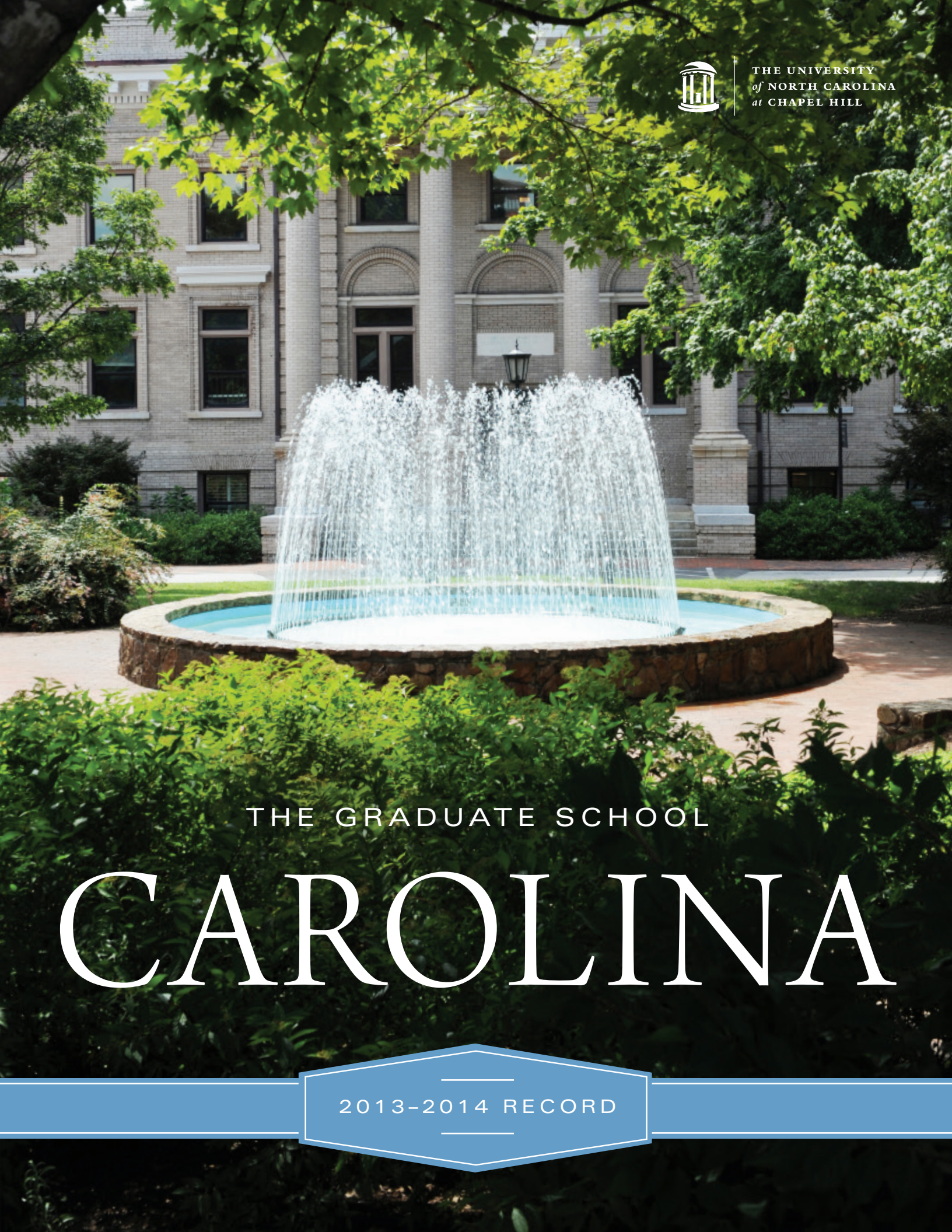

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

THE GRADUATE SCHOOL

CAROLINA

2013–2014 RECORD

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PUBLISHED BY THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL, Chapel Hill, NC

www.unc.edu/gradrecord

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The University of North Carolina at Chapel Hill is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, GA 30033-4097; telephone number [404] 679-4501) to award bachelor's, master's, doctoral, and professional degrees.

Cover photo by Dan Sears.

THE GRADUATE SCHOOL

Graduate Record of The University of North Carolina at Chapel Hill 2013–2014

www.unc.edu/gradrecord

UNC's Commitment to Diversity and Inclusivity

UNC–Chapel Hill has a long-held tradition of striving for excellence. Quality education takes place among persons with differing social backgrounds, economic circumstances, personal characteristics, philosophical outlooks, life experiences, perspectives, beliefs, and expectations. We at the University acknowledge that we face ongoing challenges to overcome the effects and influences of adverse historical, social, political, and economic factors. A critical element for any 21st-century educational institution is a diverse and inclusive community that functions in a global context. The historical, political, economic, and educational backgrounds of the University, the state, and the nation shape our present circumstances and inform the measures we must take to accomplish our highest aspirations. The University engages in teaching, research, and service to expand and discover knowledge, promote educational enlightenment, and improve understanding. We work to assure that we have a complement of students, faculty, and staff that broadly reflects the ways in which people differ. We speak of these differences as representing "diversity."

UNC's commitment to diversity excellence began in the 1960s through the support of minority programming and continues today through the work of the Office for Diversity and Multicultural Affairs (DMA). DMA is an administrative unit in the Office of the Executive Vice Chancellor and Provost. It is lead by the associate provost for diversity and multicultural affairs, who serves as the chief diversity officer and advises the University community on diversity policies and issues. The office collaborates with University officers and campus units to identify and implement strategies and initiatives for achieving the core values with respect to diversity and the goal of increased diversity among students, staff, and faculty. The ultimate goal of both DMA and the University is building an inclusive environment that values and respects the contributions of all members of the Carolina community.

For more information about the Office for Diversity and Multicultural Affairs, see www.unc.edu/diversity.

For information about Graduate School diversity matters, see gradschool.unc.edu/diversity or contact Roy Charles, Director of Diversity, Recruitment, and Retention, UNC–Chapel Hill Graduate Student Center, 211A W. Cameron Avenue, Campus Box 4010, Chapel Hill, NC 27599-4010. Phone: (919) 966-2613; e-mail: rac@email.unc.edu.

Summary of the University's Policy on Prohibited Harassment, Including Sexual Misconduct, and Discrimination, and the Policy Statement on Nondiscrimination

The University's Policy on Prohibited Harassment, Including Sexual Misconduct, and Discrimination (campusconversation.web.unc.edu/policy) prohibits discrimination or harassment on the basis of an individual's race, color, gender, national origin, age, religion, creed, genetic information, disability, veteran's status, sexual orientation, gender identity, or gender expression. Appendices B and C of this policy provide specific information for students who believe that they have experienced sexual misconduct or have been harassed or have been discriminated against on the basis of one or more of these protected classifications.

Students who want additional information regarding the University's process for investigating allegations of harassment, including sexual misconduct, or discrimination, should contact the Equal Opportunity/ADA Office or the student complaint coordinator in the Office of the Dean of Students for assistance:

Equal Opportunity/ADA Office
100 E. Franklin Street, Unit 110
Campus Box 9160
Chapel Hill, NC 27599-9160
Telephone: (919) 966-3576
Fax: (919) 962-2562
E-mail: equalopportunity@unc.edu

Office of the Dean of Students
Student and Academic Services Building North
450 Ridge Road
Campus Box 5100
Chapel Hill, NC 27599
Telephone: (919) 966-4042
Fax: (919) 843-9778
E-mail: dos@unc.edu

Any administrator or supervisor, including a department chair, associate dean or other administrator, who receives a student's complaint about prohibited harassment or discrimination must notify the Equal Opportunity/ADA Office within five (5) calendar days of receiving the complaint. If a student raises a claim of prohibited harassment or discrimination during an academic appeal, an investigation of the student's claim must be performed under the direction of the Equal Opportunity/ADA Office. The school or department must await the results of the harassment or discrimination investigation before deciding the student's academic appeal.

Policy Statement on Nondiscrimination

The University is committed to providing an inclusive and welcoming environment for all members of our community and to ensuring that educational and employment decisions are based on individuals' abilities and qualifications. Consistent with this principle and applicable laws, it is therefore the University's policy not to discriminate in offering access to its educational programs and activities or with respect to employment terms and conditions on the basis of race, color, gender, national origin, age, religion, creed, genetic information, disability, veteran's status, sexual orientation, gender identity, or gender expression. Such a policy ensures that only relevant factors are considered and that equitable and consistent standards of conduct and performance are applied. Copies of the University's EPA and SPA Equal Opportunity Plans are available on the University's Web site at equalopportunity-ada.unc.edu/index.htm.

Any inquiries regarding the University's nondiscrimination policies should be brought to the attention of one of the following administrators, as noted:*

Discrimination in employment or educational programs and activities:

Equal Opportunity/ADA Office
100 E. Franklin Street, Unit 110
Campus Box 9160
Chapel Hill, NC 27599
Telephone: (919) 966-3576
Fax: (919) 962-2562
E-mail: equalopportunity@unc.edu

Discrimination in employment:

Vice Chancellor for Human Resources
300 South Building
Campus Box 1000
Chapel Hill, NC 27599-3000
Telephone: (919) 962-1554

Academic Personnel Office
218 South Building
Campus Box 8000
Chapel Hill, NC 27599-8000
Telephone: (919) 843-6056

Sex discrimination in educational programs and activities:

University Title IX Officer
100 E. Franklin Street, Unit 110
Campus Box 9160
Chapel Hill, NC 27599-9160
Telephone: (919) 966-3576
Fax: (919) 962-2562
E-mail: equalopportunity@unc.edu

Deputy Title IX Officer
Office of the Dean of Students
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5100, Chapel Hill, NC 27599
Telephone: (919) 966-4042
Fax: (919) 843-9778
E-mail: dos@unc.edu

The University's Office of Counseling and Psychological Services ([919] 966-3658) is available to provide confidential assistance to students. The University's Ombuds Office ([919] 843-8204) is available to provide confidential assistance to employees.

* The University's policy prohibiting discrimination on the basis of sexual orientation, gender expression, and gender identity does not apply to the University's relationships with outside organizations, including the federal government, the military, ROTC, and private employers.

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To Graduate Students and Prospective Graduate Students

The University of North Carolina at Chapel Hill is one of the leading graduate research universities in the United States. As one of the most comprehensive universities in the nation, Carolina provides a breadth of study and interdisciplinary experience matched by few institutions. More than 80 graduate programs, including both doctoral-level and master's-level training, are currently active in The Graduate School.

This catalog provides basic information about these programs. It includes our admission standards and requirements, tuition and other costs, sources of financial aid (including fellowships), information concerning research institutes and centers, and brief descriptions of programs and courses. In addition, you will find under each program description a listing of all graduate faculty in that area together with their specific research interests. Please visit The Graduate School Web site, gradschool.unc.edu, for further information on many of these topics.

The University of North Carolina at Chapel Hill believes that academic excellence is enhanced by the maintenance of a community that includes people from a wide range of ethnic, racial, socio-economic, and geographic backgrounds, as well as individuals whose personal attributes will contribute to a richer learning environment. The University is committed to equality of educational opportunity.

In addition to our outstanding faculty, our comprehensive research and library resources and our exceptional facilities, the University has a warm and collegial spirit that is conducive to personal growth and scholarship.

By attending this institution you are becoming an important part of a 200-year-long tradition of excellence in scholarship, research, teaching, and public service. We hope that your time here is fruitful, challenging, and rewarding.

The Graduate School

Academic Calendar

University Registrar Calendars can be obtained on the Registrar's Web site: registrar.unc.edu.

Mission Statement: The University of North Carolina at Chapel Hill

The University of North Carolina at Chapel Hill, the nation's first public university, serves North Carolina, the United States, and the world through teaching, research, and public service. We embrace an unwavering commitment to excellence as one of the world's great research universities.

Our mission is to serve as a center for research, scholarship, and creativity and to teach a diverse community of undergraduate, graduate, and professional students to become the next generation of leaders. Through the efforts of our exceptional faculty and staff, and with generous support from North Carolina's citizens, we invest our knowledge and resources to enhance access to learning and to foster the success and prosperity of each rising generation. We also extend knowledge-based services and other resources of the University to the citizens of North Carolina and their institutions to enhance the quality of life for all people in the State.

With *lux, libertas*—light and liberty—as its founding principles, the University has charted a bold course of leading change to improve society and to help solve the world's greatest problems.

(Approved by the UNC Board of Governors, November 2009)

The UNC System History of the University

In North Carolina all the public educational institutions that grant baccalaureate degrees are part of the University of North Carolina. The University of North Carolina at Chapel Hill is one of the constituent institutions of the multicampus state university.

The University of North Carolina, chartered by the North Carolina General Assembly in 1789, was the first public university in the United States to open its doors and the only one to graduate students in the 18th century. The first class was admitted in Chapel Hill in 1795. For the next 136 years the only campus of the University of North Carolina was at Chapel Hill.

In 1877 the North Carolina General Assembly began sponsoring additional institutions of higher education, diverse in origin and purpose. Five were historically black institutions, and another was founded to educate Native Americans. Several were created to prepare teachers for the public schools. Others had a technological emphasis. One is a training school for performing artists.

In 1931 the North Carolina General Assembly redefined the University of North Carolina to include three state-supported institutions: the campus at Chapel Hill (now the University of North Carolina at Chapel Hill), North Carolina State College of Agriculture and Engineering at Raleigh (now North Carolina State University at Raleigh) and the North Carolina College for Women (Woman's College) at Greensboro (now the University of North Carolina at Greensboro). The new multicampus University operated with one board of trustees and one president. By 1969 three additional campuses had joined the University through legislative action: the University of North Carolina at Charlotte, the University of North Carolina at Asheville, and the University of North Carolina at Wilmington.

In 1971 the General Assembly passed legislation bringing into the University of North Carolina the state's 10 remaining public senior institutions, each of which had until then been legally separate: Appalachian State University, East Carolina University, Elizabeth City State University, Fayetteville State University, North Carolina Agricultural and Technical State University, North Carolina Central University, North Carolina School of the Arts, Pembroke State University, Western Carolina University, and Winston-Salem State University. This action created a 16-campus University. In l985 the North Carolina School of Science and Mathematics, a residential high school for gifted students, was declared an affiliated school of the University, and it recently became the 17th constituent institution.

The UNC Board of Governors is the policy-making body legally charged with "the general determination, control, supervision, management and governance of all affairs of the constituent institutions." It elects the president, who administers the University. The 32 voting members of the board are elected by the North Carolina General Assembly for four-year terms. Former board chairs and board members who are former governors of North Carolina may continue to serve for limited periods as nonvoting members emeriti. The president of the UNC Association of Student Governments, or that student's designee, is also a nonvoting member.

Each of the 17 institutions is headed by a chancellor, who is chosen by the Board of Governors on the president's nomination and is responsible to the president. Each institution has a board of trustees, consisting of eight members elected by the Board of Governors, four appointed by the governor, and the president of the student body, who serves ex officio. (The North Carolina School of the Arts has two additional ex officio members.) Each board of trustees holds extensive powers over academic and other operations of its institution on delegation from the Board of Governors.

The University of North Carolina: Constituent Institutions

Universities

Appalachian State University
www.appstate.edu

East Carolina University
www.ecu.edu

Elizabeth City State University
www.ecsu.edu

Fayetteville State University
www.uncfsu.edu

North Carolina Agricultural and Technological State University
www.ncat.edu

North Carolina Central University
www.nccu.edu

North Carolina School of the Arts
www.ncarts.edu

North Carolina State University
www.ncsu.edu

University of North Carolina at Asheville
www.unca.edu

University of North Carolina at Chapel Hill
www.unc.edu

University of North Carolina at Charlotte
www.uncc.edu

University of North Carolina at Greensboro
www.uncg.edu

University of North Carolina at Pembroke
www.uncp.edu

University of North Carolina at Wilmington
www.uncwil.edu

Western Carolina University
www.wcu.edu

Winston-Salem State University
www.wssu.edu

High School

North Carolina School of Science and Mathematics
www.ncssm.edu

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The University of North Carolina

www.northcarolina.edu/bog/members.htm

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The University of North Carolina General Administration

www.northcarolina.edu/bog/members.htm

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www.unc.edu/depts/trustees

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Matthew S. Brody, M.S., *Associate Vice Chancellor, Human Resources*

Information Technology Services
Chris Kielt, M.A., *Vice Chancellor and Chief Information Officer*
Ramon Padilla Jr., M.B.A., *Associate Vice Chancellor; Deputy Chief Information Officer; Interim Information Security Officer*

Medical Affairs
William Roper, M.D., *Vice Chancellor, Medical Affairs; CEO, UNC Health Care System; Dean, School of Medicine*

Research and Economic Development
Barbara Entwisle, Ph.D., *Vice Chancellor, Research*
Robert P. Lowman, Ph.D., *Associate Vice Chancellor, Research*
Robin L. Cyr, *Associate Vice Chancellor, Research; Director, Office of Sponsored Research*
Andrew S. Johns, *Associate Vice Chancellor, Research*
Don Hobart, *Associate Vice Chancellor, Research*

Student Affairs
Winston B. Crisp, J.D., *Vice Chancellor, Student Affairs*
Christopher Payne, Ph.D., *Associate Vice Chancellor, Student Affairs*
Bettina Shuford, Ph.D., *Associate Vice Chancellor, Student Affairs*

University Advancement
Julia Sprunt Grumbles, B.A., *Interim Vice Chancellor, University Advancement*
Vacant, *Senior Associate Vice Chancellor, Development*
Michael B. McFarland, M.A., *Interim Associate Vice Chancellor, University Relations*

University Counsel
Leslie Chambers Strohm, J.D., *Vice Chancellor and General Counsel*
Patricia C. Crawford, J.D., *Associate Vice Chancellor and Deputy General Counsel*
David M. Parker, J.D., *Associate Vice Chancellor and Deputy General Counsel*

Athletics
Lawrence R. "Bubba" Cunningham, M.B.A., *Director, Athletics*

The UNC System: UNC–Chapel Hill Administrative Board of the Graduate School

John Bane, Ph.D.
Professor of Marine Sciences (2015)

John Bowles, Ph.D.
Associate Professor of Art (2014)

Marila Cordeiro-Stone, Ph.D.
Professor of Toxicology and Pathology (2014)

Betsy Crais, Ph.D.
Professor of Allied Health Sciences (2015)

Jennifer D'Auria, Ph.D.
Associate Professor of Nursing (2015)

Deb Eaker-Rich, Ph.D.
Clinical Assistant Professor of Education (2016)

Michel Gagne, Ph.D.
Professor of Chemistry (2014)

Rhonda Gibson, Ph.D.
Professor of Journalism and Mass Communication (2015)

Stephanie Haas, Ph.D.
Professor of Information and Library Science (2016)

Carolyn Halpern, Ph.D.
Professor of Maternal and Child Health (2014)

Wayne Landsman, Ph.D.
Professor of Business Administration (2015)

Jessica Lee, Ph.D.
Professor of Dentistry (2015)

Noreen McDonald, Ph.D.
Associate Professor of City & Regional Planning (2014)

Rebecca Macy, Ph.D.
Associate Professor of Social Work (2014)

Graeme Robertson, Ph.D.
Associate Professor of Political Science (2016)

Edgar Shields, Ph.D.
Associate Professor of Exercise and Sport Science (2014)

Scott Singleton, Ph.D.
Associate Professor of Pharmaceutical Sciences (2016)

Mark Sorensen, Ph.D.
Associate Professor of Anthropology (2014)

Carl Stenberg, Ph.D.
Professor of Public Administration (2016)

Randall Styers, Ph.D.
Associate Professor of Religious Studies (2014)

Beverly Taylor, Ph.D.
Professor of English (2014)

Student Representative

Julie Lauffenburger
Graduate and Professional Student Federation

The Graduate School

Steven W. Matson, Ph.D.
Dean

Sandra H. Hoeflich, Ph.D.
Associate Dean for Interdisciplinary Education, Fellowships and Communication

Stephanie Schmitt, Ph.D.
Associate Dean for Academics

Leslie Lerea, Ph.D.
Associate Dean for Student Affairs

The UNC System: UNC–Chapel Hill Staff of the Graduate School

Roy Anthony Charles
Director of Diversity, Recruitment, and Retention

Pam Dixon
Office Manager

Pam Frome
Research Associate for Graduate Education Studies

Chris Harris
Admissions and Enrolled Students Specialist

Betty Haggerty
Admissions and Enrolled Students Specialist

Sandra Hoeflich
Associate Dean for Interdisciplinary Education, Fellowships and Communication

Valerie Hudock
Admissions and Enrolled Students Specialist

Mary Anne Larson
Director, Office of Development

Melissa Lawrence
Admissions and Enrolled Students Specialist

Leslie Lerea
Associate Dean for Student Affairs

Faye Lewis
Dean's Assistant/Special Project Coordinator

Jenny Lewis
Admissions and Enrolled Students Specialist

Steven Matson
Dean

Vacant
Director, Admissions and Enrolled Students

Julie Montaigne
Fellowship and Funding Manager

Jennifer Olson
Fellowship Programs Assistant

Lou Anne Phelps
Program Review and Student Services Coordinator

Sylvia Roberson
Admissions and Enrolled Students Specialist

Bryan Rybarczyk
Director, Graduate Student Academic and Professional Development

Deb Saine
Communications and Interdisciplinary Programs Manager

Stephanie Schmitt
Associate Dean for Academics

Medelia Stambach
Financial Manager

Rachell Underhill
Web and Information Manager

Beverly Wyrick
Director of Finance and Administration

UNC–Chapel Hill General Information

History

The University of North Carolina at Chapel Hill was the first state university to admit students. It was chartered in 1789 and formally opened in 1795; from early in its history, it has encouraged research and creative activity.

As early as 1853–1854 the catalog of the University carried an announcement of graduate course work. In 1876, after the institution had been closed for the period 1871–1875, the catalog announced the requirements for the master's degree, and the next issue carried an announcement of regulations governing the degrees of master of arts, master of science and doctor of philosophy. Several graduate degrees were awarded before the turn of the century (the first degree of doctor of philosophy being conferred in 1883), but it was not until 1903 that a separate graduate school with a dean was established.

The Graduate School celebrated its 100th year in 2003 by hosting a national forum on graduate education, numerous student and alumni recognition ceremonies, and by commissioning the book *Pioneer to Powerhouse: The History of Graduate Education at Carolina.*

In 1922, the graduate faculty voted, first, to vest in the Administrative Board of The Graduate School legislative powers in matters that affected graduate education; second, to authorize the Administrative Board to admit members to the teaching faculty of The Graduate School; and, third, to vest in the Administrative Board the responsibility for authorizing curricula and courses carrying graduate credit.

With the exception of the master of business administration (MBA), the master of accounting (MAC), the master's in clinical laboratory science (MCLS), the master's in radiologic science (MRS), the master of law (LLM), the master of education for experienced teachers (MED), and the master of school administration (MSA), all master's degrees offered by the University and the degrees of doctor of philosophy, doctor of education (post-2011), and doctor of public health are conferred by The Graduate School.

Work toward advanced degrees at the University of North Carolina at Chapel Hill proceeds under policies and regulations established by the graduate faculty. The immediate direction of The Graduate School is in the charge of the Administrative Board, of which the dean is chair. At present, the board consists of academic and health affairs faculty representatives appointed by the chancellor upon nomination by the dean of The Graduate School.

Summer School

The University of North Carolina at Chapel Hill established what was possibly the first summer school in America in 1877. The "Summer Normal School," as it was then called, enrolled 235 students in courses over ten disciplines. About half the students were teachers; students came from 42 counties across North Carolina and from neighboring states. Summer School was the first school at UNC-Chapel Hill to enroll women, beginning in its first year and continuing thereafter. By 1925, records indicate that 19,983 students had enrolled in Summer School.

Curricula and courses that are offered during Summer School are comparable to those of the fall and spring semesters. Summer School offers two sessions of five weeks each, a three-week Maymester, and other short courses with various beginning and ending dates. The summer program is planned to meet the needs of graduate students who are fulfilling degree requirements in this institution, visiting graduate students who desire to take courses for transfer to other institutions, teachers and administrators who desire to meet state certification requirements, and other students who have special educational objectives.

Graduate students who wish to be admitted or readmitted for the summer to a degree program should contact The Graduate School. The requirements for admission to a degree program starting in the summer are the same as those in the regular academic year. Those who desire other information or those wanting to enroll in the summer as visiting students should visit Summer School's website at summer.unc.edu, or contact Summer School via email at summer_school@unc.edu. Summer School is located at 134 East Franklin Street, Room 200, Chapel Hill, NC 27599-3340, or telephone (919) 966-4364.

Visiting Scholars

Registration as a visiting scholar at the University of North Carolina at Chapel Hill entitles the registrant to certain privileges of the University, the issuance of a UNC One Card and the use of University facilities for the duration of the visiting scholar's stay.

Eligibility for registration as a visiting scholar is limited to those who (1) are not on the University payroll as employees in any capacity, and (2) are visiting the University under the sponsorship of an academic department or school for the furtherance of scholarly interests. Visiting Scholars may include faculty members on leave from other institutions of higher learning, postdoctoral fellows or others who hold the terminal degree in their fields and are invited to visit by a department or school.

Persons interested in applying for visiting scholars status should communicate with the appropriate department or school within the University. Further details concerning University privileges for visiting scholars are available from the EPA/Faculty Benefits Office, CB# 1045, 725 Martin Luther King Jr. Boulevard, Chapel Hill, NC 27599-1045.

The University Year

Two semesters of approximately 17 weeks each and a summer school consisting of two sessions (each five and one-half weeks long) constitute the University year. The requirements for admission to graduate programs and for graduate degrees in the summer session are the same as those in the regular academic year. For the schedule of events of particular interest to graduate students, consult the academic calendars at the Office of the University Registrar (registrar.unc.edu).

Admissions and Financial Information

Admissions Information

Welcome. We are pleased that you are considering applying for admission to the UNC–Chapel Hill Graduate School. Admission to Graduate School academic programs is competitive and students are selected on the basis of their academic preparation, ability, and program fit. For some programs, an on-site pre-admissions interview may be required. Early contact with your program of interest can be helpful in preparing your application.

For the most updated admissions information, please check our Web site at gradschool.unc.edu/admissions. Due to final changes in each year's admission process, the Web site will often be more updated than this publication, so we encourage prospective students to begin there.

The Graduate School relies mainly on e-mail to communicate with all applicants. Therefore, please include a current e-mail address on your application and be sure to promptly respond to all correspondence.

Required Application Materials

Required materials for all applicants include:

- Graduate School online application (app.applyyourself.com/?id=unc-ch)
- Application fee (gradschool.unc.edu/admissions/instructions.html#fee)
- Transcripts (gradschool.unc.edu/admissions/instructions.html#transcript)
- Current letters of recommendation (gradschool.unc.edu/admissions/instructions.html#ltrs)
- Standardized test scores (gradschool.unc.edu/admissions/instructions.html#tests)
- Statement of purpose (gradschool.unc.edu/admissions/instructions.html#purpose)
- Resume/CV (gradschool.unc.edu/admissions/instructions.html#resume)
- Supplemental information (any additional information or materials required by the program)

For international applicants only:

- TOEFL or IELTS score (gradschool.unc.edu/admissions/instructions.html#toefl)
- Financial Certification (gradschool.unc.edu/admissions/instructions.html#fincert)

Once we have received all required application materials and fees, the review and evaluation of your application will begin. While the recommendations and test scores will likely arrive at The Graduate School at different times, it is your responsibility to make sure the online application is submitted and paid prior to the program's posted deadline.

Minimum Graduate Admission Requirements

The minimum requirements for admission to a graduate program are:

- A bachelor's degree (based on a four-year curriculum) completed before graduate study begins or its international equivalent with an accredited institution
- An average grade of B (cumulative GPA 3.0) or better

Along with these minimal requirements, admission decisions are based on a number of factors, including academic degrees and record, written statement of purpose, letters of recommendation, test scores, and relevant work and research experience. All admission recommendations are made by each individual program or department.

Application Process

Applications for admission to the UNC–Chapel Hill Graduate School are submitted via the online admission application (https://app.applyyourself.com/?id=unc-ch). All required materials listed above should be submitted according to the instructions provided. Your application will not be reviewed until the application is submitted and the application fee is received. By submitting an application to UNC–Chapel Hill, consent is granted to university staff to obtain any additional or missing information as needed, including campus safety information.

Application Deadlines

Please be aware that each program has a specific application deadline. Most programs admit students for the fall semester only, however a few programs allow spring or summer session admissions. Please see the listing of graduate programs and their application deadlines (gradschool.unc.edu/academics/degreeprograms/) for accepted terms of entry.

Each offered admission is specific for the term stated in the admission letter. If you do not register for classes or complete your first semester, you must apply again in a subsequent semester. Contact your intended program for questions about deferrals of admission offers.

Completed applications and application fees (non-refundable) must be submitted before the program's application deadline. Applications will not be accepted for review or consideration after the posted graduate program deadline has passed. International applicants should apply early in order to allow sufficient time for financial and visa document preparation. The Graduate School recommends that international applicants submit a complete application no later than December 1.

Fellowship and Financial Aid Deadlines

Most of the financial support available to graduate students is based within individual programs. In addition, a limited amount of financial support is available from The Graduate School and is based upon nominations from individual programs. In order to allow sufficient time for your program to nominate you for Graduate School fellowships, your application should be received before December 17.

If your program continues to accept applications after December 17, you are still eligible for their program-based support. Contact your intended program for complete information about available graduate student financial support and relevant deadlines.

The University awards loans and Tuition Enhancement Grants to graduate students who qualify, based on information provided in the FAFSA (Free Application for Federal Student Aid) (www.fafsa.ed.gov)

form due March 1. For more information, please visit the Office of Scholarships and Student Aid (studentaid.unc.edu).

Campus Safety Information
Applicants for admission will be asked several questions regarding criminal pleas, charges and convictions, academic suspensions, and military discharges. If additional information is needed, you may be asked to submit information for a criminal background check, including a nominal fee. You must describe violations of law in your home country and in any other country in which you have resided. The term "law" includes codes, legal rules and regulations, and other criminal-type statutes or violations of municipal, local, provincial, state, federal, national, commonwealth, and other governmental jurisdiction. Failure to provide complete, accurate, and truthful information will be grounds to deny or withdraw your admission, or to dismiss you after enrollment. The same actions will occur if you fail to notify The Graduate School promptly in writing of such charges that occur at any time after you submit the application.

For any additional questions, please review our Admissions Office contacts (gradschool.unc.edu/admissions/contacts.html).

Funding Opportunities

The Graduate School offers a variety of funding opportunities to assist graduate students in funding their graduate programs from admission through graduation. The Graduate School provides information and support to students applying for external fellowships, as well as providing fellowships and other direct financial support to graduate students, which supplements what the individual department provides. For updated information, please see our Funding Resources Web site (gradschool.unc.edu/funding).

Graduate Tuition Incentive Scholarship: Helps cover the remaining cost of in-state tuition for graduate students who are receiving external funding awards in support of their thesis or dissertation research (gradschool.unc.edu/funding/gradschool/gtis.html)

Graduate Student Opportunity Fund: Assists students with small, non-recurring, unusual and unexpected academic expenses (gradschool.unc.edu/funding/gradschool/opportunityfund.html)

Graduate Student Transportation Grant: Assists students with some of the transportation costs necessary for travel to a regional, national or international academic conference or professional society meeting to present their dissertation research (gradschool.unc.edu/funding/gradschool/transportationgrant.html)

The Graduate Funding Information Center is a resource for graduate students seeking information on funding sources for independent research, collaborative projects, fellowships, program development and other scholarly activities. For more information, please visit their Web site (gradfunding.web.unc.edu).

Questions?
Contact the Fellowships Office at gradfunding@unc.edu.

To receive alerts when funding opportunities are posted, subscribe to the Graduate School Funding Listserv (gradschool.unc.edu/funding/listserv.html).

Departmental Awards

Teaching and Research Assistantships
The majority of assistantships available to graduate students are awarded by academic departments. Approximately 2,500 graduate, research, and teaching assistantships are available through specific departments. Graduate assistantships are also available through the University's various research institutes and centers. Stipends, responsibilities, selection criteria, and application and notification procedures vary from department to department. Applicants should discuss with the program to which they are applying (see gradschool.unc.edu/programs/degreeprograms.html) the specific funding opportunities available through graduate programs.

Federal/State Fellowships and Traineeships
A number of state and federally funded fellowships and traineeships are also available in some departments. Students must be pursuing graduate training in specified fields of study to be eligible for these awards. Interested students should request additional information from their academic departments.

Application Deadline
Prospective students may indicate when applying for admission their interest in an assistantship and should discuss application deadlines with their prospective departments.

Questions
Contact the department to which you are applying (see gradschool.unc.edu/programs/degreeprograms.html).

Financial Aid

The Office of Scholarships and Student Aid works with graduate students who need financial aid to meet the costs of attending the University. Financial support may be available through small grants, from federal or private lender loan programs, and from the federal work-study program, in the form of either hourly paid campus jobs or teaching/research assistantships.

To be eligible for financial aid programs administered by the Office of Scholarships and Student Aid, a student must be enrolled in a degree program on at least a half-time basis, a United States citizen or permanent resident, making satisfactory progress toward completion of the academic program, and, if applicable, registered for Selective Service. The student may not be in default on a loan previously received for college expenses nor owe a refund on a scholarship, grant, or loan from a previous enrollment period.

Graduate students who wish to apply for financial aid to meet the costs of attending the University must complete the Free Application for Federal Student Aid (FAFSA). The application should be completed online at www.fafsa.ed.gov. However, a paper application may be obtained from high schools, most college financial aid offices or in person at the Office of Scholarships and Student Aid. In completing the FAFSA, the student must list UNC–Chapel Hill (code number 002974) as one of the schools to receive the FAFSA information. The information on the FAFSA will be analyzed by an agency contracted by the federal government. The agency will send information and an analysis of the student's eligibility for financial aid funds to both the student and to the Office of Scholarships and Student Aid.

A student should not wait for admission to a graduate program before applying for aid. An applicant should submit the FAFSA by February 15. If additional documentation is needed to complete a student's application for financial assistance, the Office of Scholarships and Student Aid will notify the student. A student who completes the file promptly can expect to receive notice of an award decision early in June.

Student Affairs Information

Students are at the center of the learning community at the University of North Carolina at Chapel Hill. To ensure a successful learning experience, graduate and professional students are encouraged to take advantage of a variety of programs and services offered by the University through Student Affairs, The Graduate School, and individual schools and departments. Student Affairs oversees services intended for the entire University student community, and offers programs designed primarily for undergraduate students. The Graduate School, on its own and in conjunction with various Student Affairs offices, offers programs and services intended to specifically address the needs of graduate and professional students.

The Graduate School

The Graduate School is committed to improving and facilitating the integration of graduate and professional students' academic, professional, and personal development, as well as to assist students to make the most of their Carolina experience. To further these aims, staff in The Graduate School are responsible for assisting students in a number of capacities. The offices of the associate dean for student affairs and the associate dean for academics create and implement programs and services that specifically address the needs of graduate and professional students. Some of these programs are listed below. The director of diversity, recruitment, and retention develops and provides a number of programs and services throughout the year, both academic and social in nature, to assist graduate students of color with a successful transition and experience during their graduate work. The director of graduate student academic and professional development oversees workshops and events in the Graduate Student Center. Graduate School staff are available to all graduate and professional students as a source of counsel, information, and referral for questions involving student services, academic procedures, policies, and grievances.
Telephone: (919) 966-2611
Web: gradschool.unc.edu

Graduate School Handbook

The *Graduate School Handbook* contains most of the policies and procedures of The Graduate School at the University of North Carolina at Chapel Hill. Students should become familiar with the material pertaining to their degree programs, and, together with their faculty advisors, make certain that the chosen program of study complies with all policies. The *Handbook* may be viewed or downloaded from the Graduate School Web site: handbook.unc.edu.

Policies and Guidelines for a Cooperative Learning Environment

Teaching and learning occur simultaneously through a partnership between instructor and student. Instructors share knowledge, experience and ideas with their students. Students process these thoughts, generate new ones and share them with their teachers. In most cases, students and instructors communicate clearly and effectively. However, misunderstandings do occur. In an attempt to foster a positive academic environment, the Faculty Council, upon recommendation of the Educational Policy Committee, establishes these policies and guidelines.

The Faculty Council resolves:
Part I. Policies
Section 1.
The Faculty Council recognizes and affirms the following policies. This recognition is not to be interpreted as precluding modification of any policy by the appropriate authority.

The Honor Code. The faculty should inform students of the provisions of the honor code and be aware of their own responsibilities specified in the honor code. Faculty responsibilities are stated in the Instrument of Student Judicial Governance.

Student Grievance Procedures. According to UNC–Chapel Hill Student Grievance Committee procedures, students may file a grievance against a UNC–Chapel Hill employee, EPA non-faculty employee, staff employee, or student employee (when acting in the role of employee) when there is a violation of one of the following:

A. The UNC-Chapel Hill Sexual Harassment Policy

B. The UNC-Chapel Hill Racial Harassment Policy

C. The UNC–Chapel Hill Policy on Sexual Orientation

D. The Americans with Disabilities Act

E. Title IX, which prohibits exclusion from participation on the basis of sex

F. Section 504 of the Rehabilitation Act of 1973, which outlaws discrimination on the basis of a handicap or

G. The Family Educational Rights and Privacy Act, which allows students to challenge the content of their educational records.

Copies of these can be obtained from the Office of the Dean of Students. They contain information about how to file a grievance. A grievance based on incidents that occurred more than six months before the complaint was filed will not be considered.

Student Access to Academic Records—Protection Against Improper Disclosure. As stated in The Family Educational Rights and Privacy Act of 1974, students may have access to their full academic records. Individuals who are, or have been, in attendance at UNC–Chapel Hill may inspect and review their education records. Otherwise, education records are subject to confidentiality requirements as specified by law and may not be disclosed improperly. Requests for recommendations imply that the student has given consent to the disclosure of information related to ability and performance. Judgments of ability and character may be provided under appropriate circumstances, normally with the knowledge or consent of the student. "Education records" are those records directly related to a student that are maintained by an educational institution. Particular University policy provisions are found in the University of North Carolina at Chapel Hill's Policies and

Procedures under the Family Educational Rights and Privacy Act of 1974.

Appealing a Grade. The University has systems for appealing a grade. The exact procedures vary among the academic units. Students should consult with their dean or department chairperson to obtain information about grade appeal procedures.

Part II. Guidelines
Section 2.
The Faculty Council endorses the following guidelines for the faculty-student relationship. This endorsement shall not be construed as faculty legislation, is not intended to establish a contractual undertaking by the University or any individual, and shall not constitute the basis for civil action in a court or a claim in any administrative or judicial body of the University of North Carolina at Chapel Hill.

Clear Definition of Potential Honor Code Violations. In an attempt to avoid unintended misunderstanding, instructors should clearly state what is acceptable in their class. When study aids such as computers are allowed, the instructor is responsible for explaining what constitutes proper use of these items. These rules should be established at the beginning of the course and should not be changed without giving students proper notice.

Assignment of Graded Work during the Last Week of the Semester. Instructors may not assign graded work during the last week of classes unless the course syllabus clearly states that such an assignment will be given.

Suggested Classroom Procedures. In general, instructors are strongly encouraged to follow the guidelines for course design and classroom procedures recommended by the Center for Faculty Excellence. When students enter into a learning relationship, they have certain needs and expectations. They are entitled to information about course procedures, content and goals. Instructors should provide a syllabus that describes the course and methods of evaluation. Particular attention should be paid to several areas of special concern to students, including provision of reserve readings and grading policy.

Evaluated assignments should be returned to the students within a reasonable amount of time. Since part of the purpose of such assignments is to provide feedback, students should be given time to assess and to learn from their mistakes. Ideally, such assessment would take place while the relevant topics are still fresh in their minds.

Extra credit, if offered, should be announced publicly and made available to the entire class.

Students Should Have Freedom of Expression. Students should be free to take reasoned exception to the data or views offered in any course of study. They are responsible, however, for learning the content of any course of study for which they are enrolled. Incorrect facts and poorly supported arguments or opinions inevitably have an impact on grades. Nothing herein shall be construed to limit the freedom of the faculty to assign grades according to appropriate academic standards.

Responsibilities of Students and Teachers. Just as students ought to expect instructors who are knowledgeable and well prepared, so should teachers expect their students to be motivated, eager to learn and actively engaged in class. It is the responsibility of teachers to make their courses serious intellectual experiences for themselves and for their students. It is the responsibility of students to take seriously the courses in which they enroll. Good teachers need good learners.

Students should understand that they are members of a community of scholars, and membership in such a community is not a passive activity. To be full participants in the educational community and to maximize the educational value of a class, pre-class preparation is necessary. Proper class preparation involves obtaining course materials as they are needed and completing assignments as they are due. Full participation in a class requires regular attendance, arriving on time and remaining until class conclusion, and active involvement in the work of the class.

Students should also consider the extent of their own involvement in a class in assessing the educational value of a class.

Grade Appeals
The procedure for grade appeals can be found in the *Graduate School Handbook*. Any questions regarding the grade appeals process should be directed to The Graduate School.

Web: handbook.unc.edu/grading.html

Orientation
The Graduate School sponsors a University-wide orientation program for new graduate and professional students to (1) acclimate them to the University community and (2) provide information sessions on a range of topics relevant to graduate students such as broad campus resources, campus health facilities, Graduate and Professional Student Federation, and getting to know the local area. Important reference materials and guides to the campus and Chapel Hill/Carrboro area community resources are available to students on the Graduate School Web site: gradschool.unc.edu. These resources include the *Graduate School Handbook, Academic Integrity and Ethics, A Guide to Theses and Dissertations,* copies of University policies, and other helpful campus and community publications that are intended to be used throughout the students' graduate careers. As orientation is a continuous process throughout a student's first year, The Graduate School schedules a number of orientation workshops throughout the academic year on a variety of issues related to graduate students such as residency for tuition purposes, funding, and networking.

In addition to the Graduate School orientation, individual graduate and professional programs conduct department-based orientations for new students. Information regarding departmental orientations is available in the respective academic departmental offices.

Orientation and relocation information can be found on the Web site of The Graduate School at gradschool.unc.edu. The Graduate School Office, open year-round, is located on the second floor of Bynum Hall. Graduate School staff and are available to answer questions and help students find the resources they need to make the most of their Carolina experience.

Professional Development in Graduate Education
The University of North Carolina at Chapel Hill is committed to providing students with the highest quality graduate education. While this clearly entails academic training, it also includes a commitment to providing students with resources and services to enhance their graduate experience and to prepare them for their post-student careers.

The cornerstone of professional development at Carolina is a series of workshops and selected one-credit-hour courses. These workshops cover topics designed to promote graduate student academic, professional, and personal growth. Sessions are designed to provide students with the opportunity to develop five areas of professional competency: communication, leadership, teaching and instruction, professional adaptability, and self-awareness.

For more information, visit the Web site of The Graduate School at: gradprofdev.web.unc.edu/.

Graduate Student Foreign Language Proficiency Assessment

The departments of Romance Languages and Literatures, Germanic Languages and Classics offer foreign language proficiency assessments in French, German, Spanish and Latin (classical or medieval) for graduate students needing to satisfy a departmental foreign language requirement. This service is offered once each semester. The Graduate School administers registration for these assessments.

Student Affairs

Office of the Vice Chancellor for Student Affairs

The Office of the Vice Chancellor for Student Affairs coordinates the division's programs and provides guidance and leadership for its departments. The office also acts in a consulting role for faculty, administrators and students who wish to raise issues that concern the University community, with a particular focus on student needs. Members of the Office of the Vice Chancellor also serve on various University committees to represent the division's several constituencies.

Students are encouraged to explore the opportunities offered by Student Affairs throughout their University career, either directly through the respective departments, or through the Office of the Vice Chancellor.

Telephone: (919) 966-4045
Web: studentaffairs.unc.edu

Office of the Dean of Students

The Office of the Dean of Students, located on the first floor of the Student and Academic Services Building North, provides a variety of direct student services and works closely with a wide range of student programs. The Office of the Dean of Students is the contact and information point for students regarding the University's policies on racial and sexual harassment and discrimination based on sexual orientation. In addition, staff members provide counseling and general advisement to students and assist students, parents, and members of the University staff in dealing with crisis situations or other problems affecting student life. Staff members of the Office of the Dean of Students also work with programs that have a specific focus, such as the Student Activity Fund Office (SAFO). In addition to providing the administrative coordination of the student judicial system, staff members also work with leaders of a variety of extracurricular organizations.

Telephone: (919) 966-4042
Web: deanofstudents.unc.edu

Campus Y

Since its founding in 1860, the Campus Y has been a starting point for the development of many programs responding to students' concerns. The mission of the Campus Y is the pursuit of social justice through the cultivation of pluralism. In particular, the Y serves as a bridge between the University and the local community by addressing the needs of both groups. Y-sponsored committees include community outreach (such as the Big Buddy, Elderly Exchange and Tutoring programs), social issues (such as Women's Issues and Human Rights Week), global action (such as Hunger Action and the South African Scholarship Fund) and fund-raising programs (such as the Footfalls Road Race). Students can also serve on the Y Student Executive Committee, for which elections are held in the spring. All students are welcome to visit the Campus Y offices in the fully renovated historical YMCA Building to learn about volunteer service and University, local and global issues.

Telephone: (919) 962-2333
Web: campus-y.unc.edu

University Career Services

Services for graduate students provided by University Career Services (UCS) include workshops on writing résumés and curriculum vitae, interviewing and job-seeking; résumé referral to employers; individual career advising and career interest assessment; on-campus interviewing; job listings via the Web; and a reference file for students in selected curricula. Some services are limited to students who are in a UNC–Chapel Hill degree or certificate program.

Additional resources and programs include occupational and employer information, career panels, career and professional school fairs, an automated alumni network service, various employer databases, and a UCS home page on the Web.

Students in law, dentistry, and medicine and students enrolled in the M.B.A. and M.A.C. programs are served by career services in their departments, rather than by UCS.

University Career Services is located in 219 Hanes Hall. Office hours are from 8:00 a.m. to 5:00 p.m. Monday through Friday. Resource Room hours are from 8:00 a.m. to 8:00 p.m. Monday through Thursday.

Telephone: (919) 962-6507
Web: careers.unc.edu

Counseling and Psychological Services

Counseling and Psychological Services (CAPS) provides free, confidential psychological counseling to help students solve personal, academic, and career problems. CWS specializes in individual evaluations, counseling, psychotherapy, and career counseling. A variety of counseling, testing, developmental, and informational services are offered to all students. Counseling services for individuals or groups focus on academic success, including test anxiety and time management; career decisions, including selecting or changing a major and choosing a career; relationships, including loneliness, shyness, roommate conflicts, dating relationships, and family problems; and cultural issues, including cultural identity, gay and lesbian issues, racism, and women's issues. Also available are dissertation and thesis support groups; training and development programs; stress management and biofeedback; and communication skills training, including assertiveness training and guidance in how to overcome speech anxiety. CAPS is located on the third floor of the James A. Taylor Building.

Telephone: (919) 966-3658
Web: campushealth.unc.edu/caps

Accessibility Resources & Services

Accessibility Resources & Services is responsible for ensuring that programs and facilities are accessible to all members of the University community. Students with disabilities and/or medical conditions may receive accommodations and services that are designed to remove barriers, so that they may independently meet the demands of University life. Accommodations and services—which may include but are not limited to note-takers, alternative testing, accessible class materials and interpreters—are provided on an individual-needs basis. There is no charge for any accommodation or service. Students will be asked to provide documentation of the disability and/or medical condition from an appropriate primary care provider.

Telephone: (919) 962-8300 (Voice/TDD)
Web: accessibility.unc.edu

Academic Success Program for Students with LD and ADHD

The Academic Success Program for Students with LD and ADHD, formerly called Learning Disabilities Services, is the University's designated service provider to students with documented learning disabilities (LD) and attention-deficit/hyperactivity disorders (ADHD). The Academic Success Program also meets the needs of students with Acquired Brain Injury (ABI) in conjunction with Accessibility Resources and Services, , the campus office that works with students with disabilities other than LD and ADHD.

Telephone: (919) 962-7227
Web: learningcenter.unc.edu

Housing and Residential Education

The Department of University Housing and Residential Education, consistent with the academic mission of the University, endeavors to provide eligible students a supportive environment within which to live. The department maintains the physical quality and the integrity of its buildings at a level conducive to security and comfort, and does so in the belief that providing a safe and healthy living environment supports and contributes to the learning process.

The University of North Carolina at Chapel Hill follows the principle that all persons shall have equal opportunity and access to facilities in any phase of University activity without regard to handicap, sex, race, creed, color, age, sexual orientation, or national origin. Under this principle, educational, cultural, social, housing, extracurricular and employment opportunities are available on an equal basis. However, receipt of the application by and advance payment to the Department of University Housing does not guarantee admission to the University or to a residence hall. The Department of University Housing reserves the right to refuse for just cause any application for space and to return any advance payment within two weeks of receipt of the completed application. Early application is encouraged.

Telephone: (800) UNC-5502
E-mail: housing@unc.edu
Web: housing.unc.edu

Graduate Student Housing

The Department of Housing recognizes that the living needs of graduate and professional students are usually different from those of undergraduates. At Carolina, graduate and professional students can enjoy the benefits of being affordably close to classes, facilities, and events, and living in a community of fellow graduate students where the atmosphere is characterized by early quiet hours and respect for personal time and space.

Odum Village and Baity Hill Apartments are Carolina's on-campus communities for graduate students providing apartment-style housing. Odum Village is located on south campus off of Manning Drive near the medical facilities, the Dean Smith Center, and the Kenan–Flagler Business School. Its quiet yet friendly atmosphere lends itself to graduate student interests and study. The Baity Hill and Mason Farm communities serve as the Student Family Housing apartment complex for students with families. These one- and two-bedroom apartment communities are situated on rolling hills adjacent to the campus. The apartments are within walking distance of the campus and are served by campus and city bus routes. Rental costs compare favorably with similar area housing. These communities comprise nine buildings with 398 apartments.

Parking is available for graduate students on a limited basis, and a fare-free campus bus service offers several routes that connect the north, middle, and south regions of campus. Find specifications for apartments by visiting the Housing Web site at housing.unc.edu and clicking on "Apartments."

Generally, demand for on-campus housing for graduate students exceeds the supply. On-campus housing is not guaranteed for graduate students, although every effort is made to offer a space to all applicants. Returning residents have priority to re-sign up for the following academic year before spaces are offered to new graduate students. Please visit the department's Web site at housing.unc.edu for additional information.

Off-Campus Housing

Off-campus housing refers to any housing not owned and operated by the University of North Carolina at Chapel Hill. This category includes small group housing, such as fraternities and sororities, as well as apartments, houses, and rooms. Two-thirds of the University's students live in the off-campus market. Some units are furnished and within walking distance to campus. Other off-campus housing consists of large, unfurnished apartment complexes located throughout Chapel Hill and Carrboro.

Office of International Student and Scholar Services (OISSS)

The Office of International Student and Scholar Services promotes international educational exchange through its services and programs. OISSS serves as the principal administrative, programming, and advising office for approximately 2,500 international students, faculty, and administrative staff at UNC–Chapel Hill, including research scholars and visiting professors. Located in the FedEx Global Education Center, OISSS issues and helps maintain visa documentation, provides advising related to immigration matters and adjustment to life in the United States, and serves as a liaison between international students and scholars and their departments and governmental and private agencies involved in international education exchange. In addition to administrative and advising services, OISSS provides programming that helps international students and scholars maximize their experience at UNC–Chapel Hill. Programs include orientation, tax seminars, and various cultural programs. The center is a focal point for community service organizations, including the Host Family Program, Conversation Partners Program, Speakers' Bureau, and International Women's English Conversation Group. It also administers the UNC Class of '38 Summer Study Abroad Fellowships.

Campus Health Services

Campus Health Services (CHS), located next to Kenan Stadium in the James A. Taylor Building, provides a broad range of ambulatory, primary care, and prevention services. Specialty care services are also available, including orthopedics, obstetrics and gynecology, dermatology, travel information and immunization, and allergy management. For convenience, in-house laboratory, radiology, pharmacy, and physical therapy services are also available.

Any student who has paid the campus health fee for the current semester (or summer session) is eligible for health care at Campus Health Services. The fee covers the cost of most services provided by CHS professionals, including physicians, physician extenders, nurses, physical therapists, and health educators. Additional charges are made for after-hours care, drugs, and miscellaneous supplies. Laboratory and X-ray studies at CHS require a co-payment by the user. There also may be additional charges for specialty services. Spouses not enrolled in the University as students become eligible to receive the same services as students by demonstrating appropriate insurance coverage and by paying the student health fee at CHS.

Hours of operation vary according to the academic calendar. Please call to verify hours of operation Monday through Friday and on the weekends. Preferred CHS office hours are 9:00 a.m. to 4:30 p.m., Monday through Friday, when students are seen on an appointment basis. For convenience, students are encouraged to call (919) 966-2281 for an appointment. After-hours care is available from 4:30 p.m. to 11 p.m. Monday through Friday and 8:00 a.m. to 5:00 p.m. on weekends. Physician extenders are available with medical and psychiatric back up. Services are considered a premium service with a visit charge during these times. If other ancillary services are required an additional fee will apply. Major problems may be referred to the UNC Hospitals Emergency Department by the CHS staff when open, or by the HealthLink nurse (966-2281) when CHS is closed. Students should be aware that the campus health fee does not cover medical care at UNC Hospitals or other facilities. Students will be responsible for charges incurred at the UNC Hospital Emergency Department anytime that they use those services.

All students enrolled in UNC system colleges and universities, including UNC–Chapel Hill, who meet three specific criteria (enrolled in six credit hours if an undergraduate or one credit hour if a graduate student, degree-seeking, and eligible to pay the campus health fee) will be required to have health insurance coverage. Distance learning students are exempted from this requirement. For information, please review the Mandatory Health Insurance information at the UNC Campus Health Services Web site (campushealth.unc.edu).

North Carolina law mandates that all new students at the University document the completion of immunization requirements. Failure to comply results in cancellation of registration 30 days after classes begin. Vaccines are offered at Campus Health Services at reduced rates for students who need to complete their immunization requirement. For additional information on Campus Health Services, visit the CHS Web site at campushealth.unc.edu.

Carolina Union

The Carolina Union is an organization of students, professional staff, and part-time student staff who provide programs, services, and facilities for all members of the campus community. The Carolina Union contributes to the educational mission of the institution through the provision of cultural, social, educational, and entertainment programs sponsored by the Carolina Union Activities Board and the Carolina Union Performing Arts Series. The many co-curricular programs offered impact the intellectual environment of the campus and create opportunities for campus members to engage in debate, conversation, and interaction around the issues of the time.

Students play an important role in determining needs, setting programming and financing goals, and evaluating all aspects of the Union. Student employees also provide and maintain the many services offered in the Frank Porter Graham Student Union and other campus locations.

The Carolina Union Board of Directors reviews and approves Union finances, provides long-range planning for the Union, and selects the Union president from student volunteers each year. The Carolina Union Activities Board is a student organization that plans and carries out social, cultural, recreational, and educational programs for the entire student body. Programs range from informal stage performances and workshops on current issues to major speakers and popular and cultural concerts.

In addition to providing office and meeting space and services for student organizations, the Carolina Union also offers lounge space, food services, , and games for all UNC–Chapel Hill students.

Employment opportunities are available in many of the Union's service areas, such as the information desk, ticket office, and technical services. (For more information, contact the administrative office in Room 201 of the Frank Porter Graham Student Union.)

More information about the Carolina Union is available on the Web at carolinaunion.unc.edu.

Co-curricular Student Organizations

The University requires that co-curricular student organizations be officially recognized each academic year. This recognition process is designed to ensure that student organizations affiliated with the University do not discriminate on the basis of race, religion, national origin, disability, age, veteran status, sex (as defined by law), or sexual orientation. In addition, official recognition provides student groups with the following benefits: applying for use (through reservation) of specified University facilities, property, services, or equipment pursuant to the Facilities Use Policy; use of the University's name in the organization's title, so long as University sponsorship or endorsement is not implied or stated; the privilege of applying for funding from monies generated by the Student Activity Fee, which is legislatively apportioned by the Student Congress; and the assistance of University staff. Applications for official University recognition must be completed annually, in order to ensure that active students are aware of University policies and to provide staff with information concerning University-recognized student organizations.

Applications are available in Room 201 of the Frank Porter Graham Student Union Building. (Note: all information in and attached to the application is considered public information upon the granting of recognition.)

A full list of active student organizations (there are currently more than 600) is available on the Union Web site.

Student Government

The Graduate and Professional Student Federation (GPSF), the official representative of graduate and professional students at the University, is organized on the basis of school, departmental, and curricula organizations. The GPSF provides communication between graduate and professional students, represents graduate and professional students both within and outside the University community, and provides structures capable of dealing with ongoing issues and concerns. It also allocates and administers the funds appropriated to it from student fees. Every duly enrolled graduate and professional student is automatically a member of the GPSF. Web: studentorgs.unc.edu/gpsf. Graduate students, whether as a result of individual interest or because of teaching assistantships, may want to learn more about student government at Carolina. Information is available on the Web at studentorgs.unc.edu/studgov.

I. Executive Branch of Student Government

A. Officers: President; Vice President; Treasurer; Secretary; Executive Assistants; Elections Board Chair

B. Current committees that address various areas of student concern: Academic Affairs; External Relations; Human Relations; Info-Tech; Public Service; Student Services

II. Judicial Branch of Student Government

Student Courts (both Undergraduate and Graduate). These bodies maintain original jurisdiction with respect to all violations of the Code of Student Conduct.

Student Attorney General's Staff. The staff of the Student Attorney General investigates alleged violations of the Code of Student Conduct

and brings to trial those charges sufficiently supported by evidence. The staff also advises and assists students accused of violations.

University Hearing Board. This court has original jurisdiction in cases deemed inappropriate for hearing within another court, and appellate jurisdiction with respect to cases appealed from student courts.

III. Legislative Branch of Student Government
Student Congress. The legislative branch of the student government is unicameral (one house), consisting of 37 representatives elected by the student body, with the presidents of the student body and of the Graduate and Professional Student Federation (GPSF) serving as non-voting ex officio members. The Speaker of the Student Congress (SC) is elected from among the representatives. Graduate and professional students and on- and off-campus undergraduates are proportionally represented in the congress. Graduate and professional students represent districts composed of several schools grouped together, while undergraduates represent geographical areas.

The Student Congress handles a vast amount of legislation; one of its primary responsibilities is to appropriate student fees for recognized student organizations. Congress also approves appointments, serves as a student advocate and legislates changes to the Student Code.

The representatives are elected in the spring for one-year terms, and each member serves on one of three standing committees: Finance, Rules and Judiciary, and Student Affairs.

Other Services

Public Safety
The Office of Public Safety is located on Manning Drive on the UNC–Chapel Hill campus. Public safety administers the parking and transportation system at the University (including the issuing of parking permits) and provides for the overall safety and security of the campus. Parking permits are available for purchase on a limited basis for students. More information about parking availability can be found on the Web at www.dps.unc.edu.

UNC–Chapel Hill is committed to assisting all members of the University community in providing for their own safety and security. The University's combined Annual Security and Fire Safety Report, which is required by law, contains information regarding campus security and personal safety, including topics such as crime prevention, fire safety, University police law enforcement authority, crime reporting policies, disciplinary procedures and other matters of importance related to security and safety on campus. It also contains information about crime statistics for the three previous calendar years concerning reported crimes that occurred on campus; in certain off-campus buildings or property owned or controlled by UNC–Chapel Hill; and on public property within or immediately adjacent to and accessible from the campus.

To receive the combined Annual Security and Fire Safety Report, stop by the Department of Public Safety at the Public Safety Building, 285 Manning Drive, Chapel Hill, NC 27599 or request a mailed copy by calling (919) 962-3951. The report is also available on the Department of Public Safety Web site at www.dps.unc.edu/securityreport.

Student Dining Services
Carolina Dining Services operates 10 separate dining facilities at UNC–Chapel Hill. Meal purchases can be made with the UNC One Card using a meal plan, Dining Flex, à la carte, expense, or cash. All meal purchases made with the UNC One Card are not subject to the six percent North Carolina state sales tax on these items. Cash purchases are taxable. To find out more information about acquiring a UNC One Card, visit the One Card Office Web site at www.onecard.unc.edu.

Students can use their meal plans at several of the campus all-you-care-to-eat dining facilities. Top of Lenoir is an award-winning facility with an array of menu choices. The Rams Head Dining Hall is a 30,000 square foot state-of-the-art facility that includes several restaurants and all-you-care-to-eat venues.

Carolina Dining Services offers several meal plans that offer the convenience and value of purchasing meals on campus ahead of time. To find out more about the different meal plan options, visit the Carolina Dining Services Web site at www.dining.unc.edu.

Sonja Haynes Stone Center for Black Culture and History
The Sonja Haynes Stone Center for Black Culture and History (SHSCBCH) was founded in July 1988 and is named for Dr. Sonja Haynes Stone, a member of the UNC–Chapel Hill family for more than 17 years. The SHSCBCH opened in a new building on South Road in fall 2004 in the heart of campus, across from the Student Union and near the Bell Tower. As a center within the University's Academic Affairs Division, SHSCBCH has a central role in supporting the University's academic mission by a strong commitment to broaden the range of intellectual discourse about African Americans and to encourage better understanding of peoples of the African diaspora and their perspectives on important social and cultural issues. The center focuses its efforts on the interdisciplinary examination of Africana lives, cultures, and histories. The Stone Center works with numerous departments and units of the University to help promote interdisciplinary inquiry, as well as focused examinations from various interdisciplinary and disciplinary perspectives.

The Stone Center is a major resource of cultural, historical, and social programming for the UNC–Chapel Hill community. As a focal point for Black cultural expression, the Stone Center sponsors concerts, poetry readings, lectures, group discussions, and presentations in drama and dance. Its permanent programs include the Sonja Haynes Stone Memorial Fellowship and Lecture, the African Diaspora Lecture Series, the Cross-Cultural Communications Institute (CCCI), the Sonja Haynes Stone Collegiums, and the Visiting Scholar Program. More information about the Stone Center can be found on the Web at sonjahaynesstonectr.unc.edu.

American Indian Center
The mission of the American Indian Center is to bridge the richness of North Carolina's American Indian cultures with the strengths of Carolina s research, education and teaching. This will establish the University of North Carolina at Chapel Hill as a leading public university for American Indian scholarship and scholars and make native issues a permanent part of the intellectual life of the university. The AIC provides focused support for the recruitment and retention of American Indian graduate students, including support for the graduate student organization 'First Nations Graduate Circle;' support for intellectual activities such as Native Authors' Book Club, mentoring by the AIC Director, support for cultural seminars and events such as Elder-in-Residence, Native American Heritage Month, and related services. More information about the American Indian Center and the director can be found on the Web at americanindiancenter.unc.edu.

Academic Resources

Scholarly Journals

The University has published scholarly journals since 1884, when the *Journal of the Elisha Mitchell Scientific Society* first appeared.

The following list contains Sme of the publications currently produced by the University's graduate and professional programs.

American Diplomacy. A journal for commentary, analysis and research on American foreign policy and its practice. www.unc.edu/depts/diplomat

Annali d'Italianistica. The mission of this publication is to promote the study of Italian literature in its cultural context, to foster scholarly excellence, and to select topics of interest to a large number of Italianists. www.ibiblio.org/annali

Carolina Papers in International Health and Development. A series of UNC–Chapel Hill graduate student working papers designed to promote scholarship in the fields of health and development and to raise awareness of such issues among international studies specialists. cgi.unc.edu/initiatives/carolina-papers/international-health

Endeavors. Features outstanding research and creative work undertaken by faculty and students at the University. Distributed free, the magazine reaches 8,600 on- and off-campus readers in an effort to engage others in Carolina research. endeavors.unc.edu

North Carolina Law Review. Published by the School of Law to stimulate research and publication by faculty and students. http://www.nclawreview.org/

Studies in Romance Languages and Literatures. For 60 years, this publication has supported and disseminated scholarship in the romance literatures. www.unc.edu/~clsherma

The University of North Carolina Studies in the Germanic Languages and Literatures. An internationally renowned monograph series in the field of Germanic studies. gsll.unc.edu/

In addition, the University of North Carolina Press publishes the following journals (uncpress.unc.edu/bm-journals.html):

Social Forces, one of the best known journals in sociology and related fields.

The High School Journal, for educational practitioners and theorists nationwide.

Studies in Philology, publishing articles on British literature before 1900 and articles on relations between British literature and works in the classical, Romance, and Germanic languages.

Southeastern Geographer, publishing the academic work of geographers and other social and physical scientists since 1961.

Southern Literary Journal, premier publication devoted to the fiction, poetry, and drama of the American South.

Southern Cultures, dedicated to the exploration of what makes the South the South.

Early American Literature, journal of the Division on American Literature to 1800 of the Modern Language Association.

Appalachian Heritage, a leading literary magazine of the southern Appalachian region.

The University of North Carolina Press

The University of North Carolina Press is the primary publishing arm of the University in the scholarly field. In addition to its publication of the journals of research, it carries on a book publishing program of about 80 new titles a year. Although these books are the work of scholars from all parts of the world, the presence in the University of a professionally staffed book publishing organization, with facilities for the international distribution of works of scholarship, is a stimulus to research and writing by members of the University community. The Press' program is an important contribution to the development of that aspect of the University's service which has to do with the advancement of learning.

Web: uncpress.unc.edu/default.htm
Electronic Publications: www.ibiblio.org/uncpress/epubs.shtml

Libraries

The University Libraries
The main humanities and social sciences collections of the Academic Affairs Library are housed in the Walter Royal Davis Library. Davis Library includes more than 900 open and closed carrels for assignment to graduate students, and an additional 1,950 lounge, carrel, and table seats for general use. The building also houses group study rooms, 11 lounges, a computer lab, and a number of special study areas. All students are also welcome to use the Louis Round Wilson Library, home of the University's special collections, as well as the Robert B. House Undergraduate Library and any of the specialized departmental libraries.

The University Libraries hold over 5 million bound volumes and nearly 4.5 million microforms, constituting one of the most important collections in the South. Additional information about the libraries, as well as access to the online catalogs and to many electronic resources, is available at www.lib.unc.edu. Reference librarians at any of the UNC–Chapel Hill libraries are available to help graduate students locate materials, use print or online library resources, or tackle any question from the most basic to in-depth advice on research projects.

The University Libraries receive more than 100,000 periodicals and other serials annually, including the publications of professional associations and learned societies. The Academic Affairs Library also receives the publications of such organizations as the Smithsonian and Carnegie institutions, the Rockefeller Foundation, the Hispanic Society

of America, and the Russell Sage Foundation, and of many universities, including foreign universities and academies.

The government document collections comprise a rich body of resources. The Academic Affairs Library is a regional depository for United States government documents and United Nations publications, as well as selected foreign government documents. Particularly rich are its files of federal and state publications; state legislative journals, laws, collected documents, colonial and state records, and records of constitutional conventions.

The libraries provide access to a wide array of online resources including indexes and abstracts, statistical materials and government data, and full text titles. Many titles may be accessed from home by members of the University community. The Davis Library Information Commons makes available state-of-the-art workstations for library research.

Departmental libraries containing collections for study and research are assigned to Art, Biology (Botany and Zoology), Chemistry, City and Regional Planning, Geological Sciences, Institute of Government, Information and Library Science, Mathematics/Physics, and Music. The Law Library, containing more than 300,000 volumes, is located within the School of Law at Van Hecke-Wettach Hall. It contains material useful to students of history and government.

In addition to the collections available in-house, the libraries provide access to a multitude of external resources. Materials that the libraries do not own may be borrowed through interlibrary borrowing. UNC–Chapel Hill students may obtain a Triangle Research Libraries Network card allowing them to borrow materials from Duke, North Carolina State, and North Carolina Central Universities. The valuable manuscripts of the State Department of Archives and History and the collections of the State Library at Raleigh are also nearby.

Web: www.lib.unc.edu

Special Collections (Wilson Library)

The North Carolina Collection holds books, pamphlets, maps, newspapers, serials, broadsides, microforms, documents, recordings, and other materials relating to the state and its people, and ranging in date from the 16th century to the present. Two of its prominent collections are the Sir Walter Raleigh Collection, relating to the courtier and the era of Elizabethan exploration, and the Thomas Wolfe Collection of manuscripts and published items by and about the University's well-known literary alumnus. The Photographic Archives provide a visual record of people, places, and events throughout the state in negatives, prints, and postcards, including examples of all formats beginning with daguerreotype of the 1840s. The North Carolina Collection Gallery exhibits artifacts, art, and furnishings related to the history and culture of the state and the University.

The Manuscripts Department consists of several units. The Southern Historical Collection preserves private papers—letters, diaries, account books, broadsides, photographs, taped interviews, video documentation, etc.—of individuals, families, and organizations of the region. University Archives houses the official unpublished records of the University created since its charter in 1789. The General and Literary Manuscripts Collection includes documents related to notable British writers and literary enterprises and to American writers from outside the South. The Southern Folklife Collection houses extensive recorded music, field tapes, photographs, movie film, and other materials related to study and research in the field of folklore and popular culture, with emphasis on materials about the region.

The Rare Book Collection includes books, pamphlets, broadsides, medieval and Renaissance manuscripts, and graphic images. Of particular interest are the Estienne Imprint Collection, the Bernard J. Flatow Collection of the Cronistas, the George Harper Collection of W. B. Yeats, the Archibald Henderson Collection of George Bernard Shaw, the William Henry Hoyt Collection of French History, the Bill Morgan Collection of Beat Literature, the William A. Whitaker Collection of Samuel Johnson and His Circle, and an array of collections supporting the study of 19th-century British, Irish, and American literature.

Health Sciences Library

The Health Sciences Library is the primary library for the University of North Carolina Schools of Dentistry, Medicine, Nursing, Pharmacy, and Public Health, and the University of North Carolina Hospitals. It also serves the health and biomedical information needs of the entire University of North Carolina at Chapel Hill, the North Carolina Area Health Education Centers (AHEC) system, and health personnel and researchers throughout the state.

Collections

The library has an excellent collection to support curricular, research, and patient care information needs, consisting of more than 300,000 volumes and more than 4,000 serial titles, and more than 3,000 electronic resources. The Health Sciences Library provides a growing collection of computer-based multimedia courseware, CD-ROMs, and customized computer-assisted instruction, and offers electronic reserves. Information about the collection is accessible through the Triangle Research Libraries Network online catalog (www.trln.org). UNC-affiliated users have free access to the majority of the library's collections, wherever and whenever they are needed.

Borrowing

Faculty, students, researchers, and staff of the University of North Carolina at Chapel Hill and the University of North Carolina Hospitals, as well as area health professionals, receive borrowing privileges upon application. The library provides photocopy services, article delivery service, and an interlibrary loan service for materials not available on campus. Borrowing privileges are also available to any North Carolina resident for a small fee.

Information Services

Librarians are available to aid users in locating information, to instruct in the use of library resources, and to provide additional help. Online search services, with access to MEDLINE and about 100 other databases, are also provided. Direct access to databases and full text journals is offered through the library Web site (www.hsl.unc.edu) free of charge. From this site, users can search MEDLINE, nursing and allied health literature, international pharmaceutical abstracts, public health community papers, and other databases from their workstations on and off-campus. These and other databases are also available in the library.

The Health Sciences Library coordinates the AHEC Library and Information Services Network. This is a statewide network that supports information services for community-based health professions education. Students, faculty off-campus, and preceptors receive a variety of help through the Information Connection Service.

Help in using the library's services and collections is available online, via e-mail, by telephone, and by appointment. Consultation services can be used to make an appointment with a library staff member to develop a search strategy for a thesis topic, to learn advanced literature search techniques, or to receive any other in-depth help needed. In addition, education services faculty offer a variety of instructional programs, including orientation, workshops, and course lectures, designed to teach information-management skills.

Information Technology Services

UNC–Chapel Hill's campus computing services are organized under a central office: Information Technology Services (ITS). Most graduate students have their main contact with ITS through divisions that manage academic computing, electronic mail (e-mail), public microcomputing labs, interactive media presentation, database access, exam scoring, networking, and video and multimedia classroom support. The IT Response Center (ITRC), Carolina's help desk, assists students, staff, and faculty in using IT services across campus. Visit the online help site at help.unc.edu for self-help options or to contact the ITRC, or call (919) 962-HELP for assistance.

All enrolled students at UNC–Chapel Hill are eligible for a login ID, called an Onyen (Only Name You'll Ever Need), that can be used for e-mail and other IT services at UNC. After creating an Onyen at onyen.unc.edu, students are able to create personal Web pages, download shareware software, check grades, and set up their computers to access the campus wired or wireless network.

With the Onyen, a number of online services are available, including e-mail, listservs, access to online courses in BlackBoard, and access to MyUNC, Carolina's portal (my.unc.edu). Through the portal, students can access their class lists, grades, financial information, and other relevant sites, all with a single login.

Off-campus students may want to consider subscribing to an Internet service provider (ISP) or learn about other ways to remotely access the University networks. Detailed information can be found on the help site at help.unc.edu.

Public microcomputer labs can be found throughout campus. Each lab has Microsoft Windows machines as well a variety of software applications for student use. Additionally, all lab machines have Internet connections, so students can check their e-mail or access the Web. There are also laser printers for student use in each lab. Lab hours vary according to usage patterns and location; check the help site at help.unc.edu for information on lab locations and hours of operation.

Web: its.unc.edu

Research Resources

The intellectual life of the University and the research activities of graduate students and faculty alike receive valuable encouragement and support from the various institutes and centers listed below. These institutes do not operate as instructional agencies within the University; rather, they serve to obtain financial and organizational assistance for the scholars who constitute their membership. Many of the institutes provide opportunities for graduate student training.

Research Institutes and Centers

Most research centers and institutes can be found at the following Web site. Selected locations are detailed below.

research.unc.edu/offices/index.htm

Child Development Institute
(see Frank Porter Graham Child Development Institute)

www.fpg.unc.edu

Institute for the Arts and Humanities
The institute's mission is to provide time and common space for faculty in the College of Arts and Sciences to work on projects that will advance their careers and benefit their students. The institute provides funds for faculty during the academic year or summer (Faculty Fellows Program) so that faculty may spend their time on scholarly or research activities.

(919) 962-0249
www.iah.unc.edu

Institute for the Environment
The UNC Institute for the Environment is leading UNC's world-renowned environmental community in developing solutions to critical environmental challenges. In doing so, it educates future environmental leaders and engages with the people of North Carolina and the nation to address and solve environmental challenges.

www.ie.unc.edu/index.cfm

Institute for Research in Social Science
(see Odum Institute for Research in Social Science)

www.odum.unc.edu

Institute of African American Research
The Institute of African American Research (IAAR) is the research component of the Sonja Haynes Stone Center for Black Culture and History. The mission of the institute is to promote the scholarly investigation of the culture and thought of African Americans, as well as Blacks in the Diaspora. The aim of the institute is to support intellectual productivity across far-reaching investigative interests and academic disciplines that is committed to research in Black studies. The institute supports projects that examine the impact of the African Diaspora on Black life and culture in the United States.

www.unc.edu/iaar

Institute of Government
The Institute of Government within the School of Government is devoted to teaching, research, and consultation in state and local government. Over the years the institute has served as the research agency for numerous study commissions of the state and local government.

(919) 966-5381
www.sog.unc.edu

Institute for the Study of the Americas
The Institute for the Study of the Americas (ISA) at the University of North Carolina at Chapel Hill is dedicated to the pursuit of knowledge of the Latin American experience in the Western Hemisphere. It builds on a long-standing and distinguished tradition of scholarly interest in the diverse regions that make up Latin America, including Mexico, Central America, South America, and the Caribbean.

isa.unc.edu

Institute of Marine Sciences
The institute's mission is to serve the state and nation through the conduct of high quality basic and applied marine science research.

(252) 726-6841
www.marine.unc.edu

Institute of Outdoor Drama
Established in 1863, the Institute of Outdoor Drama is a public service agency of UNC–Chapel Hill. It is the only advisory and research organization in the United States dedicated to the advancement of the outdoor drama movement, and serves as a resource for groups, government agencies, and individuals who wish to create new outdoor dramas or who are seeking information on the field.

(919) 962-1328
outdoordrama.unc.edu

Institute on Aging
Mission: The North Carolina General Assembly created the Institute on Aging in August 1996, placed it under the general umbrella of the 17-campus University of North Carolina System and based it at the UNC–Chapel Hill campus. The institute's mission is to enhance the well-being of older people in North Carolina by fostering statewide collaboration in research education and service. Its mandate is to 1) promote collaborative applied and basic gerontological research, 2) develop innovative programs of interdisciplinary gerontological education and practice, and 3) provide state-of-the-art information to policymakers, program managers, service providers, clinicians, and the general public.

www.aging.unc.edu

Jordan Institute for Families
Created in 1996, the Jordan Institute for Families is the research, training, and technical assistance arm of the School of Social Work at the University of North Carolina. Cutting across traditional disciplinary

lines, the Jordan Institute develops knowledge and promotes practices and policies that build supportive families and stable communities. The Jordan Institute addresses family issues across the life span that threaten to undermine some families—such as poverty, abuse, mental illness, school failure, and substance abuse—as well as challenges that confront most families, such as providing for aging family members and caring for young children.

ssw.unc.edu/jif

Kenan Institute of Private Enterprise
The Frank Hawkins Kenan Institute of Private Enterprise, an affiliate of the Kenan–Flagler Business School, encourages cooperation among business, academia, and government to foster private-sector development and to utilize the private sector to serve the public interest in the United States and worldwide. The Kenan Institute develops innovative public-private and private-private partnerships that build the capacity of people, business, and communities to prosper in market-based environments. These programs are anchored in research that provides the basis for replicating and extending these outreach programs nationally and internationally. The Kenan Institute was established in 1985 by a series of gifts from the William R. Kenan Jr. Charitable Trust and the William R. Kenan Jr. Fund. The institute operates from two locations—the Kenan Center at the University of North Carolina at Chapel Hill and Washington, DC. A sister institute in Thailand, Kenan Institute Asia, has been established to provide a physical and institutional presence.

www.kenan-flagler.unc.edu/kenan-institute/about.aspx

H. W. Odum Institute for Research in Social Science
H. W. Odum Institute for Research in Social Science promotes and supports social science research at UNC-Chapel Hill. Founded in 1924, the Odum Institute houses one of the nation's largest social science and census data archives, maintains a state-of-the-art computing and GIS lab for faculty and student research, offers advanced quantitative and qualitative statistical software and consulting support for social science and survey research design and analysis, offers short courses and seminars on research topics, and sponsors 16 ongoing faculty work groups.

www.odum.unc.edu

Oak Ridge Institute for Science and Education
Since 1946, students and faculty of the University of North Carolina have benefited from its membership in Oak Ridge Associated Universities (ORAU). ORAU is a consortium of 85 colleges and universities and a contractor for the U.S. Department of Energy (DOE) located in Oak Ridge, Tennessee. ORAU works with its member institutions to help their students and faculty gain access to federal research facilities throughout the country; to keep its members informed about opportunities for fellowship, scholarship and research appointments; and to organize research alliances among its members.

Through the Oak Ridge Institute for Science and Education (ORISE), the DOE facility that ORAU operates, undergraduates, graduates, and postgraduates, as well as faculty, enjoy access to a multitude of opportunities for study and research. Students can participate in programs covering a wide variety of disciplines including business, earth sciences, epidemiology, engineering, physics, geological sciences, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry, and mathematics. Appointment and program length range from one month to four years. Many of these programs are especially designed to increase the numbers of underrepresented minority students pursuing degrees in science- and engineering-related disciplines. A comprehensive listing of these programs and other opportunities, their disciplines, and details on locations and benefits can be found in the ORISE Catalog of Education and Training Programs, which is available at see.orau.org.

ORAU's Office of Partnership Development seeks opportunities for partnerships and alliances among ORAU's members, private industry, and major federal facilities. Activities include faculty development programs, such as the Ralph E. Powe Junior Faculty Enhancement Awards, the Visiting Industrial Scholars Program, consortium research funding initiatives, faculty research, and support programs as well as services to chief research officers.

www.orau.org

Triangle Institute for Security Studies
The object of TISS is to promote communication and cooperation among faculty, graduate students, and the public across disciplines and beyond the confines of each university in order to advance research and education concerning national and international security, broadly defined.

(919) 684-5162
sanford.duke.edu/centers/tiss

Bowles Center for Alcohol Studies
The mission of the Bowles Center for Alcohol Studies is to conduct, coordinate, and promote basic and clinical research on the causes, prevention, and treatment of alcoholism and alcohol abuse.

(919) 966-5678
www.med.unc.edu/alcohol

Carolina Center for Public Service
Mission: The Carolina Center for Public Service leads the University's engagement efforts and service to the state of North Carolina and beyond by linking the expertise and energy of faculty, staff, and students to the needs of the people.

In all its efforts, the Carolina Center for Public Service seeks to build partnerships throughout the University and the state as it:

- advances the quality and sustainability of efforts through effective practices
- recognizes and celebrates exemplary service
- shares information, strategies, and outcomes of UNC's service endeavors
- facilitates community-based scholarship in addressing community issues

As the first public university, Carolina has a proud history of changing lives through educating scholars and leaders dedicated to forging a brighter future for the state, nation, and the world. The University of North Carolina at Chapel Hill is committed to expanding its tradition of engagement and responsiveness through the Carolina Center for Public Service.

www.unc.edu/ccps

Carolina Population Center
The Carolina Population Center exists to serve the research and research training needs of faculty at the University of North Carolina at Chapel Hill who have interests in the population field. The center is rich in its diversity. Its 56 faculty fellows have their primary appointments in sixteen departments in five schools or colleges within the University. The postdoctoral, predoctoral, and undergraduate training programs also reflect the diversity of the center.

(919) 966-2157
www.cpc.unc.edu

Cecil G. Sheps Center for Health Services Research
The Cecil G. Sheps Center for Health Services Research organizes interdisciplinary research on the structure and impact of the health care system. A fundamental interest of the center has been the interaction between the medical care system and vulnerable populations, such as the poor, the elderly, rural residents, minority groups, the chronically ill, children, and the mentally ill.

(919) 966-5011
www.shepscenter.unc.edu

Center for Aging Research and Educational Services
The Center for Aging Research and Educational Services is dedicated to serving social work practitioners and decision makers who work with older adults and their families.
ssw.unc.edu/cares/cares.htm

Center for AIDS Research
The purpose of the UNC Center for Aids Research (CFAR) is to provide infrastructure to support investigation of the HIV/AIDS epidemic using clinical research, behavioral research, research into HIV biology and pathogenesis at the molecular level, and educational outreach. The UNC CFAR is a consortium of three complementary institutions: The University of North Carolina at Chapel Hill, Research Triangle Institute, and Family Health International.

cfar.med.unc.edu

Center for Community Capitalism
The center examines ways that government, nonprofits, and the private sector can work together through innovative public-private community development partnerships to strengthen inner cities. The center works to create public policies that will make capitalism work better in distressed communities and focuses on new ways government policy can bring the energy of private enterprise to lift inner-city residents out of poverty. It views inner cities as untapped markets with considerable financial and human resources and profit potential for enterprising businesses.

www.ccc.unc.edu

Center for Developmental Science
The Center for Developmental Science is an interdisciplinary and inter-institutional center for the advanced study of human development. The mission of the CDS is to provide an environment that transcends the ordinary boundaries of disciplines and institutions in order to facilitate multidisciplinary, collaborative explorations of new frontiers in developmental research and training based on the principles of developmental science.

Goals of the CDS are:

- to transcend traditional barriers to scholarship by drawing developmental investigators from a wide variety of disciplines and institutional affiliations
- to support research about human development that aims to understand the basic processes of behavioral, emotional, physical, and cognitive development, and the mechanisms that affect development across the life span
- to develop, apply, critique, and revise developmental theory and methods such as longitudinal design and data analytic techniques that are sensitive to developmental processes
- to translate this basic science research into practice in a variety of venues in order to improve the health and developmental outcomes of individuals across the life span
- to develop and support a strong cohort of developmental researchers through the establishment of a unified and integrated research environment in which faculty collaborate and work closely with each other and with doctoral students and postdoctoral fellows to prepare the next generation of developmental researchers.

Funded by grants from the National Institute of Health and other sources, the CDS administers a pre- and postdoctoral training program, sponsors a weekly consortium series, supports workshops and special institutes on critical topics, and provides support for visiting faculty.

(919) 962-0333
www.cds.unc.edu

NSF Science and Technology Center for Environmentally Responsible Solvents and Processes
More than 30 billion pounds of organic and halogenated solvents are used worldwide each year as process aids, cleaning agents, and dispersants. Considerably more water is used and contaminated in related processes. In the 21st century, manufacturing and service industries must increasingly attempt to avoid production, use, and subsequent release into the environment of contaminated water, volatile organic solvents, chlorofluorocarbons, and other noxious pollutants. Technological breakthroughs of the last decade now indicate that liquid and supercritical carbon dioxide (CO2) could become a very commonly used solvent in overcoming these environmental problems. The S&T Center for Environmentally Responsible Solvents and Processes, established in 1999, has as its goal to develop the scientific fundamentals necessary to enable liquid and supercritical CO2 to replace aqueous and organic solvents in key processes in the nation's manufacturing sector. Three key focus areas identified to date are macromolecular synthesis/engineering, microlithography, and nanostructures. This is a multidisciplinary effort with participants from five academic centers and two national laboratories: the University of North Carolina at Chapel Hill, North Carolina State University, North Carolina A&T University, University of Texas at Austin, and Georgia Institute of Technology in partnership with Sandia National Laboratory and Oak Ridge National Laboratory.

(919) 962-5468
www.nsfstc.unc.edu

Center for European Studies
The mission of the Center for European Studies is to advance understanding of the social, political, and economic events that shape contemporary Europe. It does this primarily by supporting faculty and graduate student research through its roles as a National Resource Center funded by Title VI grants and as a European Union Center funded by the European Commission. At the same time, the center disseminates knowledge about contemporary Europe by enriching the University's work in graduate and undergraduate education and in outreach programs with public schools. One major new initiative in the center's educational functions has been the establishment of the Trans-Atlantic Master's Program (TAM). Another is its present effort to institute a new major in contemporary European studies.

www.unc.edu/depts/europe

Center for Gastrointestinal Biology and Disease
The Center for Gastrointestinal Biology and Disease promotes research and teaching on all aspects of gastrointestinal biology, physiology, and epidemiology, with special emphasis on inflammatory bowel disease. Resources at the center's disposal include investigators and core

laboratories at two constituent members of North Carolina's university system. The University of North Carolina at Chapel Hill, where the activities are based largely at the School of Medicine, and North Carolina State University, where the activities are based largely at the School of Veterinary Medicine. The level of cooperation between these different but complementary institutions makes the center unique.

(919) 966-1757
https://cgibd.med.unc.edu/index.php

Center for Health Statistics Research
The Center for Health Statistics Research (CHSR) opened its doors in the fall of 1999 with the mission of providing the infrastructure and relevant expertise to address important statistical design and analysis issues tied to research focusing on high-risk populations, especially that which leads to new insights in health promotion and disease preventions. This is accomplished by 1) focusing the center's attention on methodological issues that arise in conjunction with existing substantive research efforts and 2) conducting this statistical research parallel to and in collaboration with the efforts of researchers in various settings of the health research landscape in North Carolina.

(919) 962-3282
www.schs.state.nc.us/SCHS

Center for Home Visiting
The center's mission addresses the following goals through collaborative efforts with researchers, educators, evaluators, trainers, practitioners, and policymakers: to promote interdisciplinary research and evaluation efforts, to promote interdisciplinary training efforts at the college and university level, to promote interdisciplinary efforts in ongoing professional activities, and to advance the knowledge base concerning practice and training.

(919) 962-9197
www.unc.edu/~uncchv

Center for Instructional Technology
The mission of the Center for Instructional Technology (CIT) is to assist UNC–Chapel Hill faculty, staff, and graduate instructors in achieving their instructional, research, and other professional objectives by providing support for commonly used and emerging information technologies. To fulfill that mission, the CIT works collaboratively with staff in Information Technology Services (ITS) and other service providers on campus to coordinate, promote, and support campus-wide instructional technology-related services.

its.unc.edu/TeachingAndLearning/index.htm

Center for Pharmaceutical Outcomes Research
The mission of the Center for Pharmaceutical Outcomes Research is to improve patient health outcomes, primarily those associated with the use or potential use of pharmaceuticals. The center will advance the field of health outcomes through methodology development, evaluative research, and the translation of research findings to clinical practice and pharmaceutical education.

Center for Public Television
The University of North Carolina Center for Public Television operates a statewide network of eleven digital transmitters with a commitment to inform, enrich and educate viewers. Each transmitter broadcasts four channels of standard definition programming and one channel of high definition programs. In addition to UNC–TV, they are UNC–KD, a children's channel, UNC–ED, an educational channel, UNC–HD, a high definition channel, and UNC–NC, a channel that eventually will be dedicated entirely to local content.

UNC–TV also supports a wide variety of outreach activities, including partnerships with educational and social service agencies; college telecourses for credit to more than 17,500 adults yearly; educational support for teachers; and a comprehensive Web site. UNC–TV actively seeks partnerships with others to bring greater focus to the key cultural and social issues in North Carolina.

www.unctv.org

Center for Research on Chronic Illness
CRCI provides central resources and facilities to both seasoned and novice investigators actively conducting research to assist individuals and groups to establish and maintain favorable health behaviors. Individuals and groups at high risk, or vulnerable, for developing or incurring chronic health problems are the major focus of CRCI research. Vulnerable people include the poor, marginalized communities, those at critical development stages of life (childhood, adolescence, or old age) and residents of rural or underserved areas.

(919) 966-0453
nursing.unc.edu/index.htm

Center for Slavic, Eurasian, and East European Studies
Inasmuch as the mission of the University is the generation, preservation, transmission, and dissemination of useful knowledge, the mission of the Center for Slavic, Eurasian, and East European Studies is entirely coherent with that mission, particularly honed to the subset of knowledge pertaining to the languages, cultures, and political systems of the Slavic, Eurasian, and East European peoples and countries.

(919) 962-0901
www.unc.edu/depts/slavic

Center for the Study of the American South
The Center for the Study of the American South affirms the commitment of the University of North Carolina at Chapel Hill to the study of the South, to teaching about the region, and to a tradition of service spanning two centuries. Through myriad programs, publications, and conferences, the center seeks to sponsor a broad public dialogue that addresses the central challenges to public life in the South. What is this shared Southern history and culture that both divides and unites Southerners? What threats to the region are posed by persistent poverty, a decline in civility, and the fragmentation of communities by racism and migration? How are recent changes to the region redefining opportunity in a global economy, transforming landscapes, and radically reshaping communities? The center brings the University's vast resources to bear on these questions.

(919) 962-5665
www.uncsouth.org

Center for Faculty Excellence
The Center for Faculty Excellence provides Carolina faculty holistic support across the entire spectrum of professional development: instruction, research, and leadership skills. The center also provides support to graduate instructors through a wide range of activities and resources. The center provides:

- Resources to individuals who wish to improve their effectiveness as instructors and mentors
- Support and guidance for designing, funding, and undertaking successful research on campus
- Advice and training for faculty members taking on campus leadership roles

The Center for Faculty Excellence is a new institution, but it is based on an old idea: that a faculty member should be regarded as an individual, and not simply the summation of research (or teaching, or leadership) competencies. The mission of the center is to provide holistic support to that individual across the entire spectrum of professional development: instruction, research, and leadership skills.

Carolina is a rich environment for an academic professional, but it is often difficult for faculty members to take advantage of this richness. The center is designed to implement five core principles in mobilizing or publicizing the University's resources for faculty: transparency, collaboration, mentoring, comparative advantage, and assessment.

Transparency is critical in ensuring that faculty members can recognize and access quickly all available resources. Of all scarce resources, faculty time is probably the most valuable. Time spent searching for supports on campus is time that could be spent better on instruction or research.

Collaboration among faculty members is a critical support to faculty success in all areas—research, instruction, or leadership. Some collaboration is a natural outgrowth of shared interest, but this only scratches the surface of the opportunities for mutual gain offered.

Mentoring best utilizes our considerable faculty strengths to ensure that the next generation of faculty will be at least as strong. Through mentoring, our more senior faculty pass on accumulated research, instruction, and leadership skills to our more junior faculty—as we have for more than two hundred years.

Comparative advantage is jargon for the fact that each faculty member has a set of characteristics that make him or her uniquely effective as a researcher, instructor, or leader. Our metric of faculty success is not that all faculty members will have the same skills in each area. Our faculty members will demonstrate a competence in each area, but beyond that our faculty will be free to specialize in those aspects of instruction, research, and leadership in which they are most skilled. The University's success follows naturally from this specialization.

Assessment is a critical component of any initiative. New ideas often look good on paper, but effectiveness will be measured in their practical application.

As is evident from this list, the center is not really a place; it is a springboard. Good researchers will become great researchers, good instructors will become great instructors, and faculty members will become leaders.

(919) 966-1289
cfe.unc.edu

Center for Urban and Regional Studies

The center's mission is to promote and support within UNC–Chapel Hill, high-quality basic and applied research on urban, regional, and rural planning and policy issues. The center seeks to generate new knowledge of urban and regional processes and problems and ultimately to improve living conditions in our communities. This is done by involving the University's faculty and graduate students in large, multidisciplinary research projects and smaller, more narrowly focused projects. The center's mission also includes promoting the use of the research it facilitates.

(919) 962-3074
curs.unc.edu

Center for Aging and Diversity

The Center for Aging and Diversity addresses, through research and training, health disparities in later life, provides a forum in which to discuss and examine ethnic, racial, and cultural variation in life course processes, and disseminates research findings to the academic and lay community on the health of older diverse populations.

www.aging.unc.edu/cad/index.html

Clinical Center for the Study of Development and Learning

The Clinical Center for the Study of Development and Learning (CDL) is a multidisciplinary research, technical assistance, and leadership training center. The center is dedicated to improving the lives of individuals with developmental disabilities. Its work covers the broadest range of dysfunctions and handicaps, from learning disorders and attention deficits to mental retardation and multiple handicapping conditions.

(919) 966-5171
cdl.unch.unc.edu

Collaborative Studies Coordinating Center

The Collaborative Studies Coordinating Center (CSCC) is a division within the Department of Biostatistics of the Gillings School of Global Public Health at the University of North Carolina at Chapel Hill. As the coordinating center for a number of multicenter public health and medical studies, it provides statistical, data management, quality assurance, and study management services. The organization includes professional personnel from biostatistics, epidemiology, computer science/data management, medicine, pharmacy, and nutrition. The professional personnel are supported by staff with training and experience in all of these fields as well as in study management, office management, and communication.

www.cscc.unc.edu

Comprehensive Center for Inflammatory Disorders

Established in 1999, the Comprehensive Center for Inflammatory Disorders (CCID) is one of six national Comprehensive Oral Health Research Centers of Discovery created by the National Institute of Dental and Craniofacial Research to improve the oral health of Americans. The CCID faculty conducts basic, clinical, epidemiological, and community-based research on inflammatory disorders such as periodontal disease, cardiovascular disease, and diabetes, and on at-risk pregnant women. The center also provides comprehensive specialized oral health care to patients with periodontal disease, diabetes, and cardiovascular disease, and on patients with at-risk pregnancies. Finally, the center provides educational opportunities for scientists, professionals, and the public on the links between inflammation and systemic medical conditions.

(919) 966-1455
www.dent.unc.edu/research/ccid

Cystic Fibrosis Pulmonary Research Center

The Cystic Fibrosis Pulmonary Research and Treatment Center is a large, multidisciplinary group focused on the pathogenesis and therapy of cystic fibrosis and other lung diseases.

(919) 966-1077
www.med.unc.edu/pulmonary/areas-and-programs/cysticfibrosis

Dental Research Center

The Dental Research Center provides a central base for the research carried out by the Dental School by making available well-equipped laboratories and core research support facilities. The center fosters collaborative research relationships for faculty throughout the University and offers opportunities in graduate research training for basic sciences and clinical specialty students.

www.dent.unc.edu/research

Frank Porter Graham Child Development Institute

The research mission of the Frank Porter Graham Child Development Institute is to create new knowledge to enhance the lives of young children and their families. Emphasis has and will be placed on the study of vulnerable populations, such as those at risk, the disabled, or the disadvantaged.

(919) 966-2622
www.fpg.unc.edu

The UNC Center for Functional GI and Motility Disorders

Mission: Advancing the biopsychosocial understanding and care of patients with functional gastrointestinal (GI) and motility disorders through research, training, and education.

The center's goals are:

- Research: Conducting studies on the physiological and psychosocial mechanisms underlying the functional GI and motility disorders, their impact on quality of life, health outcome, and their treatment
- Professional Training and Education: Providing multidisciplinary training and education in clinical and research skills with emphasis on patient-centered care and advanced research methods
- Evaluation and Treatment: Applying up-to-date evaluation and treatment for a full range of functional GI and motility disorders

General Center Information: (919) 966-0144;
Center Coordinator: (919) 843-0821
www.med.unc.edu/ibs

Gene Therapy Center

The University of North Carolina School of Medicine created the Gene Therapy Center in 1993 with the goal of merging molecular genetics research with health care delivery. The Gene Therapy Center provides important resources to academic investigators through two core facilities created to support preclinical and clinical gene therapy studies. These facilities, the Vector Core and the Human Applications Laboratories, were created to ensure that investigators would have promising gene vectors available in the quality and quantities needed for preclinical or clinical studies. Research in the laboratory has centered on the molecular biology of adeno-associated virus (AAV) in order to exploit the unique features of this virus to develop an efficient viral vector system for use in human gene therapy. Continued efforts in understanding the mechanism of viral replication and integration for both wild-type and recombinant AAV are being pursued in order to create more efficient gene transfer vectors. The ultimate goal of the Gene Therapy Center is to facilitate the progression and translation of gene therapy research from the laboratory bench into Phase I clinical trials for the treatment of human disease.

(919) 962-3285
genetherapy.unc.edu

Clinical and Research Center

As a member of the Clinical Sciences Awards consortium (CTSA), the NC TraCS Institute seeks to create new programs and pathways to facilitate clinical and research at UNC and throughout North Carolina.

The CTRC offers investigators a variety of research support services, including access to inpatient and outpatient examination rooms, a staff of highly skilled research professionals, an investigators' laboratory, nutrition research support, and an oral health research facility. In addition, CTRC staff can assist with study start-up, from the preparation of the IRB application and CTRC addendum to the sponsor regulatory package, budget negotiations, and internal processing form. Other services include assistance with pre-study feasibility, patient recruitment, study budgeting, letters of support, and research coordinator orientation. The CTRC also offers adult and pediatric research coordinator services.

Mission: The Clinical and Research Center improves the health and well-being of the people of North Carolina and beyond by ensuring an optimal professional environment for clinical innovation, quality care, resource stewardship, and research leadership.

All publications, press releases, or other documents that result from the utilization of any NC TraCS Institute resources are required to credit the CTSA grant and comply with NIH Public Access Policy, found at www.hsl.unc.edu/Collections/NIHToolkit/NIHPublicAccessToolkit.cfm (submission to PubMed Central). Visit tracs.unc.edu/index.php?option=com_content&view=article&id=130&Itemid=193 to view recommended language for use in publications based on the type of support/funding received from the CTRC and / or NC TraCS overall.

tracs.unc.edu/index.php?option=com_content&view=article&id=303&Itemid=330

Highway Safety Research Center

The Highway Safety Research Center (HSRC) is dedicated to improving transportation safety, with a major emphasis on highway safety. Its fundamental mission is to conduct basic and applied research that increases knowledge and contributes to reducing death, injury, and the related societal costs. HSRC translates developed knowledge into practical interventions that can be applied at local, state, national, and international levels.

(919) 962-2202
www.hsrc.unc.edu

Injury Prevention Research Center

Injury is a major, but under-recognized, public health problem worldwide. In the United States alone, about 150,000 people die of injuries each year, resulting in more years of life lost before age 65 than any other single health problem. In addition to loss of life, the pain, suffering, and long-term disability associated with injuries are enormous. Most of these injuries are preventable, but there is much to learn. More must be understood about the factors that influence when, how, where, and to whom injuries will occur, and effective and appropriate intervention strategies must be designed and implemented.

The UNC Injury Prevention and Research Center (IPRC) envisions a world in which injuries are reduced as a result of important discoveries made and disseminated in a scholarly manner to guide policies and program development. Its vision includes a leadership role for UNC IPRC in effecting change both nationally and internationally.

The mission of the IPRC is to build the field of injury prevention and control through a combination of interdisciplinary scholarly approaches to research, intervention, and evaluation as well as through the training of the next generation of researchers and practitioners.

The UNC IPRC strives to be an innovative, nurturing, efficient, highly productive, and versatile organization that believes in

- Promoting rigor and integrity in all aspects of its work
- Identifying, creating, and seizing opportunities to enhance scientific progress and application of knowledge to prevent injury
- Creating an intellectual home in which faculty, staff, and students find collegiality, mentoring, and assistance in realizing their professional and academic goals

- Embracing new ideas with enthusiasm while planning strategically for the future
- Nurturing an atmosphere of open communication, sharing of ideas, and interdisciplinary collaboration in which good science and practice merge
- Supporting forward-thinking leadership that brings national and international perspectives
- Providing high quality service to affiliated faculty, staff, and students for project development management and dissemination
- Ensuring that all are clear about their roles and responsibilities and do what they are supposed to do
- Fostering synergies among ideas, individuals, and functions such that all engaged with the center contribute fully based on their unique and complementary roles, and
- Being adaptable to shifts in leadership, staffing, and external conditions while maintaining organizational stability.

(919) 966-2251
www.iprc.unc.edu

UNC Lineberger Comprehensive Cancer Center
The UNC Lineberger Comprehensive Cancer Center of the School of Medicine of the University of North Carolina at Chapel Hill is the public cancer center for North Carolina. The UNC Lineberger center is the focal point for cancer research and cancer-related activities at UNC–Chapel Hill. It has an organized program for postdoctoral training of basic science and prevention and control cancer research. Curricular goals of the UNC Lineberger Comprehensive Cancer Center are implemented through academic departments. Cancer center members direct or participate in a wide variety of training programs. The center's activities are interdisciplinary, and its 235 members are drawn from more than 25 departments in the UNC School of Medicine, the Gillings School of Global Public Health, the schools of Dentistry, Nursing, Pharmacy, and the College of Arts and Sciences. The UNC Lineberger Center features nine research programs that are organized in three areas: basic science, clinical science, and population sciences. Basic scientists study various aspects of cancer development and progression at the molecular level. Programs include cancer cell biology, immunology, molecular carcinogenesis, molecular therapeutics, virology, and cancer genetics. A clinical research program focuses on developing novel approaches to cancer diagnosis and treatment. The population sciences programs include cancer prevention and control research and cancer epidemiology which seek to understand the causes of cancer in human populations and to develop, test, and disseminate interventions to reduce cancer risk, increase early detection, enhance cancer survivorship, and reduce mortality from cancer.

(919) 966-3036
unclineberger.org/

National Center for Catastrophic Sport Injury Research
The National Center for Catastrophic Sport Injury Research collects and disseminates death and permanent disability sports injury data that involve brain and/or spinal cord injuries. The research is funded by a grant from the National Collegiate Athletic Association, the American Football Coaches Association, and the National Federation of State High School Associations. This research has been conducted at the University of North Carolina at Chapel Hill since 1965.

(919) 962-5171
www.unc.edu/depts/nccsi

Neurodevelopmental Disorders Research Center
The National Institute of Child Health and Development created the Neurodevelopmental Disorders Research Center in 1967. The center, one of only twelve such research centers in the country, studies mental retardation and other developmental disorders. Its primary mission is to promote research and research training in the pathogenesis and treatment of neurodevelopmental disorders.

(919) 843-8641
www.fpg.unc.edu/~ndrc

North Carolina Center for Nanoscale Materials
The North Carolina Center for Nanoscale Materials (NCCNM) was officially established in April 1998. Major funding is provided by the Office of Naval Research, UNC–Chapel Hill, and North Carolina State University (NCSU). The center currently has 15 associated faculty members from several academic units at UNC–Chapel Hill and NCSU, and supports eight postdoctoral fellows and 15 graduate research assistants. The research activities in the center are directed toward understanding the fundamental science of nanoscale materials and utilizing their unique properties for commercial applications.

www.physics.unc.edu/~zhou/muri

North Carolina Occupational Safety and Health Education and Research Center
The North Carolina Occupational Safety and Health Education and Research Center (NCOSHERC) is an interinstitutional, multidisciplinary organization committed to graduate education and continuing education training of occupational health and safety professionals.

(888) 235-3320, (919) 962-2101
osherc.sph.unc.edu

Research Support Center
The School of Nursing's Research Support Center (RSC) facilitates faculty and student research endeavors with particular emphasis on expanding the research base in the School of Nursing, increasing external funding for research and developing new scholars and their programs of research. The center provides a broad array of research support services, including consultation in the areas of research design, advanced statistical support including measurement, statistical analysis and analysis programming, preparation of research grant proposals, assistance with institutional grant processing, editorial assistance, computer short courses for faculty and students of the School of Nursing, and grant fiscal management. The RSC maintains information on funding sources, research conferences, and faculty research interests, and publishes a newsletter highlighting grant and conference opportunities, research and computing news, and faculty research activities. The RSC also manages school-awarded small grants programs.

(919) 966-5803
www.unc.edu/depts/rsc

Sheps Center for Health Services Research
(see Cecil G. Sheps Center for Health Services Research)

www.shepscenter.unc.edu

Sonja Haynes Stone Center for Black Culture and History

Mission: To encourage and support the critical examination of all dimensions of African American and African Diaspora cultures through sustained and open discussion, dialogue, and debate, and to enhance the intellectual and sociocultural climate at the University of North Carolina at Chapel Hill.

(919) 962-9001
sonjahaynesstonectr.unc.edu

Thurston Arthritis Research Center

Independence is an American right. Self-sufficiency is an American ambition. Freedom of movement is an American assumption. The Thurston Arthritis Center draws from the spirit of this national psyche to create powerful instruments to lessen the suffering and immobility of those with arthritis-related diseases and to enhance the miracles of scientific vision.

(919) 966-4191
tarc.med.unc.edu

Tissue Culture Facility

The mission of the Tissue Culture Facility is to provide the members and colleagues of the UNC Lineberger Comprehensive Cancer Center with the highest quality research services and products available and to support and expand the science of cancer and medical research with professionalism and dedication.

unclineberger.org/tissueculture

Center for Global Initiatives

Formerly known as the University Center for International Studies (UCIS), the Center for Global Initiatives is a catalyst for the innovative work of faculty and students.

The center offers an array of competitive funding opportunities including the Fulbright Program, curriculum development, international internships, conference participation, undergraduate research, and predissertation travel.

It generates flows of ideas through research projects such as the annual Navigating the Global American South conference and the book Going to Carolina del Norte: Narrating Mexican Migrant Experiences, through programs such as the Rotary Peace Center and K–12 Outreach and through online resources highlighting faculty expertise and student internship experiences.

Founded in 1993, the center has received $20 million in grants from agencies and private donors including Ford, Freeman, MacArthur, Mellon, National Science Foundation, Z. Smith Reynolds, Rockefeller, Rotary International, United Nations University, U.S. Agency for International Development, the U.S. Departments of State and Education, and the World Bank.

The center's director reports to the associate provost for international affairs, who leads the University's effort to raise its international profile. This institutional connection offers a broad academic scope spanning the entire University, and the Center for Global Initiatives complements the work of other units focusing on thematic and area studies, study abroad, service learning, career services, and external relations.

To learn more about the Center for Global Initiatives, stop by its offices on the third floor of the new FedEx Global Education Center. The center encourages discussion of innovative ideas that expand and amplify the global work of UNC.

cgi.unc.edu

Research Laboratories

Baity Air Engineering Laboratory

The Baity Air Engineering Laboratory is one of the premier industrial hygiene, air pollution control, and aerosol science research facilities in the country. The laboratory is part of the Department of Environmental Sciences and Engineering at the University of North Carolina at Chapel Hill. It includes a 2,000-square-foot bay for testing air pollution control devices with a 3-ton overhead crane on a 25-foot ceiling. The laboratory also contains a 200-cubic-foot wind tunnel, fans capable of moving 10,000 cfm, an aerosol physics laboratory, a chemistry laboratory, and office space. In addition, high bay space and analytical laboratories are available to conduct pilot scale experiments on water quality. The Baity Laboratory is housed in its own building adjacent to the UNC School of Public Health.

www.unc.edu/~leith/Baity

Research Laboratories of Archaeology

The Research Laboratories of Archaeology were established in 1939 to conduct studies in archaeology and related fields such as ethnography, physical anthropology, and ethnohistory. Today, the research laboratories' interdepartmental program pursues research in such areas as North American prehistory and history (with a focus on the Native American cultures of North Carolina), Latin American prehistory, Old World archaeology, paleo-ethnobotany, and human osteology. Rigorous field and laboratory training is provided for graduate and undergraduate students. The Research Laboratories of Archaeology also curate one of the nation's finest collections of southeastern archaeological materials, including more than 6,000,000 artifacts, extensive photographic collections dating from the 1930s and smaller archaeological and ethnographic collections from Latin America, Europe, and Japan.

rla.unc.edu

L. L. Thurstone Psychometric Laboratory

The mission of the L. L. Thurstone Psychometric Laboratory is to support the faculty and students of the laboratory in the development and application of quantitative methods for psychological research. The laboratory seeks to create an active and vital intellectual atmosphere for its members so as to facilitate a high level of scholarly effort and interaction. Toward this end, the laboratory secures and manages resources that support these research activities and goals. This support takes a variety of forms, including financial, administrative, and logistical. Laboratory resources are expended for purposes such as financial support of graduate students, upgrading of facilities and equipment, funding of student travel to conferences or workshops, sponsoring of visiting speakers, and sponsoring and hosting of academic conferences. The laboratory also seeks to establish and promote productive associations with other academic units at the University of North Carolina. These include the Departments of Statistics, Biostatistics, Linguistics, and Computer Science, as well as the Howard W. Odum Institute for Research in Social Science (IRSS), the Center for Developmental Science, and the Frank Porter Graham Child Development Institute. Each of these units is engaged in research and teaching relevant to members of the laboratory. Faculty of the laboratory collaborate in research with faculty in these units, and the laboratory's graduate students often take courses in these departments and become involved in research activities.

www.unc.edu/depts/quantpsy/thurstone

Triangle Universities Nuclear Laboratory

The Triangle Universities Nuclear Laboratory (TUNL) is a cooperative research laboratory located on the Duke University campus and supported by Duke University, North Carolina State University, and the University of North Carolina at Chapel Hill. Fifty faculty and graduate students from the three universities use the facilities. TUNL is the largest university-based nuclear physics laboratory in the southeast, and one of the largest such laboratories in the United States. The major research interests of TUNL are studies of fundamental symmetries and studies of nuclear interactions at low to medium energies in the one to twenty million-electron-volt range.

secretary@tunl.duke.edu
www.tunl.duke.edu

University Regulations and Policies

The Honor Code

Persons enrolled in The Graduate School are members of the student body of the University of North Carolina at Chapel Hill, and are held responsible for conducting themselves in conformity with the moral and legal restraints found in any law-abiding community. They are, moreover, subject to the regulations of the Honor Code.

The Honor Code is the heart of integrity at Carolina. In brief, the Honor Code states that all students shall "refrain from lying, cheating, or stealing," but the Honor Code imparts much more. It is the guiding force behind the responsible exercise of freedom, the foundation of student self-governance at UNC–Chapel Hill. By abiding by the Honor Code, students can be assured that their individual rights and academic work will be respected.

Mutual Responsibilities of the Faculty and Students

Academic work is a joint enterprise involving faculty and students. Both have a fundamental investment in the enterprise and both must share responsibility for ensuring its integrity. In relation to the Honor Code, therefore, specific responsibilities of the faculty which parallel the responsibilities of the students have been formally adopted by the Faculty Council.

Responsibilities of the Faculty

I. Awareness: To assure that community-wide expectations regarding academic integrity are understood and communicated, and that students are held accountable for conforming their conduct to such expectations.

II. Communicating Expectations and Administering Examinations: To assist students in complying with their responsibilities relating to academic integrity, faculty members, teaching assistants, and other instructional personnel should

A. Use good judgment in setting and communicating clear ground rules for academic work conducted under their supervision.

B. Require students to sign the honor pledge as a condition of submitting academic assignments.

C. Take steps to prevent unauthorized access to examinations during development, duplication, and administration.

D. Avoid reusing prior examinations in whole or in part to the extent possible.

E. Take all reasonable steps consistent with physical classroom conditions to reduce the risk of cheating during the administration of examinations.

F. Maintain proper security during the administration of examinations, including as appropriate overseeing distribution and collection of examinations and proctoring the examination session.

III. Oversight: In the event of student misconduct that appears to violate the requirements of the Honor Code, faculty members, teaching assistants, and other instructional personnel should

A. Report to the appropriate Student Attorney General any instance in which the instructor has reasonable basis to conclude that a student under the faculty member's supervision has engaged in academic dishonesty or substantially assisted another to do so in connection with academically related work.

B. In the instructor's discretion, notify the student of the instructor's intention to report the suspected academic dishonesty and permit the student to provide relevant further information if the student chooses to do so.

C. Refrain from taking unilateral punitive action as to a student rather than reporting conduct in suspected violation of the Honor Code.

D. Cooperate with representatives of the Honor System in conducting necessary investigation, providing testimony or other evidence, recommending appropriate sanctions, or otherwise bringing the matter to prompt conclusion.

IV. Involvement: To bring to bear requisite faculty judgment regarding the nature and importance of academic integrity, and to nourish a strong campus-wide understanding and commitment to associated intellectual and personal values, faculty members, teaching assistants, and other instructional personnel should

A. Explore issues of integrity in connection with instructional activities where relevant and appropriate.

B. Encourage their academic units to take matters of academic integrity seriously, become informed regarding related problems and advisable means of preventing problems from arising, and provide requisite training and support to instructional personnel.

C. Participate upon request as part of educational initiatives, faculty advisory panels, and University Hearing Boards designed to create, nurture, and enforce high standards of academic integrity within the University community.

Responsibilities of Students

In order to ensure effective functioning of an Honor System worthy of respect in this institution, students are expected to

I. Conduct all academic work within the letter and spirit of the Honor Code, which prohibits the giving or receiving of unauthorized aid in all academic processes.

II. Consult with faculty and other sources to clarify the meaning of plagiarism, to learn the recognized techniques of proper attribution of sources used in the preparation of written work, and to identify allowable resource materials or aids to be used during examination or in completion of any graded work.

III. Sign a pledge on all graded academic work certifying that no unauthorized assistance has been received or given in the completion of the work.

IV. Comply with faculty regulations designed to reduce the possibility of cheating—such as removing unauthorized materials or aids from the room and protecting one's own examination paper from the view of others.

V. Maintain the confidentiality of examinations by divulging no information concerning an examination, directly or indirectly, to another student yet to write that same examination.

VI. Treat all members of the University community with respect and fairness.

VII. Report any instance in which reasonable grounds exist to believe that a student has given or received unauthorized aid in graded work or in other respects violated the Honor Code. Such report should be made to the Office of the Student Attorney General, the Office of the Dean of Students, or other appropriate officer or official of their college or school.

VIII. Cooperate with the Office of the Student Attorney General and the defense counsel in the investigation and hearing of any incident of alleged violation, including the giving of testimony when called upon.

Procedure for Reporting
Members of the University community who wish to report possible violations of the Honor Code should contact the Student Attorney General (966-4084) or the Office of the Dean of Students (966-4042). Faculty members who have cause to report a student should use the online report form available at the following Web site: honor.unc.edu.

Alcoholic Beverages Policy

(For complete alcoholic beverages policy, see appendix.)

The University's Policy on Student Possession and Consumption of Alcoholic Beverages in Facilities of the University of North Carolina at Chapel Hill sets forth the circumstances in which alcoholic beverage use, consistent with federal, state, and local laws and ordinances, is permitted in University facilities and on University property. Copies of the policy may be obtained from the Office of the Dean of Students, located in the Student and Academic Services Building North. The text of the policy can be accessed on the Web at policies.unc.edu/policy-category/university.

Drug Policy

(For complete drug policy, see appendix.)

Students, faculty members, administrators, and other employees of the University of North Carolina at Chapel Hill are responsible, as citizens, for knowing about and complying with the provisions of North Carolina law that make it a crime to possess, sell, deliver, or manufacture those drugs designated collectively as 'controlled substances' in Article 5 of Chapter 90 of the North Carolina General Statutes. Any member of the University community who violates that law is subject both to prosecution and punishment by the civil authorities and to disciplinary proceedings by the University. Also, recent federal legislation requires, as a condition of employment, that any faculty or staff member engaged in the performance of a federal grant or contract must abide by the University's Drug Policy and must notify his or her dean, director, or department chair of any criminal drug statute conviction for a violation occurring in the work place not later than five days after the conviction.

Disciplinary proceedings against a student, faculty member, administrator, or other employee will be initiated when the alleged conduct is deemed to affect the University's interests. Penalties will be imposed for violation of the policies of the University only in accordance with procedural safeguards applicable to disciplinary actions against students, faculty members, administrators and other employees. The penalties that may be imposed range from written warnings with probationary status to expulsions from enrollment and discharges from employment.

Every student, faculty member, administrator, and other employee of the University is responsible for being familiar with and complying with the terms of the Policy on Illegal Drugs adopted by the Board of Trustees. Copies of the full text of that policy are available from each student's dean, director, or department chair, or from the Office of the Dean of Students or the counseling service of the Office of Human Resources. The text of the policy may be accessed on the Web at policies.unc.edu/policy-category/university.

Smoking Policy

Smoking is prohibited in University facilities, residence hall rooms, apartments, and common area spaces, including hallways, lounges, lobbies, stairwells, laundries, vending areas, balconies, breezeways, connectors, and porches. Additionally, smoking is not permitted within 100 feet of any University building, or in state-owned vehicles. The University's policy regarding smoking may be accessed on the Web at policies.unc.edu/policy-category/university.

Disciplinary Records

Disciplinary files and records of cases that resulted in "not guilty" findings will be destroyed immediately after the hearing that rendered the "not guilty" verdict. Disciplinary files and records on other adjudicated cases will be maintained for 10 years after all appeal rights have expired or have been exhausted, and then destroyed. Disciplinary files for students who have been permanently suspended or expelled from the University are maintained indefinitely. Files on pending cases will be maintained indefinitely.

The release of information contained in a student's disciplinary file or education record is governed by the provisions of the Family Educational Rights and Privacy Act (see policies.unc.edu/policy-category/university).

Summary of the University's Policy on Prohibited Harassment, Including Sexual Misconduct, and Discrimination

The University's Policy on Prohibited Harassment, Including Sexual Misconduct, and Discrimination (campusconversation.web.unc.edu/policy) prohibits discrimination or harassment on the basis of an individual's race, color, gender, national origin, age, religion, creed, genetic information, disability, veteran's status, sexual orientation, gender identity, or gender expression. Appendices B and C of this policy provide specific information for students who believe that they have experienced sexual misconduct or have been harassed or have been discriminated against on the basis of one or more of these protected classifications.

Students who want additional information regarding the University's process for investigating allegations of harassment, including sexual misconduct, or discrimination, should contact the Equal Opportunity/ADA Office or the student complaint coordinator in the Office of the Dean of Students for assistance:

Equal Opportunity/ADA Office
100 E. Franklin Street, Unit 110
Campus Box 9160
Chapel Hill, NC 27599-9160
Telephone: (919) 966-3576
Fax: (919) 962-2562
E-mail: equalopportunity@unc.edu

Office of the Dean of Students
Student and Academic Services Building North
450 Ridge Road
Campus Box 5100
Chapel Hill, NC 27599
Telephone: (919) 966-4042
Fax: (919) 843-9778
E-mail: dos@unc.edu

Any administrator or supervisor, including a department chair, associate dean or other administrator, who receives a student's complaint about prohibited harassment or discrimination must notify the Equal Opportunity/ADA Office within five (5) calendar days of receiving the complaint. If a student raises a claim of prohibited harassment or discrimination during an academic appeal, an investigation of the student's claim must be performed under the direction of the Equal Opportunity/ADA Office. The school or department must await the results of the harassment or discrimination investigation before deciding the student's academic appeal.

Policy Statement on Nondiscrimination

The University is committed to providing an inclusive and welcoming environment for all members of our community and to ensuring that educational and employment decisions are based on individuals' abilities and qualifications. Consistent with this principle and applicable laws, it is therefore the University's policy not to discriminate in offering access to its educational programs and activities or with respect to employment terms and conditions on the basis of race, color, gender, national origin, age, religion, creed, genetic information, disability, veteran's status, sexual orientation, gender identity, or gender expression. Such a policy ensures that only relevant factors are considered and that equitable and consistent standards of conduct and performance are applied. Copies of the University's EPA and SPA Equal Opportunity Plans are available on the University's Web site at equalopportunity-ada.unc.edu/index.htm.

Any inquiries regarding the University's nondiscrimination policies should be brought to the attention of one of the following administrators, as noted:*

Discrimination in employment or educational programs and activities:
Equal Opportunity/ADA Office
100 E. Franklin Street, Unit 110
Campus Box 9160
Chapel Hill, NC 27599
Telephone: (919) 966-3576
Fax: (919) 962-2562
E-mail: equalopportunity@unc.edu

Discrimination in employment:
Vice Chancellor for Human Resources
300 South Building
Campus Box 1000
Chapel Hill, NC 27599-3000
Telephone: (919) 962-1554

Academic Personnel Office
218 South Building
Campus Box 8000
Chapel Hill, NC 27599-8000
Telephone: (919) 843-6056

Sex discrimination in educational programs and activities:
University Title IX Officer
100 E. Franklin Street, Unit 110
Campus Box 9160
Chapel Hill, NC 27599-9160
Telephone: (919) 966-3576
Fax: (919) 962-2562
E-mail: equalopportunity@unc.edu

Deputy Title IX Officer
Office of the Dean of Students
Student and Academic Services Building
North, 450 Ridge Road, Campus Box
5100, Chapel Hill, NC 27599
Telephone: (919) 966-4042
Fax: (919) 843-9778
E-mail: dos@unc.edu

The University's Office of Counseling and Psychological Services ([919] 966-3658) is available to provide confidential assistance to students. The University's Ombuds Office ([919] 843-8204) is available to provide confidential assistance to employees.

* The University's policy prohibiting discrimination on the basis of sexual orientation, gender expression, and gender identity does not apply to the University's relationships with outside organizations, including the federal government, the military, ROTC, and private employers.

Amorous Relationships

According to a system-wide policy adopted by the University of North Carolina Board of Governors in 1996, it is misconduct, subject to disciplinary action, for a University employee, incident to any instructional, research, administrative, or other University employment responsibility or authority, to evaluate or supervise any enrolled student of the institution with whom he or she has an amorous relationship or to whom he or she is related by blood, law, or marriage. It is misconduct, subject to disciplinary action, for a University employee to engage in sexual activity with any enrolled student of the institution, other than his or her spouse, who is a minor below the age of 18 years.

Friendships or mentoring relationships between faculty or instructional staff and students are not proscribed by this policy. Nor is it the intent of this policy that such nonamorous relationships be discouraged or limited in any way. Copies of the full text of this policy are available from each student's dean, director, or department chair, the Office of the Dean of Students, the Office of Human Resources, the Office of the University Counsel, or the Equal Opportunity/ADA Officer. The text of this policy is available on the Web at policies.unc.edu/policy-category/university (click on "Improper Relationships between Students and Employees").

Transportation and Parking

Parking

Every student at UNC–Chapel Hill and UNC Hospitals who parks an automobile between 7:30 a.m. and 5:00 p.m. on weekdays in the University's designated reserved parking is required by the Department of Public Safety to obtain and display a parking permit. Parking permit holders must park only in specific zones as indicated on their parking permits. After 5:00 p.m. on weekdays, however, students may park in any unreserved space except those in resident student lots, which are reserved until 9:00 p.m. Please note the signs at the entrances to each lot which detail the hours of enforcement for that parking area.

Motor vehicle parking permits may be applied for during online registration procedures at the Department of Public Safety. Vehicles found parked illegally may be cited by the Department of Public Safety's Parking Control Division, and subsequent violations may result in further citations, immobilization ("booting"), or towing of the vehicle. Citations may be appealed through the Department of Public Safety's Appeals Office within 10 calendar days upon receipt of the citation. Citations can be appealed in person during office hours Monday through Friday from 7:30 a.m. to 5:00 p.m., online at www.dps.unc.edu, or by regular mail.

The Parking Control Division operates MAP, the cost-free Motorist Assistance Program. If a vehicle requires a "jump start" or if the keys are locked inside the vehicle, motorists may call for assistance at 962-8006 (weekdays 7:00 a.m. to 9:00 p.m.). During all other times (and on University holidays), the UNC Police Department should be contacted for motorist assistance at 962-8100.

The Commuter Alternatives Program

The Commuter Alternatives Program (CAP) is an initiative with the goal of reducing campus traffic congestion and parking demand through the promotion and management of viable alternatives to single-occupancy vehicle use at UNC–Chapel Hill. It is a free program designed to reward campus community members for the use of bicycling, walking, transit, park and ride services, and ridesharing. CAP requires only that a registrant commute to UNC from outside a two-mile radius from the Bell Tower at the center of the campus and not be registered for a parking permit. CAP has a listserv, giveaways, prizes, discounts to local merchants, and daily benefits in relation to alternative transportation programs. For more information or to request a brochure, call the Department of Public Safety at (919) 962-3951 or visit the student CAP link on the department's Web site at www.dps.unc.edu/Transit/gettingtowork/CAP/studentcap.cfm.

Alternatives to Parking

The Web site www.redefinetravel.org provides excellent information on student transportation alternatives. RedefineTravel.org is designed to give students all the information needed to ride the bus, ride with friends, or bike to great destinations throughout the Triangle. The site includes a Transit Trip Planner to popular destinations; schedules for Triangle Transit, Durham Area Transit Authority, Capital Area Transit, and Chapel Hill Transit; information about Triangle Transit's express bus to Raleigh; bike safety information and city bike maps; a calorie counter to show how active transportation affects health; information on student carpool options; and a calculator tool that calculates how much an individual can save by using alternative transportation.

Municipal and Regional Transit

The University, Chapel Hill, and Carrboro work together to provide the fare-free Chapel Hill Transit system. No exchange of money, coupons, or display of a bus pass is needed when boarding a Chapel Hill Transit bus. Campus U route and RU (Reverse U) shuttles run in continuous loops from 7:00 a.m. to 8:00 p.m., serving nearly every area on campus.

Commuting students can use any of the town park and ride lots, or they can join the Commuter Alternative Program and gain access to additional CAP (Commuter Alternative Program) park-and-ride lots. Chapel Hill Transit provides free and quick service to and from campus to the park-and-ride lots. Student CAP participants receive one one-day occasional use pass per semester allowing free parking on S11 zoned lots. In addition, in the case of an emergency, UNC–Chapel Hill's Emergency Ride Back service is available to provide transportation to the park-and-ride lots or any location within Carrboro or Chapel Hill municipal boundaries. Consult the Chapel Hill Transit Web site at www.chtransit.org for information on specific routes.

Regional transit (to and from RDU, Raleigh, and Durham) is available aboard Triangle Transit buses. Included in the full complement of regional service is express service from Raleigh to UNC–Chapel Hill and from Hillsborough to UNC–Chapel Hill. For more route information, call Triangle Transit at (919) 485-RIDE or visit www.triangletransit.org.

Commuting students must join CAP by visiting the Department of Public Safety Building, bringing proof of their PID number. If the student is a licensed driver, then he or she must also present a driver's license, plate, make and model of any vehicles owned and proof of auto insurance.

Park-and-Ride Lots

There are four town park-and-ride lots and five additional lots available to those who join UNC–Chapel Hill's Commuter Alternative Program. Many commuting students find the park-and-ride services to be a reliable transportation solution. Triangle Transit also serves some of the lots. The nine lots encircle the campus, and space is available on a first-come, first-served basis. Parking at the preferred lot is usually possible, but not guaranteed as the most popular lots fill up by the end of rush hour.

Point-to-Point

Point-to-Point transportation (P2P) offers fare-free, fixed-route service aboard the P2P Express minibuses, operating on a continuous loop around campus during evening hours, 7:00 p.m. until 3:00 a.m., seven nights a week (when residence halls are open) during fall and spring academic semesters. Students must show their UNC ONE Card to board the P2P Express. After dark, a demand-response van can be accessed by students in areas that are not served by the P2P Express route.

P2P also offers fare-free, demand-response transportation service to disabled students and students going to or from Campus Health Services 24 hours a day.

Safe Ride

A student-run program called "Safe Ride" aims to provide increased mobility between 11:15 p.m. and 2:30 a.m. on weekend evenings. Although it shares part of the name, this is a different program from the P2P Library Safe Ride Shuttle. There are three Safe Ride bus routes operating on Thursday, Friday, and Saturday nights. They provide service between campus and many private student housing developments, as well as other off-campus destinations after Chapel Hill Transit routes service ends for the evening. For more information, phone Chapel Hill Transit at (919) 969-4900, or visit the Web site at townofchapelhill.org/index.aspx?page=1586.

UNC Bicycle Registration

The Department of Public Safety requires bicycle registration for bicycles stored or traveling on campus. The program serves as a deterrent to crime, aids in the identification of lost or stolen bicycles, and enables the department to plan for improved bicycle parking facilities around campus in the future. Forms for bicycle registration are available at the following Web site: www.dps.unc.edu/Forms/Bike%20Registration/bike1.cfm.

You can also obtain registration forms at the Department of Public Safety. Cyclists who live more than two miles from the Bell Tower may join the Commuter Alternative Program.

Zimride Rideshare Matching

Zimride is an easy way to share the seats in your car or catch a ride. The UNC–Chapel Hill private Zimride community allows you to find friends, classmates, and coworkers going the same way you are. UNC–Chapel Hill Zimride helps you offer or request rides for commutes, road trips, and popular events. If you have a car, split costs by offering rides. If you don't have a car, find rides where you need to go. For more information, visit zimride.unc.edu.

Zipcar for Students 18 and Older

For students 18 and older, Zipcar, UNC–Chapel Hill's car-sharing program, provides another option. For a $35 annual fee, reimbursable in driving credits if used within 30 days, six on-campus Zipcars can be reserved for short or long trips. Currently, UNC–Chapel Hill has a Honda Civic, two Toyota Matrix four-doors, and a Mazda 3. Cars are reserved online or by using a toll-free phone number. The Zipcar membership card serves as the key to the vehicle, and a gas card is inside. Fuel, insurance, and maintenance bills are footed by the program, and the reservation rate is $5 per hour with a $55 per day maximum fee. More information can be found by visiting www.zipcar.com/unc, dialing 866-4ZIPCAR, or e-mailing info@zipcar.com.

For More Information

Visit the Department of Public Safety during regular business hours (weekdays 7:30 a.m. to 5:00 p.m.), in the Public Safety Building via Morrison Drive (just off Manning Drive) on south campus. For more information on parking and transportation at UNC–Chapel Hill, log onto the Department of Public Safety's Web site at www.dps.unc.edu. You may also "like" the department on Facebook (UNC Public Safety) or choose to follow us on Twitter (@UNCDPS). Concerns may be addressed at the following campus telephone numbers:

- General Information (919) 962-3951, 3952
- Police Emergencies 911
- Police Non-emergencies (919) 962-8100
- Parking Control (919) 962-8006
- Accounts Receivable (919) 962-6073
- Parking Appeals (919) 962-3953
- Visitor Pay Operations Parking (919) 966-4424
- Point-to-Point Shuttle Dispatcher (919) 962-7867 (962-"P-TO-P")
- Commuter Alternatives Program (919) 843-4414

Students with temporary physical handicaps or other hardships requiring special consideration should contact the Department of Disability Services for complete information on transportation options. To get specific information about steps to take to obtain a disability permit, visit the Department of Public Safety or the Web site www.dps.unc.edu/permit%20information/studentdisability.cfm.

Graduate Degrees Conferred at UNC–Chapel Hill *(administered through The Graduate School)*

American Studies –
- American Studies – M.A., Ph.D.
- Folklore – M.A.

Anthropology – M.A., Ph.D.
Art –
- History – M.A., Ph.D.
- Studio Art – M.F.A.

Biochemistry and Biophysics – M.S., Ph.D.
Bioinformatics and Computational Biology – Ph.D.
Biology – M.A., M.S., Ph.D.
Biomedical Engineering – M.S., Ph.D.
Business Administration – M.S. (Management), Ph.D.
Cell and Developmental Biology – M.S., Ph.D.
Cell and Molecular Physiology – M.S., Ph.D.
Chemistry – M.A., M.S., Ph.D.
City and Regional Planning – M.C.R.P., Ph.D.
Classics – M.A., Ph.D.
Communication Studies – M.A., Ph.D.
Comparative Literature – M.A., Ph.D.
Computer Science – M.S., Ph.D.
Dentistry –
- Dental Hygiene Education – M.S.
- Endodontics – M.S.
- Operative Dentistry – M.S.
- Oral Biology – M.S., Ph.D.
- Oral and Maxillofacial Pathology – M.S.
- Oral and Maxillofacial Radiology – M.S.
- Oral and Maxillofacial Surgery – M.S.
- Orthodontics – M.S.
- Pediatric Dentistry – M.S.
- Periodontology – M.S.
- Prosthodontics – M.S.

Dramatic Art – M.F.A.
Ecology – M.A., M.S., Ph.D.
Economics – M.S., Ph.D.
Education –
- Curriculum and Instruction – Ed.D.
- Educational Leadership – Ed.D.
- Master's/Doctorate in Education – M.A., Ph.D.
- Master of Arts in Teaching – M.A.T.
- School Counseling – M.Ed.
- School Psychology – M.A., M.Ed., Ph.D.

English – M.A., Ph.D.
Exercise and Sport Science – M.A.
Genetics and Molecular Biology – M.S., Ph.D.
Geography – M.A., Ph.D.
Geological Sciences – M.S., Ph.D.
German Studies – M.A., Ph.D. (joint with Duke University)
Global Studies – M.A.
History – M.A., Ph.D.
Human Movement Science – M.S., Ph.D.
Information and Library Science – M.S.I.S., M.S.L.S., Ph.D.
Journalism and Mass Communication –
- Mass Communication – M.A., Ph.D.
- Technology and Communication – M.A.

Linguistics – M.A.
Marine Sciences – M.S., Ph.D.
Materials Science – M.S., Ph.D.
Mathematics – M.A., M.S., Ph.D.
Microbiology and Immunology – M.S., Ph.D.
Musicology – M.A., Ph.D.
Neurobiology – M.S., Ph.D.
Nursing – D.N.P., M.S.N., Ph.D.
Occupational Science – Ph.D.
Occupational Therapy – M.S.
Pathology – M.S., Ph.D.
Pharmaceutical Sciences – M.S., Ph.D.
Pharmacology – M.S., Ph.D.
Philosophy – M.A., Ph.D.
Physics – M.S., Ph.D.
Political Science – M.A., Ph.D.
- Off campus – M.A. (Transatlantic Master's)

Psychology – M.A., Ph.D.
Public Administration – M.P.A., MPA@UNC (Off-campus)
Public Health –
- Biostatistics – Dr.P.H., M.P.H., M.S., M.S.P.H., Ph.D.
- Environmental Sciences and Engineering – M.P.H., M.S., M.S.E.E., M.S.P.H., Ph.D.
- Epidemiology – M.P.H., M.S.C.R., M.S.P.H., Ph.D.
- Health Behavior – Dr.P.H., M.P.H., M.S.P.H., Ph.D.
- Health Policy and Management –
  - Residential – M.H.A., M.P.H., M.S.P.H., Ph.D.
  - Off-campus – Dr.P.H. in Public Health Executive Leadership, M.H.A. in Health Policy and Management, M.P.H. in Public Health Policy and Management, M.S.D.M. (not active)
- Maternal and Child Health –
  - Residential – Dr.P.H., M.P.H., M.S.P.H., Ph.D.
  - Off-campus – M.P.H., M.S.P.H.
- Nutrition – Dr.P.H., M.P.H., M.S., Ph.D.
- Public Health Leadership –
  - Residential – M.P.H.
  - Off-campus – M.P.H.

Public Policy – M.A., Ph.D.
Rehabilitation Counseling and Psychology – M.S.
Religious Studies – M.A., Ph.D.
Romance Languages and Literatures – M.A., Ph.D.
Social Work –
- Residential – M.S.W., Ph.D.
- Off-campus – M.S.W.

Sociology – M.A., Ph.D.
Speech and Hearing Sciences – M.S., Ph.D.
Statistics and Operations Research – M.S., Ph.D.
Toxicology – M.S., Ph.D.

Certificate Programs

Programs have various options when developing specialized studies for postbaccalaureate, graduate, and professional students. A Certificate Program is a formal program of courses and other related experiences in a field of specialization. In some disciplines, a certificate is akin to a professional credential, while in others, a certificate is recognition of competence in a given skill, practice, or field of study. Like an academic degree, a Certificate Program is offered by a host academic school, department, or curriculum and is related to an academic area of study. It carries academic credit. The campus encourages interdisciplinary and inter-institutional Certificate Programs where appropriate. All certificate programs that award academic credit, regardless of intended audience, are governed within The Graduate School.

For additional information about certificate programs, please see gradschool.unc.edu/policies/certificates.html.

Academic Program Listings of Graduate Faculty and Courses

Appointment to the Graduate Faculty

Graduate faculty members whose appointments are current as of the publication date of this *Record* are listed by academic rank in the department(s) in which they serve. Comprehensive listings of the graduate faculty may also be found at gradschool.unc.edu/policies/faculty-staff/faculty. Within the school and departmental sections of the *Graduate Record*, following the faculty member's name, where applicable, is a section number that students should use when registering for independent studies, reading, research, and thesis and dissertation courses with that particular professor. Areas of specialization are listed for each faculty member following the section number.

Course Numbers and Credit

Courses numbered 400–699 are for advanced undergraduates and graduates; courses numbered 700–999 are for graduates only. The unit of measurement in meeting degree requirements is the semester hour—that is, one hour of lecture or at least two hours of laboratory or fieldwork a week per semester. The number in parentheses following the course title in the sections "Courses for Graduates and Advanced Undergraduates" and "Courses for Graduates" indicates the value of the course in semester hours.

Department of American Studies

amerstud.unc.edu
folklore.unc.edu
BERNARD HERMAN, *Chair*
PATRICIA SAWIN, *Coordinator of the Folklore Program*

*Core members of the Folklore Program are indicated with *.*

Professors

Robert Allen, American Cultural History, Media Studies, Digital Humanities, Global American Studies
*William Ferris, Southern Music and Literature, Documentary Studies, American South
Philip Gura, American Literature, American Studies
*Bernard Herman, Material Culture, Visual Culture, Vernacular Arts, Foodways
John Kasson, American Intellectual and Cultural History, Technology and Society, Art and Literature, Popular Culture
Joy Kasson, American Visual Culture, Literature, Popular Culture, Cultural History

Associate Professors

Daniel Cobb, American Indian History, 20th-Century History and Culture
*Marcie Cohen Ferris, Southern Jewish History, American Foodways, Women's Studies, Folklore, Material Culture
*Glenn Hinson, Ethnography, African American Expressive Culture, Belief Systems, Vernacular Art, Public Folklore, American South
Tim Marr, American Literature and Culture, American Studies Theory, Globalization, American Encounters with Southeast Asia
*Patricia Sawin, Folklore Theory, Gender, Narrative, Festival, Ethnography of Speaking
*Christopher Teuton, North American Indigenous Oral and Written Literatures, Indigenous Critical Theory; Nineteenth Century American Literature and Culture
Rachel Willis, Labor Economics, Access to Work, History of the University, Documentary Studies

Assistant Professors

Michelle Robinson, 19th-Century American Literature and Culture, Detective Fiction, Women's History, Religious Movements
Jenny Tone-Pah-Hote, American Indian Material and Expressive Culture, American Indian Art History, Museums, Tourism, the Plains, and American Indian Social and Cultural History

Adjunct Faculty in American Studies

Yaakov Ariel, Religious Studies, Religion in the Americas, Evangelicals and Jews; Jewish Renewal; Jewish New Religious Movements; Christianity and Israel
Carole Blair, Communication Studies, Visual and Material Rhetorics, Rhetoric and Memory, and Rhetorics of Place, Contemporary Rhetorical Theory and Criticism
Fitzhugh Brundage, History, American History since the Civil War, Southern History
Kathleen DuVal, History, Early America, Particularly Cross-Cultural Relations on North American Borderlands
Lawrence Grossberg, Communication Studies, Media and Cultural Studies
Minrose Gwin, English, 20th-Century American Literature, Critical Theory and Cultural Studies, Southern Literature
Reginald Hildebrand, History and African American Studies, Emancipation in the South
Jennifer Ho, English, 20th-Century American Literature, Asian-American Literature, Critical Theory and Cultural Studies
Emily Kass , Museum Studies and Administration, Art History, Contemporary Art.
Malinda Maynor Lowery, History, Native American History, Southern History, Race and Ethnicity
Richard Marciano
Eliza Richards, English, 19th-Century American Literature, Gender Studies, American Poetry
Ruth Salvaggio, English, 18th-Century Literature, Feminist Theory
Anne Whisnant, Public History, Digital Humanities, Landscape and Memory
Heather Williams, History, African Americans in 19th and 20th Centuries

Additional Faculty in Folklore

Professors

James L. Peacock (11) Culture Change, Symbolic Systems, Southeast Asia

Della Pollock (9) Performance of Literature, Performance Theory and Criticism, Cultural Studies

Associate Professors

Robert Edward Daniels (4) Social Anthropology, Culture and Personality, Africa

Valerie Lambert (59) American Indians, Ethnography, Political and Legal Anthropology, Sovereignty, Identity, Race and Racism, Elites

*Jocelyn Neal (7) Country Music, 20th-Century Theory, Popular Music, Southern Studies

Christopher Nelson (64) History and Memory, Everyday Life, Ethnography, Critical Theory, Storytelling, Ritual and Performance, Japan and Okinawa

Karla Slocum (56) Global/Local Studies, Social Movements, Agency, Development, Gender, Applying Anthropology, Caribbean

Professors Emeriti

*Robert Cantwell, Folklore, Vernacular Music, Culture and Human Rights, Folklore Theory, Jane Addams, Pragmatism and the Progressive Era, Jewish Writers, Close Reading

Trudier Harris, African American Folklore and Literature

Daniel W. Patterson, Ballads, American Folksong, Religious Folklife, Gravestones, American South

Theda Perdue, Native American History

Charles Gordon Zug, Pottery, Material Culture, Narrative, Maritime Folklife, Folk Art, American South

The American Studies Department is the home for the master's degree in folklore. It also offers graduate courses that may be taken as part of a graduate minor by students admitted in other departments. Requirements for these, and for the M.A. and Ph.D. degrees in American Studies, follow.

Ph.D. in American Studies

amerstud.unc.edu/programs/graduate-studies/ph-d-in-american-studies/

Recruitment and Admissions

Application for admission must be made on forms provided by The Graduate School or by The Graduate School's electronic application process. These also serve as applications for fellowships and assistantships if the applicant marks the appropriate statement on the form.

Applicants for advanced degrees must have completed an undergraduate degree. Students will be admitted from a wide range of undergraduate programs, and some will be admitted with an M.A. from American Studies or another relevant department. Candidates for admission should be firmly grounded in the humanities, social sciences, or the arts. The best qualified students should articulate an interest in American history, literary, expressive and/or material culture, and/or critical theory, should show some familiarity with library, Web-based, and/or ethnographic research methods, and should offer a specific rationale for their interest in the UNC–Chapel Hill graduate program. In addition to the Graduate School application form, candidates for admission will present a twenty to twenty-five page writing sample, a statement of purpose, three letters of recommendation, official undergraduate transcripts, GRE aptitude scores, and a *curriculum vitae*. Transfer credits may be awarded at the department's discretion on the basis of course equivalencies.

Degree Requirements

All students will be admitted to the doctoral program at UNC–Chapel Hill. Applicants do not need a master's degree prior to admission in the program. The M.A. degree in American Studies is typically earned at the end of the fourth semester, but students planning to earn a terminal master's degree will not be admitted to the program. Students admitted with an M.A. in a related field such as Folklore will take some additional core courses as they progress toward the American Studies Ph.D.

For the Master of Arts Degree in American Studies

30 credit hours, of which at least 21 must be in American Studies, including:

- AMST 700, *The History and Practices of American Studies*
- AMST 701, *Interdisciplinary Research Methodologies*
- AMST 702, *Readings in American Studies*
- AMST 901, *M.A.Research Seminar*
- AMST 992, *Thesis Substitute*
- Two more courses drawn from American Studies and Folklore graduate offerings
- Additional courses (9 credit hours) in American Studies or other related departments
- A capstone project (thesis substitute) with oral defense

At least two semesters in residence.

Capstone Project

The Department of American Studies requires a capstone project, which replaces the traditional master's thesis and will be submitted, after revision, in the second month of the student's fourth semester. This paper, which may stem from previous work in the student's career, usually will be 35-50 pages in length and should take the form of a potentially publishable essay or equivalent project. This requirement is in accord with the best practices in humanities departments at UNC–Chapel Hill and peer institutions, and recognizes the fact that successful students often publish work during their graduate careers. The Capstone Project will be read by a three-person committee consisting of the student's primary advisor and two other members of the graduate faculty, at least one of whom must come from the American Studies faculty.

After the defense and discussion among the committee members, the student's advisor will convey in writing to the Director of Graduate Study an evaluation of the Capstone Project and the student's progress to date.

Colloquium

All students enrolled in the American Studies graduate program will participate throughout their graduate careers in a monthly colloquium in which faculty and Ph.D. candidates will offer presentations of their work-in-progress. The colloquium exposes graduate students to the research interests of faculty in American Studies and allied fields, and may also include visiting graduate students and faculty from international partner institutions. The Colloquium is the collegial wellspring of the program, the intellectual and social center of the American Studies community, the conversation occurring there will naturally both inform and be informed by classroom work, particularly in AMST 700, 701, and 702, will help to shape, against the backdrop of individual specializations, a common discourse, and in large part provide a site for the formation of the American Studies social and intellectual community.

Assessment

The American Studies graduate faculty will meet in the spring semester to evaluate the progress toward degree of first-year students, and to review second-year students who have completed their capstone projects, consider the assessment of each student's committee, and evaluate the student's process toward the Ph.D. For students who elect not to continue in the program or whom the faculty does not believe to be progressing satisfactorily, the submission and defense of the capstone project will conclude their course of study at UNC and departmental financial support.

- Factors for satisfactory progress include:
- Academic performance reflected primarily in seminars and independent studies;
- Contributions to the intellectual life of the program and department;
- Successful and timely completion of the capstone requirement;
- Recommendation of the student's advisor and director of graduate studies.
- The M.A. degree will be awarded after completion of all courses required for the M.A. and the capstone project.

The Ph.D. in American Studies

With its continuing emphasis upon interdisciplinarity and collegiality, the Ph.D. program in American Studies provides candidates with a number of occasions, including the ongoing monthly Colloquium, for sharing discourses and ideas, developing research areas and dissertation topics, and designing, collaboratively, comprehensive examination reading lists reflecting both local consensus and individual concentration. The Ph.D. curriculum balances particular American Studies graduate course offerings within American Studies itself with cognate courses across the Arts and Sciences graduate curricula; within these the Ph.D. candidate will develop three specific fields. For all students, "American Studies" will constitute the major field, and the other two field concentrations will reflect specializations defined by the student and his/her committee. Examples of fields include American Indian Studies, Southern Studies, Folklore, Visual and Material Culture, American Literature, U.S. History, American Religious Studies, Ethnic Studies, or other relevant areas that reflect the strengths of the faculty in American Studies and in cognate departments. A teaching portfolio of syllabus, bibliography, lesson plan, sample lectures, and related material, will demonstrate pedagogical and scholarly proficiency in one of the field concentrations. In some cases, the director of graduate studies may approve the substitution of a professional portfolio directed toward museum, archival, or public history applications of the field. The major field and second field concentration will be assessed by means of comprehensive exams. An Advisory Committee will assist the candidate in course selection, help to define areas of specialization, administer the comprehensive examination, approve the student's dissertation prospectus, assess progress towards completion, and finally read the student's dissertation and approve the oral defense of dissertation.

The Department of American Studies offers a separate M.A. degree in Folklore. Students in the Folklore M.A.may apply for admission to the Ph.D. in American Studies. Admission to the M.A.in Folklore does not constitute admission to the Ph.D. in American Studies.

The Ph.D. program seeks to incorporate flexibility in course options and to allow students to fulfill basic requirements in a variety of ways suited to their progress in consultation with their advisors. It is our intention that greater flexibility in the degree requirements related to core courses will allow faculty to offer more thematic or topical research seminars designed to attract students from a variety of fields.

For the Ph.D. Degree in American Studies

An additional 24 credit hours, including:

- AMST 890, Topics in American Studies
- AMST 902, Ph.D. Research Seminar
- AMST 994, Dissertation Registration (6 hours)
- Additional courses (12 credit hours) in American Studies or other related departments
- Demonstration of proficiency in one language other than English
- Successful completion of written comprehensive examinations in three fields (one takes the form of the teaching portfolio)
- Successful completion of a comprehensive oral examination
- Dissertation prospectus and oral defense
- Ph.D. dissertation
- Successful completion of an oral defense of dissertation

At all stages of progress to degree students are encouraged to seek funding for summer advanced language training and pre-dissertation field research as needed.

Assessment

Student progress toward the Ph.D. will be assessed annually by the American Studies faculty.

Factors for satisfactory progress include:

- Academic performance reflected primarily in completion of coursework and performance in seminars and independent studies;
- Contributions to the intellectual life of the program and department;
- Language proficiency;
- Comprehensive exams, including teaching portfolio;
- Dissertation proposal;
- Recommendation of the student's advisor and director of graduate studies.

Language Proficiency

Ph.D. candidates will have demonstrated reading proficiency in *one* language other than English before the beginning of their fifth year of study (third year if admitted with an M.A.).

Language competence may be demonstrated in one of three ways:

- An undergraduate degree in language study;
- Successful completion of a university-administered language examination or other examination approved by the director of graduate studies;
- Successful completion (at least a B grade) of an undergraduate literature course in any language other than English. Such a course will not count toward required graduate credits.

Teaching Portfolio

Students will prepare a teaching portfolio, to be submitted as part of the comprehensive exams. The teaching portfolio will demonstrate competence in course and curricular development, class preparation and classroom performance, as well as proficiency in scholarly and pedagogical uses of digital technologies, and will constitute the written exam in one of the student's field concentrations. The teaching portfolio is an exercise in course planning, not necessarily a course actually taught. Potential topics are limitless, since the portfolio will highlight a field of concentration individualized for each student. It should be envisioned as a senior seminar or capstone course on a topic of the student's devising, not a standard introductory or methodological course. Over the years, students will continue to produce new and innovative portfolios, just as

they will produce original dissertation proposals. The teaching portfolio will include the following:

- Complete syllabus including a fourteen week class schedule, requirements, readings, and student assessment;
- Bibliography divided into the core bibliography for students in the projected course and the comprehensive bibliography used by the instructor for course development;
- Sample lectures including notes, supporting materials such as digital image presentations and/or audio content;
- Related supporting material as deemed appropriate.

Occasionally, students may choose to prepare a professional portfolio in their field concentration directed toward museum, archival, or public history applications of the field. Requirements for such a portfolio will be determined by the director of graduate studies in conjunction with the student and his/her committee.

Teaching and Professional Development

All students will be expected to teach as part of their service requirement for financial aid. Teaching experience is fundamental to preparation for the professoriate. In their first year of graduate study, students may participate, under supervision, in collaborative faculty-student undergraduate teaching assignments. (Students entering with a Master's Degree may begin teaching in their first year). Students may also apply for teaching assistantships in undergraduate courses. After supervised classroom teaching (TA), depending upon the availability of assistantships, students may develop and teach undergraduate courses in their special topics. The Teaching Portfolio may provide the basis for an independently taught course.

Comprehensive Exams

Comprehensive exams will be held normally in the spring of the third year for students admitted with a B.A. and in the spring of the second year for students admitted with an M.A. Reading lists will emerge from students' work in AMST 902. Students and faculty will work collaboratively, with the aim of integrating the best work with the most current scholarship in particular fields. The Ph.D. Comprehensive Examination will address reading lists in two fields (the successful completion of a Teaching Portfolio constitutes the third exam) and will be administered in the form of two three-hour written sessions, one in the American Studies major field and one in the field concentration. The major and field concentration exams will be offered on separate days no more than ten working days apart. The exam schedule will be set by the director of graduate studies and announced the previous semester. Individual students and their faculty committees will collaborate to set the parameters of the exams with core materials covered in the major exam in "American Studies" and individual reading lists developed for the field concentration. Shortly after passing the written exam, students will undergo a 90-minute oral exam covering the American Studies major and the field concentrations. Students are expected to receive passing evaluations in all three examination areas as well as the oral exam. Any student who fails one or more sections of the exam may repeat the failed section(s) only once.

Doctoral Dissertation

The dissertation prospectus will normally be due within three months of the successful completion of the Comprehensive Exams and the acceptance of the Teaching Portfolio. Meetings with the student's doctoral advisory committee will refine the proposal. The prospectus must be approved by the committee following a prospectus defense. Students should normally plan to complete the doctoral dissertation during the spring of the third year of doctoral studies (the fifth year of matriculation for students beginning the program without an MA; the third year for students admitted with an MA).

Students register for AMST 994 once they have passed their comprehensive exams. AMST 994 registration allows students to conduct dissertation research on or away from campus. A minimum of 6 hours are required and cannot be taken simultaneously during one semester.

- Dissertation writing groups. The department strongly urges students to participate in dissertation writing groups with other students in their same field or with similar interests or approaches.
- Dissertation defense. Upon completion of the Dissertation, all degree candidates must successfully defend their dissertations before a committee of at least five faculty consisting of their advisory committee supplemented by two other qualified members.

M.A. in Folklore

folklore.unc.edu

The Folklore Program, which operates within the departmental structure of American Studies, offers a M.A. in Folklore that is wholly independent of the American Studies graduate program. Our program focuses on the study of creativity and aesthetic expression in everyday life and on the social and political implications of this expression as it unfolds in the contested arenas of culture. Not bound to traditional definitions of folklore, and committed to preparing students for ethical practice in a multicultural world, the Folklore Program offers a flexible M.A. curriculum that readies students for both public practice and further academic study.

The second decade of the 21st century marks the seventh decade of the Folklore Program's presence at UNC–Chapel Hill. Founded with an eye to regional study and deeply integrated with the University's long-standing focus on Southern history, literature, and culture, the program maintains its commitment to the study of regional folklife. This dedication, however, in no way limits the program's vision. While students and faculty do much of their fieldwork in the South, they also work in a range of other regions and countries. Faculty interests cluster in the areas of music, language, and narrative, African American culture, public folklore, gender, material culture, vernacular architecture and landscape, foodways, self-taught art, occupational folklife, and the politics of culture. Deeply committed to collaborative work in the public realm, folklore program members work extensively with local communities, pursuing projects with museums, arts councils, media production companies, and a range of other organizations.

Of particular interest to students and scholars interested in the Folklore Program are the University's extensive library and archival collections. UNC's libraries have extensive holdings of books, manuscripts, periodicals, images, and both field and commercial sound and visual recordings relating to vernacular culture, with especially strong and growing holdings for the American South and the British Isles. Particularly notable among these collections are the Archie Green Occupational Folklife Collection, the Mike Seeger Collection of southern vernacular music, the Don Yoder Collection of American religious tune books, and the John Edwards Memorial Collection of early Southern commercially recorded folk and popular music, all part of the Southern Folklife Collection.

Degree Requirements: The M.A. program in folklore balances flexibility and a focus on students' own areas of interest with requirements designed to insure knowledge of key issues and texts in the discipline. Master's students must complete 10 courses (30 hours). Two specific courses—Approaches to Folklore Theory (FOLK 850) and The

Art of Ethnography (FOLK 860)—are required, and students must take three other courses offered by core faculty. Students also traditionally take courses in a variety of associated graduate programs, including anthropology, communications studies, English, history, and music, or take advantage of the opportunity to enroll in courses at neighboring universities, particularly those offered at the Center for Documentary Studies at Duke. Students pursuing an M.A. must compile a critical literature review at the beginning of their third semester, and must complete and defend a thesis at the end of their second year of study. They must also demonstrate reading proficiency in a language other than English.

Students may also opt for a folklore minor in another Ph.D. program. Students pursuing the minor complete six courses, chosen in consultation with the program coordinator.

Graduate Minor in American Studies

amerstud.unc.edu/programs/graduate-studies/graduate-minor

The Curriculum

American studies is a nationally and internationally recognized field, comprising the interdisciplinary study of American culture. The object of study is American culture in all its diversity, and the methodologies include historical, literary, and visual analysis as well as ethnography, sociology, economics, and political science as appropriate. The American Studies Department at UNC offers courses in the theory and methodology of American studies and in concentrations including American Indian studies, folklore, material culture studies, and Southern studies. The American studies graduate minor serves students admitted in a variety of departments, including art, communications studies, English, history, religious studies, and others. Interdisciplinary training can enhance scholarly and teaching capabilities for these students.

Applications

See the department chair or director of graduate studies.

Requirements for the Minor in American Studies

The graduate minor consists of five courses, to be selected with the advice of the chair or director of graduate studies in American studies. These courses should include AMST 700 or 701 and at least two other graduate courses with American studies designation. Additional courses may be chosen from cognate departments.

Courses for Graduate and Advanced Undergraduate Students

AMST

410 Senior Seminar in Southern Studies (3). We will engage such topics as race, immigration, cultural tourism, and memory to consider conceptions of the South. Students will research a subject they find compelling and write a 20- to 25-page paper.

440 American Indian Poetry (3). This course explores the relation of American Indian poetry and music in English to the history and culture of indigenous communities and their relation to the United States.

466 You Are Where You Live: The American House in Critical Perspective (3). This course emphasizes the complexities of human shelter in the United States. We learn housing types, explore their social uses and meanings, and evaluate critical issues, such as affordability and gentrification.

482 Images of the American Landscape (3). This course will consider how real estate speculation, transportation, suburbanization, and consumerism have shaped a landscape whose many representations in art and narrative record our ongoing struggle over cultural meaning.

483 Seeing the U.S.A.: Visual Arts and American Culture (3). Examines the ways in which visual works—paintings, photographs, sculpture, architecture, film, advertising, and other images—communicate the values of American culture and raise questions about American experiences.

484 Visual Culture (3). This course investigates how we make and signify meaning through images, ranging from art to advertising to graffiti, and provides the critical tools to understand the visual worlds we inhabit.

485 Folk, Self-Taught, Vernacular, and Outsider Arts (3). Drawing on American and international examples, this course addresses a body of art that occupies the borderlands of contemporary art, examining questions of authenticity, dysfunction, aesthetics, and identity.

486 Shalom Y'all: The Jewish Experience in the American South (JWST 486) (3). This course explores ethnicity in the South and focuses on the history and culture of Jewish Southerners from their arrival in the Carolinas in the 17th century to the present day.

487 Early American Architecture and Material Life (3). This course explores, through lecture and discussion, the experiences of everyday life from 1600 through the early 19th century, drawing on the evidence of architecture, landscape, images, and objects.

488 No Place like Home: Material Culture of the American South (FOLK 488) (3). Seminar will explore the unique worlds of Southern material culture and how "artifacts" from barns to biscuits provide insight about the changing social and cultural history of the American South.

489 Writing Material Culture (3). A reading seminar that examines multiple critical perspectives that shape the reception and interpretation of objects, with a particular emphasis on things in American life.

493 Internship (1–3). Permission of the department and the instructor. Internship. Variable credit.

498 Advanced Seminar in American Studies (3). Graduate or junior/senior standing. Examines American civilization by studying social and cultural history, criticism, art, architecture, music, film, popular pastimes, and amusements, among other possible topics.

685 Literature of the Americas (CMPL 685, ENGL 685) (3). See ENGL 685 for description.

691H Honors in American Studies (3). Directed independent research leading to the preparation of an honors thesis and an oral examination on the thesis. Required of candidates for graduation with honors in American studies who enroll in the class once permission to pursue honors is granted.

692H Honors in American Studies (3). Directed independent research leading to the preparation of an honors thesis and an oral examination on the thesis. Required of candidates for graduation with honors in American studies who enroll in the class once permission to pursue honors is granted.

Courses for Graduate Students

AMST

700 The History and Practices of American Studies (3). This course will acquaint students with the texts, contexts, issues, and controversies in American studies as a field of study. It is required for most American studies graduate students and open to graduate students in other departments.

701 Interdisciplinary Research Methods (3). This course will focus on techniques of American studies investigation. Various faculty members will make presentations highlighting approaches including Southern studies, American Indian studies, Material Culture studies, and new media.

702 Readings in American Studies (3). This course takes a specific topic to explore in depth, and through this investigation critically examines contending perspectives on the field. Topics will change depending on faculty interest.

840 Digital Humanities/Digital American Studies (3). This course, explores the application of digital technologies to the materials, questions, and practices of humanities scholarship, particularly as related to enduring topics in American Studies scholarship and community engagement. Students will work on group digital history projects in collaboration with local cultural heritage organizations.

850 Digital Humanities Practicum (3). This practicum blends graduate seminar discussions with hands-on training in the digital humanities. Students will work in the Digital Innovation Lab, contributing to real-life projects while developing their own professional development goals. Students will emerge with a deeper understanding of and experience with digital humanities approaches, practices, and issues.

878 Readings in Native American History (HIST 878) (3). See HIST 878 for description.

880 American Film and Media History (3). Topically focused examination of social and cultural aspects of cinema and media history in the United States including cinema/media audiences, reception, and historiography.

890 Special Topics in American Studies (3). Field/topical/research seminar. Instructors use this course to offer instruction in particular topics or approaches. Specific course descriptions are available each semester on the departmental Web site.

895 Directed Readings for Graduate Students (3). Permission of the instructor. Independent reading programs for graduate students whose needs are covered by no course immediately available. For students resident in Chapel Hill or vicinity.

900 Directed Readings (0.5–21). Topics vary according to the needs and interests of the individual student and the professor directing the reading and writing project.

901 M.A. Research Seminar (3). Students will be introduced to issues of project design, develop a prospectus for the M.A. capstone project, work with an advisor, and prepare full drafts of their projects.

902 Ph.D. Research Seminar (3). A review of current scholarship in American studies, with the aim of creating the final reading list for the comprehensive exams, and an introduction to dissertation design.

948 Research in Native American History (HIST 948) (3). See HIST 948 for description.

992 Non-Thesis Option (3).

993 Master's Thesis (3-6).

994 Doctoral Dissertation (3). Individual work on the doctoral dissertation, pursued under the supervision of the Ph.D. advisor.

Courses for Graduate and Advanced Undergraduate Students

FOLK

428 Religion and Anthropology (ANTH 428, RELI 428) (3). See ANTH 428 for description.

429 Culture and Power in Southeast Asia (ANTH 429, ASIA 429) (3). See ANTH 429 for description.

435 Consciousness and Symbols (ANTH 435, CMPL 435) (3). See ANTH 435 for description.

454 Historical Geography of the United States (GEOG 454) (3). See GEOG 454 for description.

455 Method and Theory in Ethnohistoric Research (ANTH 455) (3). See ANTH 455 for description.

470 Medicine and Anthropology (ANTH 470) (3). See ANTH 470 for description.

473 Anthropology of the Body and the Subject (ANTH 473) (3). See ANTH 473 for description.

484 Discourse and Dialogue in Ethnographic Research (ANTH 484, LING 484) (3). See ANTH 484 for description.

487 Folk Narrative (ENGL 487) (3). See ENGL 487 for description.

488 No Place like Home: Material Culture of the American South (AMST 488) (3). See AMST 488 for description.

490 Topics in Folklore (3). Topics vary from semester to semester.

495 Field Research (3). Research at sites that vary.

496 Directed Readings in Folklore (3). Permission of the department. Topic varies depending on the instructor.

502 Myths and Epics of the Ancient Near East (RELI 502) (3). See RELI 502 for description.

525 Culture and Personality (ANTH 525) (3). See ANTH 525 for description.

537 Gender and Performance (ANTH 537, WMST 438) (3). See ANTH 537 for description.

550 Introduction to Material Culture (3). An introduction to material folk culture, exploring the meanings that people bring to traditional arts and the artful creations with which they surround themselves (e.g., architecture, clothing, altars, tools, food).

560 Southern Literature and the Oral Tradition (3). Course considers how Southern writers employ folklore genres such as folk tales, sermons, and music and how such genres provide structure for literary forms like the novel and the short story.

562 Oral History and Performance (COMM 562, HIST 562, WMST 562) (3). See COMM 562 for description.

565 Ritual, Theater, and Performance in Everyday Life (COMM 362) (3). See COMM 362 for description.

571 Southern Music (HIST 571) (3). See HIST 571 for description.

587 Folklore in the South (3). An issue-oriented study of Southern folklore, exploring the ways that vernacular artistic expression (from barns and barbecue to gospel and well-told tales) come to define both community and region.

610 Vernacular Traditions in African American Music (AAAD 432) (4). Explores performance traditions in African American music, tracing development from African song through reels, blues, gospel, and contemporary vernacular expression. Focuses on continuity, creativity, and change within African American aesthetics.

670 Introduction to Oral History (HIST 670) (3). See HIST 670 for description.

675 Ethnographic Method (ANTH 675) (3). See ANTH 675 for description.

688 Observation and Interpretation of Religious Action (ANTH 688, RELI 688) (3). See ANTH 688 for description.

690 Studies in Folklore (3). Topic varies from semester to semester.

691H Honors Project in Folklore (3). Permission of the instructor. For honors candidates. Ethnographic and/or library research and analysis of the gathered materials, leading to a draft of an honors thesis.

692H Honors Thesis in Folklore (3). Prerequisite, FOLK 691H. Writing of an honors thesis based on independent research conducted in FOLK 691H. Open only to senior honors candidates who work under the direction of a faculty member.

Courses for Graduate Students
FOLK

790 Public Folklore (3). A graduate seminar addressing theory and praxis in public sector cultural work. Focusing on public folklore, this course explores broad issues of representation, cultural politics, and cultural tourism.

841 Performance Ethnography (COMM 841) (3). See COMM 841 for description.

842 Seminar in Performance and Cultural Studies (COMM 842) (3). See COMM 842 for description.

843 Seminar in Contemporary Performance Theory (COMM 843) (3). See COMM 843 for description.

850 Approaches to Folklore Theory (3). A systematic overview of the major issues and theoretical perspectives that have informed the study of folklore historically and that are emerging in contemporary scholarship.

860 Art of Ethnography (ANTH 860) (3). A field-based exploration of the pragmatic, ethical, and theoretical dimensions of ethnographic research, addressing issues of experience, aesthetics, authority, and worldview through the lens of cultural encounter. Field research required.

890 Seminar in Selected Topics (3). An irregularly offered graduate seminar exploring selected topics in the theory and practice of folklore.

891 Topics in Folklore (3). An irregularly offered graduate seminar exploring selected topics in the theory and practice of folklore.

895 Seminar in Folklore (3). An irregularly offered graduate seminar exploring selected topics in the theory and practice of folklore.

993 Master's Thesis (3-6). Research in a special field under the direction of staff members.

Department of Anthropology

anthropology.unc.edu
RUDOLF COLLOREDO-MANSFELD, *Chair*

Professors

Rudolf Colloredo-Mansfeld (76) Sociocultural Anthropology; Latin America; Economic and Social Change in Indigenous Communities in the Ecuadorian Andes; Indigenous Political Movements; Material Culture and Social Process

Arturo Escobar (53) Political Ecology; Anthropology of Development, Social Movements, and Science and Technology; Latin America; Colombia

Dorothy C. Holland (16) Identity and Agency, Social Practice Theory, Social Movements, Alternative Agri-food Movement, History in Person, Cultural Studies, Environmental Activism, Schooling and Work, United States

Dale L. Hutchinson (63) Bioarchaeology, Human Osteology, Forensic Anthropology, Paleopathology, Health and Nutrition, Agricultural Origins and Consequences, Southeastern and Mid-Atlantic United States, South America

Fatimah L.C. Jackson (80) Human Biological Variation, Population Substructure, Ancestry, Health Disparities, Africa and the Transatlantic African Diaspora, Co-Evolutionary Effects of Phytochemical Exposures, Human Population Genetics, Biocultural Processes; Integrative Science, Experimental Bioanthropology; Africa, the Americas

Paul W. Leslie (37) Human Ecology, Biological Anthropology, Demography, Population Genetics, Reproduction, East Africa

Patricia McAnany (75) Archaeology, Ritual Practice, Ancestor Veneration, Cultural Heritage, Economic Organization, Lithic Technology, Quantitative Methods, Mesoamerica

Donald Nonini (34) Urban Anthropology; Alternative Economic Systems; Political Anthropology; Cultural Politics of Ethnicity and Race; Globalization and Diasporas; Chinese Populations in Asia-Pacific; Southern United States

James L. Peacock (11) Global Issues and Identities: Southeast Asia and Southeastern United States

C. Margaret Scarry (48) Archaeology, Paleoethnobotany, Subsistence Economies, Foodways, North America, Greek Aegean, Complex Societies

Vincas P. Steponaitis (2) Archaeology, Political Economy, Chiefdoms, Quantitative Methods, Southeastern United States

Associate Professors

Brian Billman (42) Archaeology of Political Organizations, Political Economy, and Human Violence; Settlement Pattern Analysis, Household Archaeology, Heritage Preservation, Andes, and Southwestern United States

Robert E. Daniels (4) Social Anthropology, Psychological Anthropology, Systems Theory, Africa

Glenn D. Hinson (36) Folklore and Folklife, Belief Studies, Ethnography, Public Folklore, African American Vernacular Musics, African American Expressive Culture, Oral Poetry, Vernacular Art; African Diaspora, the American South

Valerie Lambert (58) American Indians, Sovereignty, Tribal Nation-Building, Tribal Governance, Oklahoma

Christopher Nelson (64) History and Memory, Everyday Life, Ethnography, Critical Theory, Storytelling, Ritual and Performance, Japan and Okinawa

Charles Price (62) Black Identity; Personal and Social Identity; Oral and Life History; Jamaica and the Anglophone Caribbean; Southern

United States; Community Organizing; Community Organizations; Action Research; Welfare and Higher Education Policies, Action Research

Peter Redfield (54) Anthropology of Science and Technology, Colonial History, Ethics, Humanitarianism and Human Rights, NGOs and Transnational Experts, Europe, French Guiana, Uganda

Michele Rivkin-Fish (73) Medical Anthropology, Critical Analyses of the U.S. Health Care System, Clinical Ethics, Gender, Reproductive Politics, Postsocialisms, Anthropology and Demography, Medical Education, Russia, Poland

Karla Slocum (56) Globalization, Social Movements, Place, Race, Political Economy, Gender; the Caribbean, North America

Mark Sorensen (67) Biological Anthropology, Health and Culture Change, International Health, Adaptability, Nutrition, Russia, Siberia

Silvia Tomaskova (59) Archaeology & Anthropology, Paleolithic Europe, South Africa, History and Theory of Archaeology, Gender and Science, Prehistoric Imagery

Margaret Wiener (47) Actor Network Theory and Ontological Politics, History and Memory, Materiality, Religion and Magic, Colonial Societies, Southeast Asia, Indonesia

Assistant Professors

Jocelyn Lim Chua (82) Medical Anthropology; Biomedicine, Psychiatry, and the Ethical Management of Life and Death; Suicide; Politics of Emotion and Affect; Violence and the Body; Migration and Diaspora; Postcolonial Studies; South Asia; Kerala

Anna Agbe-Davies (79) Historical Archaeology, African Diaspora Archaeology, Classification and Typology, Public Archaeology, North America

Jean Dennison (77) Visual Anthropology; the Osage Nation; North American Indian Subjectivities, Citizenship, Sovereignty, and Nation Building

C. Townsend Middleton (83) Politics of Recognition, Belonging, and Autonomy; Affect and Anxiety; the State; Anthropology of Knowledge; Political Anthropology; India; South Asia

Amanda Thompson (78) Human Biology, Nutrition, Growth and Development; US, China

Colin West (81) Human Ecology and the Human Dimensions of Global Change; West Africa, Arctic North America/Asia, Southwestern United States

Adjunct Professors

Margaret Bentley, Nutritional Anthropology, Infant Feeding and Culture, Maternal and Child Nutrition

Jonathan Boyarin, Jewish Ethnography, Politics of Memory, Comparative Diasporas, Ethnography of Reading, Law, Temporality

R. P. Stephen Davis Jr. (40) Archaeology, Computer Applications, Settlement Systems, Contact Period, Southeastern United States

Sue E. Estroff (31) Medical, Psychiatric Anthropology, Chronic Illness, Health Policy as a Cultural System, Research Ethics, Cultural Complications of Maternal-Fetal Interventions

Richard Fox, Cultural Anthropology, Social Theory, History of Anthropology, Research Methodology, South Asia

Lawrence Grossberg, Cultural Studies, U.S. Political Culture (1950s to present), U.S. Popular Culture (20th Century), Youth Culture, Cultural and Social Theory, Contemporary Philosophy

John Pickles, Globalization, Modernity, Geographies of Social Change

Debra G. Skinner (46) Sociocultural Implications of Genetic Research, Newborn Screening, Families and Childhood Disability, Culture and Human Development, Poverty Studies, Identity and Cultural Worlds, Anthropology of Schooling, Nepal, United States

Adjunct Associate Professors

Lorraine Aragon (71) Religion, Intellectual Property Law, Art and Artisan Practices, Global Connections, Minorities and States, Language and Media, Migration and Conflict, Subsistence; Southeast Asia, Indonesia

Kia Caldwell, Gender, Race, and Citizenship in the African Diaspora; Race, Culture, and Politics in Brazil; Health and Human Rights, HIV/AIDS in African American and Afro-Brazilian Communities

William S. Lachicotte Jr. (52) Medical Institutions and Technologies, Human Services, Professions and Public Life, Practice Theories, Sociality and Identity, United States

Michael C. Lambert (51) Political Anthropology, Economic Anthropology, Africa

Barry Saunders (72) Anthropology of Biomedicine, Technologies, and Embodiment

Patricia Sawin (44) Ethnography of Communication, Narrative, Performance and Poetics, Gender, Anthropology of Children and Adoption, Southern United States, Latin America

Adjunct Assistant Professors

Lauren Leve, Anthropology of Religion, Ethnographic Methods, Law, Ethicization, Globalization, Citizenship and Identity; South and Southeast Asian Buddhism; South Asia, Nepal

Todd Ochoa, African-Inspired Religions in Latin America and the Caribbean; Cuban-Kongo Societies of Affliction; Materiality; Creolization and Racialization; Critical Ethnographic Practice

Karaleah Reichart, Economic Anthropology, Gender and Ethnicity, Conflict Resolution and Coalition Building, Life Histories, Appalachia

Brett Riggs (60) Archaeology, Contact Studies, Southeastern United States, Ethnohistory

Beverly Sizemore, Cultural Anthropology, Anthropology and Education, Literacy, Anthropology and Law, Iceland, Eritrea

Sandy Smith-Nonini (74) Medical Anthropology, Anthropology of Sustainability (Energy and Economics), Health Policy, Military Violence and Health, International Development, Social Movements, Latino Immigration, Central America

Laurie C. Steponaitis (39) Archaeology, Hunter-Gatherers, Regional Survey, Settlement Patterns, Coastal Adaptations, Shellfish Analysis, Eastern North America

Amanda Tickner, Paleoethnobotany, Foodways, Historical Ecology, Landscape Archaeology/Anthropology, Old World and North American Archaeology

Research Professor

M. Jean Black, Ethnohistory, Cultural Ecology, Ethnography, North America

Research Associate Professors

William H. Jansen III, Applied Anthropology, Behavioral Factors in Public Health, Public Policy, Health Service Delivery Systems, Health Care Seeking Behavior, Diplomacy, Culture Change, Circumpolar Peoples, South and Southeast Asia, Middle East

Scott L. H. Madry (65) Spatial Analysis, Remote Sensing, Geographic Information Systems, Global Positioning System, Modeling, Old World Prehistory

Lecturer

John F. Scarry (49) Method and Theory, Cultural/Resource Management, Complex Societies, European-Native American Interaction

Professors Emeriti

Carole L. Crumley (22) Historical Ecology, State Societies, Complex Systems Theory, Global Environmental Change, Ethnography, Ethnohistory, and Archaeology of Europe

Terence M. S. Evens (5) Social Anthropology, Social Theory, Phenomenology, Ethics, Philosophical Anthropology, Collectivist Settlements
Kaja Finkler (32) Medical Anthropology, Gender and Health, The New Genetics, Kinship and Family, Economic Anthropology, Political Economy, Globalization, Mexico, Latin America
John Gulick, Social Organization, Sex Roles and Identities, Fertility Behavior, Urban Cultures, Middle East
Norris B. Johnson (25) Architecture, Art and Aesthetics, Photography and Visual Anthropology, Religion and Nature, Japan
Richard A. Yarnell, Ecology, Evolution, Ethnobotany, North America

The Department of Anthropology offers advanced work leading to the master of arts and doctor of philosophy degrees. Students admitted into the graduate program are admitted for the Ph.D. degree. A master's degree may be taken as part of the program leading to the Ph.D. degree; however, a master's degree is not an essential part of the doctoral program.

In order to organize constellations of research interest, five paths of study have been identified, which consist of three concentrations and two programs. Concentrations include history, meaning and materiality; ecology and evolution; and social formations and processes. Programs are offered in medical anthropology and archaeology. Students are expected to take at least three courses from within their chosen area of concentration or from a set of courses designated by the program in medical anthropology or the program in archaeology.

Programs are distinguished from concentrations by their institutional links to other faculty and administrative units on campus, and by their greater specificity for certain course requirements. Students interested in one or the other program are advised to so declare when they enter the department if they have not yet done so. Students interested in choosing a concentration may make this choice after beginning their graduate work. The choice of concentration or program must be made by the end of the student's third semester. Whichever path the student chooses, the faculty expects all students to obtain broad training in anthropology. To this end, graduate students may take courses offered by other departments or institutions such as Duke University. Departmental policy is to help the student select courses that supplement and strengthen their specialization in anthropology.

Incoming graduate students are required to complete the appropriate two-semester core course sequence for their concentration: Sociocultural Theory and Ethnography (ANTH 701, 702) or Evolution and Ecology (ANTH 703, 704). In addition, incoming students will either choose to complete the remaining core course sequence, or take one course from that sequence and Archaeological Theory (ANTH 705). Other courses are selected from a list of concentration courses, field research courses, and professional preparation courses.

During the second year of study, graduate students are required to produce a substantial piece of independent research, advised by a three-member faculty committee and presented to the entire faculty at the end of the fourth semester. Graduate students are advised to take their written and oral Ph.D. exams by the end of the sixth semester.

The Ph.D. degree requires specialization in a defined area of study and the completion of an acceptable dissertation treating some problem within this area. The Ph.D. program is quite flexible; any area or problem can be selected for study, provided it meets the approval of the student's advisor, the Ph.D. committee, and the faculty. Part of the training of a professional anthropologist is based on a minimum of one year's fieldwork, which provides the context for the dissertation data in sociocultural anthropology or human ecology. For students concentrating in archaeology or biological anthropology, the Research Labs in Archaeology offer opportunities for student-led investigations as well as analysis of existing collections of archaeological material.

The Department of Anthropology works closely with the Institute for Research in Social Science, the Institute for the Study of the Americas, the Carolina Population Center, and the Research Laboratories of Archaeology.

Up-to-date lists of anthropology faculty and courses, along with additional information about the graduate program, faculty research projects, and other information, are available on the department's Web site: anthropology.unc.edu.

Courses for Graduate and Advanced Undergraduate Students
ANTH

400 Introduction to General Linguistics (LING 400) (3). See LING 400 for description.

406 Indigenous Ethnography (3). Explores texts written by indigenous or native anthropologists and social commentators about social, political, and economic realities and aspirations. Compared globally and historically are indigenous experience, sovereignty, and colonization.

411 Laboratory Methods in Archaeology (3). An examination of the laboratory techniques used by archaeologists to analyze artifacts and organic remains, including the analysis of stone tools, pottery, botanical remains, and bone.

412 Paleoanthropology (3). This course traces the evolution of humans and nonhuman primates—including behaviors, tools, and bodies of monkeys, apes, and human hunters and gatherers—evolutionary theory, and paleoanthropological methods.

413 Archaeobotany Lab Methods (3). Required preparation, any course in archaeology or permission of the instructor. A general survey of the laboratory techniques used to study and draw social and behavioral inferences from plant remains recovered from archaeological sites.

413L Archaeobotany Lab (1). Required preparation, any course in archaeology or permission of the instructor. This is a required one-hour laboratory section to be taken in conjunction with ANTH 413.

414 Laboratory Methods: Human Osteology (3). This course will focus on the analysis of human skeletal materials in the laboratory and in the field, with an emphasis on basic identification, age and sex estimation, and quantitative analysis.

414L Human Osteology Lab (1). Corequisite, ANTH 414. The laboratory analysis of human skeletal materials with an emphasis on basic identification, age and sex estimation, and quantitative analysis.

415 Laboratory Methods: Zooarchaeology (3). This course will focus on the analysis of animal remains from archaeological sites. Introduction to laboratory methods, analytical approaches, and interpretive frameworks for zooarchaeology.

415L Zooarchaeology Lab (1). Corequisite, ANTH 415. Required preparation, an archaeological course or permission of instructor. Examination of identification techniques, quantitative methods, and interpretive frameworks used to analyze animal remains recovered from archaeological sites.

416 Bioarchaeology (3). The study of human skeletal remains from archaeological contexts. The collection and interpretation of quantitative and qualitative data is emphasized to assess the relationship between past biology, environment, culture, and behavior.

417 Laboratory Methods: Lithic Seminar (3). Laboratory techniques in stone tool research and experimental practice.

417L Lithic Analysis Lab (1). Corequisite, ANTH 417. Required preparation, any course in archaeology or permission of the instructor. This is a required one-hour laboratory section to be taken in conjunction with ANTH 417.

418 Laboratory Methods: Ceramic Analysis (3). A survey of the laboratory techniques used by archaeologists to study and draw social and behavioral inferences from ancient pottery.

419 Anthropological Application of GIS (3). Permission of the instructor. GIS experience required. This course explores applying GIS science technologies to anthropological problems. Students will learn GIS skills and apply them using spatial data.

421 Archaeological Geology (GEOL 421) (3). See GEOL 421 for description.

422 Anthropology and Human Rights (3). An examination of human rights issues from an anthropological perspective, addressing the historical formation of rights, their cross-cultural contest, and the emergence of humanitarian and human rights organizations on a global scale.

423 Written in Bone: CSI and the Science of Death Investigation from Skeletal Remains (3). This course combines laboratory training, field projects, lectures, films, discussion, and student presentations into a course on the science of human skeletal analysis. Students learn the laboratory methods scientists use to study human remains and the role of skeletal analysis in the study of contemporary forensic cases.

428 Religion and Anthropology (FOLK 428, RELI 428) (3). Religion studied anthropologically as a cultural, social, and psychological phenomenon in the works of classical and contemporary social thought.

429 Culture and Power in Southeast Asia (ASIA 429, FOLK 429) (3). The formation and transformation of values, identities, and expressive forms in Southeast Asia in response to forms of power. Emphasis on the impact of colonialism, the nation–state, and globalization.

435 Consciousness and Symbols (CMPL 435, FOLK 435) (3). This course explores consciousness through symbols. Symbols from religion, art, politics, and self are studied in social, psychological, historical, and ecological context to ascertain meanings in experience and behavior.

437 Evolutionary Medicine (3). This course explores evolutionary dimensions of variation in health and disease in human populations. Topics include biocultural and evolutionary models for the emergence of infectious and chronic diseases and cancers.

438 Religion, Nature, and Environment (3). A seminar on concepts of nature within religions and a variety of world-wide spiritual traditions. Emphasis on sacred space, place, and pilgrimage as a vital intersection of religion and nature.

439 Political Ecology (3). Examines environmental degradation, hunger, and poverty through the lens of power relationships, particularly inequality, political and economic disenfranchisement, and discrimination. Discussion of global case studies, with a Latin American focus.

441 The Anthropology of Gender, Health, and Illness (WMST 441) (3). The course explores cultural beliefs, practices, and social conditions that influence health and sickness of women and men from a cross-cultural perspective.

442 Health and Gender after Socialism (3). This course examines post-socialist experiences of the relationship between political, economic, social, and cultural transitions, and challenges in public health and gender relations.

443 Cultures and Politics of Reproduction (3). This course takes a cross-cultural approach to understanding how reproduction and associated phenomena become arenas where political debates are played out and where global and local social relations are contested.

444 Medicine, Politics, and Justice (3). This course brings an anthropological approach to understanding the intersections between medicine, politics, and public health.

445 Migration and Health (3). This course examines the intersections between migration processes and the political, economic, and social dimensions of health and well-being among migrants, their families, and their communities.

446 Poverty, Inequality, and Health (3). This course examines poverty, inequalities, and health from a global and historical perspective. We will study the role of sociopolitical context, individual behavior, and human biology, and will pay particular attention to the roles of psychosocial stress, material conditions, and policy in shaping health differences within and between populations.

447 The Anthropology of Work (3). Anthropological investigations of work and the relationship between work, family life, and community in contemporary societies in the United States, Asia, and Latin America, within the framework of globalization.

449 Anthropology and Marxism (3). Critical study of Marx's mature social theory and its relationship to contemporary anthropology.

451 Field School in North American Archaeology (6). Intensive training in archaeological field methods and techniques. Students participate in the excavation, recovery, recording, and interpretation of archaeological remains. Instruction given in survey, mapping, photography, flotation recovery, etc.

452 The Past in the Present (3). Memory and history, history and politics, national narratives, the past in the present, and the present in the past; a cross-cultural examination of ways of connecting the present and the past.

453 Field School in South American Archaeology (6). Intensive study of archaeological field and laboratory methods and prehistory of the Andes through excavation and analysis of materials from archaeological sites in Peru. Includes tours of major archaeological sites.

454 The Archaeology of African Diasporas (3). Considers how archaeological evidence is used to understand the movement of Africans and their descendants across the globe, with an emphasis on the transformation of societies on the African continent and in the Americas.

455 Ethnohistory (FOLK 455) (3). Integration of data from ethnographic and archaeological research with pertinent historic information. Familiarization with a wide range of sources for ethnohistoric data and practice in obtaining and evaluating information. Pertinent theoretical concepts will be explored.

456 Archaeology and Ethnography of Small-Scale Societies (3). The study of small-scale hunter-gatherer and farming societies from archaeological and ethnographic perspectives. Methods and theories for investigating economic, ecological, and social relations in such societies are explored.

458 Archaeology of Sex and Gender (WMST 458) (3). A discussion of gender and sex roles and sexuality in past cultures; a cross-cultural examination of ways of knowing about past human behavior.

459 Ecological Anthropology (3). Examines how human-environmental adaptations shape the economic, social, and cultural lives of hunter–gatherers, pastoralists, and agriculturalists. Approaches include optimal foraging theory, political ecology, and subsistence risk.

460 Historical Ecology (ENST 460) (3). Historical ecology is a framework for integrating physical, biological, and social science data with insights from the humanities to understand the reciprocal relationship between human activity and the earth system.

461 Colonialism and Postcolonialism: History and Anthropology (3). This course examines colonialism and postcolonialism through the lenses of history and anthropology respectively. Through history, it asks, What were the dynamics of colonialism then? Through anthropology, it questions, What are the conditions, quandaries, and possibilities of postcolonialism now? Regional focus varies by instructor and year.

466 Alternative Economic Systems (3). An investigation of economic systems that are sustainable alternatives to the prevailing economic order. Topics include markets, the commons, cooperatives, local trading systems, and social movements working to achieve alternatives.

467 Culture, Wealth, and Poverty (3). Examines three broad perspectives used to explain inequality: ecological, cultural, and political. Students read theoretical works and evaluate arguments using ethnographies that describe local economies, institutions, and adaptive practices.

468 State Formation (3). The course examines the state, from its initial appearance 5,000 years ago to newly established nation–states, exploring the concepts of ethnicity, class, race, and history in state formation and maintenance.

469 History and Anthropology (3). Studies links between history and anthropology; cultures in historical perspective and history in cultural perspective; and effects of relations of power and historical interconnections on the peoples of the world.

470 Medicine and Anthropology (FOLK 470) (3). This course examines cultural understandings of health, illness, and medical systems from an anthropological perspective with a special focus on Western medicine.

473 Anthropology of the Body and the Subject (FOLK 473) (3). Anthropological and historical studies of cultural constructions of bodily experience and subjectivity are reviewed, with emphasis on the genesis of the modern individual and cultural approaches to gender and sexuality.

474 The Anthropology of Disability (3). Investigates the social, cultural, and historical variation in the conception of disability, in its practical meaning and performance, and in its social and medical management. Special attention is paid to the interplay of embodiment, identity, and agency in work and everyday life and in political action and advocacy.

477 Visual Anthropology (3). This course introduces students to visual forms of communication through both the analysis and production of still and video materials. Ethics, cross-cultural representations, and ethnographic theory will all be explored.

484 Discourse and Dialogue in Ethnographic Research (FOLK 484, LING 484) (3). Study of cultural variation in styles of speaking applied to collection of ethnographic data. Talk as responsive social action and its role in the constitution of ethnic and gender identities.

490 Undergraduate Seminar in Anthropology (3). Restricted to junior and senior anthropology majors; generally the course is limited to 18 students. The subject matter will vary with the instructor. Each course will concern itself with a study in contemporary anthropology and new directions in research or applications.

491 Political Anthropology (3). Introduction to political anthropology. A thematically organized investigation of political processes in state societies, including state formation, with special attention to ethnographic and historical approaches.

502 Globalization and Transnationalism (3). Anthropological examination of processes of globalization and transnationalism, with special attention to transnational migration, emergence of transnational ("global") institutions, commodity flows, and dissemination of ideologies, cultural frameworks, and media imagery.

520 Linguistic Phonetics (LING 520) (3). See LING 520 for description.

523 Phonological Theory I (LING 523) (3). See LING 523 for description.

525 Culture and Personality (FOLK 525) (3). Systems theory used to conceptualize relationship between cultural patterns and individual minds. Functional, dysfunctional, and therapeutic processes considered. Examples from Africa, Asia, Europe, and Native America. Lectures, films, recitations.

538 Disease and Discrimination in Colonial Atlantic America (3). Colonization of Atlantic America between 1500 and 1900, through landscape change, agriculture, poverty, labor discrimination, and slavery differentially placed subsets of the general population at risk for infectious disease and other insults to their health. Lecture and discussion using archaeological and bioarchaeological studies, modern disease studies, and historic documents.

539 Environmental Justice (3). Course examining issues of race, poverty, and equity in the environmental movement. Cases include the siting of toxic incinerators in predominantly people-of-color communities as well as resource exploitation on indigenous lands.

541 Sociolinguistics (LING 541) (3). See LING 541 for description.

542 Pidgins and Creoles (LING 542) (3). See LING 542 for description.

545 The Politics of Culture in East Asia (ASIA 545) (3). Examines struggles to define culture and the nation in 20th-century China in domains like popular culture, museums, traditional medicine, fiction, film, ethnic group politics, and biography and autobiography.

550 Archaeology of the American South (3). Current issues and interpretations in the archaeology of the American South. Through weekly readings and discussions, students will explore the lifeways and changes that characterized each major period of the South's ancient history, from 12,000 years ago to the beginnings of European colonization.

559 History in Person (3). Extends anthropological approaches to identity in social life. Examines social position, power, and cultural imagination; the personal and collective dynamics of sociocultural change; and the concept of agency.

567 Urban Anthropology (3). Comparative study of the political economy and cultural politics of populations in spaces and landscapes in cities in America and the Third World undergoing globalization, economic restructuring, and transnational immigration.

574 Chinese World Views (ASIA 574, RELI 574) (3). Explores the indigenous Chinese sciences and the cosmological ideas that informed them. Topics include astronomy, divination, medicine, fengshui, and political and literary theory. Chinese sources in translation are emphasized.

578 Chinese Diaspora in the Asia Pacific (ASIA 578) (3). Examination of the histories, social organization, and cultures of the Chinese diasporas in the Asia Pacific region, focusing on contemporary issues in the cultural politics and identities of "overseas Chinese."

585 Anthropology of Science (3). Cultural perspectives on science and technology at a global scale, including research settings and social contexts, knowledge claims and material practice, and relations between scientific worldviews, social institutions, and popular imagination.

586 The Gardens, Shrines, and Temples of Japan (ASIA 586) (3). The religious landscape and built environments of Japan. Attention to palace, courtyard, and teahouse architecture and gardens, with emphasis on Shinto shrines and the Zen Buddhist temple and garden.

590 Special Topics in Anthropology I (3). Subject matter will vary with instructor but will focus on some particular topic or anthropological approach. Course description is available from the departmental office.

623 Human Disease Ecology (3). This seminar considers cultural ecologies of disease by examining how social, cultural, and historical factors shape disease patterns. We examine how ecosystems are shaped by disease, how disease shapes ecosystems, and how cultural processes (e.g., population movements, transportation, economic shifts, landscape modifications, and built environments) contribute to emerging infectious disease.

624 Anthropology and Public Health (3). This course compares disciplinary approaches of public health and anthropology. We begin by examining the social determinants of health paradigms and relationships between inequality, poverty, and global health. We will explore epidemiological, biocultural, and symbolic approaches to these problems. Public policy and health development will also be examined.

625 Ethnography and Life Stories (3). The course focuses on the practical and research uses of ethnography and oral history, emphasizing life histories, life stories, biographies, and how these intersect with communities.

626 African Cultural Dynamics (3). In-depth reading of several books and articles that consider the interaction between indigenous African traditions and intrusive colonial and postcolonial forces. Emphasis on class discussion. Short papers and individual projects.

629 Language Minority Students: Issues for Practitioners (EDUC 629) (3). See EDUC 629 for description.

639 Beyond the Tragedy of the Commons (3). Reexamination of the "tragedy of the commons" concept in light of recent work on environmental problems, property rights, and community-based conservation. Case studies include fishery, waterway, forest, and pasture management.

650 Reconstructing Life: Nutrition and Disease in Past Populations (3). This is an advanced course in the reconstruction of nutrition and health in past populations. Among the topics explored are epidemiology, disease ecology, dietary reconstruction, and paleopathology.

660 Kinship, Reproduction, Reproductive Technology, and the New Genetics (WMST 660) (3). This course focuses on the relationship between family, kinship, new reproductive technologies, and the new genetics from a cross-cultural perspective.

675 Ethnographic Method (FOLK 675) (3). Intensive study and practice of the core research methods of cultural and social anthropology.

682 Contemporary Chinese Society (ASIA 682) (3). Presents recent anthropological research on the People's Republic of China. In addition to social sciences sources, fictional genres are used to explore the particular modernity of Chinese society and culture.

688 Observation and Interpretation of Religious Action (FOLK 688, RELI 688) (3). Permission of the instructor. Exercises (including field work) in learning to read the primary modes of public action in religious traditions, e.g., sermons, testimonies, rituals, and prayers.

690 Special Topics in Anthropology II (3). Subject matter will vary with instructor but will focus on some particular topic or anthropological approach. Course description is available from the departmental office.

691H Seniors Honors Project in Anthropology (3). Permission of the instructor. Open only to honors candidates.

692H Senior Honors Thesis in Anthropology (3). Permission of the instructor. Open only to honors candidates.

Courses for Graduate Students

ANTH

700 Advanced Survey of Anthropology (3). Course description is available from the departmental office.

701 Theory and Ethnography (3). Permission of the instructor. Development of a critical understanding of the anthropological study of society and culture through discussion of problems and issues expressed in classic theoretical and ethnographic literature.

702 Sociocultural Theory and Ethnography (3). Prerequisite, ANTH 701. Permission of the instructor for students lacking the prerequisite.

703 Evolution and Ecology (3). Permission of the instructor. Development of a critical understanding of anthropological approaches to evolution and ecology in paleontological, archaeological, and present-day crosscultural contexts through the historical and comparative study of theory, method, and content.

704 Evolution and Ecology (3). Prerequisite, ANTH 703. Permission of the instructor for students lacking the prerequisite. Continuation of topics covered in 703, with an emphasis on ecological and evolutionary perspectives on contemporary human biology and behavior.

705 Archaeological Theory (3). Review of the recent history of archaeology and contemporary approaches to archaeological interpretation.

710 Writing and Publishing in Anthropology (3). A seminar on the peer review and analysis of student writing. Training in writing for academic publication.

714 Current Issues in Participatory Research: A Workshop Course (1). This one-hour course is open to UNC graduate students interested in Participatory Research (PR). It is required for the Graduate Certificate in PR and designed to integrate new students into the intellectual discussions and the PR community on campus.

715 Feminism and Society (WMST 715) (3). Selected topics in feminist analysis of social life, with materials drawn from a global range of societies.

717 Advanced Studies in Art and Architecture (3). Prerequisite, ANTH 334. Permission of the instructor for students lacking the prerequisite. Intensive study of selected topics and issues in the analysis and interpretation of prehistoric and cross-cultural art, architecture, and other aesthetic forms.

723 Seminar in Anthropological Linguistics (LING 723) (3). Selected topics from general linguistics and sociolinguistics, special emphasis on methods and problems involved in analysis and description of semantic structure of language and its relation to the rest of culture.

724 Seminar in Anthropology and Cybernetics (3). Examination of systems theory, or cybernetics; evaluation of previous applications of cybernetic models in anthropology; and original analysis of anthropological data in these terms by students.

725 Quantitative Methods in Anthropology (3). Survey of standardized data-gathering techniques, problems in research design, and methods of quantitative analysis encountered in anthropological research.

726 Quantitative Methods in Archaeology (3). Introduction to quantitative and computer methods in archaeology. The course stresses exploratory data analysis and graphical pattern recognition techniques.

727 Archaeology of North America (3). The history of American Indian cultures from 10,000 BCE to the time of the European colonization as reconstructed by archaeological research. Special emphasis on the eastern and southwestern United States.

728 Seminar in American Archaeology (3). This seminar covers current research topics in North American archaeology, with an emphasis on the eastern or southwestern United States. Specific topics may vary from year to year.

729 Research Strategies in Archaeology (3). This seminar develops students' skills in crafting research designs, proposals, and presentations. Examples and readings focus on archaeology and bioarchaeology but the skills covered are widely applicable.

733 Advanced Seminar in Caribbean Studies (3). Permission of the instructor. Survey of Caribbean cultural development for students with some knowledge or experience in the area. Particular attention is given to current problems and recent theoretical issues.

740 Power (3). Theories of power within anthropology, from Marxism, poststructuralism, feminist studies, studies in race relations, cultural studies, others.

744 Seminar in Ethnicity and Cultural Boundaries (3). Investigation of recent theoretical approaches to ethnic phenomena; consideration of cases ranging from tribal organization to complex industrial nations; analysis of particular ethnographic and ethnohistorical situations by individual students.

749 Cultural Production (3). Critical examination of theories of social and cultural (re)production (e.g., Bourdieu's practice theory, cultural studies and resistance theory) applied to enduring issues (e.g., the relations between power and gender, race, and class).

750 Seminar in Medical Anthropology (3). Specially designed for, but not restricted to, students who are specializing in medical anthropology. Medicine as part of culture; medicine and social structure viewed crossculturally; medicine in the perspective of anthropological theory; research methods. A special purpose is to help students plan their own research projects, theses, and dissertations.

751 Seminar on the Anthropological Contribution to the Understanding of Medical Systems (3). Anthropological contributions to the understanding of medical systems, sickness, and public health. Attention is given to the ways in which medical anthropology illuminates social processes, beliefs, and ideologies.

752 Transcultural Psychiatry (3). Prerequisite, ANTH 470 or 525. Permission of the instructor for students lacking the prerequisite. Considers cross-cultural variations in the perception, definition of, and reaction to course and treatment of deviant behavior—especially mental disorders.

753 Gender, Sickness, and Society (WMST 753) (3). This seminar deals in-depth and cross-culturally with the nature of gender and the ways in which social comprehension of gender, gender status, and gender relationships impinge upon differential experience of health and sickness of men and women from a historical and contemporary perspective.

754 Phenomenological Anthropology (3). Permission of the instructor. The course aims to apply the theories and methods of phenomenology to the practice of anthropology.

755 Seminar in Ecology and Population (3). Mutual relationships of environment, social structure, mortality, and natality, reviewed in an evolutionary framework.

756 The Evolution of Human Cognition (3). Permission of the instructor. A critical exploration of contemporary evidence on the evolution of human cognition and consciousness, including phylogenetic, comparative (interspecific), ontogenetic, and cross-cultural perspectives.

759 Identity and Agency (3). Sociogenic theories of identity, agency, and human consciousness—the works of Mikhail Bakhtin, Pierre Bourdieu, and others—examined ethnographically and cross-culturally in selected fields of social activity.

760 Seminar in Human Evolutionary Ecology (3). Permission of the instructor for undergraduates. Examination of evolutionary ecology concepts with existing or potential uses in human adaptation research, including adaptation and optimization, effective environmental properties, foraging strategies, niche, competitive exclusion, life history tactics, and biogeography.

765 Seminar in the Anthropology of Law (3). This course analyzes the nature of law and conceptions of authority in various Asian, African, and American preliterate societies. Using theories of social cohesion and process, the course relates law to the economy, social organization, religious ideology, and political institutions.

766 Seminar in Ethnobotany (3). Permission of the instructor. The focus is on economic plants and primitive technology, ecological relationships between man and plants, and analysis and interpretation of archaeological plant remains. Some laboratory work is expected.

770 Seminar on Anthropological Perspectives on Latin America (3). The seminar focuses on the interaction of five major issues in Latin America: class, ethnicity, gender, religion, and health.

777 Human Rights and Humanitarianism (3). This seminar examines human rights claims and contemporary moral discourse about human suffering from the perspective of anthropology.

788 Observation and Interpretation of Religious Action (3). Explores religious action through fieldwork as a way of studying method and theory.

790 Dialectology (LING 790) (3). See LING 790 for description.

793 Linguistic Field Work I (LING 793) (3). See LING 573 for description.

794 Linguistic Field Work II (LING 794) (3). See LING 574 for description.

808 Researching and Writing Lives (3). The course focuses on developing students' qualitative and analytic research skill through a project that culminates in writing a life story. Students will design a research plan, develop a research relationship with an interlocutor, hone methodological techniques, discuss ethical concerns, strengthen analytic interpretation, and produce a polished life narrative.

809 Ethnographic Methods (3). Explores method and theory of ethnographic research, including its critical development, ethical challenges, personal transformations, and place as social scientific inquiry. Field project required.

810 Seminar in the Anthropology of Meaning (1). Ongoing seminar for students and faculty participating in the Anthropology of Meaning concentration.

817 The Concept of Teaching General Anthropology (3). Permission of the department. Directed course preparation and review of teaching techniques, films, and other aids.

818 Training in the Teaching of Anthropology (3). Prerequisite, ANTH 817. Permission of the department. The trainee teaches a small class in general anthropology under supervision.

860 Art of Ethnography (FOLK 860) (3). See FOLK 860 for description.

897 Seminar in Selected Topics (1–4). Topic determined by instructor and announced in advance.

898 Seminar in Selected Topics (1–4). Topic determined by instructor and announced in advance.

901 Reading and Research (1–4). Permission of the instructor. Topic determined by instructor and announced in advance.

902 Reading and Research (1–4). Permission of the instructor. Topic determined by instructor and announced in advance.

915 Reading and Research in Methodology (1–4). Permission of the instructor. Topic determined by instructor and announced in advance.

916 Reading and Research in Methodology (1–4). Permission of the instructor. Topic determined by instructor and announced in advance.

921 Field Research (3). Permission of the instructor. Topic determined by instructor and announced in advance.

922 Field Research (3). Permission of the instructor. Topic determined by instructor and announced in advance.

993 Master's Thesis (3–6). Individual research in a special field under the direction of a member of the department.

994 Doctoral Dissertation (3–9). Individual research in a special field under the direction of a member of the department.

Curriculum in Applied Sciences and Engineering

www.unc.edu/depts/appl_sci
NANCY ALLBRITTON, *Chair*
Lu-Chang Qin, *Associate Chair for Graduate Studies*
Richard Goldberg, *Associate Chair for Undergraduate Studies*

Professors

Nancy L. Allbritton (BME and Chemistry) Signaling in Single Cells, Microfabricated Systems for Cellular Analysis
A. J. Banes (Biomedical Engeneering) Tissue Engineering tendons and ligaments, Cytomechanics, Cell-Cell Communication, Matrix Proteins, Hydrogels
Joseph M. DeSimone (Chemistry) Polymeric Materials Synthesis
Dorothy Erie (Chemistry) Physical and Biological Chemistry, Structure and Function of Transcription Processes
Michael Falvo (Physics and Astronomy) Mechanics and Friction of Nanoscale Materials, Nanoscale Electromechanical Systems (NEMS), Scanning Probe Microscopy and Nanomanipulation Forces and Mechanics of Nanobiological Systems
Greg Forest (Mathematics) Flow and Structure of Complex Polymeric Fluids, Weakly Compressible Transport Phenomena, Solitons and Optical Fiber Applications, Inverse Problems for Material Characterization, Modeling of Transport in Multiphase Porous Media
Barry Lentz (Biochemistry and Biophysics) Biomembrane Structural Features in the Role of Platelet Membranes in Blood Coagulation and the Involvement of Bilayer Microstructures in Cell Membrane Fusion
Wenbin Lin (Chemistry) Nonlinear Optical, Supramolecular and Chiral Porous Materials, Asymmetric Catalysis, Chiral Sensing and Separations
Jianping Lu (Physics and Astronomy) Theoretical Studies of Materials
Laurie E. McNeil (Physics and Astronomy) Structure-Property Relations, Optical Spectroscopy
Lu-Chang Qin (Physics and Astronomy) Synthesis and Structure of Nanomaterials
Michael Rubinstein (Chemistry) Molecular Models of Polymers
Edward T. Samulski (Chemistry) Liquid Crystals and Liquid Crystal Polymers
Sergei S. Sheiko (Chemistry) Dynamics of Single Molecule on a Surface
Richard Superfine (Physics and Astronomy) Interfacial Ordering of Molecules
Russell Taylor (Computer Science) Advanced Computer Graphics, Data Rendering, Novel Microscopy Instrumentation
Alex Tropsha (Medicinal Chemistry) Biomolecular Informatics, Relationships between Chemical Structures and Their Functional Properties
Frank Tsui (Physics and Astronomy) Synthesis of Artificially Structured Materials
Sean Washburn (Physics and Astronomy) Quantum Transport, Mechanical and Electrical Response.
Yue Wu (Physics and Astronomy) Quasicrystals, Nanocrystals, Nanotubes and Molecular Motion in Polymers
Otto Zhou (Physics and Astronomy) Synthesis, Properties and Applications of Nanomaterials

Associate Professors

Richard Goldberg (Biomedical Engineering) Assistive Technology Devices for People with Disabilities

Nalin Parikh (Physics and Astronomy) Ion Beam Modifications and Analysis

Paul Weinhold (Orthopaedics) Orthopaedic Biomechanics, Vibration Testing of Orthopaedic Tissues and Constructs

The materials science program at the University of North Carolina at Chapel Hill is an interdisciplinary graduate program that brings together faculty from physics and astronomy, chemistry, and various departments in the health sciences (including dentistry, orthopedics, and biomedical engineering) to engage in research and training in materials science. The primary areas of emphasis in the program are electronic, nano, polymer, and biomaterials. Students pursuing M.S. and Ph.D. degrees in materials science begin their studies with a core curriculum covering the fundamentals of materials, including their structures, surfaces, fabrication, thermodynamics, and materials science laboratory techniques. They continue with elective courses offered by the curriculum or the participating departments as appropriate to their area of research concentration. Graduate students engage in research under the supervision of one of the participating materials science faculty in the Curriculum in Applied Sciences and Engineering.

Research Interests

The four areas of research emphasized in the materials science program are electronic, nano, polymer, and biomaterials. These four areas are not discrete, however, as research projects in electronic polymers, nonlinear optics of polypeptides on surfaces, liquid crystals, and wear in polyethylene artificial joints demonstrate. Individual faculty members may have research interests in more than one of the primary areas, and may collaborate with others to address all four. For detailed information on the graduate program, please contact Professor Lu-Chang Qin at (919) 843-3575, or e-mail lcqin@email.unc.edu.

Degree Requirements

The Ph.D. degree requirements include completion of a suitable set of courses, cumulative written comprehensive exams, a preliminary doctoral oral exam, an original research project culminating in a dissertation, and a final oral exam. The M.S. degree requirements include completion of a suitable set of courses, cumulative written comprehensive exams, a research project, and a final oral exam. The general regulations of The Graduate School govern credit hour, residency, and examination requirements.

Courses

All graduate students must pass the following courses or appropriate ones approved by the curriculum, or must have passed their equivalents elsewhere: APPL 470, APPL 473, and MTSC 615, 720, 730, and 735. Each student also takes additional courses offered by the curriculum or participating departments, as appropriate for his or her area of study.

Comprehensive Exam

M.S. students must pass three core exams and one specialty exam. Ph.D. students must pass four core exams and two specialty comprehensive exams. Topics for the specialty exams will be research areas represented in the materials science program at UNC–Chapel Hill; core exams cover the fundamental knowledge of materials science. All students are required to complete the comprehensive exam by the second year.

Preliminary Doctoral Oral Exam

Students are required to select a research adviser during the first year in graduate school and a thesis committee before they take the preliminary doctoral exam. To pass the preliminary doctoral oral exam, students must present and successfully defend their Ph.D. research proposal to the thesis committee by the end of the third year.

Facilities and Equipment

Students and faculty in the curriculum have access to the following central facilities located in various departments: NMR (2), computer modeling and computer graphics, confocal microscopy, electron microscopy (SEM, TEM, and STEM), FIB, glass shop, machine shop (2), laser lab, mechanical testing, mass spectroscopy, and X-ray diffraction. In addition, a variety of equipment is located in individual research laboratories. This includes equipment for thermal analysis; polymer synthesis; FTIR, UV-Vis, Raman, and photoluminescence spectroscopy; ellipsometry; CVD; MBE; thermal oxidation; AFM; electrical measurements; nonlinear optics; and low temperatures and high pressures. Facilities at North Carolina State University in Raleigh and MCNC in Research Triangle Park are also available.

Fellowships and Assistantships

Teaching assistantships are available to qualified graduate students. The duties of teaching assistants include teaching laboratory sections, assisting in the supervision of advanced laboratories, teaching recitation sections, and grading papers. Summer support is generally available. Research assistantships are also offered.

Courses for Graduate and Advanced Undergraduate Students

APPL

410 Systems and Signals (4). Prerequisite, MATH 383. Analysis of linear systems by transform methods to networks, including stability analysis. Survey of numerical methods for network solutions.

420 Introduction to Polymer Chemistry (CHEM 420) (3). See CHEM 420 for description.

421 Synthesis of Polymers (CHEM 421, MTSC 421) (3). See CHEM 421 for description.

422 Physical Chemistry of Polymers (CHEM 422, MTSC 422) (3). See CHEM 422 for description.

423 Intermediate Polymer Chemistry (CHEM 423, MTSC 423) (3). See CHEM 423 for description.

425 Bioelectricity (3). Prerequisites, BIOL 252 and PHYS 351. Quantitative analysis of excitable membrane signals, origin of electrical membrane potentials, propagation, subthreshold stimuli, extracellular fields, membrane biophysics, and electrophysiology of the heart. Design and development of an electrocardiogram analysis system.

430 Digital Signal Processing I (3). Prerequisite, COMP 110 or 116. This is an introduction to methods of automatic computation of specific relevance to biomedical problems. Sampling theory, analog-to-digital conversion, and digital filtering will be explored in depth.

450 Linear Control Theory (3). Prerequisite, MATH 528. Linear control system analysis and design are presented. Frequency and time domain characteristics and stability are studied.

465 Biomedical Instrumentation (4). Prerequisite, PHYS 351. Topics include basic electronic circuit design, analysis of medical instrumentation circuits, physiologic transducers (pressure, flow,

bioelectric, temperate, and displacement). This course includes a laboratory where the student builds biomedical devices.

470 Fundamentals of Materials Science (CHEM 470) (3). See CHEM 470 for description.

472 Chemistry and Physics of Electronic Materials Processing (CHEM 472, MTSC 472, PHYS 472) (3). See PHYS 472 for description.

473 Chemistry and Physics of Surfaces (CHEM 473, MTSC 473) (3). See CHEM 473 for description.

480 Microcontroller Applications I (3). Prerequisites, COMP 110 or 116, and PHYS 351. Introduction to digital computers for online, real-time processing and control of signals and systems. Programming analog and digital input and output devices is stressed. Case studies are used for software design strategies in real-time systems.

490 Special Topics (3). Topics vary from semester to semester.

491L Materials Laboratory I (PHYS 491L) (2). See PHYS 491L for description.

492L Materials Laboratory II (PHYS 492L) (2). See PHYS 492L for description.

510 Biomaterials (BMME 510) (3). Prerequisite, BIOL 101 or BMME 589. Chemical, physical engineering, and biocompatibility aspects of materials, devices, or systems for implantation in or interfacing with the body cells or tissues. Food and Drug Administration and legal aspects.

520L Polymer Chemistry Laboratory (CHEM 520L) (2). See CHEM 520L for description.

691H Honors Thesis (3). Research honors course. Prior approval needed from the chair or associate chair of the program for topic selection and faculty research mentor. Minimum GPA requirement, written report, and abstract requirements as set forth by the honors program.

692H Honors Thesis (3). Research honors thesis continuation with required GPA, research topic selection with approved faculty mentor. Written abstract and report per honors program guidelines submitted by specific deadlines.

697 Senior Design Project I (2). Prerequisite, APPL 310. Conceptual prelude and preparation to APPL 698, in which the theoretical and practical knowledge acquired during the undergraduate tenure is applied to develop a solution to a real-world problem.

698 Senior Design Project II (4). Prerequisite, APPL 697. Implementation phase of the senior design experience. Students apply the theoretical and practical knowledge they have acquired in their previous seven semesters to the design and implementation of a solution to a real-world problem.

MTSC

421 Synthesis of Polymers (APPL 421, CHEM 421) (3). See CHEM 421 for description.

422 Physical Chemistry of Polymers (APPL 422, CHEM 422) (3). See CHEM 422 for description.

423 Intermediate Polymer Chemistry (APPL 423, CHEM 423) (3). See CHEM 423 for description.

472 Chemistry and Physics of Electronic Materials Processing (APPL 472, CHEM 472, PHYS 472) (3). See PHYS 472 for description.

473 Chemistry and Physics of Surfaces (APPL 473, CHEM 473) (3). See CHEM 473 for description.

573 Introductory Solid State Physics (PHYS 573) (3). See PHYS 573 for description.

615 Structure of Solids (3). Crystallography, reciprocal lattices, Bloch waves, band structure, electronic wave functions, phonons, thermal expansion. Superlattice structures, including liquid crystals. Overview of properties of ceramic, amorphous, polymeric, and composite materials.

Courses for Graduate Students

MTSC

715 Visualization in Science (COMP 715, PHYS 715) (3). See COMP 715 for description.

720 Materials Fabrication (3). Permission of the department. Introduction to materials fabrication techniques. Includes single crystal growth, thin film deposition, synthesis of quantum dots and nanotubes/nanowires, dielectric and electron emissive materials, nanocomposites, bioceramics, and energy storage materials.

730 Statistical Thermodynamics (3). Permission of the instructor. Theory of ensembles and interactions in statistical mechanics. Classical and quantum statistics. Applications to simple systems: ideal gas, heat capacity of solids, blackbody radiation, phase transitions.

735 Techniques in Materials Science (3). Permission of the department. Lecture and laboratory in materials analysis techniques, including optical microscopy, scanning electron microscopy, transmission electron microscopy, X-ray diffraction, fluorescence, nuclear magnetic resonance, Raman spectroscopy, thermal analysis, XPS, channeling and RBS.

740 Advanced Biomaterials (BMME 740) (3). See BMME 740 for description.

750 Kinetics, Diffusion, and Phase Transitions of Materials (3). Reaction kinetics in bulk materials. Mass transport, microstructural transformations, and phase transitions in condensed phases. Atom diffusion in solids. Spinodal decomposition.

810 Device Physics and Electronic Properties of Solids (3). Prerequisites, APPL 470 or PHYS 573, MTSC 615, and 730. Permission of the instructor for students lacking the prerequisites. Survey of crystal structure, bandstructure, transport. Overview of FETs, heterostructures, light emission, dissipation, noise, integrated circuits, solar cells, and ceramics. Emphasis on physical sources of device behavior.

820 Optical Properties of Solids (3). Prerequisites, APPL 470 or PHYS 573, and PHYS 415. Permission of the instructor for students lacking the prerequisites. Reflection, waveguides, nonlinear optics, optical switching, photorefraction, optical storage. Optical coupling to electronic states, device applications, optical computing.

830 Ion–Solid Interactions (3). Prerequisite, APPL 470 or PHYS 573. Permission of the instructor for students lacking the prerequisite. Interatomic potentials, range distribution, radiation damage, annealing, secondary defects, analytical techniques, silicon-based devices, implantation in compound semiconductors, and buried layer synthesis. Ion implantation in metals, ceramics, polymers, and biomaterials.

840 New Technologies and Device Architecture (3). Prerequisites, APPL 470 or PHYS 573, MTSC 615, and 730. Permission of the instructor for students lacking the prerequisites. Survey of novel and emerging device technologies. Resonant tunneling transistors, HEMT, opto-electronic devices and optical communication and computation, low-temperature electronic, hybrid superconductor devices.

871 Solid State Physics (PHYS 871) (3). See PHYS 871 for description.

872 Solid State Physics (PHYS 872) (3). See PHYS 872 for description.

891 Special Topics in Material Science (1–3). Permission of the department. Current topics in materials science, including electronic and optical materials, polymers, and biomaterials.

992 Master's (Non-Thesis) (3–9).

993 Master's Thesis (3–6). Permission of the department.

994 Doctoral Dissertation (3–9). Permission of the department.

Department of Art

art.unc.edu
JAMES HIRSCHFIELD, *Chair*

Professors
Christoph Brachmann, European Art, 1400–1700
S. Elizabeth Grabowski, Printmaking, Painting, Drawing
James Hirschfield, Sculpture
Yun-Dong Nam, Ceramic Sculpture
Mary D. Sheriff, 18th- and 19th-Century Art, Gender Studies
Daniel J. Sherman, European Art, 1850–1960, Cultural History, Museums
elin o'Hara slavick, Mixed Media
Mary C. Sturgeon, Ancient Art, Archaeology
Dennis Zaborowski, Painting, Drawing

Associate Professors
Glaire Anderson, Islamic Art
John P. Bowles, African American Art
Eduardo Douglas, Latin American Art
Pika Ghosh, South Asian Art
Carol Magee, African Visual Culture
Mary Pardo, Italian Renaissance
Tania String, European Art, 1400–1700
Dorothy Verkerk, Late Antique, Celtic, Early Medieval
Jeff Whetstone, Photography
Lyneise Williams, Latin American and African Diaspora Art

Assistant Professors
Ross Barrett, American Art
Sabine Gruffat, Digital Art
Cary Levine, Contemporary Art
Wei-Cheng Lin, East Asian Art
Mario Marzan, Painting, Drawing, Latin American Art
Roxana Perez-Mendez, Sculpture
Hong-An Truong, Digital Art
Jina Valentine, Mixed-Media

Lecturers
Jennifer J. Bauer, Modern Art
Michael Sonnichsen, Photography and Printmaking

Ackland Art Museum:

Adjunct Professor
Timothy Riggs, Curator of Collections

Adjunct Associate Professor
Peter Nisbet

Adjunct Assistant Professors
Carolyn Allmendinger, Director of Academic Programs

North Carolina Museum of Art:

Adjunct Associate Professors
John Coffey, Deputy Director for Art

Adjunct Professor – American Studies Department
Bernard Herman

Professors Emeriti
Jaroslav T. Folda
James Gadson
Frances Huemer
Juan Logan
Arthur Marks
Jerry Noe
Marvin Saltzman

For those considering professional careers as art historians (teaching and research), critics, or museum or gallery professionals, the Department of Art offers graduate work leading to the degrees of master of arts and doctor of philosophy. Those who aim to become professional artists should take the degree of master of fine arts. The Hanes Art Center provides exhibition galleries, a departmental library, a visual resources library, offices, study areas, classrooms, and studios. Additional studios and shops are located in the Art Laboratory building on Airport Drive, one mile from campus. The Joseph C. Sloane Art Library has a collection of over 100,000 print volumes and is supplemented by the University Libraries, with holdings of more than 6,000,000 volumes. The Sloane Art Library provides quite study spaces, access to specialized art resources, and houses the reserve holdings for Art Department courses. Graduate students have access to the departmental visual resources library and can use different types of scanning equipment (flatbed scanners, slide and film scanners) to digitize images for research. The VRL has current holdings of 250,000 slides, 60,000 digital images, and 20,000 photographs.

Admission
Deadline for applications will be in December for art history and in January for studio art. The Graduate School application is submitted via the online application for admission. See gradschool.unc.edu/admissions/instructions.html for detailed information and deadlines. This user-friendly, online application is faster and easier than completing a paper application and provides for the prompt receipt and distribution of application information. Individuals who are unable to utilize the online application may request a paper application from gradinfo@unc.edu or by phoning (919) 966-2612.

Master of Fine Arts (M.F.A.)

Overview
The master of fine arts program in studio art is a community of dedicated and diverse fine arts professionals. We recognize and respond to the universal human need for visual expression, and the indispensable role of the visual arts and visual communication in contemporary society. We recognize the necessity of intellectual curiosity and creative discipline as components of a quality learning environment and respect the conversation between intuition and intellect that contributes to transformative art-making. We encourage exploration and experimentation that crosses intellectual and methodological boundaries while simultaneously respecting and engaging the history and traditions of art.

In the context of a research I institution, the UNC M.F.A. program stands as a site of synthesis, where extensive intellectual and creative resources are available to students in their pursuit of self expression. We seek students who are technically adept, critically aware, and dedicated to their passion for art-making. With these qualities as a point of

departure, faculty work closely with students to encourage aesthetic and intellectual inquiry, impart versatile skills, and motivate self-exploration. Our resolve is to help students create outstanding works of art.

M.F.A. Curriculum

The master of fine arts degree at UNC–Chapel Hill is a two-year, 60-hour program. Credits are earned through studio practice, formal critique, professional development, and academic electives. Additionally, a teaching foundation class is available for students who wish to prepare for an academic career. While this class is optional, it is required for students who wish to apply for teaching fellowships in the M.F.A. program. Most students take advantage of this opportunity and receive teaching fellowships that provide the opportunity to teach their own class.

Credits for studio practice constitute the majority of credits. These are earned through independent study and critique. All M.F.A. students have individual studio space to support their creative research. With the department's interdisciplinary approach, students need not choose a particular medium for specialization. They may use different media to express a variety of aesthetic and conceptual goals. This however, does not preclude a media focus, but does mean that media choices are integral to students' intellectual and aesthetic explorations.

The structure for feedback in the program is through weekly critiques, where students interact with the studio faculty over the course of the semester. A series of formal reviews bring the entire faculty together to evaluate each student's progress at the end of the first, second, and fourth semester.

The academic component of the M.F.A. program is designed to complement the art making process. The program strongly believes that the decision to pursue the making of fine art in an academic context carries an attendant responsibility to develop the verbal and written articulation of the visual. To help achieve this goal, students participate each semester in a graduate seminar (three credit hours). Contemporary critical issues surrounding the making of art are explored and debated in this group forum. Practical aspects of an art career (grant writing, professional presentation, networking with galleries and museums, etc.) make up the professional development component of the seminar. The balance of these components will vary from semester to semester, reflecting the focus of the various faculty teaching the course.

Other academic credits are satisfied by a requisite six hours of additional course work in art history and/or related fields. Students select these courses depending on the focus of their studio explorations, thus stretching the capacity of their creative work. Usually students are urged to take one of these courses in the area of contemporary art history.

The remaining academic credits are earned through the master's thesis. This includes the preparation of the thesis exhibition and the writing of the thesis document. At the end of the students' final semester, they mount a group exhibition of the thesis work produced under the direction of a thesis committee. Students write a thesis statement to accompany the thesis work. A final oral defense takes place during the time of the exhibition. Once the oral defense has been passed, students submit a copy of the thesis statement (along with documentation of the thesis work) for permanent retention in the Sloane Art Library.

In addition to the core curriculum, the UNC–Chapel Hill master of fine arts program supports students by bringing artists and cwritics to UNC throughout the year. For our Hanes Visiting Artist Lecture Series, artists are typically invited to campus for a two-day visit during which they give a public lecture and provide private critiques for the department's graduate students. In addition, each semester one artist is invited for a longer two-week residency. Graduate students have the opportunity to interact with these artists in a variety of settings. This program has proved to be a vital conduit for graduate students to see the work of, and interact with, a large and diverse number of professional artists. Additionally, once a semester the department brings to campus a critic, gallerist or other art professional to further introduce students to the professional art world, furthering knowledge and fostering mutually beneficial practical and professional connections and relationships.

Financial Aid for Studio Art Students

All applicants for admission to the M.F.A. program are automatically considered for nomination for merit awards offered by The Graduate School. Additional support in the form of assistantships and/or specially designated awards is administered directly by the department. Students may apply for teaching fellowships after they have completed the teaching practicum course.* Students desiring financial aid should consult as early as possible the Office of Scholarships and Student Aid (studentaid.unc.edu/) for information about work-study jobs and loans.

**Students with demonstrable teaching experience at the college level are exempt from this course.*

Admission Requirements — M.F.A.

We seek applications from individuals committed to their development as professional artists. While the majority of applicants hold a bachelor's degree in art, we also welcome applications from students who hold undergraduate degrees in other fields and can present a strong art portfolio. Students who do not have a bachelor's degree in art should have at least one basic-level and one intermediate-level course in art history in preparation for the graduate-level course work in art history required of M.F.A. students. Applicants to the M.F.A. program are not required to take the Graduate Record Exam (GRE).

Application for admission to the M.F.A. program in studio art must be made online through The Graduate School. Their instructions for applicants may be found at gradschool.unc.edu/admissions/instructions.html.

Applicants are admitted for the fall semester only.

All applications must be submitted by posted deadlines, and must include the following:

The electronic application via the UNC Graduate School (see gradschool.unc.edu/admissions/instructions.html)

- Graduate School Application
- Undergraduate Transcript
- Three Letters of Recommendation
- Application Fee

Supplemental materials specific to the M.F.A. admission include (See the Department of Art Web site at art.unc.edu/Studio_Art/Graduate_Programs/APPLY_DEADLINES for specific instructions.)

- Statement of Purpose
- Visual Materials for Creative Review
- List of Images Submitted for Creative Review

For more information, contact

Director of Graduate Studies for Studio Art
Department of Art
CB# 3405, Hanes Art Center
The University of North Carolina at Chapel Hill
Chapel Hill, N.C. 27599-3405
Web: art.unc.edu

Master of Arts (M.A.) and the Doctorate (Ph.D.) in Art History

In addition to completing an application to The Graduate School (which must include up-to-date GRE scores), the candidate for admission to the programs in art history must submit an example of his/her written work. The writing sample should be no more than 15 pages. All applicants for graduate study in art history are admitted to the program as candidates for the master of arts degree unless they have already received or expect to receive the M.A. degree in art history from another institution. An undergraduate major in art history is not required for M.A. candidacy; however, entering candidates must have taken a minimum of twenty-four semester hours in art history, archaeology, cultural anthropology, or aesthetics.

There are no spring semester admissions in art history.

Degree Requirements for Art History

Master of Arts Degree

The master of arts degree generally follows the requirements of The Graduate School as described in the section on graduate degree requirements in the *Graduate School Handbook*.

Purpose of the M.A. degree: Both a broad knowledge of world art and a basic sampling of the diverse theory and methods employed by our faculty in the discipline of art history.

The master's program in art history is designed to be completed in four semesters.

Diagnostic Slide Examination

During the first week of their first semester, entering M.A. students take a diagnostic slide examination (DSE). The purpose of the DSE is to identify one or more areas where the graduate student needs to develop visual knowledge beyond his or her undergraduate background. It is in no way punitive, nor is it graded. Since the field of art history is increasingly global, and our program encourages a global approach, the diagnostic exam serves to assist the new graduate student in identifying an area in which he or she could increase his or her visual repertoire by auditing a survey class offered by one or more of the faculty.

Course Work

Total of 12 courses, 36 credits.

Three required courses: Methods in Art Historical Research (ARTH 850) in the first semester; Master's Thesis Writing Seminar (ARTH 991) and Master's Thesis (ARTH 993) in the fourth semester.

Nine courses, of which five should be graduate research seminars (700-900-level).

In order to develop breadth of knowledge, both in terms of content and method, students must take at least two courses whose topics cover the time period before 1700 C.E. and two covering the period after 1700 C.E. Additionally, students must take courses with five different members of the graduate faculty.

Language Requirement

M.A. Degree: By the end of the third semester, all M.A. students are required to have met the language requirement of one language, other than English, appropriate to the area of study. The language will be determined in consultation with the student's advisor, the director of graduate studies, and the graduate committee. The student can demonstrate competency by obtaining a passing grade on the UNC–Chapel Hill reading competency exam, or earning a "B" (or a graduate "P") or better in a fourth semester or higher language course, or earning a "B" (or a graduate "P") in a literature course in that language at UNC–Chapel Hill. Note: No credit toward the M.A. course work requirement is given for language courses.

Master's Exam

M.A. students take this exam at the beginning of their third semester. Students who do not pass the exam at that time may re-take the exam at the end of the third semester. Only students who have successfully passed the exam may register for ARTH 991 (Master's Thesis Writing Seminar) or ARTH 993 (Master's Thesis). The exam is offered only during the fall semester.

Master's Thesis

The M.A. thesis is completed by the end of the fourth semester of enrollment. The completed thesis must be signed by the members of the thesis committee and submitted to The Graduate School in time for May graduation.

Doctor of Philosophy Degree

The degree of doctor of philosophy generally follows the requirements of The Graduate School as described in the section on graduate degree requirements in the *Graduate School Handbook*.

Course Work

Ph.D. students take a total of nine courses, at least four of which are research seminars (900-level), plus a final course, ARTH 994 (Doctoral Dissertation). Two of the nine courses may be taken in other departments as electives for supplementary and complimentary studies.

Electing to pursue an external minor: Ph.D. students may choose to complete a formal external minor, which consists of at least three additional courses in a field related to his or her area of specialized study (such as communication studies, women's studies, history, or medieval studies). The student must secure prior approval of the minor department, and a copy of the proposed courses to be taken must be signed by both departments and entered in the student's permanent record in the Department of Art and the UNC–Chapel Hill Graduate School.

Language Requirement

Ph.D. students are required to demonstrate proficiency in two languages (other than English). The first language will be the language that fulfilled the M.A. language requirement. The second language should be appropriate to the area of study, and will be determined in consultation with the student's advisor, the director of graduate studies for art history, and the graduate committee. Some fields require additional languages and students should study these languages as necessary. Competency in the second language will be determined following the same guidelines as those of the M.A. language requirement.

Preliminary Doctoral Exams

Ph.D. students take both the written and the oral preliminary exams during the semester after the Ph.D. course work is completed. Most Ph.D. students will take the preliminary exams during the spring semester of their second year in the Ph.D. program. Those students pursuing an external minor will take the preliminary exams during the fall semester of their third year.

- *Written Exams.* Students take the written exams over the course of a one-week period. Students who fail the written exams may repeat them only once. These exams are taken in three parts: first major field of study (six hours), second major field of study (six hours), methodological/thematic area of study (six hours).
- *Preliminary Oral Exam.* An oral exam will take place within two weeks of the written exam. The oral will be on the content of the written

exams and may also include a defense of the dissertation prospectus. The examining committee will consist of at least three members who must be full-time active graduate faculty or adjunct teaching faculty in art history.

- *Dissertation Prospectus.* Ph.D. students defend their dissertation prospectus orally. If the dissertation prospectus is not defended at the oral exam, this defense should take place within four months of the written exams. At least two weeks before the prospectus defense, the student submits a dissertation prospectus to his or her dissertation committee, which should consist of five faculty members, three of whom must be permanent members of the UNC–Chapel Hill art history faculty.

Dissertation and Final Oral Exam

After passing the preliminary doctoral exams, the student begins work on the dissertation. Once the dissertation is completed and approved by the advisor and dissertation committee, the student defends the finished dissertation. Doctoral students have eight calendar years from the date of first registration in the doctoral program to complete the Ph.D. For doctoral students, there is a minimum residence credit requirement of four semesters, and at least two semesters must be earned through continuous full-time registration on the UNC–Chapel Hill campus.

For further information the applicant should write to the director of graduate studies for art history.

Financial Aid for Art History Students

All applicants for admission who have completed their applications by December 1 are automatically considered by the department for nomination for Graduate School awards. Applicants and students in residence are also eligible for teaching and research assistantships, which are awarded by the department. There are also annual service and non-service awards. Students desiring financial aid should consult as early as possible the Office of Scholarships and Student Aid (studentaid.unc.edu) for information about work-study jobs and loans.

ARTH (Art History)
Courses for Graduate and Advanced Undergraduate Students

The content of these courses varies slightly from year to year in accordance with **the needs of the students and the special competence of the instructor.**

450 [ART 450] The City as Monument (3). A city or cities will be considered as cultural artifact(s), with emphasis given to plans and planning, architecture, public monuments and to various institutions, such as religion, government, the arts, and commerce that initiate or affect these urban developments and forms.

451 [ART 451] Women in the Visual Arts II (WMST 451) (3). Prerequisite, ARTH 151 or 254. Permission of the instructor for students lacking the prerequisite. Discussion of topics related to the representation of women in Western art and/or women as producers of art.

452 [ART 452] Brazilian Modernism (3). Prerequisite, ARTH 157 or 267. Permission of the instructor for students lacking the prerequisite. This course covers the development of modernism in the visual arts in Brazil from 1917, the year in which a Brazilian artist first exhibited "modernist" artworks in Brazil, to 1960.

453 [ART 453] Africa in the American Imagination (AAAD 486) (3). Restricted to sophomores, juniors, and seniors. Examines the ways African art appears in United States popular culture (advertisements, magazines, toys, films, art) to generate meanings about Africa. Addresses intersecting issues of nationalism, multiculturalism, imperialism, nostalgia, race.

454 [ART 454] Cathedrals, Abbeys, Castles: Gothic Art and Architecture, ca.1130–1500 (3). Prerequisite, ARTH 157 or 267. Permission of the instructor for students lacking the prerequisite. Covers the development of Gothic church and secular architecture in Europe between 1130 and 1500. Explores formal and constructive progress in architecture (including sculpture and stained glass windows) and social, political, and economic aspects of medieval society that affected these developments.

455 [ART 455] City, Architecture, Art: Nuremberg as a European Artistic Center, 1300–1600 (3). Prerequisite, ARTH 157 or 267. Permission of the instructor for students lacking the prerequisite. The course covers the development of art and architecture from ca. 1300 to ca. 1600 in one of the most important medieval and early modern art centers in Europe: Nuremberg, the hometown of the famous German painter Albrecht Dürer (1471–1528).

456 [ART 456] Art and Visual Culture of South Asia (ASIA 456) (3). Required preparation, any intermediate art history course or permission of the instructor. This thematic course explores how objects and monuments are viewed, experienced, and used in a ritual context in South Asia.

457 [ART 457] Studies in the History of Graphic Art (3). Required preparation, any intermediate art history course or permission of the instructor. Study of prints and printmaking in Western art from ca. 1400 to the present focusing on selected topics.

458 [ART 458] Islamic Palaces, Gardens, and Court Culture (Eighth–16th Centuries CE) (ASIA 458) (3). Prerequisite, ARTH 154. Permission of the instructor for students lacking the prerequisite. This course focuses on palaces, gardens, and court cultures beginning with the eighth-century Umayyad period and ending with the 16th-century reigns of the Mughal, Safavid, and Ottoman dynasties.

460 [ART 460] Greek Painting (CLAR 460) (3). Required preparation, any intermediate art history course or permission of the instructor. A survey of the development of Greek art from geometric to Hellenistic painting through a study of Greek vases, mosaics, and mural paintings.

461 [ART 461] Archaic Greek Sculpture (CLAR 461) (3). Required preparation, any intermediate art history course or permission of the instructor. A focused study of sculpture during the Archaic period in Greece.

462 [ART 462] Classical Greek Sculpture (CLAR 462) (3). See CLAR 462 for description.

463 [ART 463] Hellenistic Greek Sculpture (CLAR 463) (3). Required preparation, any intermediate art history course or permission of the instructor. A focused study of Greek sculpture in the Hellenistic period.

464 [ART 464] Greek Architecture (CLAR 464) (3). See CLAR 464 for description.

465 [ART 465] Architecture of Etruria and Rome (CLAR 465) (3). See CLAR 465 for description.

466 [ART 466] History of the Illuminated Book (3). Required preparation, any intermediate art history course or permission of the instructor. Chronological survey of major developments in book painting during the European Middle Ages from 300 to 1450 CE.

467 [ART 467] Celtic Art and Cultures (3). Required preparation, any intermediate art history course or permission of the instructor. This course explores the art and culture from the Hallstat and La Tène periods (seventh century BCE) to the Celtic "renaissance" (ca. 400–1200 CE).

468 [ART 468] Visual Arts and Culture in Modern and Contemporary China (3). This course examines visual materials, including those from fine arts, commerce, popular culture, political propaganda, avant-garde movements, etc., produced in modern and contemporary China as an important means of defining China's self-identity in the modern and global world.

469 [ART 469] Art of the Aztec Empire (3). This course provides a comprehensive introduction to the art of the Aztec Empire, including architecture, monumental sculpture, small-scale sculpture, ceramics, painting, lapidary work, gold work, and feather work.

470 [ART 470] The Moving Image in the Middle Ages (3). The course explores the range of contexts in which images in the medieval period were made to move; for instance, in rituals, processions, and miracles.

471 [ART 471] Northern European Art of the 14th and 15th Centuries (3). Required preparation, any intermediate art history course or permission of the instructor. Advanced study of painting and sculpture in France, England, and the Netherlands, 1300 to 1400.

472 [ART 472] Early Modern Art, 1400–1750 (3). Required preparation, any intermediate art history course or permission of the instructor. This course explores specialized themes and/or broad topics in Western European art of the early modern period.

473 [ART 473] Early Modern and Modern Decorative Arts (3). Required preparation, any intermediate art history course or permission of the instructor. This course traces major historical developments in the decorative and applied arts, landscape design, and material culture of Western society from the Renaissance to the present.

474 [ART 474] Roman Sculpture (CLAR 474) (3). See CLAR 474 for description.

475 [ART 475] Icons and Idols: Debates in Medieval Art (3). This course will examine theories and instances of image making and breaking from the classical world to the early modern world, covering late antiquity, iconoclasm in Byzantium, and the medieval West.

476 [ART 476] Roman Painting (CLAR 476) (3). See CLAR 476 for description.

481 [ART 481] American Art and the Civil War (3). Prerequisite, ARTH 53, 54, 61, 64, 77, 79, 84, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, or 161. Permission of the instructor for students lacking the prerequisite. An exploration of the ways that American artists negotiated the Civil War, examining artworks and popular images that addressed slavery and sectionalism, the wartime experience, and the project of Reconstruction.

483 [ART 483] Art, Politics, and Society in France, 1850–1914 (3). An examination of the interaction of artists, criticism, and the market with larger political and social developments in France, with an emphasis on primary sources.

485 [ART 485] Art of the Harlem Renaissance (3). Examines the Harlem Renaissance (1918–1942) as an instance of both transnational modernism and cultural nationalism through study of how artworks articulate interrelated conceptions of race, gender, sexuality, and social class.

487 [ART 487] African Impulse in African American Art (3). Required preparation, any intermediate art history course or permission of the instructor. This class will examine the presence and influences of African culture in the art and material culture of Africans in the Americas from the colonial period to the present.

488 [ART 488] Contemporary African Art (AAAD 405) (3). Prerequisite, AAAD 101 or ARTH 152 or 155. Permission of the instructor for students lacking the prerequisite. Examines modern and contemporary African art (1940s to the present) for Africans on the continent and abroad. Examines tradition, cultural heritage, colonialism, postcolonialism, local versus global, nationalism, gender, identity, diaspora.

490 Special Topics in Art History (3). Required preparation, any intermediate art history course or permission of the instructor. Selected topics in art history.

514 [ART 514] Monuments and Memory (GLBL 514) (3). See GLBL 514 for description.

551 [ART 551] Introduction to Museum Studies (3). Introduces careers in museums and other cultural institutions. Readings and interactions with museum professionals expose participants to curation, collection management, conservation, exhibition design, administration, publication, educational programming, and fundraising.

552 [ART 552] The Literature of Art (3). Required preparation, any intermediate art history course or permission of the instructor. A study of the principal critics and historians who have contributed to the development of modern art history. Also application of the principles to specific works of art.

553 [ART 553] The Body in Social Theory and Visual Representation (3). A study of how the human body has been represented in contemporary art and the relation of those representations to theories of the individual and society.

554 [ART 554] Imagining Otherness in Visual Culture in the Americas (3). Required preparation, any intermediate art history course or permission of the instructor. This course examines representational othering of black, Asian, Latina/o, and Native American people in images in the Americas through postcolonial topics like racial stereotyping, Orientalism, primitivism, essentialism, and universalism.

556 [ART 556] Visual Cultures of the American City, 1750–1950 (3). Prerequisite, ARTH 53, 54, 61, 64, 77, 79, 84, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, or 161. Permission of the instructor for students lacking the prerequisite. An exploration of the wide field of American art and visual culture inspired by the spaces and social life of the modern city.

561 [ART 561] Art and Society in Medieval Islamic Spain and North Africa (ASIA 561) (3). Prerequisite, ARTH 154. Permission of the instructor for students lacking the prerequisite. This course introduces the art and architecture of medieval Islamic Spain and North Africa between the eighth and 16th centuries.

562 [ART 562] Islamic Urbanism (3). Prerequisite, ARTH 154. Permission of the instructor for students lacking the prerequisite. This course explores the development, urban forms, and social structures of some of the major cities of the medieval Islamic lands.

583 [ART 583] Theories of Modern Art (3). Required preparation, any intermediate art history course or permission of the instructor. A study of theoretical issues central to the understanding of trends in modern art (e.g., modernism, the avant-garde, formalism originality).

586 [ART 586] Cultural Politics in Contemporary Art (3). Permission of the instructor. This course will examine the strategies of critique in contemporary art. Organized thematically, it focuses on the tactics employed by artists who address political, social, or cultural issues through their work.

588 [ART 588] Current Issues in Art (3). Addresses select issues that have gained or regained prominence in today's art world, for example globalization, training, the market, and the nature of the "contemporary."

590 [ART 550] Topics in Connoisseurship (3). Permission of the instructor. Works in the Ackland Museum's collection will be studied directly as a means of training the eye and exploring the technical and aesthetic issues raised by art objects.

592 [ART 595] History and Theory of Museums (3). Required preparation, any intermediate art history course or permission of the instructor. Provides an historical overview of museums. Serves as an introduction to many of the theoretical issues museums face including: ethics, audiences, the role of museums in society, exhibiting dilemmas.

595 [ART 596] Experience in Research (1–3). Required preparation, one 100-level art history course and one 200- to 399-level art history course. An experiential-learning opportunity in independent and original research on a topic or in a field of the student's choosing under the close direction of a faculty supervisor.

597 [ART 597] Studiolo to Wunderkammer (3). Required preparation, any intermediate art history course or permission of the instructor. This course explores the history of early modern collecting, encompassing scholars' and merchants' "study rooms," aristocrats' menageries, humanists' "sculpture gardens," and princely cabinets of wonders.

683 [ART 683] Etruscan Art (CLAR 683) (3).

691H Honors in Art History (3). Permission of the instructor. Independent research directed by a faculty member leading to an honors thesis.

692H Honors in Art History (3). Permission of the instructor. Independent research directed by a faculty member leading to an honors thesis.

Courses for Graduate Students

In the seminars listed, the topics for study change from year to year depending upon the professor conducting the course. Architecture, sculpture, painting, or a combination of these may be the subject. Consult the department schedule for details on specific courses in any given semester.

750 [ART 750] Advanced Readings Topics in the History of Art (3).

751 [ART 751] Gender and Visual Culture (WMST 751) (3).

755 [ART 755] Museum Studies Apprenticeship (3). Prerequisite, ARTH 551 or ARTH 592. Permission of the instructor for students lacking the prerequisite. Provides experience in some aspect of museum work: curatorial, educational, collections management, exhibition design, administration. Requires a minimum of 90 hours and will have an academic component.

763[ART 763] Medieval Studies (3).

768]ART 768] Tudor and Jacobean Portraits: A Theoretical and Practical Investigation (3). This course involves close and critical examination of a select body of extant portraits from the Tudor and Jacobean periods in English history (1485-1625) in the collection of the North Carolina Museum of Art. Students taking this unit will play an active role in researching these relatively unstudied works of art.

777 [ART 777] Colonialism and European Visual Culture, 1800–1990 (3). Considers the role of visual representation in the construction of European empire and its associated knowledges from the Napoleonic expedition to Egypt to debates over primitivism in the 1980s.

794 [ART 794] Greek Topography (CLAR 794) (3). See CLAR 794 for description.

798 [ART 798] Roman Topography (CLAR 798) (3).

850 [ART 850] Methods in Art Historical Research (3). This course introduces students to a variety of historical and contemporary methods for the interpretation of visual culture.

910 [ART 910] Seminar in Architecture (3).

950 [ART 950] Problems in the History of Art (3).

952 [ART 952] Seminar in Museum Studies (3).

954 [ART 954] Seminar in Chinese Art and Architecture (3). Study selected topics in the history of Chinese art and architecture.

955 [ART 955] South Asian Art (3).

956 [ART 956] Seminar in Islamic Art (3). Required preparation, 400-level or higher art history course or permission of the instructor. Graduate seminar for critical issues in Islamic art (for example, Orientalism, historiography of Islamic art, critiquing the Islamic city).

957 [ART 957] Seminar in African Art (3).

958 [ART 958] Seminar in Contemporary Global Arts (3). This seminar examines contemporary artistic production that engages, questions, and challenges the narratives of culture and art that privilege Europe and America as the models for understanding cultural production.

959 [ART 959] Seminar in Latin American Art (3). This seminar investigates topics in the history of colonial and modern Latin American art.

960 [ART 960] Seminar in Ancient Art (CLAR 960) (3).

961 [ART 961] Seminar in Medieval Art (3).

971 [ART 971] Seminar in Renaissance Art (3).

972 [ART 972] Seminar in Baroque Art (3).

980 [ART 980] Seminar in Modern Art (3).

981 [ART 981] Seminar in Nineteenth-Century Art (3).

982 [ART 982] Seminar in American Art (3).

983 [ART 995] Mexico City: 1890–1950 (3). Permission of the instructor. This course examines the visual culture of Mexico City between 1890 and 1950. It also considers works by artists outside of Mexico who were associated and inspired by cultural production here.

984 [ART 984] Seminar in Contemporary Art (3). Addresses select topics and theoretical issues relevant to contemporary art.

987 [ART 987] Seminar in African American Art (3). Advanced standing in art history or permission of the instructor. Explores current debates crucial to the study of African American art. Emphasis on the variety of theories and methods central to the field.

991 [ART 992] Master's Thesis Writing Seminar (3).

993 [ART 993] Master's Thesis in Art History (3–6).

994 [ART 994] Doctoral Dissertation (3–9).

ARTS (Studio Art Courses)
Courses for Graduate and Advanced Undergraduate Students

402 [ART 402] Advanced Painting (1–6). Prerequisite, ARTS 302. Permission of the instructor for students lacking the prerequisite. Continuation of ARTS 302. May be repeated for credit.

403 [ART 403] Advanced Sculpture (1–6). Prerequisite, ARTS 303. Permission of the instructor for students lacking the prerequisite. Continuation of ARTS 303. May be repeated for credit.

405 [ART 405] Color Photography (3). Prerequisite, ARTS 105. The class will focus on lectures, readings, technical demonstrations, and visual assignments investigating color photography. Students will be responsible for completing a series of photographic assignments. Emphasis will be placed on intensive final projects.

407 [ART 407] Body Imaging (3). Prerequisite, ARTS 102. Required preparation, one intermediate ARTS class or permission of the instructor. Work is made through close examination and analysis of the human "body." Work may be made using any technical or theoretical approach. Required readings provide a conceptual grounding.

410 [ART 410] Public Art (3). Prerequisite, ARTS 302, 303, or 305. Permission of the instructor for students lacking the prerequisite. This studio class explores public art from historical and critical perspective. Students will propose and create works of public art. Opportunities to implement projects will be explored through the Department of Art and other resources.

413 [ART 413] Advanced Ceramic Sculpture (1–6). Prerequisite, ARTS 313. Permission of the instructor for students lacking the prerequisite. Continuation of ARTS 313. May be repeated for credit.

415 [ART 415] Conceptual-Experimental Photography (3). An advanced photography course for students interested in contemporary photographic practices, critical theory, art history, and experimental processes: theory and practice, formal and conceptual investigations, and historical and contemporary strategies will all be given equal attention.

416 [ART 416] Video Art (3). Prerequisite, ARTS 106. Permission of the instructor for students lacking the prerequisite. An introduction to the creative and technical processes in producing video art. Students will shoot and edit their own independent video projects. Some class time will be devoted to viewing video art and other media-based work.

417 [ART 417] Advanced Mixed Media Projects (3). Cultural production and practice, theory, and criticism. Pursuit of individual visual projects, formally and conceptually, through theoretical, poetic, art historical, and autobiographical texts, critiques, collaboration, and discussion using all media.

418 [ART 418] Advanced Printmaking (1–6). Prerequisites, ARTS 208 and any two of 328, 338, or 348. Permission of the instructor for students lacking the prerequisites. This course is appropriate for students who have had a minimum of three semesters of prior printmaking experience. Students submit a proposal outlining technical and artistic goals for the semester.

423 [ART 423] Installation (3). Prerequisite, ARTS 303. Permission of the instructor for students lacking the prerequisite. This class explores art that encompasses its audience. Conceptual motivations as well as practical realities of dealing with a specific three-dimensional space will be considered.

426 Two-Dimensional Computer Animation (3). Prerequisite, ARTS 106. Familiarity with basic computer skills and drawing required. Explores concepts and techniques of two-dimensional animation, including conceptualization with storyboards, pencil testing and timing animation, animating sequences with Photoshop, experimenting with color and compositing using After Effects. Emphasis placed on developing ideas though experimental practices, combining traditional and digital animation processes.

428 [ART 428] Book Art (3). Prerequisite, ARTS 102. Required preparation, one additional two-dimensional studio course (drawing, photography, or printmaking). Defining the book as a "multiple and sequential picture plane," this course considers a range of traditional approaches and conceptual departures of the book as a format for creative expression.

490 [ART 490] Special Topics in Studio Art (3). Required preparation, any intermediate studio art course or permission of the instructor. Advanced consideration of selected topics in studio art.

493 Studio Art Practicum or Internship (3). Prerequisite, ARTS 300. Recommended for juniors or seniors. Allows studio art majors to pursue unpaid practicums or internships for credit. Examples include working as a studio assistant or working in art-related fields, such as galleries, design firms, architectural firms, and nonprofit arts organizations. Work undertaken must comply with Federal criteria governing unpaid internships.

500 [ART 500] Senior Seminar (3). Restricted to senior studio art majors. This course is the capstone course for the studio art major. Topics covered include issues of professional development, curatorial practice, and presentation of works of art in exhibition. The culminating project is mounting the Senior Exhibition.

515 [ART 515] Advanced Photography (3). Prerequisite, ARTS 305. Permission of the instructor for students lacking the prerequisite. May be repeated for credit.

526 Three-Dimensional Animation (3). Prerequisite, ARTS 106. The primary goals of this class are to introduce three-dimensional computer modeling and animation in Maya. The course covers a broad range of creative applications including special effects, compositing with video, and motion graphics. Students will produce a short three-dimensional animation as their final project.

596 [ART 590] Independent Study in Studio Art (1–9). Permission of the instructor. For students wishing to pursue additional media or thematic study beyond the advanced level. Students register with section numbers designated for faculty. May be repeated for credit.

636 [ART 406] Interactive Media (COMM 636) (3). See COMM 636 for description.

691H [ART 691H] Honors in Studio Art (3). Permission of the instructor. Independent research directed by a faculty member leading to an honors thesis.

692H [ART 692H] Honors in Studio Art (3). Permission of the instructor. Independent research directed by a faculty member leading to an honors thesis.

Courses for Graduate Students

700 [ART 700] Graduate Studio Art Seminar (3).

701 [ART 701] TA Practicum (3).

710 [ART 710] Graduate Studio (1–21).

713 [ART 713] Graduate Sculpture (1–21).

718 [ART 718] Graduate Printmaking (1–21).

720 [ART 720] Qualifying Review (2).

798 [ART 799] M.F.A. Graduate Group Critique (3). M.F.A. candidates meet weekly for organized group analysis and critique of their art work. Each candidate presents work on rotating basis before a panel of faculty and peers

992 Master's Project in Studio Art (3).

Department of Biochemistry and Biophysics

www.med.unc.edu/biochem
LESLIE V. PARISE, *Chair*

Professors

Sharon Campbell (18) NMR Spectroscopy, Structure and Regulation of Proteins Involved in Ras-Mediated Cell Signaling
Charles W. Carter Jr. (19) Structural Molecular Biology, Protein Structure-Function, X-ray Crystallography of Proteins Including Aminoacyl tRNA Synthetases, Deaminases, Phasing Methods and Crystal Growth
David Clemmons (15) Receptor Signaling
Lyndon Cooper (21) Osteoblast Responses to Physiological Stress: Characterization of the Heat Shock Response and Mechanochemical Deformation and Stimulation
Stephen Crews (24) Molecular Genetics of Nervous System Development, Transcriptional Control, Evolution of Regulatory Mechanisms
Henrik Dohlman (17) Regulators of G Protein Signaling, Mechanisms of Drug Desensitization
Nikolay Dokholyan (47) Computational Structural Biology
Marshall Edgell (143) Use of Biophysical and Genetic Techniques Using Combinatorial Libraries and High Throughput Robotics to Assess Determinants of Protein Structure
Ann Erickson (33) Cellular Protein Targeting, Lysosomal Enzyme Biosynthesis, Secretion of Lysosomal Proteases by Transformed Cells
Beverly Errede (144) Function and Regulation of MAP-Kinase Activation Pathways in Saccharomyces cerevisiae
Jack Griffith (41) Architecture of DNA-Protein Complexes Involved in Replication, Repair, and Telomere Maintenance; Electron Microscopy
David G. Kaufman (53) Cellular and Molecular Mechanisms of Cancer Development, Epithelial Cell-Stromal Cell Interactions, Cell-Cycle Influences on Carcinogenesis
Hengming Ke (50) X-ray Crystallography, Structure and Function of Biologically Important Proteins such as Phosphodiesterase and Molecular Chaperone System
Brian Kuhlman (72) Computational Protein Design, Protein-Protein Interactions, Structural Biology
Barry R. Lentz (62) Biomembrane Structure and Its Relationship to Function, Platelet Membranes in Blood Coagulation, Membrane Fusion, Liposomes
Patricia F. Maness (68) Mechanisms of Cell Signaling and Adhesion, Axon Guidance and Synaptic Plasticity
William F. Marzluff (69) Control of Gene Activity, Cell-Cycle Regulation in Early Embryos, Control of Expression of Histone mRNA
Gerhard W. Meissner (79) Intracellular Ca2+ Signaling and Regulation of Ion Channels in Striated Muscle
Gary Pielak (99) Protein Structure/Function Using 2-D NMR
Dale Ramsden (108) Mechanism of V(D)J Recombination, End-Joining Pathway for Repair of DNA Double Strand Breaks
Matthew Redinbo (110) Structural Biology of Proteins and Protein-Nucleic Acid Complexes
John Riordan Membrane Protein Structure-Function, ABC Proteins in Human Disease, Ion Channel Function, Cellular Protein Quality Control, Molecular And Cellular Biology of Cystic Fibrosis
Aziz Sancar (105) DNA Repair and Cancer, Structure and Function of DNA Repair Enzymes, Molecular Neurobiology, Reaction Mechanism of Human Blue-Light Photoreceptor
Gwendolyn B. Sancar (104) Cellular Responses to Genotoxic Stress, DNA Repair, Transcriptional Regulation of Stress Response Genes
John Sondek (117) Protein Crystallography and Signal Transduction
Ronald I. Swanstrom (123) Molecular Biology of HIV, Resistance to HIV Protease Inhibitors
Michael D. Topal (126) Protein-DNA Recognition, Genomic Instability
Thomas W. Traut (128) Enzyme Structure and Regulation, Allosteric Dissociating Enzymes
Elizabeth M. Wilson (134) Mechanisms of Steroid Hormone Action, Androgen Regulation of Gene Transcription
Richard V. Wolfenden (139) Enzyme Mechanisms, Water Affinities of Biological Compounds
Yue Xiong (140) Molecular Mechanisms of Cell Cycle Control, Tumor Suppression and Development

Associate Professors

Xian Chen (12) Protein-Protein and Protein-Ligand Interaction, Protein Tertiary Structure, Quaternary Structure of Multi-Protein Complexes, Structure-Function Relationship of Proteins, Functional Proteomics
Ed Collins (23) Use of Biophysical Tools to Study Immunological Problems Focusing on Immune Recognition of Cancer
Jean Cook (150) Regulation of DNA Replication in Mammalian Cells
Howard M. Fried (39) Cell and Molecular Biology, Mechanisms of Nuclear-Cytoplasmic Transport, Mechanisms of RNA-Protein Recognition
Andrew Lee (71) Protein, Structure and Dynamics, NMR Spectroscopy
Scott Singleton (116) Bio-Organic and Biophysical Chemical Investigations of the Mechanisms DNA Repair, Directed Evolution of Novel Enzymes, Development of Alternate Strategies for Targeting Drug-Resistant Pathogenic Microorganisms
Brian Strahl (120) Mechanisms of Chromatin-Mediated Gene Transcription

Assistant Professors

Wolfgang Bergmeier, Adhesion Mechanisms of Platelets and Neutrophils
Saskia Neher, Lipase Structure and Function, Membrane Proteins, Molecular Chaperones
Gang Greg Wang, Cancer Epigenetics; Chemical Modifications of Histones

Research Professors

Brenda Temple, Structural Bioinformatics
Arrel D. Toews (125) Neurochemistry, Neurotoxicology: Metabolism and Gene Expression during Demyelination and Remyelination, Molecular Biology of Cholesterol Metabolism and Trafficking
Ashutosh Tripathy, Measurement of Affinity, Stoichiometry, Kinetics and Thermodynamics of Interactions among Macromolecules and Their Cognate Ligands

Professors Emeriti

Michael K. Berkut
Michael Caplow
Stephen G. Chaney
Jan Hermans
David J. Holbrook Jr.
George K. Summer

The Department of Biochemistry and Biophysics is an administrative division of the School of Medicine and a member of The Graduate School. The graduate program offers instruction and research opportunities leading to the Ph.D. degree. Although the department offers the M.S. degree, the graduate program is not designed as a terminal master's curriculum. Applicants are offered admission with the expectation that they will complete their doctorate.

Modern research in biochemistry and biophysics is designed to address mechanism and function; it utilizes the paradigms of molecular biology, but is influenced by chemistry, physics, and genetics. The philosophy of the department and its graduate program is to provide students with broad training in modern approaches to the field and unique opportunities for multidisciplinary training.

Curriculum

Students are admitted to the graduate program through the BBSP portal, complete a minimum of three laboratory rotations, and then join the Department of Biochemistry and Biophysics at the end of their first year. All students in the department are required to complete a seminar in biochemistry (BIOC 701) OR seminar in biophysics (BIOC 704); BIOC 712, which is a grant writing course designed to help prepare students for their comprehensive written examination; and BIOC 715, which is a scientific presentation course. Students are also required to complete nine credit hours in core courses and four credit hours of electives. Further information on course requirements may be found at www.med.unc.edu/biochem/students/degree-requirements. Students in the combined M.D./Ph.D. program are required to complete all course requirements.

The director of graduate studies advises entering students about course selection until the student chooses a research sponsor. Students select research sponsors from the department's primary and joint faculty members following the three laboratory rotations. After a research sponsor has been selected, a dissertation committee is formed to review the student's yearly progress. The examinations required for admission to candidacy for the Ph.D. are administered as a comprehensive oral exam, a comprehensive written exam, and a final oral defense of a dissertation. The comprehensive oral exam (defense of the initial thesis proposal) will stress the dissertation proposal and related areas in an effort to ascertain the student's understanding of the research project that he/she is undertaking. The comprehensive written examination will cover major topics in the areas of biochemistry and biophysics and cell and molecular biology. The most important requirement for the Ph.D. degree is a final oral defense of a dissertation or original research carried out independently by the candidate.

Financial Aid and Admissions

Funds available from the University, the department, and individual research grants provide stipends for students. All applicants are considered for special fellowships and teaching or research assistantships. In recent years students received a stipend of $26,000 plus in-state tuition and fees. Major medical insurance was also provided. Nonresidents with predoctoral fellowships or assistantships are recommended for special tuition rates. Applications are considered from prospective graduate students who present evidence of superior scholarship in biology, chemistry, or biochemistry. The department recommends that students prepare themselves by taking general and organic chemistry, biochemistry, biology, physics, and calculus. It is anticipated that students who have not had these courses will take them, as appropriate, after their arrival. Departmental information may be obtained through the department's Web site: www.med.unc.edu/biochem. Applicants should apply online at gradschool.unc.edu/admissions.

Research Interests

The faculty research interests are diverse and include research in the following areas: cell signaling and growth control, DNA repair and replication, membrane biophysics and function, molecular regulation including transcriptional control, nervous system development and function, and protein structure/function, including enzymology. Model systems used by the faculty range from bacteria to mammals; techniques span molecular biology to physical biochemistry. A brochure describing the department and more detailed faculty research interests can be obtained by writing to the director of graduate studies of the Department of Biochemistry and Biophysics, or by visiting the department's Web site: www.med.unc.edu/biochem.

Facilities

The departmental research facilities are centered in the Genetic Medicine Building, which is within walking distance of other medical school departments, research centers, and the departments of biology, chemistry, and physics. The building is equipped with instruments for molecular biological, biochemical, structural, and biophysical research. Animal care facilities are available to support the department's research endeavors. Research and training support is provided by several core facilities on campus. Educational support is provided by the BBSP.

Courses for Graduate and Advanced Undergraduate Students

BIOC

442 Biochemical Toxicology (ENVR 442, TOXC 442) (3). See ENVR 442 for description.

601 Enzyme Properties, Mechanisms, and Regulation (3). Prerequisite, CHEM 430. Permission of the instructor for students lacking the prerequisite. Focuses on enzyme architecture to illustrate how the shapes of enzymes are designed to optimize the catalytic step and become allosterically modified to regulate the rate of catalysis.

631 Advanced Molecular Biology I (BIOL 631, GNET 631, MCRO 631) (3). See GNET 631 for description.

632 Advanced Molecular Biology II (BIOL 632, GNET 632, MCRO 632) (3). See GNET 632 for description.

643 Cell Structure, Function, and Growth Control I (CBIO 643, MCRO 643, PHCO 643, PHYI 643) (3). See CBIO 643 for description.

644 Cell Structure, Function, and Growth Control II (CBIO 644, MCRO 644, PHCO 644, PHYI 644) (3). See CBIO 644 for description.

649 Mathematics and Macromolecules (1.5). This course focuses on the application of mathematics to topics important in biophysics, such as thermodynamics and electrostatics. The unit is designed to help students perform more efficiently in BIOC 650, 651, and 652.

650 Basic Principles: From Basic Models to Collections of Macromolecules (1.5). Prerequisite, CHEM 430. Required preparation, two semesters of physical chemistry or permission of the instructor. Basic molecular models and their use in developing statistical descriptions of macromolecular function. Course intended primarily for graduate students.

651 Macromolecular Equilibria: Conformation, Change, and Binding (1.5). Prerequisite, CHEM 430. Required preparation, two semesters of physical chemistry or permission of the instructor. Macromolecules as viewed with modern computational methods. Course intended primarily for graduate students.

652 Macromolecular Equilibria (1.5). Prerequisite, CHEM 430. Required preparation, two semesters of physical chemistry or permission of the instructor. Stability of macromolecules and their complexes with other molecules. Course intended primarily for graduate students.

655 Case Studies in Structural Molecular Biology (3). Prerequisite, CHEM 430. Permission of the instructor for students lacking the prerequisite. Principles of macromolecular structure and function with

emphasis on proteins, molecular assemblies, enzyme mechanisms, and ATP enzymology.

660 Introduction to Light Microscopy (1). Prerequisites, BIOC 650–653. Permission of the instructor for students lacking the prerequisites. Fundamentals of optics and light microscope design for the novice student.

662 Macromolecular Interactions (1). Prerequisites, BIOC 650–653. Permission of the instructor for students lacking the prerequisites. Theory and practice of biophysical methods used in the study of interactions between macromolecules and their ligands, including surface plasmon resonance, analytical ultracentrifugation, and calorimetry.

663A Macromolecular NMR (1). Prerequisites, BIOC 650–653. Permission of the instructor for students lacking the prerequisites. Principles and practice of nuclear magnetic resonance spectroscopy: applications to biological macromolecule structure and dynamics in solution. Course intended primarily for graduate students.

663B Macromolecular NMR Practice (1). Prerequisite, BIOC 653. Permission of the instructor for students lacking the prerequisite. Lab section for BIOC 663A. Course intended primarily for graduate students.

664 Macromolecular Spectroscopy (1). Prerequisite, CHEM 430. Required preparation, two semesters of physical chemistry or permission of the instructor. Principles of UV, IR, Raman, fluorescence, and spin resonance spectroscopies; applications to the study of macromolecules and membranes. Course intended primarily for graduate students.

666 X-Ray Crystallography of Macromolecules (1). Prerequisites, BIOC 650–653. Permission of the instructor for students lacking the prerequisites. Principles of protein crystallography, characterization of crystals, theory of diffraction, phasing of macromolecular crystals and structure refinement. Course intended primarily for graduate students.

667 Macromolecular Crystallographic Methods (2). Prerequisite, BIOC 666. Permission of the instructor for students lacking the prerequisite. A combined lecture/laboratory workshop for serious students of protein crystallography. Course intended primarily for graduate students.

668 Principles of and Simulation of Macromolecular Dynamics (1). Prerequisites, BIOC 650–653. Permission of the instructor for students lacking the prerequisites. A combined lecture/computer lab treatment of the principles of macromolecular dynamics and structure as approached using the tools of molecular dynamics simulations. Course intended primarily for graduate students.

670 Biomolecular Informatics (1). Prerequisites, BIOC 650–653. Permission of the instructor for students lacking the prerequisites. A combined lecture/computer lab course introducing the methods and principles of biological data management as this relates to macromolecular sequence analysis. Course intended primarily for graduate students.

671 Summer Research in Biophysics (3). This class is a 10-week summer course in biophysics.

673 Proteomics, Protein Identification and Characterization by Mass Spectrometry (1). Prerequisites, BIOC 650–653. Required preparation, one semester of physical chemistry or permission of the instructor. A lecture module that introduces students to the basics of mass spectrometry as applied to protein science. Course intended primarily for graduate students.

674 Ion Channels Transporters (1). Ion channels transporters.

678 Electrical Signals from Macromolecular Assemblages (2). Prerequisites, BIOC 650–653. Permission of the instructor for students lacking the prerequisite. An intensive, six-hour per week introduction to the fundamentals of ion channel biophysics, including laboratory sessions to demonstrate principles and methods. Course intended primarily for graduate students.

Courses for Graduate Students

BIOC

700 Current Topics in RNA Structure, Function, and Technology (2). Critical reading and discussion of current literature related to the study of RNA structure, RNA-protein interactions, novel RNA functions, RNA as a therapeutic target/agent, and RNA methods.

701 Critical Analysis in Biochemistry (2). Permission of the instructor. Critical analysis of research papers from departmental seminar series, student presentations, meet seminar speakers, learn about departmental research and current techniques.

702 Advanced Biochemistry Laboratory (2–4). Prerequisite, CHEM 430. Permission of the department for nonmajors. Designed to introduce the student to research methods. Minor investigative problems are conducted with advice and guidance of the staff. May be repeated for credit.

703 Advanced Biochemistry Laboratory (2–4). Prerequisite, CHEM 430. Permission of the department for nonmajors. Designed to introduce the student to research methods. Minor investigative problems are conducted with advice and guidance of the staff. May be repeated for credit.

704 Seminars in Biophysics (2). Permission of the instructor. Students present seminars coordinated with the visiting lecturer series of the Program in Molecular and Cellular Biophysics.

705 Advanced Biophysics Laboratory (2–4). Permission of the program director. Designed to introduce students in the Molecular and Cellular Biophysics Program to research methods. Minor investigative projects are conducted with advice and guidance of the staff. May be repeated for credit.

706 Biochemistry of Human Disease (3). Required preparation, biochemistry. Permission of the instructor. Graduate level, involves lectures, critical readings, and discussions of biochemical aspects of human diseases. Core biochemical principles and cutting edge approaches are considered in the following: amyotrophic lateral sclerosis, Alzheimer's, cancer, cystic fibrosis, HIV, thrombosis and heart disease, schizophrenia, V(D)J recombination, and neglected diseases.

707 Cellular Metabolism and Human Disease (2). Open to 1st year BBSP or advanced graduate students with background in basic cellular biochemistry. Permission of the instructor. Addresses the role of cellular metabolism in human disease, including the roles and regulation of biochemical pathways. Recent advances will be emphasized. Diseases addressed will include cancer and diabetes.

711 Research Concepts in Biochemistry (2). Master's candidates in biochemistry and biophysics only. A series of lectures and exercises on formulating a research plan to attack a specific scientific problem, and on presenting the research plan in the form of a grant proposal.

712 Scientific Writing (3). Doctoral candidates in biochemistry and biophysics only. A course of lectures and workshops on the principles of clear scientific exposition with emphasis on the design and preparation of research grants.

715 Scientific Presentation (1). Senior graduate students present original research results as a formal seminar. Feedback on presentation

effectiveness and style will be provided by faculty instructors and classmates.

720 The Biochemistry of HIV Replication, Inhibitors, and Drug Resistance (2). Seminar/discussion/literature course on structure-function of HIV proteins. Discussion of polymerases, proteases, protein-protein interactions, protein degradation pathways, protein-nucleic acid recognition, transcriptional control, RNA splicing and transport, and mechanisms of drug resistance.

721 Cell Regulation by Ubiquitination (2). Required preparation, two semesters of biochemistry. Lecture and literature-based discussion course on ubiquitin-mediated regulation of hormone receptor signaling, trafficking, and degradation.

722A Cellular and Molecular Neurobiology: Introduction and Electrical Signaling (NBIO 722A, PHCO 722A, PHYI 722A) (2). See NBIO 722A for description.

722B Cellular and Molecular Neurobiology: Postsynaptic Mechanisms-Receptors (NBIO 722B, PHCO 722B, PHYI 722B) (2). See NBIO 722B for description.

722C Cellular and Molecular Neurobiology: Synaptic Mechanisms & Intracellular Signaling (NBIO 722C, PHCO 722C, PHYI 722C) (2). See NBIO 722C for description.

723A Cellular and Molecular Neurobiology: Development of the Nervous System (NBIO 723A, PHCO 723A, PHYI 723A) (2). See NBIO 723A for description.

723B Cellular and Molecular Neurobiology: Anatomy and Function of Sensory and Motor Systems (NBIO 723B, PHCO 723B, PHYI 723B) (2). See NBIO 723B for description.

725 Signal Transduction (PHCO 725) (2). See PHCO 725 for description.

738 Nanomedicine (3). This course offers an introduction to the interdisciplinary field of nanomedicine for students with a physical, chemical, or biological sciences background. This course will emphasize emerging nanotechnologies and biomedical applications including nanomaterials, nanoengineering, nanotechnology-based drug delivery systems, nano-based imaging and diagnostic systems, nanotoxicology, and translating nanomedicines into clinical investigation.

740 Contemporary Topics in Cell Signaling: Phosphorylation Control (1). Required preparation, coursework in biochemistry, pharmacology, and/or cell & molecular biology. Permission of the instructor. This graduate-level course is an in-depth analysis of how protein kinases and protein phosphorylation regulates key aspects of cell signaling. This class is one of the "Contemporary Topics in Cell Signaling" modules.

741 Contemporary Topics in Cell Signaling: GTPases (1). Required preparation, coursework in biochemistry, pharmacology, and/or cell & molecular biology. Permission of the instructor. This graduate-level course conveys principles of signal transduction controlled by GTPases and emphasizes in-depth discussion of current literature and unanswered questions. This class is one of the "Contemporary Topics in Cell Signaling" modules.

742 Contemporary Topics in Cell Signaling: Cell Cycle Control (1). Permission of the instructor. Required preparation, coursework in biochemistry and/or cell & molecular biology. This graduate-level course conveys principles of eukaryotic cell proliferation control emphasizing in-depth discussion of current literature and unanswered questions. This class is one of the Contemporary Topics in Cell Signaling modules.

The following seminar courses are designed for students majoring or minoring in biochemistry who wish to further their knowledge in particular areas. Unless otherwise stated, two semesters of biochemistry are prerequisites for seminar courses. Most of these courses are given in alternate years by interested staff members. Unless otherwise stated, these seminars may not be repeated for credit. Seminar courses provide teaching experience, which is required for a graduate degree in biochemistry and biophysics. In addition, the courses provide experience in giving a critical review of the current literature.

802 Seminar in the Phase Problem in X-Ray Crystallography (2). Permission of the instructor. Image formation is treated from a quite general point of view, drawing from Fourier transform methods used in X-ray crystallography. Isomorphous replacement, multiple wavelength anomalous scattering, and Bayesian direct methods are covered. One two-hour seminar a week.

803 Seminar on Cell Signaling (2). Required preparation, two semesters of biochemistry. Signal transduction in embryonic development.

804 Seminar in DNA-Protein Interactions (2). Required preparation, two semesters of biochemistry. Review of current literature on structural, thermodynamic, and kinetic aspects of binding to DNA of proteins involved in replication, regulation, recombination, and repair.

805 Molecular Modeling (MEDC 805) (3). Prerequisites, MATH 231, 232, and CHEM 481. Introduction to computer-assisted molecular design, techniques, and theory with an emphasis on the practical use of molecular mechanics and quantum mechanics programs.

806 Macromolecular Modeling (MEDC 806) (3). See MEDC 806 for description.

807 Seminar in Cellular Responses to DNA Damage (2). Required preparation, graduate-level courses (one each) in molecular biology and biochemistry. A seminar course on the enzymology of DNA repair and damage tolerance and the regulation of genes involved in these processes. Both classic and recent literature are discussed.

808 From Force to Phenotype: How Biological Structures Respond to Physical Force (2). Literature/discussion course on integrating physics with biology, and the challenge of merging structural dynamics with living cell phenotypes. Forces and biological outcomes will be considered through specific examples.

901 Research in Biochemistry (3–9). Permission of the department.

902 Research in Biochemistry (1–21). Permission of the department. Six or more hours a week throughout both semesters.

993 Master's Thesis (3–9).

994 Doctoral Dissertation (3–9).

Curriculum in Bioinformatics and Computational Biology

bcb.unc.edu
TIMOTHY ELSTON, *Director*

Professors

Max Berkowitz, Theoretical and Computational Chemistry
Charles Carter, Protein Crystallography, Structural Polymorphism and Function
Jeff Dangl, Plant Genetics and Cellular Biology, Plant Disease Resistance and Cell Death Control
Henrik Dohlman, Regulators of G Protein Signaling
Nikolay Dokholyan, Protein Folding, Design, and Evolution
Timothy Elston, Mathematical Modeling of Biological Networks
Gregory Forest, Mathematical Modeling of Mucociliary Transport Processes
Klaus Hahn, Spatio-temporal Dynamics of Signaling in Living Cells
Joseph Ibrahim, Bayesian Model Selection, Prior Elicitation, Bayesian Computational Methods, Bioinformatics, Missing Data Problems, Survival Analysis, Longitudinal Data, Generalized Linear Models
Brian Kuhlman, Protein Design/Modeling, Protein Interactions
Terry Magnuson, Mammalian Genetics/Genomics/Development/Mouse Models of Human Disease
Steve Marron, Analyzing Data That Lie in Non-Standard Spaces
William Marzluff, Regulation of RNA Metabolism in Animal Cells
Fernando Pardo-Manuel de Villena, Evolution, Mouse Genetics, Epigenetics, Female Meiosis, Chromosome Segregation, Meiotic Drive
Charles Perou, Genomic and Molecular Classification of Human Tumors to Guide Therapy
Jan Prins, High-Performance Computing, Algorithms, Programming Languages, Scientific Computing
Matthew Redinbo, Structural Studies of Dynamic Cellular Processes
Ivan Rusyn, Molecular, Biochemical and Genomics Approaches toward Understanding the Mechanisms of Chemical-Induced Carcinogenesis
Jack Snoeyink, Discrete and Computational Geometry Applications to Molecular Biology
John Sondek, Structural Biology of Signal Transduction
Alex Tropsha, Computational Analysis of Protein Structure and Drug Design
Kirk Wilhelmsen, Genetic Mapping of Susceptibility Loci for Complex Neurological Diseases
Fred Wright, Statistical Genetics, Computational Genome Analysis
Fei Zou, Statistical Genetics of Complex Traits, Empirical Likelihood

Associate Professors

Bradley Hemminger, Bioinformatics, Medical Informatics, User Interface Design
Corbin Jones, Evolution and Underlying Genetics of Species-Specific Adaptations
Ethan Lange, Statistical Genetics of Human Disease
Yufeng Liu, Statistical Learning and Genomic Analysis
Karen Mohlke, Complex Traits, Genetics of Type 2 Diabetes
Maria Servedio, Mathematical Models Integrating Evolutionary Theories with Behavioral and Ecological Phenomena
Todd Vision, Evolution of Genome Organization, Architecture of Complex Traits

Assistant Professors

Brian Bennett, Genetic and dietary factors leading to increased susceptibility for atherosclerosis
Flavio Frohlich, Cortical Neurophysiology, Computational Neuroscience, Brain Stimulation, Epilepsy
Terry Furey, Chromatin and Gene Regulation, Cancer Genomics, High-Throughput Sequencing
Shawn Gomez, Systems Biology, Mathematical Modeling of Protein Interaction Networks
Samir Kelada, The identification of gene-environment interaction in allergic asthma
Alain Laederach, RNA Folding Bioinformatics
Leslie Lange, Genetics of complex diseases, genetics of chronic inflammation, cardiovascular disease and asthma
Yun Li, Statistical Genetics
Adrian Marchetti, Ecophysiology, biogeochemistry and genomics of marine phytoplankton
Laura Miller, Mathematical Biology, Computational Fluid Dynamics, Biomechanics
Praveen Sethupathy, Genomics of Gene Regulation, microRNAs, Epigenomics, Computational Biology, Metabolic Disease
Brenda Temple, Structural Bioinformatics
William Valdar, Mapping of Complex Disease Loci in Animal Models, Statistical Genetics
Zefeng Wang, Splicing Regulation and Modulation

Modern biology, in this post-genome age, is being greatly enriched by an infusion of ideas from a variety of computational fields, including computer science, information science, mathematics, operations research, and statistics. In turn, biological problems are motivating innovations in these computational sciences. There is a high demand for scientists who can bridge these disciplines. The goal of the Curriculum in Bioinformatics and Computational Biology (BCB) is to train such scientists through a rigorous and balanced curriculum that transcends traditional departmental boundaries.

Incoming students are expected to matriculate from a broad range of disciplines; thus, it is important to ensure that all students have a common foundation on which to build their BCB training. The first year is dedicated to establishing this foundation and training all students with a common set of core BCB courses. BCB students will also participate in three laboratory research rotations their first year and ultimately join a lab at the end of those rotations. Research work is done in the laboratory facilities of the individual faculty member and is supported primarily by faculty research grants.

Curriculum faculty have appointments in 18 departments in the School of Medicine, School of Dentistry, School of Public Health, School of Pharmacy, School of Information and Library Science, and the College of Arts and Sciences. This level of diversity allows students a broad range of research opportunities.

Requirements for Admission for Graduate Work

Ideal BCB candidates should have an undergraduate degree in a biological, physical, mathematical, or computational science. They must apply to the program through a unified application program known as the Biological and Biomedical Sciences Program (BBSP). Students apply for graduate study in the biological or biomedical sciences at UNC–Chapel Hill. Students interested in any of the BBSP research areas apply to BBSP and those whose application portfolio places them highest on the admission list are asked to visit Chapel Hill for interviews. Students who are ultimately admitted to UNC make no formal commitment to a Ph.D. program. After completing their first year of study students leave BBSP, join a thesis lab, and matriculate into one of 14 participating

Ph.D. programs. During their first year BBSP students are part of small, interest-based groups led by several faculty members. These groups meet frequently and provide a research community for students until they join a degree-granting program. Students are encouraged to apply as early as possible, preferably before December 1. (Applicants seeking a master's degree are not considered for admission.)

Requirements for the Ph.D. Degree

In addition to the dissertation requirements of The Graduate School (four full semesters of credit including at least six hours of doctoral dissertation, a written preliminary examination, an oral examination and a dissertation), students in the Curriculum in Bioinformatics and Computational Biology must meet the following requirements: complete one or two foundational courses (as needed), complete all six of the BCB core courses, complete two elective courses (as determined by thesis advisor); participate in the BCB Colloquium as attendees the first and second years and as presenters in later years, act as teaching assistants for one of the BCB modules, attend the monthly seminar series sponsored by the Carolina Center for Genome Sciences, and participate in the yearly BCB mini-symposium in the fall. Students are required to rotate through at least three laboratories before choosing a thesis advisor. It is strongly recommended that students attend national meetings in order to better understand how their research fits with progress in their field.

Financial Aid

Stipends for predoctoral students are available from an NIH predoctoral training grant and from the University. Tuition, student fees, and graduate student health insurance are also covered by the training grant and the University.

Courses for Graduate Students

BCB

701 Genome Sciences Seminar Series (1). Open to bioinformatics students only. Diverse but current topics in all aspects of bioinformatics. Relates new techniques and current research of notables in the field of bioinformatics and computational biology.

702 Genome Sciences Seminar Series (1). Open to bioinformatics students only. Diverse but current topics in all aspects of bioinformatics. Relates new techniques and current research of notables in the field of bioinformatics.

710 Bioinformatics Colloquium (1). The goal of this course is to expose students to the research interests of BCB faculty and to provide an opportunity for students to present their own work and receive input from their peers and faculty.

712 Databases, Metadata, Ontologies, and Digital Libraries for Biological Sciences (1). Course introduces the basic information-science methods for storage and retrieval of biological information.

715 Mathematical and Computational Approaches to Modeling Signaling and Regulatory Pathways (1). The course provides an introduction to the basic mathematical techniques used to develop and analyze models of biochemical networks. Both deterministic and stochastic models are discussed.

716 Sequence Analysis (1). Course designed to introduce students to the computational analysis of nucleic acids sequences, including sequence comparison, alignment, and assembly.

717 Structural Bioinformatics (1). Course introduces methods and techniques for protein modeling.

722 Population Genetic Methods for Estimating Natural Selection (1). This short course will cover methods of inferring/estimating natural selection, including the Dn/Ds ratio, the McDonald-Kreitman test, and the Poisson Random Field model. The course will feature discussions of high-profile publications that describe the application of these methods to yield insights into the forces that have shaped organismal evolution.

725 Introduction to Statistical Genetics (3). Covers statistical methods for the analysis of family and population-based genetic data. Topics include classical linkage analysis, population-based and family-based association analysis, haplotype analysis, genome-wide association studies, basic principles in population genetics, imputation-based analysis, pathway-based analysis, admixture mapping, analysis of copy number variations, and analysis of massively parallel sequencing data.

850 Training in Bioinformatics and Computational Biology Teaching (3). Principles of bioinformatic and computational biology pedagogy. Students are responsible for assistance in teaching BCB and work under the supervision of the faculty, with whom they have regular discussion of methods, content, and evaluation of performance.

905 Research in Bioinformatics and Computational Biology (1–8). Credit awarded to students for research in bioinformatics and computational biology.

993 Master's Thesis (3). Students are not accepted for master's program.

994 Doctoral Dissertation (3–8). Credit for work done towards doctorate.

Biological and Biomedical Sciences Program

www.med.unc.edu/bbsp
ROBERT DURONIO, *Interim Director*

The Biological and Biomedical Sciences Program (BBSP) of the University of North Carolina at Chapel Hill is an umbrella admissions and first-year program for 14 Ph.D. programs in the School of Medicine, School of Pharmacy, and the College of Arts and Sciences. The following programs are affiliated with the BBSP: Biochemistry and Biophysics, Bioinformatics and Computational Biology, Biology, Cell and Developmental Biology, Cell and Molecular Physiology, Chemistry (Biological Chemistry Division), Genetics and Molecular Biology, Microbiology and Immunology, Molecular and Cellular Pathology, Neurobiology, Oral Biology, Pharmaceutical Sciences (Medicinal Chemistry and Molecular Pharmaceutics tracks), Pharmacology, and Toxicology. Students interested in pursuing a Ph.D. in any of these programs apply to the BBSP. For a complete list of faculty in the BBSP see the faculty page of the program's Web site at: webapps.med.unc.edu/BBSP/BBSPFaculty. See individual program listings for more information about individual Ph.D. programs. These also can be accessed from the BBSP Web site.

A B.S. or B.A. degree is required for admission into the BBSP. It is generally expected that applicants will have a strong background in the biological sciences, chemistry, physics or mathematics. Only applicants with both strong academic records and prior research experience will be favorably considered. An interview, usually on campus, is required prior to admission.

During their first year, BBSP students are part of small, interest-based groups led by several faculty members. These groups meet weekly and provide a research community for students until they join a degree

granting program. In these groups students will develop professional skills including scientific writing and presentations, quantitative reasoning, and the ability to ask questions/solve problems based in the biological sciences. The faculty in these groups will serve as an advisory committee that will assist students in selecting courses that meet their individual interests.

BBSP students will be able to choose from more than 400 faculty members as they pursue three required research rotations in the fall and spring semesters of their first year. At the completion of the spring semester of the first year, each student will be asked to select an academic advisor who will provide guidance for his or her dissertation research training. The student will then join a Ph.D. program that the advisor is affiliated with and will complete course work requirements during the second year.

All students enrolled in the BBSP program receive an annual stipend ($27,500 in 2013). Tuition, student fees, and health insurance are covered by the program.

Courses

The BBSP does not have a core curriculum or require students to take a particular set of courses beyond BBSP 901 and 902 (listed below). Students may take courses offered by any of the participating Ph.D. programs (see individual program listings for available courses). After joining a specific Ph.D. program students must fulfill the specific coursework and other requirements of that program.

Courses for Graduate Students

BBSP

901 Research in Biological and Biomedical Sciences (0.5–6). Enrollment in BBSP program required. Lab rotations with BBSP faculty.

902 Seminar in Biological and Biomedical Sciences (0.5–4). Enrollment in BBSP program required. First Year Group course of small interest-based groups led by faculty advisors. Includes professional skills development in a research community.

Department of Biology*

www.bio.unc.edu
Victoria L. Bautch, *Chair*

** With recommendation of the department and the approval of the Administrative Board of The Graduate School, special courses and the direction of graduate studies are offered by the staff of the Institute of Marine Sciences, Morehead City, North Carolina.*

Professors

Albert S. Baldwin, Immunoglobulin Gene Expression
Victoria L. Bautch, Molecular Basis of Development
Kerry S. Bloom, Molecular Genetics
John Bruno, Marine Ecology, Population and Community Ecology
Frank L. Conlon, Xenopus, Mesoderm, Heart, Tbox Genes
Jeffrey L. Dangl, Genetic and Molecular Analysis of Disease Resistance
Robert J. Duronio, Cell Cycle Control
Patricia G. Gensel, Paleobotany and Morphology
Robert P. Goldstein, Generation of Cell Diversity in Development
Albert K. Harris, Morphogenesis and Embryology
Alan M. Jones, Plant Molecular and Cellular Biology
Joseph J. Kieber, Plant Cell Biology
William M. Kier, Functional Morphology of Invertebrates, Biomechanics
Joel G. Kingsolver, Evolutionary Ecology and Physiological Ecology
Jason D. Lieb, Specificity and Function in Protein-Genome Interactions
Kenneth J. Lohmann, Neuroethology and Invertebrate Zoology
William F. Marzluff, Transcriptional and Posttranscriptional Regulation of RNA Metabolism, Cell Cycle Regulation during Development
A. Gregory Matera, RNA Processing: Biogenesis of Small Ribonucleoproteins
Steven W. Matson, Molecular Biology and Biochemistry
Ann G. Matthysse, Molecular Biology and Plant Pathology
Robert K. Peet, Plant Ecology
Mark A. Peifer, Developmental Genetics
Charles H. Peterson, Marine Ecology
David Pfennig, Ecology and Evolutionary Biology
Patricia J. Pukkila, Molecular Genetics
Edward D. Salmon, Cell Biology
Jeff Sekelsky, Meiotic Recombination, DNA Repair
Darrel W. Stafford, Developmental Biochemistry
Peter S. White, Plant Ecology

Associate Professors

Shawn C. Ahmed, Telomeres, DNA Change and Germline Immortality
Christina L. Burch, Experimental Evolution of Viruses
Sabrina S. Burmeister, Neuroethology
Gregory P. Copenhaver, Plant Genome Biology, Recombination, Centromeres
Corbin D. Jones, Evolutionary Genetics and Genomics
Laura A. Miller, Mathematical Biology, Comparative Biomechanics
Charles E. Mitchell, Disease Ecology
Karin S. Pfennig, Ecology, Behavior, and Evolution
Jason W. Reed, Light Signal Transduction in Plants
Steven Rogers, Cytoskeletal Filaments
Lillie L. Searles, Molecular Biology
Maria R. Servedio, Evolutionary Theory
Keith W. Sockman, Neuroendocrine Control of Reproductive Flexibility
Todd J. Vision, Evolutionary and Computational Genetics

Assistant Professors

Mara C. Duncan, Membrane Trafficking
Terry Furey, High-Throughput Genomic Analysis of Gene Regulation and Cancer
Tyson L. Hedrick, Biomechanics and Animal Locomotion
Allen H. Hurlbert, Community Ecology, Biogeography
Alain Laederach, Disease-Associated Mutations and Their Effect on RNA Structure
Amy S. Maddox, Mechanisms of Cell Shape Change
Paul S. Maddox, Cell biology of Cell Division
Elizabeth A. Shank, Microbial interactions
Kevin Slep, Cytoskeletal Structure and Dynamics

Research Professors

Sarah R. Grant, Pathogenicity Factors in Pseudomonas syringae
Punita Nagpal, Plant Development
David Straight, Protein-Protein Interactions
Jianke Tie, Molecular Biology
James Umbanhowar, Ecosystem Stability and Function
Chris S. Willett, Molecular Population and Evolutionary Genetics
Elaine Yeh, Nuclear Division in Yeast

Associated Faculty

Stephen T. Crews, Molecular Genetics
Frederick Joel Fodrie, Fish and Bivalve Population Ecology
Paul W. Gabrielson, Systematics of Marine Algae
Alan Weakley, Plant Systematics

Professors Emeriti
Edward G. Barry
Aristotle J. Domnas
J. Alan Feduccia
Lawrence I. Gilbert
Max H. Hommersand
Gustavo Maroni
Donald W. Misch
Helmut C. Mueller
Clifford R. Parks
Seth R. Reice
Tom K. Scott
Alan E. Stiven
R. Haven Wiley

The Department of Biology offers a program of study leading to a doctor of philosophy degree in biology. Master's degrees are generally only received by those students who have progressed far enough in the Ph.D. program, but cannot complete the program for various reasons. Special departmental rules and guidelines for advanced degrees are available upon request.

Graduate Programs and Facilities

The Department of Biology is currently housed in four modern buildings. The newest building, the Genome Sciences Building, opened in July 2012. The department is equipped with modern instrumentation for research and research training in the diverse biological disciplines represented by the faculty. These include:

Genetics and Molecular Biology: Genetics is both a discipline (the study of heredity) and an experimental approach (manipulation of genes or the genetic material). Today, most geneticists work at the molecular level by manipulating RNA,DNA or entire genomes. Our group is strong in both model organism genetics and genomics. Areas of emphasis include biochemistry and molecular biology, chromosome biology, developmental genetics, genomics, protein synthesis, enzyme mechanics, and plant genetics.

Cell Biology, Development, and Physiology: Developmental biologists address the mechanisms through which cells acquire specialized functions to form complex body plans. These features are accomplished in part through cell proliferation, migration, and shape changes. The department has a strong research program in these areas, which are major topics in cell biology, as well as in other aspects of developmental biology. Areas of emphasis include cytology, mitotic and meiotic mechanisms, histochemistry, experimental morphogenesis, morphogenetic movements, tissue culture, hormones, plant development, signal transduction, functional morphology, biomechanics and neuroethology, and membrane functions.

Evolutionary Biology: Evolution is inherited change in the characteristics of populations over time. Evolutionary biologists seek to explain the remarkable fit of organisms to their environment (adaptation), the origins of diversity, including the formation of new species (speciation), and the relationships among organisms. The department has a strong focus on the genetic and ecological mechanisms of adaptation and speciation.

Ecology: Ecologists study how organisms interact with other organisms and with their physical environment. UNC's group has strength in behavioral, conservation, community, disease, evolutionary, and marine ecology. Areas of emphasis include population biology, life histories, and ecosystem phenomena in diverse systems.

Behavior and Organismal Biology: Organismal biologists seek to understand the diversity of life forms on Earth by analyzing organismal structure and function. UNC's Biology Department takes an integrative approach to this research, combining analyses at levels ranging from molecules to whole organisms. The group a lso endeavors to understand the evolution and mechanisms of behavior. It uses theoretical, observational, and experimental approaches in a variety of species, from crawling behavior in sea slugs to communication in birds. Areas of emphasis include social and mating systems of vertebrates, communication, ecology and ontogeny of behavior, predator-prey interactions, marine ecology and oceanography, comparative physiology, neuroethology, functional morphology, and comparative biomechanics.

Plant Biology: The department has an active and diverse group that studies features specific to plants or that uses plant model systems to address questions of broad interest. Areas of emphasis include host-pathogen interactions, signal transduction, development, genomics, and chromosome biology.

After completing required course work in the department, students in marine biology have access to the research facilities of the Institute of Marine Sciences, Morehead City, North Carolina. By cooperative arrangements, deep water research can be carried out through the use of the research vessel of the Duke University Marine Laboratory.

Inter-departmental degree programs in genetics, ecology, neurobiology, and marine sciences offer unusual opportunities for special training through participation of staff from the Department of Biology and many other departments in arts and sciences and health affairs.

UNC has a world-class library system including the Health Science Library which is dedicated to resources related to of biological research. A major research asset is the location of the University, which makes the varied flora and fauna of the Appalachian Mountains, Piedmont Plateau, Coastal Plain, and Atlantic Coast accessible for research and instruction. The department operates a small field station a few miles from the Chapel Hill campus in the Mason Farm Biological Reserve, which includes several hundred acres of upland and floodplain habitats.

The Coker Arboretum and the North Carolina Botanical Garden are of value to students in the study of questions in plant biology. The Herbarium, containing more than 600,000 specimens, is especially rich in collections of the vascular plants and fungi of the Carolinas and the Southeastern United States.

The Highlands Biological Station, administered for the University system by Western Carolina University, is located in the biologically rich mountains at Highlands, North Carolina. Graduate courses offered cover various parts of the mountain biota. Credit may be obtained through UNC–Chapel Hill or Western Carolina University. A limited amount of research support is available on a competitive basis. (See the annual announcement of the Highlands Biological Station.)

The University is a member of the Organization for Tropical Studies (OTS). Financial support is available for students attend ing OTS courses in tropical ecology in Costa Rica.

Additional information about the graduate program including instructions for application is available at www.bio.unc.edu.

Fellowships and Assistantships

Applicants interested in genetics, molecular biology, cell biology, development, or physiology should apply to the graduate program via the Biology and Biomedical Sciences Program (BBSP) application portal (www.med.unc.edu/bbsp/welcome.html). Applicants with an interest in evolutionary biology, ecology, behavior, or organismal biology should apply to the graduate program using UNC's Graduate School

application portal (gradschool.unc.edu/admissions). Application for admission and graduate appointments, accompanied by credentials and Graduate Record Examination scores, and optionally the Advanced Biology score, should be submitted according to the graduate college deadlines (gradschool.unc.edu/programs/degreeprograms).

All outstanding prospective graduate students who apply for admission are automatically considered for University fellowships.

More than 45 teaching assistantships are open to graduate students. Duties of assistants include preparation for, and supervision of, laboratory and recitation sections of undergraduate courses. Duties usually require 13 to 15 hours per week including six contact hours in classes and six to nine hours of preparation or other services associated with instruction.

Research assistantships are also available. Salaries and duties are variable as determined by the research needs of faculty supervising the work. Applications for these appointments must be made personally to faculty members directing grant-supported research.

The following awards are specifically for graduate students in the Biology Department.

- The Alma Holland Beers Scholarships are awarded annually to support summer research of students in botany. They are nonservice awards.
- The William Chambers Coker Fellowship is awarded annually to a student or students in the final years of work toward a doctor of philosophy in a botanical field. This is a nonservice award that carries with it an additional supplement for tuition and fees.
- The Mrs. W. C. Coker Fellowship is awarded annually to an outstanding first-year graduate student in plant biology. This is also a nonservice award that carries with it an additional supplement for tuition and fees.
- The H. V. Wilson Marine Scholarship is awarded annually for summer work at a marine laboratory. It is a non-service award.

Courses for Graduate and Advanced Undergraduate Students
BIOL

The stated prerequisites should be interpreted to read "or equivalent" and may be waived by the course instructor for students who are adequately prepared.

402 Infectious Disease in the Developing World (3). Prerequisites, BIOL 202 and 205. We will explore the challenges of infectious disease in the developing world, focusing on tuberculosis, HIV, and malaria. We will also examine the economics of different approaches to health care.

410 Principles and Methods of Teaching Biology (4). Prerequisites, two of the three biology core courses: BIOL 201, 202, and/or 205. This course will develop the knowledge and skills teachers need to implement inquiry-based biology instruction: rich, conceptual knowledge of biology and mastery of inquiry-based teaching methods.

421L Microbiology Laboratory with Research (2). Pre- or corequisite, BIOL 422. Sterile technique, bacterial growth, physiology, genetics and diversity, and bacteriophage, and research in bacterial genetics.

422 Microbiology (3). Prerequisite, BIOL 202. Permission of the instructor for students lacking the prerequisite. Bacterial form, growth, physiology, genetics, and diversity. Bacterial interactions including symbiosis and pathogenesis (animal and plant). Use of bacteria in biotechnology. Brief introduction to viruses.

422L Microbiology Laboratory (1–2). Pre- or corequisite, BIOL 422. Sterile technique, bacterial growth and physiology, bacterial genetics, bacteriophage, and bacterial diversity.

423L Laboratory Experiments in Genetics (4). Prerequisite, BIOL 205. Experiments using a range of organisms—from bacteria to Drosophila, higher plants, and man—to sample organismal and molecular genetics. One lecture hour, four laboratory hours.

425 Human Genetics (GNET 425) (3). Prerequisite, BIOL 202. Permission of the instructor for students lacking the prerequisite. Pedigree analysis, inheritance of complex traits, DNA damage and repair, human genome organization, DNA fingerprinting, the genes of hereditary diseases, chromosomal aberrations, cancer and oncogenes, immunogenetics and tissue transplants. Three lecture hours a week.

426 Biology of Blood Diseases (PATH 426) (3). See PATH 426 for description.

427 Human Diversity and Population Genetics (3). Pre- or corequisites, BIOL 201 and 202. Permission of the instructor for students lacking the prerequisites. This course investigates the facts, methods, and theories behind human population genetics, evolution, and diversity. Specifically, it addresses questions of human origins, population structure, and genetic diversity.

430 Introduction to Biological Chemistry (CHEM 430) (3). See CHEM 430 for description.

431 Biological Physics (PHYS 405) (3). See PHYS 405 for description.

434 Molecular Biology (3). Prerequisites, BIOL 202 and CHEM 261. Permission of the instructor for students lacking the prerequisites. Advanced studies in molecular biology from an experimental approach.

439 Introduction to Signal Transduction (3). Prerequisites, BIOL 202 and 205. Permission of the instructor for students lacking the prerequisites. This course presents an introduction to signal transduction pathways used by higher eukaryotes. Several signaling paradigms will be discussed to illustrate the ways that cells transmit information. Three lecture hours per week.

441 Vertebrate Embryology (3). Prerequisite, BIOL 205 or 252. Permission of the instructor for students lacking the prerequisite. Principles of development with special emphasis on gametogenesis, fertilization, cleavage, germ layer formation, organogenesis, and mechanisms, with experimental analysis of developmental processes. Three lecture hours a week.

441L Vertebrate Embryology Laboratory (1). Pre- or corequisite, BIOL 441. Descriptive and some experimental aspects of vertebrate development. Three laboratory hours a week.

443 Developmental Biology (3). Prerequisites, BIOL 205 and CHEM 261. Permission of the instructor for students lacking the prerequisites. An experimental approach to an understanding of animals and plants. The approach covers developmental processes, molecular, genetic, cell biological and biochemical techniques, with an emphasis on the molecules involved in development.

445 Cancer Biology (3). Prerequisites, BIOL 202 and 205. Selected examples will be used to illustrate how basic research allows us to understand the mechanistic basis of cancer and how these insights offer hope for new treatments.

446 Unsolved Problems in Cellular Biology (3). Prerequisite, BIOL 205. Permission of the instructor for students lacking the prerequisite. A survey of areas of current interest in cytology, embryology, and genetics with concentration on problems that remain unsolved but that appear to be near solution. Three lecture and discussion hours a week.

447 Laboratory in Cell Biology (4). Prerequisite, BIOL 205. Required preparation, a grade of C or better in BIOL 205. Modern methods to

study cells, technical skills necessary for research in cell and molecular biology, knowledge of good lab practice, operation of technical instrumentation. Three lecture and three laboratory hours a week.

448 Advanced Cell Biology (3). Prerequisite, BIOL 205. Permission of the instructor for students lacking the prerequisite. An advanced course in cell biology, with emphasis on the biochemistry and molecular biology of cell structure and function. Three lecture hours a week.

450 Introduction to Neurobiology (3). Recommended preparation, BIOL 205. Survey of neurobiological principles in vertebrates and invertebrates, including development, morphology, physiology, and molecular mechanisms. Three lectures a week.

451 Comparative Physiology (3). Prerequisites, BIOL 101 and 101L, and either PHYS 104 or 116 and either PHYS 105 or 117. An examination of the physiology of animals using a comparative approach. Both invertebrate and vertebrate animals are discussed in order to elucidate general principles.

451L Comparative Physiology Laboratory (1). Pre- or corequisite, BIOL 451. The fundamental principles of physiology are explored using physical models, animal experiments, and noninvasive experiments on humans, reinforcing the understanding of concepts presented in lecture.

452 Mathematical and Computational Models in Biology (MATH 452) (4). Prerequisites, BIOL 201 and 202, MATH 231, and either MATH 232 or STOR 155. Permission of the instructor for students lacking the prerequisites. This course will introduce analytical, computational, and statistical techniques, such as discrete models, numerical integration of ordinary differential equations, and likelihood functions, to explore various fields of biology. Laboratory is included.

453 Animal Societies and Communication (3). Pre- or corequisite, BIOL 278. Permission of the instructor for students lacking the pre- or corequisite. Comparative review of animal societies; diversity of social structure, social dynamics, communication, ecology, and evolution of social organization. Three lecture hours a week.

454 Evolutionary Genetics (3). Prerequisites, BIOL 201 and 202. Permission of the instructor for students lacking the prerequisites. The roles of mutation, migration, genetic drift, and natural selection in the evolution of the genotype and phenotype. Basic principles are applied to biological studies. Three lecture hours a week.

455 Behavioral Neuroscience (3). Prerequisite, BIOL 205. Permission of the instructor for students lacking the prerequisite. The neurobiological basis of animal behavior at the level of single cells, neural circuits, sensory systems, and organisms. Lecture topics range from principles of cellular neurobiology to ethological field studies.

457 Marine Biology (MASC 442) (3). See MASC 442 for description.

458 Sensory Neurobiology and Behavior (3). Recommended preparation, BIOL 205. An exploration of sensory systems and sensory ecology in animals. Topics range from neurophysiological function of sensory receptors to the role of sensory cues in animal behavior.

459 Field Biology at Highlands Biological Station (1–4). Prerequisite, BIOL 101. Permission of the instructor for students lacking the prerequisite. Content varies. Summer field biology at the Highlands Biological Station focuses on the special faunal and floristic processes and patterns characteristic of the southern Appalachian mountains. Five lecture and three to five laboratory and field hours per week, depending on credit.

461 Fundamentals of Ecology (ECOL 461, ENST 461) (4). Prerequisite, BIOL 201. Students will develop a comprehensive understanding of the field of ecology, including modern and emerging trends in ecology. They will develop literacy in the fundamental theories and models that capture ecological processes; emphasis will also be placed on the relevance of ecology and ecological research for human society.

462 Marine Ecology (MASC 440) (3). Prerequisite, BIOL 201 or 475. Survey of the ecological processes that structure marine communities in a range of coastal habitats. Course emphasizes experimental approaches to addressing basic and applied problems in marine systems.

463 Field Ecology (4). Prerequisite, BIOL 201. Application of ecological theory to terrestrial and/or freshwater systems. Lectures emphasize quantitative properties of interacting population and communities within these systems. Required laboratory teaches methodology applicable for analysis of these systems. Projects emphasize experimental testing of ecological theory in the field. Two lecture and six field hours a week.

464 Global Change Ecology (3). Prerequisite, BIOL 201. Responses of plants, animals, and communities to climate and other global changes, emphasizing ecology, physiology, behavior, and evolution. Investigation of past responses and tools for predicting future responses.

465 Global Biodiversity and Macroecology (3). Prerequisite, BIOL 201. Permission of the instructor for students lacking the prerequisite. We will explore global patterns of diversity of plants, animals, fungi, and microbes, and the insights gained by taking a statistical approach to describing these and other broad-scale ecological patterns.

469 Behavioral Ecology (3). Prerequisite, BIOL 201. BIOL 278 recommended but not required and can be taken concurrently. Behavior as an adaptation to the environment. Evolution of behavioral strategies for survival and reproduction. Optimality and games that animals play. Three lecture hours a week.

471 Evolutionary Mechanisms (4). Prerequisites, BIOL 201 and 202. Permission of the instructor for students lacking the prerequisites. Introduction to mechanisms of evolutionary change, including natural selection, population genetics, life history evolution, speciation, and micro- and macroevolutionary trends. Three lecture hours plus two hours of laboratory/recitation per week.

472 Introduction to Plant Taxonomy (4). Prerequisites, BIOL 271 and/or 272. Permission of the instructor for students lacking the prerequisites. Introduction to the taxonomy of vascular plants. Principles of classification, identification, nomenclature, and description. Laboratory and field emphasis on phytography, families, description, identification, and classification of vascular plant species. Three lecture and three laboratory hours a week.

473 Mammalian Morphology and Adaptation (3). Prerequisite, BIOL 252 or 276. An in-depth examination of the morphological adaptations of mammals. Particular attention will be given to osteology, the locomotor system, and craniofacial structures.

473L Mammalian Morphology Laboratory (1–2). Prerequisite, BIOL 252 or 276L. Laboratory includes a detailed dissection of a representative mammal, emphasizing the common structure of mammals. Opportunity for independent investigation of specific functional adaptations of specialized forms.

474 Evolution of Vertebrate Life (3). Prerequisite, BIOL 201 or 202. Permission of the instructor for students lacking the prerequisite. Evolutionary history of the vertebrates. Emphasis on anatomical, physiological, behavioral adaptations accompanying major transitions: the move from water to land, the development of complex integrating systems.

474L Vertebrate Structure and Evolution Laboratory (1). Pre- or corequisite, BIOL 474. Vertebrate comparative anatomy of organ systems and their evolution with emphasis on human anatomy. Three laboratory hours a week.

475 Biology of Marine Animals (4). Prerequisites, BIOL 101 and 101L. Required preparation, one additional course in biology. An introduction to the major animal phyla emphasizing form, function, behavior, ecology, evolution, and classification of marine invertebrates. Three lecture and three laboratory hours per week.

476 Avian Biology (3). Prerequisites, BIOL 101 and 101L; corequisite, BIOL 476L. A study of avian evolution, anatomy, physiology, neurobiology, behavior, biogeography, and ecology. Three lecture hours a week.

476L Avian Biology Laboratory (1). Corequisite, BIOL 476. Techniques for the study of avian evolution, ecology, and behavior with emphasis on North Carolina birds. Three laboratory or field hours a week, including one or two weekend field trips.

478 Invertebrate Paleontology (GEOL 478) (4). See GEOL 478 for description.

479 Topics in Organismal Biology at an Advanced Level (3). Topics in organismal biology at an advanced undergraduate or graduate student level.

479L Laboratory in Organismal Biology: Advanced Topics (1–2). Laboratory in special topics in organismal biology for advanced undergraduates and graduate students.

490 Advanced Topics in Biology (3). Permission of the instructor. Content will vary. Three lecture and discussion hours per week by visiting and resident faculty.

495 Undergraduate Research (1–3). Prerequisite, BIOL 395. Permission of the instructor. Majors only. An overall 3.0 grade point average required. Laboratory study on a selected topic and directed readings. A final written report is required each term. May be repeated. This course is offered for pass/fail credit only.

501 Ethical Issues in Life Sciences (3). Permission of the instructor. A consideration and discussion of ethical issues in life sciences including cloning humans, genetic engineering, stem cell research, organ transplantation, and animal experimentation. Counts as a course numbered below 400 for biology major requirements.

514 Evolution and Development (3). Prerequisites, BIOL 201, 202, and 205. Permission of the instructor for students lacking the prerequisites. The course examines the mechanisms by which organisms are built and evolve. In particular, it examines how novel and complex traits and organisms arise from interactions among genes and cells.

522 Bacterial Genetics (3). Prerequisite, BIOL 422. Permission of the instructor for students lacking the prerequisite. Genetics of eubacteria with emphasis on molecular genetics including regulation of gene expression, transposons, operons, regulons, plasmids, transformation, and conjugation. Computer analysis of DNA sequences.

524 Strategies of Host–Microbe Interactions (3). Prerequisite, BIOL 205. Permission of the instructor for students lacking the prerequisite. There is great variety in how microbes colonize and live with their hosts. The course will summarize strategies of pathogenicity, symbiosis, commensalism and mutualism. Evolutionary, cellular, and molecular aspects will be analyzed.

525 Computational Analyses and Resources in Genomics (4). Prerequisites, BIOL 202, COMP 116, and STOR 155. Permission of the instructor for graduate students. Computational techniques for the analysis of large-scale genomics data. Databases and online genomic resources. Programming for standard file processing and development of analysis pipelines. Course includes a computational laboratory.

526 Computational Genetics (4). Pre- or corequisites, BIOL 202, COMP 116, and STOR 155. Permission of the instructor for students lacking the prerequisites. Graduate enrollment allowed with permission of the instructor. Introduction to computational principles underlying sequence alignment and phylogenetics, genome assembly and annotation, analysis of gene function, and other bioinformatics applications. Includes a one-hour computer laboratory.

527 Seminar in Quantitative Biology (3). Prerequisites, COMP 114, and MATH 232 or 283. Permission of the instructor for students lacking the prerequisites. Seminar in quantitative biology for advanced students. The course counts as a quantitative biology course for the major.

527L Laboratory in Quantitative Biology (1). Laboratory in quantitative biology for advanced students. The laboratory will involve mathematical analysis and modeling of biological systems and processes.

528 Systems Biology of Genetic Regulation (4). Prerequisites, BIOL 202, COMP 116, and MATH 232 or 283. The course will focus on mathematical and informatics approaches to modeling biological systems in particular gene networks. Students are expected to have some experience with programming.

529 Clinical and Counseling Aspects of Human Genetics (GNET 635) (3). See GNET 635 for description.

531 Senior Seminar in Basic Research Leading to Drug Discovery in HIV Treatment or Prevention (3). Prerequisite, BIOL 205. Permission of the instructor for students lacking the prerequisite. This course will explore basic science approaches and primary scientific literature addressing the development of therapeutics or prevention of HIV infection or symptoms.

535 Molecular Biology Techniques (4). Permission of the instructor. Recommended preparation, BIOL 434. Experiments with bacterial phage, nucleic acid isolation and properties, recombinant DNA techniques, and DNA sequencing. Additional hours in laboratory will be necessary to complete assignments.

542 Light Microscopy for the Biological Sciences (3). Prerequisite, BIOL 205 for undergraduates. Permission of the instructor. Introduction to various types of light microscopy, digital and video imaging techniques, and their application in biological sciences.

551 Comparative Biomechanics (3). Prerequisites, BIOL 101 and 101L, and PHYS 104 or PHYS 116. Recommended preparation, PHYS 105. The structure and function of organisms in relation to the principles of fluid mechanics and solid mechanics.

552 Behavioral Endocrinology (3). Undergraduates need permission of the instructor to enroll. The study of the interactions among hormones, the brain, and behavior from how hormones shape the development and expression of behaviors to how behavioral interactions regulate endocrine physiology.

555 Paleobotany (GEOL 555) (4). Prerequisites, BIOL 101 and 101L, and BIOL 271 or 272. Permission of the instructor for students lacking the prerequisites. An introduction to the morphology, stratigraphic occurrence, and evolutionary relationships of fossil plants. Both macrofossils and microfossils will be considered. Three lecture and three laboratory hours a week.

556 Seminar on the Evolution of Animal Flight (3). Prerequisites, BIOL 201 and PHYS 104 or 116. Additional required preparation, a

400-level BIOL course or permission of the instructor. An examination of the origin and evolution of animal flight and how scientific understanding of this topic has changed from the mid-1800s to the present day.

561 Ecological Plant Geography (3). Prerequisite, BIOL 101 or GEOG 110. Permission of the instructor for students lacking the prerequisite. Description of the major vegetation types of the world including their distribution, structure, and dynamics. The principal causes for the distribution of plant species and communities, such as climate, soils, and history will be discussed.

562 Statistics for Environmental Scientists (ECOL 562, ENST 562) (4). See ECOL 562 for description.

563 Statistical Analysis in Ecology and Evolution (ECOL 563, ENST 563) (4). Prerequisites, MATH 231 and STOR 151. Permission of the instructor for students lacking the prerequisites. Application of modern statistical analysis and data modeling in ecological and evolutionary research. Emphasis is on computer-intensive methods and model-based approaches. Familiarity with standard parametric statistics is assumed.

565 Conservation Biology (3). Prerequisite, BIOL 201. Permission of the instructor for students lacking the prerequisite. The application of biological science to the conservation of populations, communities, and ecosystems, including rare species management, exotic species invasions, management of natural disturbance, research strategies, and preserve design principles.

567 Evolutionary Ecology (3). Prerequisite, BIOL 471. Permission of the instructor for students lacking the prerequisite. Advanced consideration of the evolution of form and function. May include issues in life-history evolution, evolutionary physiology, evolutionary morphology, and the evolution of complexity. Three lecture hours per week.

568 Disease Ecology and Evolution (3). Prerequisites, BIOL 201 and MATH 231. Permission of the instructor for students lacking the prerequisites. Recommended preparation, one course above 400 in ecology or evolution. An advanced class covering the causes and consequences of infectious disease at the levels of whole organisms, populations, communities, and ecosystems.

579 Organismal Structure and Diversity in the Southern Appalachian Mountains (4). Permission of the instructor. An examination of the field biology of selected fungi, plants, or animals of the Appalachian Mountains. The morphology, taxonomy, ecology, life history, and behavior of the organisms will be explored both in the laboratory and in the field.

590 Advanced Special Topics in Biology (3). Special topics in biology for advanced undergraduate students and graduate students.

590L Laboratory in Advanced Special Topics in Biology (1). Laboratory at an advanced level in special topics in biology. Students should have had considerable previous laboratory experience.

602 Professional Development Skills for Ecologists and Biologists (ECOL 602) (3). The goal of this course is to help students who intend to become professional ecologists or biologists acquire critical skills and strategies needed for achieving their career goals.

621 Principles of Genetic Analysis I (GNET 621) (3). Prerequisite for undergraduates, BIOL 202. Permission of the instructor for undergraduates. Genetic principles of genetic analysis in prokaryotes and lower eukaryotes.

622 Principles of Genetic Analysis II (GNET 622) (4). See GNET 622 for description.

624 Developmental Genetics (GNET 624) (3). Permission of the instructor for undergraduates. Genetic and molecular control of plant and animal development. Extensive reading from primary literature.

625 Seminar in Genetics (GNET 625) (2). Permission of the instructor for undergraduates. Current and significant problems in genetics. May be repeated for credit.

631 Advanced Molecular Biology I (BIOC 631, GNET 631, MCRO 631) (3). See GNET 631 for description.

632 Advanced Molecular Biology II (BIOC 632, GNET 632, MCRO 632) (3). See GNET 632 for description.

639 Seminar in Plant Molecular and Cell Biology (1). Permission of the instructor for undergraduates. May be repeated for credit. Current and significant problems in plant molecular and cell biology are discussed in a seminar format.

642 Advanced Studies of Cell Division (3). Prerequisite, BIOL 205. Permission of the instructor for students lacking the prerequisite. An advanced course in cell and molecular biology integrating genetic, biochemical, and structural aspects of the cell cycle. Principles derived from a variety of biological systems. Extensive reading of classic papers as well as recent literature.

643 Molecular Mechanisms of the Cytoskeleton (3). Prerequisites, BIOL 205 and CHEM 430. Permission of the instructor for students lacking the prerequisites. This seminar examines the cytoskeletal systems of eukaryotes and prokaryotes via primary literature. Architectures of cytoskeletal components are compared and contrasted along with their regulators, nucleators, and molecular motors.

648 Palynology (5). Permission of the instructor. A consideration of various aspects of palynology, including the morphology, structure, development, systematics, evolution, preparation techniques, and analysis of living and fossil pollen grains, spores, and other palynomorphs. Two lecture and six laboratory hours a week.

649 Seminar in Cell Biology (2). Prerequisite, BIOL 205. Permission of the instructor for students lacking the prerequisite. May be repeated for credit.

657 Biological Oceanography (ENVR 520, MASC 504) (4). See MASC 504 for description.

659 Seminar in Evolutionary Biology (2). Permission of the instructor. Advanced studies in evolutionary biology.

661 Plant Ecology (4). Prerequisite, BIOL 201. Permission of the instructor for students lacking the prerequisite. Consideration of terrestrial, vascular plant ecology including environmental physiology, population dynamics, and community structure. Laboratory stresses collection and interpretation of field data. Three lecture and three laboratory hours a week.

662 Field Plant Geography (2). Prerequisite, BIOL 561 or 661. Permission of the instructor. Intensive literature and field study of the plant geography and ecology of a selected region. Weekly seminar-style discussion followed by approximately nine days' field experience. May be repeated for credit.

669 Seminar in Ecology (ECOL 669) (1–3). Prerequisite, BIOL 201. Permission of the instructor for students lacking the prerequisite. May be repeated for credit.

691H Senior Honors Thesis in Biology (3). Permission of a faculty research director and three credit hours of BIOL 395 in the same laboratory required. Must be taken in the final semester of senior year. Fall and Spring only.

Courses for Graduate Students

BIOL

701 Overview of Biology (1-2). Biology faculty will present individual research presentations followed by discussion.

703 Recent Advances in Biology (1-3). A consideration of the methods and literature involved in the latest advances in selected areas of biology.

758 Molecular Population Biology (MASC 742) (4). See MASC 742 for description.

801 Seminar in Biological Sciences (1-2). Permission of the instructor. Advanced seminar in interdisciplinary biological sciences.

810 Seminar in College Science Teaching (2). This interactive course will help graduate students develop the knowledge and skills needed to implement student-centered science instruction at the university level. Participants will support one another in creating a teachable unit, a personal teaching philosophy statement, and a course syllabus.

829 Seminar in Quantitative Biology (1-3). Permission of the instructor. Advanced seminar in quantitative biology.

831 Seminar in Insect Physiology, Biochemistry, and Endocrinology (1-2). Permission of the instructor. Advanced seminar in insect physiology, biochemistry, and endocrinology.

832 Seminar in Molecular Biology (1-2). Prerequisite, BIOL 202. Permission of the instructor for students lacking the prerequisite. Advanced seminar in molecular biology.

841 Seminar in Embryology (1-2). Prerequisite, BIOL 205. Permission of the instructor for students lacking the prerequisite. Advanced seminar in embryology.

842 Seminar in Cell Biology and Biochemistry (1-2). Permission of the instructor. Advanced seminar in cell biology and biochemistry.

845 Advanced Seminar in Neurobiology (2). Advanced seminar in Neurobiology. Students should have previous experience in Neurobiology courses or research.

850 Seminar in Neurobiology (NBIO 850, PHCO 850, PHYI 850) (3). See NBIO 850 for description.

852 Seminar in Plant Systematics (1-2). Permission of the instructor. Advanced seminar in plant systematics.

853 Seminar in Plant Morphology and Anatomy (1-2). Permission of the instructor. Advanced seminar in plant morphology and anatomy.

854 Seminar in Neurophysiology (1-2). Permission of the instructor. Advanced seminar in neurophysiology. May be repeated for credit.

855 Seminar in Invertebrate Zoology (1-2). Prerequisite, BIOL 475. Permission of the instructor for students lacking the prerequisite. Advanced seminar in invertebrate zoology. May be repeated for credit.

856 Seminar in Vertebrate Evolutionary Biology (1-2). Permission of the instructor. Advanced seminar in vertebrate evolutionary biology.

857 Seminar in Comparative Animal Behavior (NBIO 857) (1-2). Permission of the instructor. Advanced seminar in comparative animal behavior. May be repeated for credit.

858 Seminar in Comparative Physiology (NBIO 858) (1-2). Prerequisite, BIOL 451. Permission of the instructor for students lacking the prerequisite. Advanced seminar in comparative physiology.

859 Seminar in Marine Biology (1-2). Permission of the instructor. Advanced seminar in marine biology. May be repeated for credit.

861 Statistical Analysis in Ecology and Evolution using R (1). Prerequisite, STOR 155. Graduate standing in biology, ecology, or genetics required. Introduction to statistical analysis and modeling of ecological and evolutionary data using the R programming environment.

890 Special Topics in Biology (1-2). Permission of the instructor. Consideration of special topics in biology. May be repeated once for credit.

891 Graduate Seminar in Biology (1). Graduate standing or permission of the instructor. A course to provide public lecture experience to advanced biology students. Students present individual research seminars based upon their dissertation projects. Lectures are critiqued by fellow students and biology faculty. Required of all candidates for the degree in biology.

892 Special Topics in Biology for Graduate Students (1-4). This course is designed to allow graduate students to explore areas of biology outside their direct area of specialization. Three credits lecture only. Four credits lecture and lab.

Courses numbered 900 and above are designed for applicants for advanced degrees. Each course requires permission of the instructor or the research director. Each may be repeated for two or more semesters for credit.

901 Introduction to Graduate Research (1–21). Graduate research for six weeks in two laboratories. Designed primarily to acquaint first-year students with research techniques and to assess their propensity for research. Arranged by mutual agreement of students and faculty members during fall orientation. May be repeated once for credit. Six to nine hours per week.

921 Research in Genetics (GNET 905) (1–21). See GNET 905 for description.

931 Research in Molecular Biology (1–21). Acquaints early career graduate students with research techniques and assesses their propensity for research. Arranged by mutual agreement of student and faculty member.

932 Research in Plant Molecular Biology (1–21). Acquaints early career graduate students with research techniques and assesses their propensity for research. Arranged by mutual agreement of student and faculty member.

941 Research in Cytology and Cell Biology (1–21). Acquaints early career graduate students with research techniques and assesses their propensity for research. Arranged by mutual agreement of student and faculty member.

942 Research in Embryology (1 –21). Acquaints early career graduate students with research techniques and assesses their propensity for research. Arranged by mutual agreement of student and faculty member.

943 Research in Physiology: Cellular, Comparative, Neurophysiology (1–21). Acquaints early career graduate students with research techniques and assesses their propensity for research. Arranged by mutual agreement of student and faculty member.

951 Research in Neurobiology (NBIO 951, PHCO 951, PHYI 951) (3–12). See NBIO 951 for description.

952 Research in Ethology and Animal Behavior (1–21). Acquaints early career graduate students with research techniques and assesses their propensity for research. Arranged by mutual agreement of student and faculty member.

953 Research in Marine Sciences (MASC 940) (2–21). See MASC 940 for description.

954 Research in Marine Sciences on Mollusca, Crustacea, Ichthyology, or Oceanography (1–21). Permission of the department. At the Institute for Marine Sciences, Morehead City, NC.

955 Research in Vertebrate or Invertebrate Zoology (1–21). Acquaints early career graduate students with research techniques and assesses their propensity for research. Arranged by mutual agreement of student and faculty member.

957 Research in Plant Systematics (1–21). Acquaints early career graduate students with research techniques and assesses their propensity for research. Arranged by mutual agreement of student and faculty member.

958 Research in Plant Morphology and Anatomy (1–21). Acquaints early career graduate students with research techniques and assesses their propensity for research. Arranged by mutual agreement for student and faculty member.

959 Research in Paleobotany (1–21). Acquaints early career graduate students with research techniques and assesses their propensity for research. Arranged by mutual agreement of student and faculty member.

961 Research in Ecology (1–21). Acquaints early career graduate students with research techniques and assesses their propensity for research. Arranged by mutual agreement of the student and faculty member.

Special Graduate Registration

992 Master's Thesis M.A. (3–9). Course for graduate students expecting to receive the degree of Master of Arts in Biology.

993 Master's Thesis in Biology (3–21).

994 Doctoral Dissertation in Biology (3–21).

Department of Biomedical Engineering

www.bme.unc.edu
www.bme.ncsu.edu
NANCY L. ALLBRITTON, *Chair*

Professors

Nancy L. Allbritton, Signaling in Single Cells, Microfabricated Systems for Cellular Analysis
Albert J. Banes, Cytomechanics, Gap Junction Biochemistry, Cell-Cell Signaling, Growth Factors
Greg Forest, Transport Processes in the Lung, Flow and Structure of Nanomaterials and Macromolecular Fluids
Edward Grant, Robotics, Biomedical Systems, Neural Networks, Biomedical Sensors, Medical Devices
Leaf Huang, Pharmacoengineering
Michael Jay, Pharmacoengineering
Weili Lin, Medical Imaging
Terry Magnuson, Genomics, Genetics
Russell Mumper, Pharmacoengineering
Troy Nagle, Medical Devices, Microsensors
Roger Narayan, Biomedical Sensors, Medical Devices, Biomaterials, Nanometer Systems
Harold Pillsbury, Neurobiology, Cochlear Implants
J. Michael Ramsey, Microfabricated Chemical Instrumentation, Microfluidics, Nanofluidics
Steven Soper, Biomedical Microsystems

Associate Professors

Ted Bateman, Rehabilitation Engineering
Paul Dayton, Biomedical Imaging, Medical Imaging, Medical Devices, Medical Instrumentation
Robert Dennis, Medical Devices, Biomechatronic Design, Tissue Mechanics, Functional Tissue Engineering, Regenerative Medicine
Caterina Gallippi, Biomedical Imaging, Medical Imaging, Image Processing and Analysis
Michael Gamcsik, Biomedical Imaging, Functional Tissue Engineering, Metabolomics, Pharmacy
Shawn Gomez, Computational Biology, Bioinformatics, Mathematical Modeling, Genomics, Image Analysis, Systems Biology
Albena Ivanisevic, Biomedical Microsystems, Biomaterials
David Lalush, Image Analysis, Biomedical Imaging, Medical Imaging, Bioinformatics, Image Processing and Analysis
Elizabeth Loboa, Tissue Mechanics, Cytomechanics, Modeling in Mechanobiology, Musculoskeletal Biomechanics, Biomechanics
Jeffrey Macdonald, Metabolomics, Functional Tissue Engineering
Marian McCord, Medical Textiles
Peter Mente, Tissue Mechanics, Cytomechanics, Modeling in Mechanobiology, Musculoskeletal Biomechanics, Biomechanics
Mark Tommerdahl, Neurobiology, Image Processing and Analysis, Physiological Systems, Somatosensory Cortical Dynamics
Glenn Walker, BioMicroelectromechanical Systems, Microfluidics, Lab-on-a-Chip Systems Research

Associate Professors

Oleg Favorov, Digital/Multidimensional Signal Processing, Biomedical Systems, Neural Networks, Bioinformatics,Neurobiology
Richard Goldberg, Medical Instrumentation
Paul Weinhold, Orthopaedic Biomechanics, Vibration Testing of Orthopaedic Tissues and Constructs

Teaching Associate Professor

Lianne Cartee, Mathematical Modeling, Bioelectric Stimulation
Hatice O. Ozturk, Digital Signal Processing/Multidimensional Signal Processing, Biomedical Image Processing and Analysis

Assistant Professors

Zhen Gu, Pharmacoengineering, Controlled Drug Delivery, Bio-inspired Materials, Protein Engineering, Nanobiotechnology
Gregory Sawicki, Bio-inspired Wearable Robotics, Locomotion Physiology, Neural Control of Movement, Rehabilitation Engineering
Anne Marion Taylor, Micro-Scale Devices, Microfluidics, Synapse Formation, Synaptic Plasticity, Protein Synthesis

Research Assistant Professors

Greg McCarty, Nanometer Systems, BioMEMS, Bioelectric Stimulation, Biochemical Engineering

Assistant Professor of the Practice

Andrew DiMeo, Medical Device Development

Research Assistant Professors

Anka N. Veleva, Biomaterials, Biochemical Engineering

Lecturer

Kenneth Donnelly

Biomedical engineering is a dynamic field stressing the application of engineering techniques and mathematical analysis to biomedical problems. Faculty research programs are key to the program, and they include four primary research directions: rehabilitation engineering, biomedical imaging, pharmacoengineering, regenerative medicine and

biomedical microdevices. The department offers graduate education in biomedical engineering leading to the master of science and doctor of philosophy degrees. Also, a joint graduate certificate in medical devices is offered.

Students enter this program with backgrounds in engineering, physical science, mathematics, or biological science. Curricula are tailored to fit the needs and develop the potential of individual students. In addition, courses in statistics, mathematics, life sciences, and engineering sciences provide a well-rounded background of knowledge and skills.

The Joint Biomedical Engineering Graduate Program is administered by the combined biomedical engineering graduate faculty from both North Carolina State University and the University of North Carolina at Chapel Hill. The joint program also has close working relations with the Research Triangle Institute and industries in the Research Triangle area. These associations enable students to obtain research training in a wide variety of fields and facilitate the selection and performance of dissertation research. Students in the joint program may study under faculty members based at the University of North Carolina at Chapel Hill or at North Carolina State University. The department, thus, provides students with excellent opportunities to realize the goal of enhancing medical care through the application of modern technology.

Admission Requirements

Students must satisfy all entrance requirements for the Graduate School of the University of North Carolina at Chapel Hill or the Graduate School at North Carolina State University, and must demonstrate interest and capability commensurate with the quality of the biomedical engineering program. Prospective students may apply to the graduate school at either UNC–Chapel Hill or NC State. All applicants are considered together as a group. Generally, applications should be submitted by mid-December for consideration for admission in the coming fall semester. Applicants are expected to present Graduate Record Examination (GRE) scores; verbal scores should be at or above the 50th percentile, quantitative scores should be at or above the 70th percentile; and applicants are expected to have at least a 30th percentile in the written GRE component to be competitive. The program requires that a one-to-three-page personal statement about research interest and background be submitted.

Students should have a good working knowledge of mathematics at least through differential equations, plus two years of physical or engineering science and basic courses in biological science. Deficiencies in preparation can be made up in the first year of graduate training.

Requirements for Degrees

Candidates for the UNC–Chapel Hill/NC State jointly issued degrees in biomedical engineering must have met the general requirements of the Graduate School of the University of North Carolina at Chapel Hill or the North Carolina State University Graduate School. Master's students are required to take a comprehensive examination, encompassing coursework and thesis research. The master's comprehensive exam may be either written or oral, and is administered by the student's advisory committee. Doctoral students qualify for the Ph.D. degree by meeting grade requirements in their core courses, and then advance on to written and oral preliminary exams before admission to candidacy. Details can be found on the department Web site. Degree candidates in this program are expected to obtain experience working in a research laboratory during their residence and to demonstrate proficiency in research. The Ph.D. dissertation should be judged by the graduate committee to be of publishable quality.

Courses for Graduate and Advanced Undergraduate Students

BMME

490 Special Topics in Biomedical Engineering (3–9). A study in the special fields under the direction of the faculty. Offered as needed for presenting material not normally available in regular BME department.

505 Biomechanics (3). Prerequisites, MATH 383 and PHYS 116. Fundamental principles of solid and fluid mechanics applied to biological systems. Human gait analysis, joint replacement, testing techniques for biological structures, and viscoelastic models are presented. Papers from current biomechanics literature will be discussed.

510 Biomaterials (3). Prerequisite, BIOL 101 or BMME 589. Chemical, physical engineering, and biocompatibility aspects of materials, devices, or systems for implantation in or interfering with the body cells or tissues. Food and Drug Administration and legal aspects. Undergraduate students should enroll in APPL 510.

515 Introduction to Systems Biology (3). Prerequisite, MATH 383 or 528. Cells, tissues, organs, and organisms have been shaped through evolutionary processes to perform their functions in robust, reliable manners. This course investigates design principles and structure-function relationships of biomolecular networks. Emphasis will be placed on gene- and protein-circuits and their role in controlling cellular behavior and phenotype.

520 Fundamentals of Materials Engineering (3). The structure, defects, thermodynamics, kinetics, and properties (mechanical, electrical, thermal, and magnetic) of matter (metals, ceramics, polymers, and composites) will be considered.

530 Digital Signal Processing I (3). Prerequisite, COMP 110 or 116. This is an introduction to methods of automatic computation of specific relevance to biomedical problems. Sampling theory, analog-to-digital conversion, digital filtering will be explored in depth. Undergraduate students should enroll in APPL 430.

550 Medical Imaging: Ultrasonic, Optical, and Magnetic Resonance Systems (3). Prerequisites, BIOS 550 and 430, and PHYS 128. Physical and mathematical foundations of ultrasonic, optical, and magnetic resonance imaging systems in application to medical diagnostics. Each imaging modality is examined, highlighting critical system characteristics: underlying physics of the imaging system, including mechanisms of data generation and acquisition; image creation; and relevant image processing methods, such as noise reduction.

551 Medical Device Design I (3). Student multidisciplinary teams work with local medical professionals to define specific medical device concepts for implementation.

552 Medical Device Design II (3). Device prototypes designed in the first course in series. Good manufacturing practices; process validation; FDA quality system regulations; design verification and validation; regulatory approval planning; and intellectual property protection.

560 Medical Imaging: X-Ray, CT, and Nuclear Medicine Systems (3). Prerequisites, APPL 410, BIOS 550, and PHYS 128. Overview of medical imaging systems using ionizing radiation. Interaction of radiation with matter. Radiation production and detection. Radiography systems and applications. Tomography. PET and SPECT systems and applications.

565 Biomedical Instrumentation I (4). Prerequisite, PHYS 351. Topics include basic electronic circuit design, analysis of medical instrumentation circuits, physiologic transducers (pressure, flow, bioelectric, temperate, and displacement). This course includes a laboratory where the student builds biomedical devices. Undergraduate students should enroll in APPL 465.

580 Microcontroller Applications I (3). Introduction to digital computers for real-time processing and control of signals and systems. Programming input and output devices using C and assembly language is stressed. Case studies are used to present software design strategies for real-time laboratory systems. Undergraduate students should enroll in APPL 480.

581 Microcontroller Applications II (3). Prerequisites, BMME 465, and APPL 480 or BMME 580. Problems of interfacing computers with biomedical and systems are studied. Students collaborate to develop a new biomedical instrument. Projects have included process control, data acquisition, disk systems interfaces, and DMW interfaces between interconnected computers.

Courses for Graduate Students

BMME

740 Advanced Biomaterials (MTSC 740) (3). Prerequisite, BMME 510. Permission of the instructor for students lacking the prerequisite. Medical or dental implants or explants are highlighted from textbooks, scientific literature, and personal accounts.

770 Physiology and Methods in Genomics (4). Prerequisite, BMME 570. Lectures in physiology systems and lab techniques covering various functional genomic methods including DNA sequencing, gene arrays, proteomics, confocal microscopy, and imaging modalities.

775 Image Processing and Analysis (COMP 775) (3). Prerequisites, COMP 665, MATH 547, and STAT 435. Approaches to analysis of digital images. Scale geometry, statistical pattern recognition, optimization. Segmentation, registration, shape analysis. Applications, software tools.

790 Graduate Systems Physiology (3). Prerequisite, BMME 589. This is the second semester of the two-semester series intended to provide graduate students with an introduction to systems and organ physiology.

795 Information Processing in the Central Nervous System (3). Prerequisite, BMME 589. Introduction to methodologies used to characterize a) the aggregate behavior of living neural networks and b) the changes in that behavior that occur as a function of stimulus properties, pharmacological manipulations, and other factors that dynamically modify the functional status of the network.

840 Rehabilitation Engineering Design (4). Prerequisite, BMME 465. Permission of the instructor for students lacking the prerequisite. Students will design an assistive technology device to help individuals with disabilities to become more independent. The project will be used in the community when it is completed.

890 Special Topics (1–21). Permission of the instructor. Special library and/or laboratory work on an individual basis on specific problems in biomedical engineering and biomedical mathematics. Direction of students is on a tutorial basis and subject matter is selected on the basis of individual needs and interests.

900 Research in Biomedical Engineering and Biomathematics (1–21). Permission of the instructor.

993 Master's Thesis (3–21).

994 Doctoral Dissertation (3–21).

North Carolina State University Biomedical Engineering Courses

512 Biomedical Signal Processing (3). Prerequisites, BME 311, and ST 370 or ST 371; BME or graduate standing only. (Credit is not allowed for both BME 412 and BME 512.) Fundamentals of continuous- and discrete-time signal processing as applied to problems in biomedical instrumentation. Properties of biomedical signals and instruments. Descriptions of random noise and signal processes. Interactions between random biomedical signals and systems. Wiener filtering. Sampling theory. Discrete-time signal analysis. Applications of Z-transform and discrete Fourier transform. Digital filter design methods for biomedical instruments.

522 Medical Instrumentation (3). Students should have a background in electronics design using operational amplifiers Fundamentals of medical instrumentation systems, sensors, and biomedical signal processing. Example instruments for cardiovascular and respiratory assessment. Clinical laboratory measurements, therapeutic and prosthetic devices, and electrical safety requirements.

525 Bioelectricity (3). Prerequisites, BME 302 or ZO 421 and a course in electrical circuits; senior or graduate standing. (Credit is not given for both BME 425 and BME 525.) Quantitative analysis of excitable membranes and their signals, including plasma membrane characteristics, origin of electrical membrane potentials, action potentials, voltage clamp experiments, the Hodgkin-Huxley equations, propagation, subthreshold stimuli, extracellular fields, membrane biophysics, and electrophysiology of the heart. Design and development of an electrocardiogram analysis system.

541 Biomechanics (3). Prerequisites, ZO 160 or BIO 183, BME 342, ST 370. (Credit is not allowed for both BME 441 and BME 541.) Students study human body kinematics, force analysis of joints, and the structure and composition of biological materials. Emphasis is placed on the measurement of mechanical properties and the development and understanding of models of biological material.

543 Cardiovascular Biomechanics (3). Prerequisites, BME 302, MAE 308, or CE 382. Engineering principles are applied to the cardiovascular system. Anatomy of cardiovascular system; form and function of blood and blood vessels. Electric analogs; continuum mechanics with derivation of equations of motion; and constitutive models of soft tissue mechanics, with attention to normal, diseased, and adaptive processes. Programming project required.

550 Medical Imaging: Ultrasonic, Optical, and Magnetic Resonance Systems (3). Prerequisites, BME 412, ST 370 or ST 371, and PY 208. Physical and mathematical foundations of ultrasonic, optical, and magnetic resonance imaging systems in application to medical diagnostics. Each imaging modality is examined on a case-by-case basis, highlighting the following critical system characteristics: 1) underlying physics of the imaging system, including the physical mechanisms of data generation and acquisition, 2) image creation, and 3) basic processing methods of high relevance, such as noise reduction.

551 Medical Device Design I (3). Prerequisite, graduate standing. Student multidisciplinary teams work with local medical professionals to define specific medical device concepts for implementation. Medical specialty immersion with clinical departments at local medical centers; design input based on stakeholder-needs assessment, market analysis and intellectual property review, new medical devices with broad markets, design output and device specification, product feasibility and risk assessment, design for medical device manufacturing.

552 Medical Device Design II (3). Prerequisite, BME 551. Student groups build and test prototypes of devices designed in the first course of this series. Good manufacturing practices, process validation, FDA quality system regulations, design verification and validation, regulatory approval planning and intellectual property protection. Students will work with local patent attorneys and/or agents to draft a patent application. The final prototypes will be evaluated by clinicians for potential use with patients.

560 Medical Imaging: X-Ray, CT, and Nuclear Medicine Systems (3). Prerequisites, BME 311, ST 370 or ST 371, and PY 208. Overview of medical imaging systems using ionizing radiation. Interaction of radiation with matter. Radiation production and detection. Radiography systems and applications. Tomography. PET and SPECT systems and applications.

566 Polymeric Biomaterials Engineering (3). Prerequisites, PY 208 and (TE 200 or CH 220 or CH 221) and (MAE 206 or CE 214). In-depth study of the engineering design of biomedical polymers and implants. Polymeric biomaterials, including polymer synthesis and structure, polymer properties as related to designing orthopedic and vascular grafts. Designing textile products as biomaterials including surface modification and characterization techniques. Bioresorbable polymers.

582 Tissue Engineering Tech (2). Prerequisite, BIT 468, crosslisted with BIT 583. This is a half semester laboratory module, students will gain practical experience with two key elements of tissue engineering: the construction of a complex living tissue that closely resembles its natural counterpart, and the assessment of the angiogenic potential of the engineered tissue. The effects of different biomaterials and angiogenic factors will be evaluated.

584 Tissue Engineering Fundamentals (3). Prerequisite, BIO 183 and CH 221 and (MAE 301 or MSE 301 or CHE 315 or TE 303) Essential concepts of organ and tissue design and engineering using living components, including cell-based systems and cells/tissues in combination with biomaterials, synthetic materials and/or devices. In vivo tissue structure and function; isolation and culture of primary cells and stem cells; principles of cellular differentiation; mass transport processes in cell culture systems; design, production and seeding of scaffolds for 3D culture; design of bioreactors to support high-density cell growth; state-of-the-art engineered and tissue systems; clinical translation; and ethics.

590 Special Topics (1–4). Prerequisite, senior or graduate standing in engineering or physical or biological sciences. A study of topics in the special fields under the direction of the graduate faculty.

601 Biomedical Engineering Seminar (1). Prerequisite, graduate standing. Elaboration of subject areas, techniques and methods important in biomedical engineering through presentations of personal and published works; opportunity to present and critically defend ideas, concepts and inferences. Discussions to identify analytical solutions and analogies between problems in biomedical engineering and other technologies, and to present relationship of biomedical engineering to societal needs.

620 Biomedical Engineering: Special Problems (1–4). Prerequisite, graduate standing in biomedical engineering. Selection of a subject by each student on which to do research and write a technical report on the results. Subject may pertain to the student's particular interest in any area of study in biomedical engineering.

650 Internship in Biomedical Engineering (1–3). Prerequisite, graduate standing in biomedical engineering. Students obtain professional experience through advanced engineering work in industrial and commercial settings under joint supervision of a member of the graduate faculty and an outside professional.

790 Advanced Special Topics (1–4). Prerequisite, graduate standing in engineering, physical or biological sciences. A study of topics in advanced or emerging special areas under the direction of the graduate faculty. Experimental doctoral level courses.

802 Biomedical Engineering Advanced Seminar (1). Elaboration of advanced subject areas, techniques and methods related to professional interest through presentations of personal and published works; opportunity for students to present and critically defend ideas, concepts and inferences; opportunity for distinguished scholars to present results of their work. Discussions to uncover analytical solutions and analogies between problems in biomedical engineering and other technologies, and to present relationship of biomedical engineering to society.

Kenan–Flagler Business School

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JAMES W. DEAN JR., *Dean*

Professors

Sridhar Balasubramanian, Marketing
Barry L. Bayus (131) Marketing Research, Technology Changes, Product Management
Richard A. Bettis, Strategic Management, Global Competition, Technological Innovation, Strategic Change
Edward Joseph Blocher (61) Auditing, Management Accounting
Gregory W. Brown (7) Asset Pricing, Capital Markets, Derivative Securities, Investments, Mutual Funds, Risk Management, Corporate Hedging
Robert M. Bushman, Information Economics, Corporate Governance, Executive Compensation, Organizational Structure
Jennifer S. Conrad (107) Market Constraints, Stocks and Options
James W. Dean (158) Quality Management, Strategic Decision Making, Organizational Cynicism
Jeffrey R. Edwards (160) Person-Organization Fit, Work-Family Issues
Paolo Fulghieri, Finance
John R. M. Hand (126) Financial Accounting, Capital Markets, Market Efficiency
David James Hartzell (16) Mortgage Bank Securities, Real Estate Investment, Finance
David A. Hofmann, Management
James H. Johnson, Diversity, Entrepreneurship–Minority, Ethnic Conflict, Management, Small Business–Minority, Urban Economics, Venture Financing, Welfare Reform
Walter Steven Jones, Business Education
Wayne R. Landsman (58) Financial Reporting, Capital Markets
Mark H. Lang (142) International Accounting and Finance, Corporate Disclosure Policy, Earnings, Stock Price Issues
Christian Lundblad, Finance
Ann E. Marucheck (21) Production/Operations, Technology and Innovation Management, Distributions Systems Design and Management, Engineering Management
Edward Maydew, Accounting, Taxation, Corporate Tax Planning, Mergers and Acquisitions–Tax Aspects, Economic Effects of Tax Changes
Atul Nerkar, Strategy and Associate Dean of the EMBA program
Hugh M. O'Neill (131) Corporate Strategy, New Ventures, Turnaround Situations
William Daniel Perreault Jr. (62) Industrial Marketing, Marketing Research Methods, Marketing Strategy
William P. Putsis, Marketing
David J. Ravenscraft (10) Mergers, Takeovers, Sell-Offs
Albert H. Segars (152) Telecommunications Management, Impact of Technology, Corporate-Level Planning for Information Technology
Douglas A. Shackelford (101) Taxes, Business Strategy, Performance

Measurement Systems
Anil Shivdasani (35) Corporate Boards of Directors, Corporate Finance, Corporate Governance, Finance, International Business–Finance, Mergers and Acquisitions, Organizations
J.B. Steenkamp, Marketing
Jayashankar M. Swaminathan, Operations, Technology and Innovation Management
Harvey M. Wagner (64) Management, Modeling
Valarie Zeithaml (169) Service Quality, Services Marketing

Associate Professors

Jeffery Abarbanell, Financial Statement Analysis, Analyst Forecasting, Valuation, Accounting in Transition-to-Market Economies
Christopher Bingham
Richard Stanley Blackburn (81) Organizational Behavior, Organizational Research Methods, Philosophy of Organizational Science
Robert A. Connolly (127) Foreign Currency Markets, Empirical Investments, Capital Markets
Nicholas Michael Didow (15) Consumer Behavior, Marketing Research Methods, Evaluation Research
Vinayak Deshpande
Alison Fragale, Organizational Behavior and Strategy
Diego Garcia
Katrijn Gielens, Marketing
Wendell Gilland (162) Production Planning and Control, Capacity Management, Business Process Reengineering
Mustafa N. Gültekin (106) Portfolio Theory, Asset Pricing Models, Corporate Finance
Eva Labro, Accounting
Arvind Malhotra, Electronic Commerce, Knowledge Management, Interorganizational Information Technology, Supply Chain Management, Internet Business Opportunities, Internet Startups, Strategic Use of Information Technology, Virtual Teams and Communities
Jacob Sagi
Jana Smith Raedy, Accounting
Adam V. Reed, Finance
Geoffrey Tate

Assistant Professors

Larry Chavis, Strategy and Entrepreneurship
Michael Christian, Organization Behavior
Riccardo Colacito, Finance
Mariano Croce, Finance
Dragana Cvijanovic
Sreedhari Desai, Organizational Behavior
David Dicks, Finance
Isaac Dinner
Noah Eisenkraft, Organizational Behavior
Nickolay Gantchev, Finance
Isin Guler, Strategy and Entrepreneurship
Bin Hu, Operations
Lisa Jones-Christensen, Strategy and Entrepreneurship
Chotibhak Jotikasthira, Finance
Eda Kemahlioglu-Ziya, Operations
Saravanan Kesavan, Operations
Dimitrios Kostamis, Operations
Venkat Kuppuswamy, Strategy and Entrepreneurship
Tarun Kushwaha, Marketing
Nandini Lahiri, Strategy and Entrepreneurship
Anh Le, Finance
Xiaoyuan Lu, Operations
Shimul Melwani, Organizational Behavior
Adam Mersereau, Operations
Paige Ouimet, Finance
Ali Parlakturk, Operations
Matthew Pearsall, Organizational Behavior
Andrew Petersen, Marketing
Scott Rockart, Strategy and Entrepreneurship
Amin Sayedi
Bradley Staats, Operations
Gunter Strobl, Finance
Stephen Stubben, Accounting
Edward Van Wesep, Finance
Sol Wang, Accounting
Kristin Wilson

Adjunct/Clinical Professors

Tamara Barringer, MAC Program
Gerald D. Bell, Leadership, Management, Negotiation, Teamwork
Linda Carolyn Bowen (9) Financial Accounting, Taxation, Auditing
Peter Brews, Strategy
Douglas Allen Elvers (18) Production/Operations Management, Scheduling, Project Management
Pat Garner, Strategy and Entrepreneurship
Eric Ghysel, Finance
Noel Greis, Air Logistics, Aviation, Innovation, International Manufacturing, International Operations, Logistics, Manufacturing
Clay Hamner, Entrepreneurial Studies
James Harris, Finance
Patrick Hartley, Finance
Michael Hussey, Finance
Michael Jacobs, Finance
Andrew Jones, Center for Entrepreneurial Studies
Morgan Jones, Adjunct Associate Professor, Operations
Mabel M. Miguel (53) Career Development, Cross-Cultural Management, Diversity, Human Resource Management, International Human Resource Management, Distance Learning, Management
Leslie Morgan, Finance
Alan Neebe, Operations
Barry Stuart Roberts (63) Legal Studies, Business Ethics, Government Regulation
Heidi Schultz (167) Business Communication
C. J. Skender, Accounting, Auditing, Decision Making
Judy Jones Tisdale, Consumer Banking Retail Sales, Professional Communication, Sales Coaching and Development
Ronald Williams, Management

Adjunct/Clinical Associate Professors

Joseph Bylinski, Adjunct Associate Professor, Accounting
Sharon Cannon, Business Communications
Travis Day, Adjunct Associate Professor, Strategy
Tim Flood, Business Communication
Paul Friga, Adjunct Associate Prof. Strategy and Entrepreneurship
Patricia Harms, Business Communication
Claudia Kubowicz-Malhotra, Clinical Associate Professor, Marketing
Ted Zoller, Entrepreneurial Studies

Adjunct/Clinical Assistant Professors

Deborah Anderson, Center for Real Estate Development
Stephen Appold, Research Assistant Professor, Kenan Institute
Alex Arapoglou, Clinical Assistant Professor, Finance
Lynn Dikolli Adjunct Assistant Professor, Accounting
Elizabeth Dickinson, Clinical Assistant Professor, Business Communications

Courtney Edwards, Clinical Assistant, Accounting
Douglas Guthe, Finance
Corinne Krupp, Finance Trade, Antidumping Trade, Exchange Rates
Michael Meredith, Clinical Assistant Professor, Business Communications
David Roberts, Adjunct Assistant, Marketing
Carol Seagle, Strategy and Entrepreneurship
Mark Yusko, Finance
Patrick Vernon, Entrepreneurial Studies
Bill Weld, Clinical Assistant Professor, Finance

Lecturers
Alston Gardner, Entrepreneurial Studies
John Glushik, Entrepreneurial Studies
Andy Grubbs, Strategy and Entrepreneurship
Gregory Hohn, Senior Lecturer, Business Communications
Kellie McElhaney
Mark McNeilly, Marketing
Donald Marple, Management
Steve Miller, Center for Entrepreneurial Studies
Mitch Mumma, Management
David Neal, Organizational Behavior and Strategy
Shelby Pohlman, M.A.C. Program
Allen Prichard, Center for Real Estate Development
Maria Elena Rodriguez, Kenan Institute of Private Enterprise
Bob Slater, Center for Real Estate Development
Chip Snively, Sr. Lecturer, Finance
Karen Trott, M.A.C. Program
Courtney Wright, Business Communication

Professors of the Practice
Michael Jacobs, Finance
Charles Myer, Strategy

Professors Emeriti
Carl H. Anderson
Gary M. Armstrong
Jack N. Behrman
R. Lee Brummet
Dewitt Clinton Dearborn
Robert DesJardins
G. David Hughes
Thomas H. Jerdee
Jay Edward Klompmaker
Clifton Holland Kreps Jr.
Hans E. Krusa
Harold Q. Langenderfer
J. Finley Lee
Richard Levin
Richard Wolcott McEnally
Dannie Joseph Moffie
Jack Olin
John Pringle
Richard Rendelman
Benson Rosen
Aleda V. Roth
David Rubin
William S. Stewart
Junius H. Terrell
Rollie Tillman
Clay Whybark

The Kenan–Flagler Business School offers programs of graduate study leading to the degrees of master of business administration, master of accounting, and doctor of philosophy. The school is committed to providing cutting-edge, real-world business education and research. Known for its collegial, intimate environment and selective, diverse admissions, the school prepares tomorrow's leaders in business and industry.

The school pioneered the team approach to learning more than a quarter century ago and has more recently added cross-functional, entrepreneurial, and global priorities to its curriculum.

Kenan–Flagler is recognized for world-class teaching. The faculty consistently has been nationally ranked for teaching excellence, availability, and responsiveness to students and emphasis on relevant, applied research and case development. Through these efforts, the faculty constantly strives to give students great opportunities for learning.

In fall 1997, the Kenan–Flagler Business School moved to its new state-of-the-art facility located on South Campus. Building features include 18 classrooms with multimedia capabilities, a 456-seat auditorium, and a 250-plus seat multipurpose dining pavilion and activity space.

The world-class McColl Building is a hub of learning, teaching, and research. Each classroom, office, and study room is designed for maximum use and technological efficiency to support these activities. The building includes an Asynchronous Transfer Mode (ATM) backbone network providing high-speed transmissions within the school and on the Internet, ports in many rooms that allow students to connect laptops from virtually anywhere in the building, a network operating at 100 megabits per second, a computer lab with state-of-the-art multimedia workstations, and network servers that provide students with online access to a number of CDs for company research and historical financial market data.

Master of Business Administration
The Kenan–Flagler Business School's highly ranked master of business administration (M.B.A.) program provides exceptional students with the opportunity to develop outstanding functional and analytical skills and the vision of a general manager. The two-year program combines a semester of core courses spread across two modules. The core courses are taken by all students and are designed to provide a general management background, technical and analytical expertise, and exposure to decision making in all functional areas of business. During substantial part of the second semester of the first year and the entire second year, students have the opportunity to take elective courses to concentrate in their areas of professional interest.

The M.B.A, program is well recognized for shaping professionals who integrate abilities related to the science and heart of business, with the former centering on analytical and functional skills, and the latter on leadership, teamwork, and execution skills.

Application forms and a brochure containing detailed information may be obtained by contacting the Kenan–Flagler Business School M.B.A. Admissions Office, CB# 3490, McColl Building, The University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-3490; (919) 962-3236; mba_info@unc.edu, www.kenan-flagler.unc.edu/programs/mba.

Master of Accounting
The Kenan–Flagler Business School's master of accounting (M.A.C.) program's unique approach to accounting and business education involves a challenging curriculum that integrates accounting with other business disciplines and emphasizes the application of accounting concepts to current business issues. The goal of the accounting and business courses is to create well-rounded business advisers who can compete in the international business world. M.A.C. students take

a broad but balanced series of accounting courses that focus on skill development, problem solving and decision-making in business situations. The business core courses are designed specifically for M.A.C. students to emphasize accounting and business consulting skills. The program develops students' communication and leadership skills, giving them a competitive advantage in today's tight job market and enhancing their ability to succeed in the accounting profession.

The M.A.C. program is designed for candidates holding undergraduate degrees in liberal arts, sciences, business and other non-accounting disciplines. Candidates earn the M.A.C. degree in 12 months of concentrated study. The application deadlines are June 15 (for UNC business majors only), December 1, and March 1. Because admission is competitive and decisions are made on a rolling basis, applicants are encouraged to apply early.

For more information, please contact the Kenan–Flagler Business School M.A.C. Admissions Office, CB# 3490, McColl Building, The University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-3490; (919) 962-3645; mac_info@unc.edu, www.kenan-flagler.unc.edu/programs/master-of-accounting.

The M.B.A. for Executives Programs

The M.B.A. for executives programs provide working professionals the opportunity to acquire the traditional M.B.A. degree without interrupting their careers. Kenan–Flagler offers three attendance options for completing the M.B.A. for Executives degree programs.

The evening program classes are held on Monday and Thursday evenings for 24 months. This program is best suited for professionals who live and work in the Triangle area and have careers that do not require frequent weekday travel.

The weekend program classes are held on alternate weekends (all day Friday and Saturday) for 20 months with two mandatory weeklong residencies for intensive course work. This program is best suited for professionals who travel extensively or who live too far from Chapel Hill to make attending evening classes feasible.

OneMBA® global program classes are held once a month on Friday, Saturday, and Sunday for 21 months. Most classes are held at Lansdowne Conference Center near Washington, DC and Dulles International Airport. The OneMBA curriculum integrates perspectives and best business practices from developed and emerging economies, providing students the knowledge and connections needed to accelerate their global management careers. Global residencies are held in the United States, Europe, Latin America, and Asia.

Application forms and a brochure containing detailed information about the program may be obtained by contacting the M.B.A. for Executives Programs, Kenan–Flagler Business School, The University of North Carolina at Chapel Hill, CB# 3490, McColl Building, Suite 3100, Chapel Hill, N.C. 27599-3490; (800) 453-9515; emba@unc.edu, www.kenan-flagler.unc.edu/programs/emba.

Doctor of Philosophy

The Ph.D. program in business administration is designed for individuals who plan careers in research and teaching. A limited number of students are admitted each year, resulting in a high-quality learning environment that emphasizes rigor and personal attention. Although many students enter the program with an M.B.A., this degree is not a requirement for admission. However, an M.B.A. from an accredited institution usually allows the student to waive some of the business fundamentals requirements. Prior to admission to the doctoral program, students are expected to have knowledge of elementary calculus and basic computer skills. A foreign language is not required for graduation from the program. Research and teaching assistantships are available on a competitive basis.

The requirements for the Ph.D. in business administration are:

- Business Fundamentals. All Ph.D. students are expected to possess or to acquire a basic knowledge of accounting, finance, marketing, organizational behavior, and production. This requirement involves a level of competence roughly equivalent to the M.B.A. core courses on these topics. Most students entering with an M.B.A. or similar degree meet this requirement without additional course work. Appropriate courses will be recommended for students who do not meet this requirement prior to beginning the program.
- Economics. All Ph.D. students are expected to possess or to acquire knowledge of microeconomic and macroeconomic theory. The basic requirement is an M.B.A. or graduate-level course on each topic. Once again, most students with an M.B.A. meet this requirement without additional course work. However, individual areas within the Business School (e.g., finance) may require that students take specific courses after entering the program to meet this requirement. Appropriate courses will be recommended for students who do not meet this requirement prior to beginning the program.
- Research Methods/Quantitative Methodologies. All Ph.D. students are required to take five courses (fifteen hours) in Research Methods/Quantitative Methodologies. At least one course (three hours) must be a research methods course covering topics such as philosophy of science, research design, sample selection, etc. At least three of the courses (nine hours) must focus on quantitative methodologies such as statistics, operations research, econometrics, etc. The fifth course (three hours) may be a more specialized research methods course (e.g., survey research, lab experimentation) or another quantitative methodologies course.
- Major Area of Concentration. All Ph.D. students are required to declare a major area. The major area consists of six courses (eighteen hours). Students may concentrate in one of the following areas:
- Accounting
- Operations
- Finance
- Organizational Behavior
- Marketing
- Strategy and Entrepreneurship

These courses may be a combination of required courses offered within the major area, required courses offered outside of the major area, or approved elective courses.

- Supporting Area. All Ph.D. students are required to declare a supporting area. The supporting area consists of four courses (twelve hours). The supporting area allows the student to develop a strong expertise in an area related to the student's research and teaching interests. These courses are usually drawn from a single area within the Business School or from a specific outside department, but a student may assemble four courses from more than one area if the courses represent a coherent package.
- Research Paper. During the summer and fall following the first year, all Ph.D. students are required to complete a research paper. The paper must be evaluated and approved by the student's faculty. The primary purpose of this paper is to provide the student with important research experience and to develop research and writing skills. Most of these papers are later presented at professional meetings and many lead to

publication. Some papers develop into dissertations.

- Comprehensive Examination. All Ph.D. students must pass a written comprehensive examination on the student's major area of concentration and relevant material from the other requirements. Students usually take this examination after completing course work, typically at the end of the second year. Some areas may require an oral examination after completion of the written examination.
- Dissertation. All Ph.D. students are required to complete a dissertation prior to graduation from the program. The dissertation is a thorough theoretical and empirical investigation of a specific problem important to the student's major area. The dissertation's value is in its contribution to knowledge, in the scholarly manner in which it is organized and presented and in the demonstrated development of the student's conceptual and research skills. Before substantial work on the dissertation is undertaken, a written dissertation proposal must be presented and approved by the student's dissertation committee. In most cases, the dissertation proposal is completed during the student's third year in residence and the dissertation is completed during the fourth year.
- Teaching and Research. All students are required to serve as teaching assistants for at least one semester and as research assistants for at least one semester. Students are also required to work with faculty prior to that semester on the development of their teaching skills.

Scholarships and Fellowships

Available to doctoral students in business administration are a number of assistantships. The school provides summer assistantships for doctoral students who receive awards from the University or the school during the academic year. Once a doctoral student is awarded financial aid, the school generally provides support for eight semesters if the student is making satisfactory academic progress.

MBA@UNC – Online MBA Program

Academics Overview

Program Format

Through the use of innovative technologies and real-world immersion experiences, MBA@UNC blends the flexibility of an online program with the rigor and quality of an on-campus experience. MBA@UNC is structured so that faculty and classmates get to know one another in ways that shape the vibrant learning community that sets UNC Kenan-Flagler apart.

World-Class Faculty and Curriculum

MBA@UNC leverages the same world-class faculty who teach in UNC Kenan-Flagler's other top-ranked MBA programs, and the curriculum is based on the curriculum delivered in those programs.

MBA@UNC is designed to provide aspiring leaders with the strong general management and leadership curriculum required to propel them to the next level in their careers. Following a foundation of required core courses, MBA@UNC students can customize their studies by concentrating in one of six business disciplines.

Innovative Approach to Distance Learning

Each course is designed and delivered by a UNC Kenan-Flagler professor and requires:

- Preparation outside of class, including teamwork (texts, articles, cases, projects, papers). Outside class, students can create sessions in exactly the same way as a professor does, and work together on the platform, seeing each other's faces, working collaboratively on documents, creating video presentations, working on simulations together and so on.
- Lectures and delivery of new information (in an asynchronous format)
- Weekly virtual classes (in a synchronous format) in small groups (10-15) led by faculty instructors (case discussions, role plays, breakout groups and other discussions to drive learning)
- Quarterly three-day immersion weekends. Students are responsible for completing all coursework for the immersion weekends. Although they are only required to attend two over the duration of the program, we are finding that most students are attending as many as their schedules permit.
- Kenan-Flagler Business School, The University of North Carolina at Chapel Hill, 1210 Environ Way, Chapel Hill, NC 27517
- Phone: (888) 9UNC-MBA [(888) 986-2622]; OnlineMBA@unc.edu

Courses for Graduate and Advanced Undergraduate Students

BUSI

401 Management and Corporate Communication (3). Open to business majors. Writing- and speaking-intensive course that emphasizes professional communication. Provides opportunities to learn and apply the conventions and expectations for standard business documents and presentations. Features strategies for addressing informative, persuasive, and bad-news messages using a variety of media (print documents, electronic messages, and oral presentations).

403 Operations Management (3). Analysis of the production/operations functions in both manufacturing and service organizations. Developing production policies that support total organizational goals under varying constraints.

404 The Legal and Ethical Environment of Business (1.5). An introduction to the legal system and an examination of ethical issues that affect business.

405 Leading and Managing: An Introduction to Organizational Behavior (3). An introduction to leading and managing in organizations. Examines the impact of individual, group, and organizational factors on organizational performance and employee attitudes. Topics include leadership, perceptions, attitudes, motivation, group development, norms and cohesiveness, empowerment, conflict, negotiations, culture, structure, stress, innovation, and change.

406 Marketing (3). Introduction to marketing with emphasis on the social and economic aspects of distribution, consumer problems, marketing functions and institutions, marketing methods and policies.

407 Financial Accounting and Analysis (3). Students will acquire the tools to understand and analyze information presented in corporate financial statements. Financial accounting results and projected results are utilized in virtually every segment of the business world. Knowledge of financial accounting and analysis is necessary for managers, investors, bankers, financial analysts, and professional accountants.

408 Corporate Finance (3). Prerequisites, BUSI 101 and ECON 410. Theoretical foundations of optimal financial policy. Problems and cases provide application of theory to financial decisions involving cash flow, capital structure, capital budgeting.

409 Advanced Corporate Finance (1.5). Prerequisite, BUSI 408. A follow-up course to BUSI 408 that goes more deeply into the theory and application of financial management. Emphasis is placed on investment, financing, and dividend decisions.

410 Business Analytics (3). Prerequisite, STOR 155. While witnessing an explosion of data, most organizations tend to be awash with data but short on information. This course exposes students to techniques that will help them impact on an organization's strategy, planning, and operations, working on applications spanning a number of fields, including operations management, finance, and marketing.

411 Strategic Management (1.5). Comprehensive analysis of administrative policy making from a total organizational point of view; use of case analysis and written reports to develop integrative decision skills.

490 Business Topics (1.5). Varied topics in business administration.

493 Business Internship Project I (3). Permission of the department. With prior approval, a student may propose and complete an academic research project (paper and presentation) derived from an internship experience.

496 Independent Study in Business (1.5–3). Permission of the department. Supervised individual study and research in the student's special field of interest.

500 Entrepreneurship and Business Planning (3). Students gain an understanding of entrepreneurship and the tools and skills necessary to conceive, plan, execute, and scale a successful new venture. Students develop business ventures in teams through an experiential pedagogy.

501 Professional Selling Strategies and Skills (3). Prerequisite, BUSI 406. Processes and techniques for successful sales and marketing in small business start-up companies.

502 Entrepreneurial Finance (1.5). Prerequisite BUSI 408 or 500. In this course students use financial tools and concepts in a real-world entrepreneurial setting. Working in assigned teams, students prepare a pitch book with financial projections for a company they wish to start or buy.

503 Family Business I: Introduction to Family Enterprise (1.5). Helps the student understand the evolutionary stages in the life of a family business and the challenges and opportunities that must be managed at each stage.

504 Launching the Venture (1.5). Prerequisite, BUSI 500. Permission of the instructor. Examines the process for developing and launching a new business venture.

505 Entrepreneurial Consulting (3). Student teams serve as consultants to actual start-ups. The course combines consulting frameworks and opportunity assessment tools, giving students a real-world learning experience working with entrepreneurs.

506 Entrepreneurship: Opportunity Assessment (3). An introduction to the tools and skills necessary to recognize opportunities in high tech, biotech, and traditional start-ups. Local entrepreneurs come to class to pitch to students, who analyze the start-ups from the perspective of venture capitalists.

507 Sustainable Business and Social Entrepreneurship (3). Examines sustainable business and social entrepreneurship. Readings draw from anthropology, ethics, international development, and traditional and nontraditional business practices.

508 Public-Private Development Projects (1.5). Prerequisite, BUSI 408. This course introduces students to challenges and opportunities associated with using public-private partnerships as a vehicle for meeting infrastructure and economic development needs. Students will develop an understanding of how the public and private sectors can have differing perceptions of risk, success, and effectiveness associated with such projects.

512 Family Business II: Governance and Ownership (1.5). Helps the student understand specific ownership, stewardship, tax, transition, and wealth management issues that affect family enterprises.

513 Innovations and Entrepreneurship in Developing Economies (1.5). Covers innovative private sector approaches to alleviating poverty around the world.

514 STAR (4.5). Pre- or corequisite, BUSI 554. Student Teams Achieving Results (STAR) is a live management consulting project that leverages and integrates UNC Kenan–Flagler course curricula. Teams of five to seven M.B.A. and undergraduate students and one faculty member work with major corporations or not-for-profit entities to solve a major strategic issue.

515 Social Entrepreneurship through Microfinance (1.5). Analyzes the role of microcredit/microfinance in global sustainable development. Students will be creating, organizing, and facilitating a sustainable microfinance initiative of their own design.

516 Private Equity for Entrepreneurs (3). Restricted to students in the GLOBE program. This course will examine all sources of private capital available to those wishing to start a business, buy a business, or refinance a business.

517 Private Equity and Debt Markets (1.5). Prerequisite, BUSI 408. The objective of this course is to examine the changing world of private equity investments today. This is a survey course and will help prepare you to work for private equity and venture capital funds or to work for investment banks.

518 Applied Private Equity (3). Prerequisites, BUSI 502 and 517. Permission of the instructor. Explores, at a very advanced level, all stages of the management of a venture capital and private equity fund, from capital formation, deal sourcing, due diligence, monitoring and adding value, and exiting of a portfolio company.

519 STAR—Global Business Projects (4.5). A global, live management consulting project that integrates other curricula and students (UNC and beyond). Teams of graduate and undergraduate students and one faculty member work to solve a major strategic issue. Team members participate in a three-day training weekend, virtual teaming, and two weeks of in-country project work.

520 Advanced Spreadsheet Modeling for Business (3). Fundamental understanding of Excel required. Use critical thinking and advanced Excel features to create spreadsheet models of common and complex business problems. Topics include flexible design and problem-solving, statistical analysis, charting, logic, retrieving data, evaluating financial decisions, organizing data for analysis, what-if analyses, enhanced decision-making tools, troubleshooting workbooks and VBA.

524 Applied Improvisation for Business Communication (3). Focuses on improving students' soft skills, such as presenting, expressiveness, and interviewing, by applying the principles and techniques of improvisational theater. Participants explore creativity, adaptation, awareness, self-confidence, risk taking, physicality, intuition, and teamwork. Students can stretch their abilities and discover things about themselves and others that are crucial to success.

525 Advanced Business Presentations (1.5). Prerequisite, BUSI 401. This course is grounded in argument, persuasion, and visual rhetoric to give students skills needed to develop winning presentations. Students learn strategies to help their messages "stick" with their audiences and to develop slide decks for the boardroom and advanced media devices. The course emphasizes efficiency in presentation preparation.

526 Leadership in Action (3). Permission of the department. Provides student leaders with practical leadership frameworks and tools; creates opportunities to apply these on the job as leaders; and provides individualized coaching, feedback, and mentoring. This is an applied learning course taught by a seasoned practitioner designed to accelerate each student's development and growth.

532 Service Operations (3). Prerequisite, BUSI 403. Studies key challenges in effective service delivery through the analysis of staffing and scheduling, customer waiting, and revenue management. Case studies illustrate examples of effective service design and delivery in various service industries including professional services, banking, health care, hospitality, and entertainment. A simulation project is used.

533 Supply Chain Management (3). Prerequisite, BUSI 403. Analyzes the key drivers of supply chain performance including inventories, transportation, information technology, and sourcing. Studies strategies for supply chain coordination, and challenges and opportunities in global supply chains. A supply chain simulation is used.

534 Business Modeling with Excel (3). Provides a broad scope of analytic experience across corporate functions that is beneficial in consulting environments.

535 Global Operations Strategy (1.5). Prerequisite, BUSI 403. Permission of the department. This course examines how organizations can use their operations to build a competitive advantage. Students may not receive credit for both BUSI 535 and MBA 709A.

536 Project Management (1.5). Prerequisite, BUSI 403. Permission of the department. This course prepares students to take part in and lead projects effectively. The goal is to equip individuals across any career concentration rather than extend the expertise of project-management specialists. Students may not receive credit for both BUSI 536 and MBA 710.

537 Retail Operations (1.5). Prerequisite, BUSI 403. Permission of the department. Examines developments in retailing and operations management principles applicable to these developments. Topics: consumer behavior, demand forecasting, logistics and distribution, store execution, international retailing, Internet-based retailing, performance assessment, and impact on financial performance. Students may not receive credit for both BUSI 537 and MBA 708.

538 Sustainable Operations (1.5). Prerequisite, BUSI 403. This course explores the link between sustainability and the operations function of a firm. The course focuses on the following activities: product and process design; manufacturing; transportation; logistics and distribution; closed-loop/after-sales operations such as recycling, remanufacturing, and reuse; supply chain management.

541 Contract and Commercial Law (3). Designed to give basic instruction in law with special emphasis upon its relationship with business. Content includes many subjects tested on the business law portion of the CPA examination, including the law of contracts and the Uniform Commercial Code (sales, negotiable instruments, and secured transactions).

543 Ethics in Management (3). By examining real ethical dilemmas in business, this course will help students analyze a problem from the triple perspective of ethics, economics, and law.

545 Negotiations (1.5). Prerequisite, BUSI 405. This course enables students to develop their expertise in managing negotiations. It integrates existing theory and research with personal experiences and ideas. Using hands-on exercises, readings, and lively discussions, students build and hone their ability to understand, adapt to, and evaluate the personal, social, and situational dynamics of negotiations.

550 Introduction to Organization Theory and Design (3). Prerequisite, BUSI 405. While BUSI 405 examines the micro-level influences on organizational success, this course focuses on more macro-level influences, including environmental analysis, strategy, structure, inter-organizational relationships, control systems, culture, power, politics, and change.

551 Human Capital (3). Prerequisite, BUSI 405. Problems, policies, and procedures in the management of personnel, including topics such as staffing, performance appraisal, training, compensation, benefits and services, safety and health, equal employment, discipline, justice.

553 Organizational Effectiveness (3). Prerequisite, BUSI 405. How organizations articulate and measure earning market share and how they link their differentiating factors to the unique abilities and behaviors of their workforce.

554 Consulting Skills and Frameworks (3). Pre- or corequisite, BUSI 408. Permission of the instructor. The course is dedicated to teaching the core skills for success in consulting and business in general: teamwork, analysis, and presentations.

555 Groups and Teams in Organizations (1.5). Examines the design, management, and leadership of teams in organizational settings. Focus is on the interpersonal processes and structural characteristics that influence the effectiveness of teams, individual behavior in face-to-face interactions, and the dynamics of interpersonal relationships.

559 New Product Marketing (1.5). Prerequisite, BUSI 406. This course provides students a thorough understanding and working knowledge of state-of-the-art tools that drive marketing strategies for launching and managing new products.

560 Advertising (3). Prerequisite, BUSI 406. The organization and functions of advertising. Topics include economic and social aspects, types of advertising and advertising objectives, developing advertising messages, media selection and evaluation, advertising research.

561 Sales Management (3). Prerequisite, BUSI 406. An overview of the sales management process, including sales force planning, budgeting, recruiting, selection, training, compensation, supervision, and control.

562 Consumer Behavior (3). Prerequisite, BUSI 406. Review of conceptual models and empirical research in consumer behavior. Topics include decision processes, social and cultural influences, information processing, and ethical issues.

563 Retailing and Distribution Channels (3). Prerequisite, BUSI 406. Examines the supply chain for retail businesses and management decision making in retailing.

564 New Product Development (3). Prerequisite, BUSI 406. The course explores the design and development of new products. Key topics include creativity, design thinking, and the innovation process.

565 Marketing Research (3). Prerequisite, BUSI 406. An introduction to research methodology with emphasis on the compilation, analysis, and interpretation of data used in the planning and control of marketing operations.

566 Marketing Strategy (3). Prerequisite, BUSI 406. The objective of this course is to understand and practice the strategic decision-making process in a dynamic competitive environment. The course builds on the foundations of marketing, and is based on lectures, cases, and computer simulations.

568 Marketing Analysis and Decision Making (3). Prerequisites, BUSI 406 and 410. Marketing analytics is a systematic approach to harnessing these data to drive effective marketing decision making. We will learn to analyze historical data, market research data, and

competitive information for making strategic marketing decisions. This course will be extensively based on case analysis and hands-on exercises.

570 Financial Reporting A (3). Permission of the department. Required in spring semester for senior undergraduate business majors who are admitted to the Kenan–Flagler Master of Accounting Program. The first of two courses designed to provide students with an in-depth knowledge of the practice and theory of financial accounting.

572 Introduction to Business Taxation (1.5). Prerequisite, BUSI 570. Permission of the department. Required in spring semester for senior B.S.B.A.s who are admitted to the Kenan–Flagler Master of Accounting Program. Provides students with an initial understanding of the basic framework of the United States income tax system as it applies to businesses.

573 Global Financial Statement Analysis (3). Prerequisite, BUSI 407. Provides the tools necessary to understand and analyze information in financial statements prepared under global accounting standards. Includes a study of the costs, risks, and opportunities of United States investors and corporations regarding the convergence of United States accounting standards to global standards.

580 Investments (3). Prerequisite, BUSI 408. A survey of investment principles and practices. Emphasis is given to the problems of security analysis and portfolio management with special attention to the investment problems of the individual investor.

582 Mergers and Acquisitions (3). Prerequisite, BUSI 408. Through lectures, case studies, and guest speakers, this course will cover all aspects of mergers and acquisitions from strategy to post-merger integration with an emphasis on valuation. Related activities such as hostile takeovers, private equity deals, and international acquisitions will also be discussed.

583 Applied Investment Management (3). Prerequisite, BUSI 408. Yearlong course. Students are registered in three credits in fall and spring. Emphasis of this course is on the decisions that must be made by, and/or for, the ultimate investor, and the analytic tools and empirical evidence that can help inform such decisions.

584 Financial Modeling (3). Prerequisite, BUSI 408. Skill development in constructing financial models for analyzing problems with decisions faced by financial professionals. Analyzing historical performance, forecasting free cash flows, estimating discount rates, determining terminal value, identifying other sources of value, and interpreting results in a dynamic setting.

585 Introduction to Real Estate (3). An overview of residential and commercial real estate markets. The course samples many facets of real estate development, market analysis, operation, valuation and financing. Students will be exposed to the variety of skills and jobs that interact within the industry.

586 Introduction to Real Property (3). Prerequisite, BUSI 408. An introduction to the social, political, economic, and investment aspects of real property.

587 Investment Banking (1.5). Permission of the instructor and confirmed offer of investment banking analyst internship or full-time job. This course prepares students for investment banking positions and internships. The focus of the class is on financial modeling, general knowledge of banking, and what it takes to succeed in the industry.

588 Introduction to Derivative Securities and Risk Management (1.5). Prerequisite, BUSI 408. Introduction to derivative securities instruments (options, futures, and swaps) and applications to the management of stock and fixed-income portfolios and other financial and business risks.

589 Fixed Income (1.5). Prerequisite, BUSI 408. The course covers traditional bonds and term structure concepts as well as fixed income derivatives and interest rate modeling.

590 Business Seminar (3). Completion of requisite core course(s) and permission of the instructor required. Selected topics in business administration presented in seminar format with students engaged in individual and team study under the supervision of a member of the faculty.

591 Quantitative Methods for Investments (3). Prerequisite, BUSI 408. Course focus is on portfolio analysis and volatility modeling and the use of statistical distributions and regression, forecasting, and simulation applications in finance.

592 Quantitative Methods for Derivative Securities (3). The goal of the course is that students will be self-starters in derivative security analysis and modeling, and generally familiar with methods for valuing fixed income securities.

594 Hedge Fund Strategies (1.5). Prerequisites, BUSI 408, and 580 or 588. Permission of the instructor. Open to seniors only. Covers the operational details of specific hedge fund strategies such as convertible arbitrage and long/short equity strategies.

598 Alternative Investments (1.5). Prerequisites, BUSI 408, and 580 or 588. Permission of the instructor. Open to seniors only. Exposes students to the benefits, opportunities, and risks of incorporating alternative investments into managed institutional investment portfolios, including pension funds, endowments, and foundations.

600 Risk Management (1.5). Prerequisite, BUSI 408. Permission of the instructor. Open to seniors only. Develops methods for applied analysis of financial and operational risk.

601 Real Estate Finance (1.5). Prerequisite, BUSI 408. This course will focus on the different ways to finance real estate property, and how different financing techniques impact the feasibility and investment benefits for equity investors.

602 Strategic Economics (1.5). Corequisite, BUSI 408. This course focuses on decision making in the presence of strategic interaction. Students will apply game theory to yield insights into business decisions. Topics covered include pricing, entry, product market competition, first-mover advantage, capital budgeting, antitrust law, corporate governance, auctions, and mergers.

603 Real Estate Development (1.5). This course is designed to introduce undergraduate students to the finance and economics of real estate development. The course will survey the physical products of real estate, its financial attributes, and the process by which a program of development is implemented. Includes site visits to local real estate projects.

604 Real Estate Capital Markets (1.5). Prerequisite, BUSI 408. This course focuses on the techniques used to analyze, finance, and structure real estate transactions, and analyzes the role of the capital markets in facilitating development and investment in real estate.

610 Global Environment of Business (3). Issues in operating overseas, including analyses of differences in country settings, legal and economic systems, and governmental policies affecting foreign operations. Studies trade theory, country groupings, and financial issues; managing operations in foreign lands; exporting.

611 International Development (1.5). Examines global poverty from the proposition that nations are poor because their markets do not work. Issues include doing business in an emerging economy and policies to reduce global poverty.

617 Global Marketing (3). Prerequisite, BUSI 406. Examination of the problems involved in marketing products and services across national boundaries. Problem issues include culture, ideology, economics, technical standards, and currency movements.

618 Global Financial Markets (1.5). Prerequisite, BUSI 408. Develops the foundation for financial decisions in a global economic environment. Extends the analytical concepts and tools learned in introductory investment and corporate finance courses to multicountry/multicurrency settings. Covers three major areas: the economics of exchange rates, international money and capital markets, and international corporate finance.

622 Managing Global Operations (3). Prerequisite, BUSI 403. Topics range from expanding overseas to managing a global enterprise, including service, manufacturing, and not-for-profit organizations.

623 Global Venturing (3). Examines developing business models that operate locally but compete globally. Restricted to GLOBE students.

650 Symposium Core Committee (1.5–3). Permission of the instructor. Service on the B.S.B.A. Symposium Core Committee to plan, execute, and evaluate the annual event.

688 Applied Derivatives (1.5). Prerequisites, BUSI 408 and 588. Real world applications of the concepts of no-arbitrage pricing covered in the introductory course will be covered. Other applications of derivatives such as portfolio insurance, the consideration of debt and equity as options, and real options.

691H Honors Research Proposal (3). Permission of the department. Open to senior business administration majors with 3.5 minimum cumulative grade average. Students learn business research techniques and develop individual proposals for business research. Successful proposals may advance to honors thesis research and writing (BUSI 692H).

692H Honors Thesis (3). Prerequisite, BUSI 691H. Permission of the department. Restricted to senior B.S.B.A.s with a 3.5 cumulative grade point average. Original investigation of a topic in business and preparation of a substantive research project under the direction of a faculty advisor. A written essay and an oral presentation are required.

693 Business Internship Project II (3). Permission of the department. This course provides students with a format for reflection while performing a professional internship that enhances their ability to achieve career objectives.

Courses for Graduate Students

BUSI

701 Artistic Entrepreneurship (3). This course is a study in entrepreneurship and the specific challenges faced by artistic entrepreneurs.

702 Introduction to Social Entrepreneurship (1–3). An overview of how entrepreneurship is transforming students' fields and disciplines and how the application of principles of entrepreneurship may be used to advance their professional objectives.

703 Introduction to Commercial Entrepreneurship (1–3). A cross-disciplinary curriculum that brings together the core field with the wide-ranging literature in entrepreneurship to seek new approaches to traditional problems.

704 Entrepreneurship Capstone (1–3). Prerequisites, BUSI 701,702, and 703. Capstone project, business plan, or paper that links the work done in the certificate to the field it is intended to complement.

705 Entrepreneurship Capstone Project (1.5–3). This Graduate Certificate in Entrepreneurship capstone project is self-paced, and overseen by the faculty director of each track (life sciences, public health, and artistic).

801 Ph.D. Independent Study (1–9). Independent study intends to extend a student's learning beyond the classroom or allows a student the opportunity to explore a topic not offered in a traditional format.

808 Applied Research Methods I (3). Addresses fundamentals of empirical social science research. Topics include framing a research question, comparing research designs, instrumentation, reliability, validity, and exploratory and confirmatory factor analysis. Emphasizes application and analysis.

809 Applied Research Methods II (3). Continuation of BUSI 808. Topics include statistical control, categorical variables, interaction, curvilinear and similarity effects, longitudinal analysis, path analysis, structural equation modeling, and publication. Emphasizes application and analysis.

810 Empirical Operations (3). Required preparation, working knowledge of probability, statistics, and regression. The course prepares students to perform academic research, and it will be conducted in a manner that simulates an academic research conference. The course will focus on empirical research approaches used in solving many classical problems in operations management.

830 Theory of Operations Management I (3). Permission of the instructor. Rigorous study of traditional and modern issues, problems, and approaches in operations management.

831 Theory of Operations Management II (3). Prerequisite, BUSI 830. A continuation of BUSI 830.

832 Theory of Operations Management III (3). Prerequisite, BUSI 830. A continuation of BUSI 830.

837 Advanced Topics in Operations Management (3). Permission of the instructor. Intensive study of a specific area in operations management.

838 Seminar in Operations Management (3). Permission of the instructor. Intensive study of a specific area in operations management.

851 Individual Behavior in Organizations (3). Analysis of individual behavior, adjustment and effectiveness. Examination of attitudes, stress, problem solving, decision making, motivation and personality. Applications to management of human resources.

852 Interpersonal and Intergroup Behavior in Business Organizations (1–3). Intensive critical examination of interpersonal and intergroup behavior, including decision processes, communication, conflict and conflict resolution in large organizations.

853 Macro Organizational Behavior (3). Graduate standing in business administration required. Intensive study of theory and research in organizational structure, coordinating and control mechanisms, design parameters, and environments.

854 Organizational Design and Development (3). The development of understanding and skills in changing and evolving organizational design, interpersonal relationships, and people to achieve organizational goals.

856 Seminar in Organizational Behavior (3). Permission of the instructor. Intensive study of important current theory and research in organizational behavior.

857 Seminar in Human Resource Management (3). Review the research literature on how firms are made more effective through their people. Coverage includes topics like recruitment, hiring, compensation, socialization, culture, and performance management.

860 Seminar in Marketing I (3). Permission of the instructor. Overview of current paradigms and research in marketing. Topics include philosophy of science, differing views of what marketing is, strengths and weaknesses of various research approaches, and career socialization issues.

861 Seminar in Marketing II (3). Prerequisite, BUSI 860. Intensive study of the empirical and analytical literature involving problems in pricing, product development and management, advertising and promotion, distribution, and strategy.

862 Marketing Models (3). This class covers a range of econometric principles and models of relevance to marketing. The emphasis will be on model formulation and estimation.

865 Seminar in Current Marketing Topics (1). Permission of the instructor. Advanced research in marketing. A seminar to discuss current research of doctoral candidates, faculty, and invited guests.

867 Issues in the Design and Analysis of Research in Marketing (3). Graduate standing in business administration required. A review of major issues in marketing, including philosophy of science, measurement, and experimental and quasi-experimental design.

868 Seminar in Marketing Research Methodology (3). Permission of the instructor. An introduction to multivariate data analysis methods including factor analysis, cluster analysis, logic, discriminant analysis and multidimensional scaling.

876 Seminar in Research in Accounting (1). Permission of the instructor. An informal seminar to discuss current research in accounting.

880 Financial Economics (3). Permission of the instructor. Introduction to the theories of asset pricing.

881 Corporate Finance (1–6). Prerequisite, BUSI 880. Permission of the instructor. Introduction to corporate finance theory.

882 Empirical Corporate Finance (3). Permission of the instructor. An introduction to the empirical corporate finance literature.

885 Seminar in Research in Finance (1.5). Permission of the instructor. Advanced research in business finance and investment. An informal seminar to discuss current research of doctoral candidates, faculty, and others.

886 Introduction to Empirical Finance (3). This course provides an introduction to the quantitative methods used in empirical asset pricing. Model specification and estimation issues are discussed at length. The course emphasizes both theoretical and practical research.

887 Quantitative Methods in Finance (3). Permission of the instructor. Review of information generating and optimizing models and their applicability to decision making in finance.

888 Seminar in Financial Markets (3). Permission of the instructor. Advanced methods in finance.

890 Strategic Management Overview (3). A seminar to provide a broad and current understanding of strategic management. Exposure to the entire field is emphasized.

891 Strategic Formulation (3). Prerequisite, BUSI 890. This seminar emphasizes both process and content issues to provide students with an in-depth understanding of strategy formulation topics.

892 Strategy Implementation (3). Prerequisites, BUSI 890 and 891. This seminar focuses on strategy implementation, with particular emphasis devoted to the process, systems, and structures required for effective implementation.

899 Seminar (1–6). Permission of the instructor. Individual research in a special field under direction of a member of the department.

899C Seminar (1–21). Individual research in a special field under direction of a member of the department.

992 Master's Thesis Substitute (3).

994 Doctoral Dissertation (3–21).

Department of Cell Biology and Physiology

www.med.unc.edu/cellbiophysio
PATRICK BRENNWALD, *Interim Co-Chair*
CAROL A. OTEY, *Interim Co-Chair*

The Department of Cell Biology and Physiology offers two Ph.D. degree programs, one in Cell and Developmental Biology and one in Cell and Molecular Physiology.

Cell and Developmental Biology Graduate Program

Professors

Patrick Brennwald (5) Cell Polarity, Tumor Suppressor, Vesicle Transport, Exocytosis, Rho GTPases
Keith W. T. Burridge (41) Cell Migration, Cell-Matrix and Cell-Cell Adhesion, Rho Family GTPases, Leukocyte Transendothelial Migration
Johnny L. Carson (6) Developmental Biology, Pathogenic Mechanisms Involving Mammalian Airways
M. Joseph Costello (50) Membrane Biophysics, Intercellular Junctions, Active Transport, Membrane Fusion, Electron Microscopy
Douglas M. Cyr (6) Cystic Fibrosis, Organelle Biogenesis, Protein Folding, Molecular Chaperones, Ubiquitin-Proteasome Pathway
Mohanish P. Deshmukh (3) Neuronal Apoptosis, Molecular Mechanism of Programmed Cell Death, Regulation of Caspase Activation
Kenneth A. Jacobson (39) Membrane Biology and Biophysics, Cell Migration, Video Image Analysis
Royce L. Montgomery (11) Invertebral Disc Lesions and Back Pain
Deborah A. O'Brien (51) Mammalian Spermatogenesis and Fertilization, Regulation of Sperm Motility, Genetics of Male Infertility
Michael G. O'Rand (38) Cell Biology, Immunology, Reproductive Biology
W. Cam Patterson (10) Cardiovascular
Peter Petrusz (13) Neurobiology, Reproductive Biology
Aldo Rustioni (15) Glutamate Receptors Expression and Regulation, Axonal Regeneration and the Cytoskeleton, Somatosensory Mechanisms
Kathleen K. Sulik (40) Developmental Toxicology, Embryology
Ellen R. Weiss (9) Regulatory Domains of G-Protein Coupled Receptors, Molecular Biology of Cellular Signaling Pathways

Associate Professors

James Bear (14) Cell Motility, Actin Cytoskeleton, Coronins, Live-Cell Microscopy
Cornelius J. Beckers (12) Signal Transduction, Cell Motility, Cytoskeleton, Infectious Diseases, Cell Biology
Jay E. Brenman (10) Drosophila and Mouse Genetics, Metabolic

Signaling, Type 2 Diabetes Therapeutics
Scott Hammond (008) Biochemical Mechanism for RNA Interference

Assistant Professors
Kurt Gilliland (16) Intercellular Junctions, Human Cataract, Electron/Confocal Microscopy
Stephanie Gupton, Coordination of Actin Dynamics and Membrane Trafficking during Development and Cancer Metastasis, Live Cell Imaging, Cell Adhesion
Edward Kernick, Human Anatomy, Neuroanatomy, Central Nervous System
Ben Major, Proteomic Analysis of Signal Transduction and Cell Biology, Oxidative Stress, Functional Genomics, Mass Spectrometry
John Reader, Protein Translation Apparatus, Aminoacyl-tRNA Synthetases, tRNAs

Research Professors
Richard Weinberg (20) Quantitative Immunocytochemistry, Organization of Excitatory Synapses, Calcium Signaling in Dendritic Spines

Research Associate Professors
Shoji Osawa (16) Regulation of Signal Transduction Pathways by G Proteins
Julia Shackelford

Research Assistant Professors
James Alb
Oleg Alekseev
Elizabeth Benson
Alain Burette
Jr-Gang Cheng
Polina Danshina
Martina Gentzch
Gerald W. Gordon
Maryna Kapustina
Scott Parnell
Erika Wittchen

Instructor
Linda Levitch

Professors Emeriti
Noelle A. Granger
Charles R. Hackenbrock
O'Dell W. Henson Jr.
William E. Koch
Jean M. Lauder

Program of Study
The Department of Cell Biology and Physiology of the School of Medicine offers a program of study leading to the doctor of philosophy degree in Cell and Developmental Biology. The primary purpose of the graduate program is to train students to become biomedical scientists. The program provides training for students whose research/teaching career objectives are faculty positions in medical school basic sciences departments. However, the flexibility of the program also provides for the training of students who seek careers in basic science as well as clinical science departments of medical schools, in other professional schools such as dental schools, in liberal arts academic departments such as biology, or in state, federal, private, and industrial research laboratories. The program for the Ph.D. normally takes five to six years to complete. Persons interested in a combined M.D./Ph.D. program must be accepted into the School of Medicine and the departmental graduate program, whereupon the combined studies are scheduled in accordance with individual requirements.

Some of the department's areas of specialization are cell biology, developmental biology, neurobiology, reproductive biology, membrane biology, molecular biology, cell signaling, and parasitology. Ph.D. students take graduate level courses in their first year as well as conduct laboratory rotations. Students who join the departmental graduate program at the end of year one are examined for advancement to candidacy. Ph.D. candidacy is followed by a dissertation based on original research is conducted under the supervision of a faculty advisor. Additional information is available on the departmental Web site (www.cellbio.med.unc.edu/grad/depttest/welcome.htm).

Admission Requirements
Admission to the departmental graduate program is via the unified Biological and Biomedical Sciences Program (BBSP) at UNC. A B.A. or B.S. degree is required for admission. Applicants are expected to have a strong background in the biological sciences, chemistry, physics, and mathematics. Details of the application process are available at the BBSP website (www.med.unc.edu/bbsp) and The Graduate School website (gradschool.unc.edu/admissions/). Briefly, the application should include transcripts, Graduate Record Examination (GRE) scores, three letters of recommendation, and a personal statement outlining career goals.

Research Facilities
The department occupies 40,000 square feet of research and office space (in addition to teaching space), primarily in Taylor Hall and the Biomolecular Research Building in the School of Medicine. The department and its research laboratories are a biotechnological resource available for qualified scientists in the University, state, and region. The laboratories house instrumentation for transmission, scanning, and cryo electron microscopy, as well as equipment to prepare biological specimens for these techniques. The Electron Microscope Facility contains a multipurpose JOEL 820 scanning electron microscope and a high-resolution FEI-Philips Tecnai 12 transmission electron microscope. Ancillary facilities include fully equipped darkrooms and equipment for ultramicrotomy, critical point drying, rotary evaporation, sputter coating, and a state-of-the-art, high-resolution Reichert freeze fracture system. A world class facility is available for optical imaging of all kinds, including digitized video microscopy, confocal microscopy, and fluorescence lifetime imaging microscopy, two-photon confocal microscopy, nanovid microscopy, and fluorescence recovery after photobleaching.

Assistantships and Other Student Aid
Students are supported by a stipend of $27,500 annually plus tuition, fees, and medical insurance.

Courses for Graduate and Advanced Undergraduate Students
CBIO

423 Developmental Toxicology and Teratology (TOXC 423) (3). Emphasizes topics of current research interest relative to the genesis of environmentally caused and genetically based birth defects. One two-hour session per week (evening).

607 Gross Anatomy (2–4). Permission of the instructor. Primarily for graduate students. Enrollment by availability of space and material.

627 Regional Anatomy (3). Permission of the instructor. For students of oral surgery, surgical residents, and graduate students.

643 Cell Structure, Function, and Growth Control I (BIOC 643, MCRO 643, PHCO 643, PHYI 643) (3). Required preparation, undergraduate cell biology or biochemistry or permission of the instructor. Comprehensive introduction to cell structure, function, and transformation.

644 Cell Structure, Function, and Growth Control II (BIOC 644, MCRO 644, PHCO 644, PHYI 644) (3). Required preparation, undergraduate cell biology or biochemistry or permission of the instructor. Comprehensive introduction to cell structure, function, and transformation.

Courses for Graduate Students

CBIO

741 Introduction to Human Anatomy (3). A general course for persons preparing for careers as dental hygienists. Two lectures and two laboratory hours a week.

750 Applied Biostatistics (PATH 750, PHCO 750) (1). See course description for PHCO 750.

791 Gross Anatomy for Physical Therapists (4). Prerequisites, BIOL 276 and 276L. Permission of the instructor. Fundamental principles and concepts of human gross anatomy for physical therapists taught by lectures and cadaver dissection. Emphasis on functional anatomy. Three lecture hours and six laboratory hours a week.

793 Functional Neuroanatomy (3). Prerequisites, CBIO 607 and 791. Permission of the instructor. Study of basic structure of the brain and spinal cord, including both lecture and laboratory. Primarily for physical therapy students. Four hours a week.

805 Gross Anatomy (4). Systematic approach to gross anatomy emphasizing a regional approach stressing head and neck anatomy. Primarily for dental students.

890 Advanced Topics in Cell and Developmental Biology (1–21). Permission of the instructor. Seminar/discussion course dealing with advanced topics in modern cell biology and/or developmental biology. Based mainly on discussion of current literature.

891A Contemporary Problems (3). Permission of the instructor. Analysis of grant proposals dealing with advanced topics in modern cell biology and/or developmental biology.

892B Contemporary Problems (3). Permission of the instructor. Analysis of grant proposals dealing with advanced topics in modern cell biology and/or developmental biology.

893 Cell Biology I (4). Permission of the instructor. Graduate students only. Discussion based course that covers key elements of cell, molecular, and developmental biology, and genetics. Students present and discuss breakthrough primary research papers under the direction of faculty members across the department. Minimal instructor lecturing is included.

894 Cell Biology II (4). Permission of the instructor. Graduate students only. Continuation of CBIO 893. Further topics are covered including cell structure, developmental biology, and cell cycle.

899 Electron Microscopy Principles and Applications (3). Permission of the instructor. Lectures on scanning, transmission, high voltage, freeze fracture, analytical and immunoelectron microscopy. Laboratory training in preparation of biological specimens, operation of scanning and transmission microscopes, and darkroom procedures. Three lecture hours and twelve laboratory hours per week.

910 Research (2–21). Credit to be arranged in individual cases.

915 Research Laboratory Apprenticeship (2). Enrollment in the cell biology and anatomy graduate program required. A course for first- and second-year graduate students in cell biology and anatomy, consisting of a research project of limited scope pursued under the supervision of a faculty member.

993 Master's Thesis (3).

994 Doctoral Dissertation (3).

Cell and Molecular Physiology Graduate Program

Professors

Eva Anton (76) Molecular Analysis of Neuronal Migration and Development of the Cerebral Cortex

William J. Arendshorst (25) Cell and Integrative Biology of Vascular and Nephron Function, Interactions of Endothelial and Vascular Smooth Muscle Cells, Receptors and Signal Transduction, Regulation of Cytosolic Calcium Concentration, Pathogenic Mechanisms of Hypertension

Richard E. Cheney (69) Motor Proteins, Cytoskeleton, Neuronal Cell Biology

James E. Faber (49) Vascular Physiology, Signal Transduction of Vascular Smooth Muscle and Fibroblast Cells, Atherosclerosis, Adrenergic Receptors

Michael F. Goy (60) Biochemistry and Physiology of Excitable Cells, Second Messenger Mechanisms in Signal Transduction, Epithelial Biology, Natriuretic Peptides

Susan J. Henning (98), Intestinal Stem Cells—Biological Properties and Potential for Therapeutic Application

Pauline K. Lund (50) Growth Factors, Cytokines, Gastrointestinal Growth, Molecular Biology, Signal Transduction, Aging and Memory Loss

Paul Manis (81) Cellular Mechanisms of Auditory Information Processing, Synaptic Plasticity, Ion Channels

Gerhard W. D. Meissner (26) Mechanisms in Excitation-Contraction Coupling in Muscle, Ion Channels

Roy C. Orlando (99) Ion Transport and Barrier Function as Mucosal Defense in Esophageal and Barrett's Epithelium; Mechanisms by Which Acid/Pepsin Injures Squamous Epithelium Leading to Esophagitis and Alters Barrett's Epithelium, Promoting Dysplasia and Malignancy

Carol A. Otey (72) Mechanisms of Cell Adhesion, Cell Migration and Cytoskeletal Organization, and Neuronal Cell Biology

Daniel N. Pomp (89) Genetics of Growth, Obesity, and Body Weight Regulation in Animal Models

Lola M. Reid (67) Hepatic Stem Cell and Maturational Lineage Biology, Synergies between Extracellular Matrix and Hormones in the Regulation of Gene Expression

Aldo Rustioni (30) Somatosensory System; Connections, Neurotransmitters, and Interneuronal Integration

Robert Sealock (32) Cell Biology and Biochemistry of the Neuromuscular Junction, Proteins Involved in Duchenne Muscular Dystrophy

William Snider (74) Developmental Regulation by Neuronal Growth Factors

Barry L. Whitsel (23) Neuronal Mechanisms of Somatic Sensation

Associate Professors

Kathleen Caron (80) Gene Targeted Models of Human Disease, Reproductive Biology, Cardiovascular Biology, G-Protein Coupled Receptor Signaling

Benjamin Philpot (82) Mechanisms of Experience-Dependent Synaptic Plasticity in Visual Cortex

Scott Randell (75) Airway Epithelial Cell Biology-Stem Cells, Host Defense and Response to Injury

Nobuyuki Takahashi (84) Mechanism of Hypertension, Diabetic Complications, and Obesity Using Genetically Engineered Animals

Robert Tarran (87) Regulation of Airway Epithelial Ion and Mucus Transport

Eleni Tzima (88) Mechanisms of Vascular Endothelial Cell Signaling and Angiogenesis in Response to Hemodynamic Stimuli
Mark J. Zylka (90) Molecules and Mechanisms for Pain

Assistant Professors
Andrew C. Dudley (103) Tumor Microenvironment, Tumor Angiogenesis, Vascular Stem Cells
Flavio Frohlich (106) Cortical Neurophysiology, Computational Neuroscience, Brain Stimulation, Epilepsy
Spencer Smith (105) Neuroscience and Neuroengineering

Research Professor
C. William Davis (51) Airway Epithelial Cell Physiology

Research Associate Professor
Nicholas G. Moss (94) Biological Signal Transduction

Research Assistant Professors
Scott Magness (104) Stem Cells/Bioengineered Tissue Scaffolds
Andrea Azcárate Peril (102) Defining Fundamental Mechanisms of Probiosis
Sarah Street (107) Molecules and Mechanisms for Pain
Hua Zhang (108) Collateral Vascular Biology: Effects of Aging on Collaterals, Assessing Collateral Endothelial Phenotype, Role of Primary Cilia

Professors Emeriti
Robert G. Faust
Paul B. Farel
Enid R. Kafer
Alan Light
David L. McIlwain
Edward R. Perl
Ann E. Stuart
Lloyd R. Yonce

Physiology is the study of the biological, chemical, and physical processes that underlie the functions of living cells and organs. Research in physiology uses tools from chemistry, mathematics, molecular biology, and physics to identify regulatory mechanisms that operate at levels of complexity ranging from the subcellular to the organismic.

Curriculum
The Department of Cell Biology and Physiology offers a program of study in Cell and Molecular Physiology leading to the Ph.D. or M.D./Ph.D. degree. The M.S. degree is offered only under special circumstances. Research opportunities cover molecular, cellular, and systems physiology with an emphasis on mechanisms of disease. Faculty specialties include neurophysiology, endocrinology, and gastrointestinal, cardiovascular, and renal physiology. The Ph.D. program typically requires four to five years of study. The first two years of graduate study include core and elective course work, laboratory rotations, seminar courses, and research. The curriculum is individualized to develop the analytical, research, and communication skills necessary to carry out successful dissertation research. All students typically take the following courses: a foundational course in physiology (PHYI 702, 703), a presentation skills class (PHYI 705, 706), and electives in year two. Requirements may be waived for students with previous graduate-level course work.

Journal clubs, a class in oral and written communication, the seminar program, and a research-in-progress series provide mechanisms for students to develop research and analytical skills. Teaching experience is available in preprofessional courses, graduate school, and medical school courses. The qualifying examination is scheduled during the second year. Students submit the dissertation proposal in year three and complete research and writing in years four and five.

Research Facilities
The department is located in the Medical Biomolecular Research Building and the adjoining Neuroscience Research Building. Faculty laboratories are equipped for research and training in all methods of biological research, including biophysics, molecular biology, biochemistry, immunochemistry, and whole-animal studies. UNC–Chapel Hill has outstanding centers for the development and breeding of transgenic and gene-knockout mice for molecular biology/recombinant DNA-related research, cardiovascular biology, and cystic fibrosis and pulmonary medicine as well as resources such as the microbiome core and the zebrafish acquaculture core facilities. Researchers in the department routinely collaborate with members of other School of Medicine departments and centers, with laboratories at Duke University, and with researchers at NIEHS in nearby Research Triangle Park.

Financial Aid
All students in good academic standing receive a stipend, tuition scholarship, and health insurance. Many students compete successfully for individual predoctoral fellowships from the AHA, NIH, and NSF, and for competitive awards from The Graduate School. Interdisciplinary training grants in vascular biology, nutrition, cell and molecular biology, and integrative medicine support students across the campus. In addition, the department and individual labs provide funds for students to attend national and international research meetings and specialty courses on- and off-campus.

Placement of Graduates
Recent graduates are working as postdoctoral fellows and faculty members at colleges and universities, as bench scientists in the biotechnology and pharmaceutical sectors, and as scientific advisers in both clinical and basic research settings.

Requirements for Admission
Applications for all 12 School of Medicine basic science graduate programs are processed through the Biomedical and Biological Sciences Program (BBSP), and students spend their first year in that program before transferring to a degree program. Majors in cell and molecular physiology typically have an undergraduate record that includes course work in organic chemistry and biochemistry, two semesters of calculus and physics, and appropriate course work in the biological sciences, typically including zoology, genetics, cell biology, and molecular biology. All applicants are required to submit scores on the GRE aptitude test, a written statement, transcripts, and a minimum of three letters of recommendation. Application details can be found on the BBSP website at www.med.unc.edu/bbsp and The Graduate School website at gradschool.unc.edu/admissions.

Courses for Graduate and Advanced Undergraduate Students
PHYI

643 Cell Structure, Function, and Growth Control I (BIOC 643, CBIO 643, MCRO 643, PHCO 643) (3). See CBIO 643 for description.

644 Cell Structure, Function, and Growth Control II (BIOC 644, CBIO 644, MCRO 644, PHCO 644) (3). See CBIO 644 for description.

Courses for Graduate Students

PHYI

701 Physiology Laboratory Rotation (1–6). Permission of the director of graduate studies. Rotations in faculty laboratories introduce methods and techniques in physiology. Individual projects provide an opportunity to explore potential dissertation topics.

702 Experimental Physiology of Human Health and Disease (4). Principles of cell, organ, and systems physiology and pathophysiology required to identify important areas of biomedical research, using model systems, common disease examples (schizophrenia, hypertension, diabetes), and current research opportunities.

703 Experimental Physiology of Human Health and Disease (4). Permission of the instructor. Molecular and cellular basis of organ system function; integration of systems to maintain the normal state. Understanding of normal physiology is amplified by examples from human disease and mouse models. Principles of cell, organ, and integrative physiology and how these principles apply to translational research.

705 Communicating Scientific Results (1). Practice in oral and written communication evaluated by peers and faculty. Includes delivery of coached presentations on topics in physiology and preparation of writing assignments typically encountered in scientific life.

706 Communicating Scientific Results (1). Practice in oral and written communication evaluated by peers and faculty. Includes delivery of coached presentations on topics in physiology and preparation of writing assignments typically encountered in scientific life.

710 Medical Neurobiology (NBIO 710) (1–3). Permission of the instructor. A special section (for physiology graduate students only) of the neurobiology course for medical students. Structural and functional organization is analyzed at the level of the cell membrane, the neuron, and integrated neuronal systems.

712A Special Topics in Physiology (NBIO 891) (1–5). Permission of the instructor. Individually arranged in-depth programs of study of selected topics such as membrane function, transport physiology, renal physiology, etc.

712B Special Topics in Physiology (NBIO 892) (1–5). See NBIO 892 for description.

712C Organ System Physiology in Health and Disease: Respiratory Physiology (1). The course begins with the basic physiology of respiration and gas transport, then applies that understanding to in-depth discussions of common respiratory diseases. Format is lecture plus journal club.

714 Physiology (DENT 114) (4). This basic physiology course introduces students to the functions of and interactions between the various systems of the body. Particular emphasis is placed on those concepts of specific relevance for students and practitioners of dentistry. The course also provides students with a solid physiological background for subsequent courses within the dentistry curriculum.

720 Human Physiology (1–5). Permission of the instructor. A special section (for physiology graduate students only) of the course for medical students. The course provides a general consideration of cell function and systemic physiology. Six lecture hours per week.

721 Stem Cells and Maturational Lineage Biology (4). Prerequisites, BIOL 111; CHEM 101, 102, and 241. All tissues are organized with stem cell compartments giving rise to maturational cell lines with lineage-dependent phenotypic characteristics. Investigators discuss research in stem cell biology and regenerative medicine.

722 Cellular and Molecular Neurobiology I (PHCO 722) (2–6). See PHCO 722 for description.

722A Cellular and Molecular Neurobiology: Introduction and Electrical Signaling (BIOC 722A, NBIO 722A, PHCO 722A) (2). See NBIO 722A for description.

722B Cellular and Molecular Neurobiology: Postsynaptic Mechanisms-Receptors (BIOC 722B, NBIO 722B, PHCO 722B) (2). See NBIO 722B for description.

722C Cellular and Molecular Neurobiology: Synaptic Mechanisms & Intracellular Signaling (BIOC 722C, NBIO 722C, PHCO 722C) (2). See NBIO 722C for description.

723 Cellular and Molecular Neurobiology II (PHCO 723) (2–6). Lecture/discussion course on the physiology, pharmacology, biochemistry, and molecular biology of the nervous system. Topics include function and structure of ion channels, neurotransmitter biosynthesis and release mechanisms, neurotransmitter receptors and intracellular signaling pathways.

723A Cellular and Molecular Neurobiology: Development of the Nervous System (BIOC 723A, NBIO 723A, PHCO 723A) (2). See NBIO 723A for description.

723B Cellular and Molecular Neurobiology: Anatomy and Function of Sensory and Motor Systems (BIOC 723B, NBIO 723B, PHCO 723B) (2). See NBIO 723B for description.

724 Developmental Neurobiology (NBIO 724) (3). Prerequisite, NBIO 722. Permission of the instructor. A survey of nervous system development emphasizing detailed analysis of selected research topics such as neuronal induction, neural crest development, neuronal differentiation, synapse formation, neurotrophic factors, glial development, and the effects of experience.

751 Seminar in Physiology (1). Permission of the director of graduate studies.

752 Seminar in Physiology (1). Permission of the director of graduate studies.

800 Teaching Physiology (1–3). Permission of the instructor. Introduces the principles of teaching physiology. Provides students the opportunity to plan instruction and to teach with increasing degrees of responsibility. The teaching internship is under the direct supervision of a faculty mentor

832 Respiratory Physiology: Defense Mechanisms in the Airways (1–4). Prerequisite, PHYI 703. The integrated defense mechanisms that protect the airways and lung from inhaled allergens, irritants, particulates, and pathogens. Topics include transepithelial ion transport, mucociliary clearance, and innate immune responses.

833 Gastrointestinal Physiology: Growth, Cancer, Inflammation, and the Microbiome (1–3). Prerequisite, PHYI 703. Roles of growth factor and cytokine signaling, and the intestinal microbiome in normal intestinal growth, inflammation, or colon cancer. Molecular, cellular, genomic, model organisms and translational medicine approaches.

834 Pain and Somatic Sensation (NBIO 824) (1–21). Prerequisite, PHYI 720. Permission of the instructor. Consideration of peripheral and central neural mechanisms for somatic sensation with particular emphasis on pain.

835 CNS Organization (1). Primary literature explores how the nervous system is organized, integrates information, and adapts.

836 Excitable Membranes, Receptors, Channels and Synapses (1–4). Basic neurophysiology of excitable membranes, channels, and synapse as the basis of neuronal communication.

839 Endothelial Cells in Health and Disease (1). Prerequisite, PHYI 703. Literature-based survey of endothelial cell biology including development, angiogenesis, environmental influences, and disease models.

840 Renal/Cardiovascular Systems (1–4). Prerequisite, PHYI 703. Permission of the instructor. Blood pressure control in normal, diseased, and genetically modified animals. Physiology and pathophysiology of the renal and cardiovascular systems.

850 Seminar in Neurobiology (BIOL 850, NBIO 850, PHCO 850) (3). See NBIO 850 for description.

901 Research in Physiology (3–10).

902 Research in Physiology (3–10).

903 Research in Physiology (3–10).

951 Research in Neurobiology (BIOL 951, NBIO 951, PHCO 951) (3–12). See NBIO 951 for description.

993 Master's Thesis (3–21).

994 Doctoral Dissertation (3–21).

Department of Chemistry

www.chem.unc.edu
VALERIE S. ASHBY, *Chair*

Professors

Nancy L. Allbritton (50) Analytical Chemistry
Valerie S. Ashby (61) Polymer and Materials Chemistry
Max L. Berkowitz (30) Physical Chemistry
Maurice S. Brookhart (2) Organic and Organometallic Chemistry
Michael T. Crimmins (39) Organic Chemistry
Joseph M. DeSimone (49) Synthetic Polymer Chemistry
Dorothy A. Erie (11) Physical and Biological Chemistry
Malcolm D. E. Forbes (48) Organic and Physical Chemistry
Michel R. Gagné (22) Inorganic, Organic and Polymer Chemistry
Gary L. Glish (40) Analytical Chemistry
Jeffrey S. Johnson (58) Organic Chemistry
James W. Jorgenson (36) Analytical Chemistry
Wenbin Lin (60) Inorganic Chemistry
Thomas J. Meyer (23) Inorganic Chemistry
Royce W. Murray (25) Analytical Chemistry
John M. Papanikolas (52) Physical Chemistry
Gary J. Pielak (46) Biological Chemistry
J. Michael Ramsey (62) Analytical Chemistry
Matthew Redinbo (55) Biological Chemistry
Michael Rubinstein (43) Polymer Physical Chemistry
Edward T. Samulski (44) Polymer Physical Chemistry
Mark H. Schoenfisch (57) Analytical and Materials Chemistry
Sergei S. Sheyko (59) Polymer and Materials Chemistry
Linda L. Spremulli (28) Biological Chemistry
Joseph L. Templeton (31) Inorganic Chemistry
Nancy L. Thompson (41) Physical and Biological Chemistry
Marcey Waters (56) Organic Chemistry
Kevin M. Weeks (53) Biological Chemistry
R. Mark Wightman (47) Analytical and Neurochemistry
Richard V. Wolfenden (65) Biological Chemistry

Associate Professors

Andrew M. Moran (6) Physical Chemistry
Cynthia K. Schauer (45) Inorganic Chemistry
Wei You (42) Polymer and Materials Chemistry

Assistant Professors

Erik J. Alexanian (77) Organic Chemistry
Todd L. Austell (70) Chemistry Education, Academic Advising, Lab Curriculum Development
Jillian Dempsey (3) Inorganic Chemistry
Christopher J. Fecko (5) Physical Chemistry
Brian P. Hogan (72), Chemistry Education, Academic Advising, Lab Curriculum Development
Leslie Hicks () Analytical Chemistry
Yosuke Kanai (81) Physical Chemistry
Jennifer Krumper, Chemistry Education
Matthew Lockett () Analytical Chemistry
Simon Meek (79) Organic Chemistry
Alexander J. Miller (4) Inorganic Chemistry
David A. Nicewicz (78) Organic Chemistry
Domenic Tiani (71) Chemistry Education, Academic Advising, Lab Curriculum Development

Professors Emeriti

Tomas Baer
Maurice M. Bursey
James L. Coke
Richard G. Hiskey
Eugene A. Irene
Richard C. Jarnagin
Donald C. Jicha
Charles S. Johnson Jr.
Paul J. Kropp
Robert G. Parr
Lee G. Pedersen

The Department of Chemistry offers graduate programs leading to the degrees of master of arts, master of science (non-thesis), and doctor of philosophy in the fields of analytical, biological, inorganic, organic, physical, and polymer and materials chemistry. Reinforcing the broad nature of our graduate program, we have close interactions with various departments including Physics, Biochemistry, Biological and Biomedical Sciences, and Environmental Science and Engineering.

Doctor of Philosophy

The Ph.D. degree in chemistry is a research degree and students normally begin research during the first year in graduate school. As soon as the entering student has selected a research advisor, an advisory committee is established to develop an appropriate course of study designed to meet individual needs. The Ph.D. degree consists of completion of a suitable program of study, a preliminary doctoral oral examination, a written comprehensive examination that is satisfied by cumulative examinations, an original research project culminating in a dissertation, and a final oral examination.

Master of Arts

The Master of Arts degree requires a minimum of 30 semester hours of credit. The student's advisory committee determines courses. A written comprehensive examination (which may be satisfied by cumulative examinations), a thesis, and a final oral examination are also required. Admission to the Ph.D. program after completion of the M.A. degree in the department requires approval by the Chemistry Graduate Studies Committee.

Master of Science (non-thesis)

The Master of Science (non-thesis) degree requires a minimum of thirty semester hours. The candidate must earn at least 24 hours of graduate credit in chemistry and allied subjects, which may include graduate seminars numbered 700 or higher but may not include CHEM 921, 931, 941, 951, 961, and 981 (referred to collectively as "9X1"). As a substitute for the thesis, the candidate must earn a minimum of three hours of CHEM 992 (master's non-thesis option). The student's advisory committee determines the student's program of study. A written report submitted to the student's research director describing work done while registered for CHEM 992 and a written examination (which may be satisfied by cumulative examinations) are also required. Admission to the Ph.D. program after completing the M.S. degree in the department requires approval by the Chemistry Graduate Studies Committee.

Research Interests

Analytical. Development of instrumentation for ultra-high pressure capillary liquid chromatography, capillary electrophoresis, and combined two-dimensional separations. Applications include proteomics and measurement of peptide hormones in biological tissues. Mass spectrometry of biological, environmental, organic, and polymeric compounds; tandem MS, ion activation, ion molecule reactions; instrument development. Electrochemistry: New methods for study of biological media, neurotransmitters small spaces, redox solids, chemically modified surfaces, nanoparticle chemistry, and quantum size effects including the analytical chemistry of nanoparticles. Chemical microsystems: Microfabricated fluidics technologies (i.e., lab-on-a-chip devices) to address biological measurement problems such as protein expression, cell signaling, and clinical diagnostics. Miniaturized mass spectrometers for environmental monitoring. Nanoscale fluidics devices for single molecule DNA sequencing and chemical sensing. Polymeric membranes to improve the analytical performance of in vivo sensors and enable accurate measurement of analytes in challenging milieu.

Biological. Structure-function relationships of complex biochemical processes; the molecular basis of disease; chemical biology; biophysics; mechanism of protein biosynthesis; metabolic regulation; gene organization and regulation of gene expression; biomolecular structure; protein folding; protein and RNA chemistry under physiologically relevant conditions, in-cell NMR; thermodynamics of protein-protein interactions; characterization of protein-protein and protein-DNA complexes by atomic force microscopy and single molecule fluorescence; in vitro and in vivo studies of DNA repair; RNA structure in vivo, RNA and viral genomics, transcriptome structure, assembly of biomedically important RNA-protein complexes; chemical synthesis of peptides and proteins; protein engineering through chemical synthesis and directed evolution; unnatural amino acid mutagenesis; molecular modeling of biomolecules; cell surface biophysics; fluorescence microscopy and spectroscopy; small molecule and protein microarray development; live cell fluorescence microscopy; genomics-driven natural product discovery; natural product biosynthesis and pathway engineering and design; synthetic biology; antibiotic mechanism of action; bioinformatics; metabolomics; small molecules involved in inter- and intra- species signaling.

Inorganic. Physical inorganic chemistry: Electronic structure of transition metal complexes; photochemistry and electrochemistry of metal complexes; use of coordination complexes and inorganic materials for solar energy harvesting and conversion; molecular orbital theory, nuclear magnetic resonance and electron paramagnetic resonance spectroscopies; X-ray crystallography; infrared and Raman spectroscopies. Chemistry of transition metal complexes: Synthesis of transition metal compounds, organometallic chemistry including metal-catalyzed organic reactions; reactions of coordinated ligands; kinetics and mechanisms of inorganic reactions; metal cluster chemistry; chiral supramolecular chemistry. Materials chemistry: Molecular precursors to materials; solid state lattice design; metal-ion containing thin films; metal-polymer complexes; functional coordination polymers and metal-organic frameworks; chiral porous solids. Bioinorganic and medicinal inorganic chemistry: Nanomaterials for biomedical imaging and anticancer drug delivery; reactivity of oxidized metal complexes with nucleic acids, photo-induced DNA cleavage, synthesis and characterization of model complexes for metalloenzymes.

Organic. Synthesis and biological reactions of natural products; peptide synthesis; protein engineering; structure-function studies on polypeptides and proteins; mechanistic and synthetic studies in organometallic chemistry; catalysis using organometallic complexes; nuclear magnetic resonance; kinetics; organosulfur and organophosphorus chemistry; surface effects in chemical behavior; chemistry of reactive intermediates including carbocations, carbanions, carbenes radical ions and radical pairs; photochemistry; light-driven organic catalysis; fluorescent sensors; enzyme inhibitors; new synthetic methods including asymmetric catalysis; stereochemistry and conformational analysis; design and synthesis of models for metalloenzymes; epr investigations of electronic couplings in high-spin organic molecules; spectroscopic studies of free radicals; synthesis and characterization of well-defined polymeric materials; synthesis of materials for use in microelectronics; homogeneous and heterogeneous polymerizations in supercritical fluids; synthesis of engineering polymers; molecular recognition.

Physical Chemistry. Ultrafast spectroscopy: Femtosecond laser techniques to study photochemistry (e.g., energy transfer, proton coupled electron transfer) in systems including carbon nanotubes, light harvesting proteins, and several materials relevant to the production of solar fuels. Nonlinear Optics: Lasers pulses with widely tunable bandwidths and frequencies with new nonlinear optical methods. Molecular interactions and dynamics in cells using optical Kerr effect and phase contrast methods. Spatial and temporal resolution of energy and charge transport within individual metal oxide nanoparticles using pump-probe microscopies. Biophysics: Movements and interactions of regulatory proteins in cell nuclei using optical microscopies (e.g., FRET, FCS). Coherent quantum effects in photosynthesis using new laser spectroscopies analogous to multidimensional NMR techniques. Theoretical Chemistry: Molecular dynamics simulations to study the structures and dynamics of biological membranes in addition to the properties of aqueous solutions next to such membranes. Laser spectroscopy in cooled molecular beams of transient species, ions and molecular complexes, subdoppler infrared spectroscopy, ion photodissociation studies, development of spectroscopic techniques, double resonance spectroscopy, pulsed field gradient NMR and NMR imaging. Application of optical and mass spectroscopies to study atmospheric chemistry. Quantum chemistry, density functional theory, quantum biology of neurotransmitters and pharmacological agents, energy minimization, protein dynamics, cooperativity, molecular graphics, mutagenesis, statistical mechanics of a liquid phase, structure and dynamics of aqueous solutions, kinetics in condensed phases, mechanical properties of polymers, state-to-state chemistry, reactions and energy transfer at solid surfaces. Polymer properties: Preparation of and nonlinear optical effects in polymeric systems, self-organized polymers, and liquid crystalline materials.

Polymer and Materials Chemistry. Synthesis, properties, and utilization of novel functional materials for various applications ranging from medicine and microelectronics to oil recovery and climate change. The many-pronged approach includes synthesis and molecular

characterization of multifunctional monomers and polymers, computer modeling and intelligent design of molecular architectures that are able to sense, process, and response to impacts from the surrounding environment, and preparation of new engineering thermoplastics and liquid crystalline materials. Recent efforts funded by the National Cancer Institute, National Institute of Health, Advanced Energy Consortium, and Army Research Office are focused on lithographic design of organic nanoparticles for the detection, diagnosis, and treatment of diseases (especially cancer), self-healing, shape-memory, mechanocatalysis, organic solar cells, and imaging contrast agents for oil exploration. A broad variety of expertise includes imaging and probing of submicrometer surface structures by scanning probe microscopy, dynamic mechanical analysis, characterization of polymer dynamics by NMR techniques and light scattering, microfluidics and drug delivery control, measurement of molecular conductivity and energy conversion efficiency, and analytical as well as computational and numerical studies of soft materials, such as polymers, colloids, and liquid crystals.

Facilities and Equipment

Research is carried out in the William Rand Kenan Jr. Laboratories; a facility of 130,000 square feet completed in 1971 the W. Lowry and Susan S. Caudill Laboratories, a facility of 71,000 square feet completed in 2006. The undergraduate laboratories are housed in the modern John Motley Morehead Laboratories, completed in 1986. Included in the department are some major facilities managed by Ph.D.-level staff scientists. The NMR laboratory includes five high-resolution FT-NMR spectrometers ranging from 300 to 600 MHz for liquids: two 400 MHz, 500 MHz and 600 MHz Bruker spectrometers, and a 600 MHz Agilent/Varian spectrometer. The Bruker 600MHz spectrometer is equipped with two cryoprobes for ultra-high sensitivity and a sample changer. There is also a Bruker 360 MHz wide bore FT-NMR spectrometer suitable for solid polymeric samples with magic angle spinning. The MS laboratory houses a Bruker BioTOF II Reflectron Time of Flight Mass Spectrometer (ESI/nESI), an Agilent HPLC Quadrupole Mass Spectrometer (ESI, APCI), A Bruker 820 ICP-MS for elemental analysis, a Thermo LTqFT with 7.0 Tesla magnet primary used for accurate mass measurements, a Photon Machines 192 Eximer Laser integrated onto a Thermo Element XR ICP-MS for elemental analysis of both solution and solid material and a Micromass Quattro II Triple Quadrupole Mass Spectrometer. An IonSpec 9.4 Telsa FT-ICR is also available for conducting high-resolution electrospray and MALDI experiments. The X-ray laboratory is equipped with a Bruker AXS SMART APEX2 single crystal diffractometer and Rigaku Multiflex powder diffractometer.

Computing services are among the most important for modern research. The University computing resources that currently reside in Information Technology Services (ITS) include Emerald (Linux) - Beowulf Red Hat Linux cluster consisting of ~830 Intel Xeon IBM Blade Center processors ranging from 2.0–3.2GHz. (help.unc.edu/6020) Emerald (AIX) - High memory (32+GB) Power5 AIX cluster with 64 processors. Topsail - 520 blade Dell Linux server with 2 quad-core 2.3 GHz Intel EM64T processors for 4160 total processors, and a variety of specialty machines that provide services for statistics, bioinformatics, and database applications. A number of the individual research laboratories in Chemistry own Silicon Graphics- or Linux-based workstations. Numerous software packages of interest to chemical, biochemical, and materials researchers are maintained for use on central systems by the ITS Research Computing group (Accelrys, Gaussian, MolPro, NWChem, CPMD, AMBER, Gromacs, Sybyl, SAS, Stata, Mathematica, ECCE, Gaussview, Schrodinger, etc.). The combined hardware and software resources are tailored to meet the needs of a broad range of chemists working on applications in quantum mechanics, molecular dynamics, NMR, X-RAY, structural biology, and bioinformatics.

To support the research programs, the department provides a number of services. Glass and Electronics facilities are provided to assist in construction and maintenance of specialized equipment. Technicians are also available to run certain specialized instruments. The William Rand Kenan Jr. Chemistry Library is located in Venable/Murray Hall. The majority of the Chemistry Library journal subscriptions and databases are available online for 24-hour access from campus workstations and other workstations that meet licensing requirements. The Chemistry collection also includes many print reference works and monographs that are available for checkout or use in the reading room when the library is open. Reference and instructional services are also available at the library service desk and by arrangement with library staff.

Financial Aid and Admission

The department awards a number of industrial fellowships and predoctoral research and teaching appointments. All outstanding prospective graduate students who apply for admission/support are automatically considered for fellowships.

There are more than 200 graduate students in the department. All are supported either as teaching assistants (27 percent), research assistants (65 percent), or as fellows (8 percent) supported by The Graduate School, industry, or the United States government. The duties of the teaching assistants include the preparation for and supervision of laboratory classes in undergraduate courses and the grading of laboratory reports.

Applications for assistantships and fellowships should be made before the end of January, although applicants for assistantships are considered after that date. All applicants (international and domestic) must take the Graduate Record Examination (GRE). All international students whose native language is not English must take the Test of English as a Foreign Language (TOEFL) examination in addition to the Graduate Record Examination. However, international students who hold a degree from a university in the United States may be exempt. Both the TOEFL and the GRE should be taken as early as possible for fall acceptance, preferably in October.

Application forms for admission can be completed online at the Graduate School's website at gradschool.unc.edu/admissions. Financial support as well as information about the department can be obtained from the Chemistry Department Web site, www.chem.unc.edu/grads. Questions about our program may be directed to chemgs@unc.edu.

Courses for Graduate and Advanced Undergraduate Students

CHEM

410 Instructional Methods in the Chemistry Classroom (4). Prerequisites, CHEM 241, 251, 262, and 262L. Permission of the instructor. This course explores secondary school chemical education through current chemical education theory and classroom teaching. Students will develop a comprehensive approach to teaching chemistry content through student-centered activities.

420 Introduction to Polymer Chemistry (APPL 420) (3). Prerequisite, CHEM 261 or 261H; pre- or corequisites, CHEM 262 or 262H, and 262L or 263L. Chemical structure and nomenclature of macromolecules, synthesis of polymers, characteristic polymer properties.

421 Synthesis of Polymers (APPL 421, MTSC 421) (3). Prerequisites, CHEM 251, and 262 or 262H. Synthesis and reactions of polymers; various polymerization techniques.

422 Physical Chemistry of Polymers (APPL 422, MTSC 422) (3). Prerequisites, CHEM 420 and 481. Polymerization and characterization of macromolecules in solution.

423 Intermediate Polymer Chemistry (APPL 423, MTSC 423) (3). Prerequisite, CHEM 422. Polymer dynamics, networks and gels.

425 Polymer Materials (3). Prerequisite, CHEM 421 or 422. Solid-state properties of polymers; polymer melts, glasses and crystals.

430 Introduction to Biological Chemistry (BIOL 430) (3). Prerequisites, BIOL 101, CHEM 262 or 262H, and 262L or 263L. The study of cellular processes including catalysts, metabolism, bioenergetics, and biochemical genetics. The structure and function of biological macromolecules involved in these processes is emphasized.

431 Macromolecular Structure and Metabolism (3). Prerequisites, BIOL 202 and CHEM 430. Structure of DNA and methods in biotechnology; DNA replication and repair; RNA structure, synthesis, localization and transcriptional reputation; protein structure/function, biosynthesis, modification, localization, and degradation.

432 Metabolic Chemistry and Cellular Regulatory Networks (3). Prerequisite, CHEM 430. Biological membranes, membrane protein structure, transport phenomena; metabolic pathways, reaction themes, regulatory networks; metabolic transformations with carbohydrates, lipids, amino acids, and nucleotides; regulatory networks, signal transduction.

433 Transport in Biological Systems (1). Prerequisites, CHEM 430 and MATH 383. Permission of the instructor for undergraduates. Diffusion, sedimentation, electrophoresis, flow. Basic principles, theoretical methods, experimental techniques, role in biological function, current topics.

434 Biochemical Kinetics (1). Prerequisites, CHEM 430 and MATH 383. Permission of the instructor for undergraduates. Kinetics of biochemical interactions. Basic principles, theoretical methods, experimental techniques, current topics.

435 Protein Biosynthesis and Its Regulation (1). Prerequisite, CHEM 430; pre- or corequisite, CHEM 431. Permission of the instructor for undergraduates. Protein biosynthesis mechanism in prokaryotes and eukaryotes; emphasis on structures of the macromolecular machinery; translational regulation mechanisms including autogenous regulation, metabolic and developmental signals; viral control of host protein synthesis.

436 The Proteome and Interactome (1). Prerequisite, CHEM 430. Permission of the instructor for undergraduates. Methods for and role of bioinformatics in proteomic analysis; proteomics in the analysis of development, differentiation and disease states; the interactome—definitions, analysis, methods of protein-protein interactions in complex systems.

437 DNA Processes (2). Prerequisites, CHEM 431 and either 480 or 481. Permission of the instructor for undergraduates. Elucidation of the mechanisms of these processes in prokaryotes and eukaryotes from experiments. Experimental results ranging from in vivo studies to structural studies to kinetics.

438 Macromolecular Structure and Human Disease (1). Prerequisite, CHEM 431. Permission of the instructor for undergraduates. Impact of protein and macromolecular structure on the development and treatment of human disease, with emphasis on recent results. Examination of relevant diseases, current treatments, and opportunities for improved therapies.

439 RNA Processing (2). Prerequisite, CHEM 431. Permission of the instructor for undergraduates. RNA processing, structure and therapeutics; in-depth exploration of examples from the contemporary literature. Topics include RNA world hypothesis, RNA structure and catalysis, and nucleic acid-based sensors and drug design.

441 Intermediate Analytical Chemistry (2). Prerequisites, CHEM 241 (or 241H), 241L (or 245L) and 262 (or 262H) and 480 (or 481). Spectroscopy, electroanalytical chemistry, chromatography, thermal methods of analysis, signal processing.

441L Intermediate Analytical Chemistry Laboratory (2). Corequisite, CHEM 441. Experiments in spectroscopy, electroanalytical chemistry, chromatography, thermal methods of analysis, and signal processing. One four-hour laboratory and one one-hour lecture each week.

444 Separations (3). Prerequisites, CHEM 441 and either 480 or 481. Theory and applications of equilibrium and nonequilibrium separation techniques. Extraction, countercurrent distribution, gas chromatography, column and plane chromatographic techniques, electrophoresis, ultra-centrifugation, and other separation methods.

445 Electroanalytical Chemistry (3). Prerequisite, CHEM 480 or 481. Basic principles of electrochemical reactions, electroanalytical voltammetry as applied to analysis, the chemistry of heterogeneous electron transfers, and electrochemical instrumentation.

446 Analytical Spectroscopy (3). Prerequisites, CHEM 441 and 482. Optical spectroscopic techniques for chemical analysis including conventional and laser-based methods. Absorption, fluorescence, scattering and nonlinear spectroscopies, instrumentation and signal processing.

447 Bioanalytical Chemistry (3). Prerequisite, CHEM 441. Principles and applications of biospecific binding as a tool for performing selective chemical analysis.

448 Mass Spectrometry (3). Prerequisite, CHEM 480 or 481. Fundamental theory of gaseous ion chemistry, instrumentation, combination with separation techniques, spectral interpretation for organic compounds, applications to biological and environmental chemistry.

449 Microfabricated Chemical Measurement Systems (3). Prerequisite, CHEM 441. Introduction to micro and nanofabrication techniques, fluid and molecular transport at the micrometer to nanometer length scales, applications of microtechnology to chemical and biochemical measurements.

450 Intermediate Inorganic Chemistry (3). Prerequisite, CHEM 251. Introduction to symmetry and group theory; bonding, electronic spectra, and reaction mechanisms of coordination complexes; organometallic complexes, reactions, and catalysis; bioinorganic chemistry.

451 Theoretical Inorganic Chemistry (3). Prerequisites, CHEM 251 and 262 or 262H. Chemical applications of symmetry and group theory, crystal field theory, molecular orbital theory. The first third of the course, corresponding to one credit hour, covers point symmetry, group theoretical foundations and character tables.

452 Electronic Structure of Transition Metal Complexes (3). Prerequisite, CHEM 451. A detailed discussion of ligand field theory and the techniques that rely on the theoretical development of ligand field theory, including electronic spectroscopy, electron paramagnetic resonance spectroscopy, and magnetism.

453 Physical Methods in Inorganic Chemistry (3). Prerequisite, CHEM 451. Introduction to the physical techniques used for the characterization and study of inorganic compounds. Topics typically include nuclear magnetic resonance spectroscopy, vibrational spectroscopy, diffraction, Mossbauer spectroscopy, X-ray photoelectron spectroscopy, and inorganic electrochemistry.

460 Intermediate Organic Chemistry (3). Prerequisite, CHEM 262 or 262H. Modern topics in organic chemistry.

465 Mechanisms of Organic and Inorganic Reactions (4). Prerequisite, CHEM 450. Kinetics and thermodynamics, free energy relationships, isotope effects, acidity and basicity, kinetics and mechanisms of substitution reactions, one- and two-electron transfer processes, principles and applications of photochemistry, organometallic reaction mechanisms.

466 Advanced Organic Chemistry I (3). Prerequisite, CHEM 262 or 262H; pre- or corequisites, CHEM 450 and 481. A survey of fundamental organic reactions including substitutions, additions, elimination, and rearrangements; static and dynamic stereochemistry; conformational analysis; molecular orbital concepts and orbital symmetry.

467 Advanced Organic Chemistry II (2). Prerequisite, CHEM 466. Spectroscopic methods of analysis with emphasis on elucidation of the structure of organic molecules: 1H and 13C NMR, infrared, ultraviolet, ORD-CD, mass, and photoelectron spectroscopy. CHEM 446 and 467 may not both be taken for academic credit.

468 Synthetic Aspects of Organic Chemistry (3). Prerequisite, CHEM 466. Modern synthetic methods and their application to the synthesis of complicated molecules.

469 Organometallics and Catalysis Organometallics (3). Pre- or corequisites, CHEM 262 or 262H, and 450. Structure and reactivity of organometallic complexes and their role in modern catalytic reactions.

470 Fundamentals of MTSC (APPL 470) (3). Prerequisite, CHEM 482; or prerequisite, PHYS 128 and pre- or corequisite, PHYS 341. Crystal geometry, diffusion in solids, mechanical properties of solids, electrical conduction in solids, thermal properties of materials, phase equilibria.

471 Mathematical Techniques for Chemists (3). Prerequisite, MATH 383. Permission of the instructor for students lacking the prerequisite. Knowledge of differential and integral calculus. Chemical applications of higher mathematics.

472 Chemistry and Physics of Electronic Materials Processing (APPL 472, MTSC 472, PHYS 472) (3). See PHYS 472 for description.

473 Chemistry and Physics of Surfaces (APPL 473, MTSC 473) (3). Prerequisite, CHEM 470. The structural and energetic nature of surface states and sites, experimental surface measurements, reactions on surfaces including bonding to surfaces and adsorption, interfaces.

480 Introduction to Biophysical Chemistry (3). Prerequisites, CHEM 261 or 261H, MATH 232, and PHYS 105. Does not carry credit toward graduate work in chemistry or credit toward any track of the B.S. degree with a major in chemistry. Application of thermodynamics to biochemical processes, enzyme kinetics, properties of biopolymers in solution.

481 Physical Chemistry I (3). Prerequisites, CHEM 102 or 102H, PHYS 116; pre- or corequisites, MATH 383 and PHYS 117. C- or better required in chemistry course prerequisites. Thermodynamics, kinetic theory, chemical kinetics.

481L Physical Chemistry Laboratory I (2). Prerequisite, CHEM 482. Experiments in physical chemistry. Solving thermodynamic and quantum mechanical problems using computer simulations. One three-hour laboratory and a single one-hour lecture each week.

482 Physical Chemistry II (3). Prerequisite, CHEM 481. Introduction to quantum mechanics, atomic and molecular structure, spectroscopy, and statistical mechanics.

482L Physical Chemistry Laboratory II (2). Prerequisite, CHEM 482; pre- or corequisite, CHEM 481L. Experiments in physical chemistry. One four-hour laboratory each week.

484 Thermodynamics and Introduction to Statistical Thermodynamics (1–21). Prerequisite, CHEM 482. Thermodynamics, followed by an introduction to the classical and quantum statistical mechanics and their application to simple systems. The section on thermodynamics can be taken separately for one hour credit.

485 Chemical Dynamics (3). Prerequisites, CHEM 481 and 482. Experimental and theoretical aspects of atomic and molecular reaction dynamics.

486 Introduction to Quantum Chemistry (3). Prerequisites, CHEM 481 and 482. Introduction to the principles of quantum mechanics. Approximation methods, angular momentum, simple atoms and molecules.

487 Introduction to Molecular Spectroscopy (3). Prerequisite, CHEM 486. Interaction of radiation with matter; selection rules; rotational, vibrational, and electronic spectra of molecules; laser based spectroscopy and nonlinear optical effects.

488 Quantum Chemistry (3). Prerequisite, CHEM 486. Applications of quantum mechanics to chemistry. Molecular structure, time-dependent perturbation theory, interaction of radiation with matter.

489 Statistical Mechanics (3). Prerequisite, CHEM 484. Applications of statistical mechanics to chemistry. Ensemble formalism, condensed phases, nonequilibrium processes.

520L Polymer Chemistry Laboratory (APPL 520L) (2). Pre- or corequisite, CHEM 420 or 421 or 425. Various polymerization techniques and characterization methods. One four-hour laboratory each week.

530L Laboratory Techniques for Biochemistry (3). Pre- or corequisite, CHEM 430. An introduction to chemical techniques and research procedures of use in the fields of protein and nucleic acid chemistry. Two four-hour laboratories and one one-hour lecture each week.

541 Analytical Microscopy (3). Introduction to microscopy techniques utilized in the analysis of chemical and biological samples with a focus on light, electron, and atomic force microscopy. Permission of instructor required for those missing prerequisites.

550L Synthetic Chemistry Laboratory I (2). Prerequisites, CHEM 241L (or 245L), 251, and 262L (or 263L). A laboratory devoted to synthesis and characterization of inorganic complexes and materials. A four-hour synthesis laboratory, a characterization laboratory outside of the regular laboratory period, and a one-hour recitation each week.

560L Synthetic Organic Laboratory (2). Prerequisites, CHEM 241L, 245L, 262L, 263L. An advanced synthesis laboratory focused on topics in organic chemistry. A four-hour synthesis laboratory, a characterization laboratory outside of the regular laboratory period, and a one-hour recitation each week.

Courses for Graduate Students

CHEM

721 Seminar in Materials Chemistry (2). Graduate standing required.

730 Chemical Biology (2–4). Prerequisite, CHEM 430. Application of chemical principles and tools to study and manipulate biological systems; in-depth exploration of examples from the contemporary literature. Topics include new designs for the genetic code, drug design, chemical arrays, single molecule experiments, laboratory-based evolution, chemical sensors, and synthetic biology.

731 Seminar in Biological Chemistry (2). Graduate standing required. Literature survey dealing with topics in protein chemistry and nucleic acid chemistry.

732 Advances in Macromolecular Structure and Function (3). In-depth analysis of the structure-function relationships governing protein-protein and protein-nucleic acid interactions. Topics include replication, DNA repair, transcription, translation, RNA processing, protein complex assembly, and enzyme regulation. Course includes both the current and classic literature that highlight the techniques used to study these processes.

733 Special Topics in Biological Chemistry (0.5–21). Modern topics in biological chemistry.

734 Biomolecular NMR (1–2). Introduction to practical solution NMR of proteins in solution.

735 Macromolecular Interactions (1). This practical course coordinates lectures with experience in the UNC Macromolecular Interactions Facility. Lectures introduce methods for monitoring interactions of macromolecules. Labs offer study teams of fewer than three students hands-on experience with major techniques available in the facility.

736 Macromolecular Crystallographic Methods (2). Data collection, phase determination, and structural refinement. Laboratory component allows students to crystallize protein, collect and process data, determine phases, and refine their structures.

741 Literature Seminar in Analytical Chemistry (2). Graduate standing required. Colloquium of modern analytical chemistry topics presented by graduate students and select invited speakers.

742 Analytical Research Techniques (2). Introduction to chemical instrumentation including digital and analog electronics, computers, interfacing, and chemometric techniques. Two one-hour lectures a week.

742L Laboratory in Analytical Research Techniques (2). Corequisite, **CHEM 742.** Experiments in digital and analog instrumentation, computers, interfacing and chemometrics, with applications to chemical instrumentation.

744 Special Topics in Analytical Chemistry (0.5–21). Modern topics in analytical chemistry, including advanced electroanalytical chemistry, advanced mass spectrometry, chemical instrumentation, and other subjects of recent significance. Two lecture hours a week.

752 Special Topics in Inorganic Chemistry (0.5–21). Permission of the instructor. Research-level survey of topics in inorganic chemistry and related areas.

754 Literature Seminar in Inorganic Chemistry (2). Graduate standing required.

758 X-Ray Structure Determination (3). Required preparation, knowledge of elementary and differential calculus is assumed. Permission of the instructor. This course is designed to introduce students to the techniques used in solving crystal structures by X-ray diffraction. Three lecture hours a week.

761 Seminar in Organic Chemistry (2). Graduate standing required. One afternoon meeting a week and individual consultation with the instructor.

764 Special Topics in Organic Chemistry (0.5–21). Two lecture hours a week.

767 Organic Chemistry (0.5–21). Permission of the instructor. Three to six hours a week.

781 Seminar in Physical Chemistry (2). Graduate standing required. Two hours a week.

783 Special Topics in Physical Chemistry (0.5–21). Permission of the instructor. Modern topics in physical chemistry, chemical physics, or biophysical chemistry. One to three lecture hours a week.

786 Special Topics in Physical Chemistry (0.5–21). Permission of the instructor. Modern topics in physical chemistry, chemical physics, or biophysical chemistry. One to three lecture hours a week.

788 Principles of Chemical Physics (PHYS 827) (3). See PHYS 827 for description.

791 Special Topics in Chemistry (1–4). Selected research-level, cross-disciplinary topics in modern chemistry.

921 Research Methodology and Seminar in Polymer/Materials Chemistry (1–21). Seminar and directed study on research methods of polymer/materials chemistry. This course provides a foundation for master's thesis or doctoral dissertation research.

931 Research Methodology and Seminar in Biological Chemistry (1–21). Seminar and directed study on research methods of biological chemistry. This course provides a foundation for master's thesis or doctoral dissertation research.

941 Research Methodology and Seminar in Analytical Chemistry (1–21). Seminar and directed study on research methods of analytical chemistry. The course provides a foundation for master's thesis or doctoral dissertation research.

951 Research Methodology and Seminar in Inorganic Chemistry (1–21). Seminar and directed study on research methods of inorganic chemistry. The course provides a foundation for master's thesis or doctoral dissertation research.

961 Research Methodology and Seminar in Organic Chemistry (1–21). Seminar and directed study on research methods of organic chemistry. The course provides a foundation for master's thesis or doctoral dissertation research.

981 Research Methodology and Seminar in Physical Chemistry (1–21). Seminar and directed study on research methods of physical chemistry. The course provides a foundation for master's thesis or doctoral dissertation research.

992 Master's (Non-Thesis) (3–6).

993 Master's Thesis (3–6). Prerequisite, CHEM 921, 931, 941, 951, 961 or 981.

994 Doctoral Dissertation (3–9). Prerequisite, CHEM 921, 931, 941, 951, 961 or 981.

Department of City and Regional Planning

www.planning.unc.edu
ROBERTO G. QUERCIA, *Chair*

Professors

Richard N. L. Andrews (37) Environmental Policy (Joint Appointment with Public Policy)
Philip R. Berke (52) Environmental Planning, Land Use Policy, Natural Hazards Mitigation
Thomas Campanella (61) Urban Design Theory and Practice, History of the American Built Environment, Site Planning
Emil E. Malizia (12) Real Estate Development, Economic Development and Finance
Roberto G. Quercia (57) Housing Finance, Housing Policy
Daniel Rodriguez (60) Transportation, Spatial Structure
William M. Rohe (22) Social Behavioral Aspects of Urban Development, Neighborhood Planning and Development
Dale Whittington (29) Environmental Planning, Public Investment Theory, International Planning (Joint Appointment with School of Public Health)

Associate Professors

Todd BenDor (65) Land Use and Environmental Planning and Policy, Spatial Analysis
Nichola Lowe (63) Economic Development
Noreen McDonald (66) Transportation Planning
Yan Song (62) Geographic Information Systems, Urban Spatial Analysis, Land Use and Site Planning
Meenu Tewari (59) Microeconomics, International Planning

Assistant Professors

Nikhil Kaza (67) Land Use and Environmental Planning and Policy, Plans and Their Uses
Mai Nguyen (64) Housing and Community Development
William Lester (67) Economic Development, Urban Spacial Structure

Research Professors

David J. Brower (34) Growth Management, Coastal Planning, Hazard Mitigation
David H. Moreau (10) Environmental Planning, Water Resources Planning, Systems Analysis
Gavin Smith, Executive Director, Center for the Study of Natural Hazards and Disasters
Jessie White, School of Government, Adjunct Professor

Adjunct Professors

Edward M. Bergman (14) Economic Development
Maryann P. Feldman, Innovation, Entrepreneurship, and Economic Growth
Edward J. Feser, Economic Development and Entrepreneurship
Harvey Goldstein (36) Planning Theory, Economic Development, Research Methods
Asad J. Khattak (54) Transportation, Quantitative Analysis
David Owens (49) Land Use Law

Associated Faculty

David J. Hartzell, Real Estate Finance
J. Myrick Howard, Historic Preservation
Judith W. Wegner, Land Use and Local Government Law

Professors Emeriti

Raymond J. Burby
F. Stuart Chapin Jr.
Edward J. Kaiser
David R. Godschalk

City and Regional Planning

The state of North Carolina, the Research Triangle region, and the community of Chapel Hill are ideally suited to serve as the home base of a nationally ranked program in city and regional planning. The UNC–Chapel Hill campus is 30 miles west of Raleigh, the state capital and the location of many agencies of state government. Through research projects, internships, and workshop courses, faculty and students interact with agencies such as Commerce, Community Development, Labor, Environmental and Natural Resources, Transportation, the Board of Science and Technology, and the North Carolina Housing Finance Agency.

The 5,600-acre Research Triangle Park, which boasts more than 40 large research facilities employing more than 30,000 people, is only 10 miles from campus. The park, which symbolizes the style of high-tech economic development emerging in many growing regions in the United States, is one of the primary engines driving the area's growth. The Raleigh/Durham metropolitan area, of which Research Triangle Park and Chapel Hill are part, has been identified as one of 30 metropolitan areas in the country that accounted for half of the new jobs in the nation. North Carolina, the nation's 10th most populous state, is growing by about 1.5 percent a year. The Research Triangle area is growing three times as fast. The future urbanization patterns of other areas are evident in the Research Triangle area.

The Department of City and Regional Planning (DCRP) at the University of North Carolina at Chapel Hill was established in 1946. It was among the first seven planning education programs in the United States. The original bases of the department and its program were ideas about regionalism, broad-scale development planning, and the application of social science methods to practical problems of government being explored on the Chapel Hill campus in the 1930s and 1940s. This was the first planning department to be established with its principal university base in the social sciences, rather than in landscape design, architecture, or engineering. The department has retained and strengthened that social science legacy through its faculty's multidisciplinary research and teaching programs.

At the start of the program in 1946, planning was defined as "the union of modern social science, design, and engineering. It utilizes social science techniques to analyze the adjustments between people and their physical environment, and adjustments among people in their efforts to meet human needs. Through the planning process, ways and means of meeting these needs are developed through social organization and the application of design and engineering techniques."

From an original concern for applications of social science to regional development needs, the department has broadened its scope to include urban, state, and community planning and to cover physical, social, economic, and natural environmental concerns. The implementation and management aspects of planning—carrying out public policy through programs, projects, budgeting and finance, regulatory controls, and other actions—are also emphasized.

The concept of development as a goal of planning remains central to the department's mission. Whether the objectives are improved physical, social, economic, or environmental conditions or more efficient and equitable policies and programs, planning is a way to effectively marshal resources to achieve public development objectives. The professional planner combines an understanding of urban and regional theory grounded in a spatial context with a grasp of the planning and management methods necessary to guide development toward desired goals. These skills have taken on added importance with the emergence

of expanded state and local responsibilities and increased public-private development ventures.

Graduates of the program apply their professional knowledge as local and regional planners, private consultants, public interest group staff members, nonprofit development organization planners, and state and federal government officials. To be an effective professional in these varying contexts requires a continuously updated knowledge base; therefore, the practitioner must be supported by active researchers. Thus, the overall mission of the department is twofold: to educate practitioners and researchers capable of leadership in planning and to expand the frontiers of knowledge about the effects of public and private actions on development processes through faculty research and service.

Degrees Offered

The department offers two degrees: the master of city and regional planning (M.C.R.P.) and the doctor of philosophy (Ph.D.) in planning. The two-year master's degree program prepares students for the professional practice of planning. The Ph.D. program prepares students for careers in research and university teaching in planning. The requirements of the two programs are described in detail in subsequent sections of the catalog. The two graduate degree programs are largely independent. Applicants should indicate which program they wish to enter.

Facilities and Equipment

The Department of City and Regional Planning is housed in New East. New East contains microcomputer laboratories, lecture and seminar rooms, and offices. Mainframe and additional microcomputer facilities and a geographic information systems laboratory are available to students through the Odum Institute for Research in Social Science and through the UNC–Chapel Hill Computation Center.

Students in the Department

During the past 60 years students have entered the department from all parts of the United States, Canada, and many other countries. The educational backgrounds of alumni who now hold positions of responsibility in the profession cover a wide range of undergraduate fields. Among them are architecture, biology, botany, business, economics, engineering, forestry, geography, history, landscape architecture, philosophy, political science, public policy analysis, psychology, public administration, sociology, and urban studies.

Graduates hold positions as directors of planning in the planning departments of small and large cities and as directors of state and regional planning programs. Graduates work as associate and assistant planners in city, county, metropolitan, and regional planning agencies; in housing and urban development agencies; in various branches of the federal service; in community-based organizations and associations; in research organizations; and in private development firms and banks. Finally, graduates are also employed as private consultants; as planning advisors to communities and developing areas; and as deans, chairs, and faculty members of educational institutions.

The Planning Profession and Employment Opportunities

During the past 30 years the field of planning has expanded considerably. The planning function remains a central part of municipal, county, and state government. Planning agencies operate within the framework of metropolitan, regional, and national governmental programs. Planning expertise is now essential in nonprofit and community-based development organizations, consulting firms, advocacy groups, and other private organizations.

This period of increasing planning activity has broadened the scope of planning. In addition to design, research, and analysis, present-day planning functions include program management and implementation activities within public agencies and private organizations, as well as coordination between government and business. Planners are increasingly called upon to lead analysis teams, to mediate conflicts, to advise decision makers of project impacts, and to package development proposals.

Employment opportunities in planning are varied. In general the work involves collection and processing of data; physical, environmental, and socioeconomic analysis; the preparation and evaluation of alternative proposals; and the formulation and implementation of programs for action.

As a consequence of the growth of planning activities throughout the world, adequately trained and qualified members of the profession are in demand in this country and abroad.

Equally important to the advancement of the field is the increasing need for advancing theory and knowledge in urban and regional development and for motivated teachers of planning. There has been a steadily increasing demand for teachers and researchers among universities and research organizations in the United States, Canada, and overseas.

Together with the faculty, hundreds of the department's 1,800 alumni in all parts of the country form an effective job referral and placement network for new and old graduates alike. Large numbers of our graduates in such key metropolitan centers as Boston, New York, the District of Columbia, Atlanta, Miami, Chicago, and on the West Coast provide invaluable assistance to students in their initial job searches and throughout their professional careers. Alumni keep in touch with the department and each other through the alumni listserv and the alumni newsletter, which the department publishes and distributes annually to all graduates.

Application and Admission

Applications for the fall semester must be received by our posted deadlines to be considered for fellowships offered by The Graduate School and to ensure first consideration for departmental fellowships, assistantships, and other financial aid. Applicants are notified of admission on a continuous basis between late January and early May. Financial aid decisions are made by early April, and the admissions process is fully completed by mid-May.

Forms and instructions for application are available on the Web (www.planning.unc.edu/program/admiss.htm) or at gradschool.unc.edu/admissions. Each applicant is required to pay a nonrefundable fee when submitting an application.

Applicants are advised to apply for admission as early as possible. Open-house weekend, hosted by the department each March, provides admitted applicants an opportunity to learn about the department and discuss their professional interests with faculty and enrolled students. Applicants may also visit the department on specific dates. For more admissions information see the departmental Web site at www.planning.unc.edu/program/admiss.htm.

Admission Requirements

All prospective students must hold a bachelor's degree from an accredited college or university. The educational backgrounds of applicants cover a wide variety of academic fields, work experiences, ethnic backgrounds, and geographic locations. Among them are architecture, biology, business, economics, engineering, biology, geography, geology, history, landscape architecture, philosophy, planning, political science, psychology, public administration, sociology, and urban studies.

Applicants are required to take the Graduate Record Examination (GRE). The GRE should be taken as early as possible. It is administered

in conveniently located centers throughout the United States and in many other countries. Appointments are scheduled on a first-come, first-served basis. Register early to get your preferred test date, and to receive your test preparation material in time to prepare for the test. Applicants may register by phone, mail, or fax. Information on the GRE is available from the admission offices of most colleges and universities, or by writing to Graduate Record Examinations, CN 6000, Princeton, NJ 08541-6000, or from their Web site, www.ets.org. GRE scores are recognized as contributory, not determinative, evidence of the applicant's qualifications.

Admission Decisions

The Graduate School makes admissions decisions on the basis of recommendations submitted by the department. In making admissions recommendations, a student committee reviews all applicants in terms of established department policy. The department considers all credentials submitted as part of the application. No single factor is regarded as qualifying or disqualifying. Factors considered in the review of all applications include the grades and academic transcript, GRE scores, references, strength of courses, undergraduate institution, professional work experience, and statement of interest. The statement of interest should demonstrate understanding of and commitment to the planning field. The student's overall academic record should be strong.

The department has a strong commitment to increasing diversity and providing opportunities for disadvantaged persons to enter the planning profession. We admit students from a variety of academic fields, work experiences, ethnic backgrounds, and geographic locations. Most successful applicants have planning-related work experience.

Transfer Credit

Students desiring to transfer to UNC–Chapel Hill from another graduate planning program may do so if they meet the admission requirements. Courses submitted for transfer must be reviewed and approved by this faculty. The maximum credit that may be transferred from another program is nine semester hours for the master's degree.

Similarly, students wishing to transfer nonplanning graduate course work taken elsewhere may do so up to a maximum of nine semester credit hours, provided that the courses were not credited to another degree and that the courses are judged by the department to be appropriate to the elective requirements of the student's program at UNC–Chapel Hill. Graduate courses taken as an undergraduate are not transferable.

A minimum of three semesters in residence is required.

The Professional Master's Degree Program

The program leading to the degree of master of regional planning prepares the candidate for professional planning practice. The curriculum covers social and institutional problems and settings and planning and management skills.

Satisfactory completion of the degree requires completion of a minimum of 51 credit hours, including an area of specialization and a master's project in that area. The normal course load is 12 to 15 credit hours per semester. Thirty-nine of the required 51 credits must be taken in the City and Regional Planning Department.

Course work for the degree is divided into general requirements, area of specialization and electives. Each student is assisted by a faculty advisor in designing an educational program. The advisor helps select courses appropriate for the student's educational interests and goals.

General Course Requirements

All master's degree students are expected to meet certain general course requirements. These consist of courses covering planning theory, urban spatial theory, applied microeconomics, analytical methods, communications skills, law and a planning workshop. These basic course topics constitute a core of knowledge and skills prerequisite to completion of the master's degree program.

The planning theory requirement is met by completing PLAN 704. The analytical methods requirement is met by completing PLAN 720. PLAN 714 fulfills the spatial theory requirement. The economics requirement is met by completing PLAN 710. All students are required to take a law course. There are many ways to fulfill this requirement. The Department offers PLAN 724 (Law for Planners) once a year. Students should consult with their advisors and instructors in other programs (e.g., LAW and MBA) to ensure that they can enroll in specific courses. Students select a planning workshop (PLAN 823) during their second year. In addition, most students take a planning law course appropriate for their specialization.

Areas of Specialization

Each student develops an area of specialization in planning in consultation with faculty advisors. The area of specialization identifies the fields of professional practice in which the student expects to develop competence and begin a professional career.

Areas of specialization offered by the department reflect a combination of current practice, employment opportunities, available faculty resources, and longer-term societal needs. As these factors change, specialization content is adjusted. Specialization offers different blends of technical knowledge, planning and management skills, philosophies about the role of the planner, and theories for understanding relevant problems and contexts.

The department offers five specializations associated with professional planning practice in community development, design and preservation, economic development, land use and environmental planning, and transportation planning. Sustainable development is the overarching concept for these specializations. Each emphasizes equity, environmental quality, economic viability and social participation and grapples with the interconnections among these dimensions of sustainability.

- **Economic Development** focuses on planning for functional and sustainable regional economies and issues of income and jobs for central city areas.
- **Housing and Community Development** is concerned with the supply of affordable housing, the revitalization of urban neighborhoods, project development, and central city redevelopment.
- **Land Use and Environmental Planning** addresses growth management at the urban and regional scales, environmental management, and policy analysis with emphasis on water resources.
- **Placemaking and Real Estate Development** focuses on planning, design, preservation, and redevelopment of the city as a physical entity.
- **Transportation Planning** provides concepts and tools relevant to transportation policy and planning and in-depth knowledge of the reciprocal relationship between transportation decisions and land development.

Students with a special interest in areas of the developing world may take a formal minor in planning for developing areas, in addition to their area of specialization. The minor is designed to train planners from both industrialized and less developed countries to work on management, research, administrative, and planning issues at the local, regional, and national levels in developing areas. Theories of

economic development, social change, environmental degradation, and urbanization are presented, as well as analytical tools and quantitative techniques that prepare students to embark on a variety of careers that meet the needs of donor agencies and governments in developing countries. Students receive training in cost-benefit analysis and project appraisal, project management, and population planning.

It is also possible for master's students in city and regional planning to take a formal minor in public policy analysis within the structure of the M.C.R.P. curriculum.

Generally, specialization courses account for 15 credit hours. Thus, in the 51-credit-hour program, about two-thirds of the credits fulfill basic requirements or specialization requirements, while the rest are electives chosen by the student in consultation with faculty advisors.

General Electives

Additional courses are required beyond the general required courses and courses in the area of specialization. General electives may be used to 1) complement and support the area of specialization, 2) specialize in another area of professional planning, 3) develop skills in a discipline (e.g., economics, design, management) or another professional program represented on campus (e.g., public administration, health administration, environmental engineering, or business), or 4) develop general competence for professional practice through courses selected both within the department and from the regular offerings of the University. Up to 12 credits may be taken outside the department.

Summary of Course Requirements

Requirement	Total Credits	# of Credits That Must Be Taken in DCRP	# of Credits That May Be Taken Outside of DCRP
Planning Theory	3	3	0
Urban Spatial Structure	3	3	0
Economic Theory	3	3	0
Planning Methods	3	3	0
Law	3	0–3	0–3
Problem-solving Workshop	3	3	0
Area of Specialization	15	12–15	0–3
Elective/Supporting Courses	15	6–9	9–12
Masters Project	3	3	0

Master's Project

The master's project required of all master's degree students is original work involving substantial independent research and analysis of a topic related to planning practice. The requirement may be met by a paper of standard format. The requirement can also be fulfilled with a product in some other form, such as a plan or audiovisual presentation. Ordinarily students submit an individually prepared paper. The student submits the paper topic and outline to the director of the student's focus area. The director approves the topic and assigns a faculty member to serve as major advisor for the project. The student may invite another faculty member to serve as a reader. Both must approve the final project. The project is completed during the final semester in residence and is filed by the department as part of the permanent record of the student's work.

The Doctoral Program

The doctoral program in planning provides training in research methods, planning theory and areas of specialization that enable graduates to contribute to the development of substantive theory, knowledge and scholarship in planning; to formulate and evaluate innovative public policy; and to administer research programs in domestic and international contexts. The program is small but highly selective and individualized. It is ideal for mature students from a variety of backgrounds.

The Ph.D. degree requires a minimum of 30 credits. A master's degree in planning is not required, although most doctoral students have previous graduate work in planning or a related field. Students must fulfill four semesters of residence. The department accepts graduate transfer credits but requires at least one year of continuous residency of at least six semester hours per regular semester. The department does not require a foreign language. It strongly encourages both research and teaching experience during residency.

In practice, doctoral candidates who hold master's degrees in planning or a related field generally require three to four semesters of formal course work in residence before beginning the dissertation. Other candidates may require five or more semesters, depending on their preparation. Dissertation research generally takes an additional year.

Each student develops an individualized course of study to reflect a specific area of interest and career aspirations. Areas of specialization and appropriate course work are determined jointly by the student and program advisor. Programs are designed to meet the student's needs and build on prior academic training, for which substantial departmental or University faculty resources are available. Courses in the area of specialization must be mutually reinforcing and coherent; must prepare the student for expertise in some body of knowledge, methodology, or problem area; and must provide the student with the methods and knowledge base to do scholarly research. The comprehensive exams, taken at the end of course work, require a knowledge of planning theory and research methods (in addition to the student's specific area of specialization).

A student may take a formal minor in another discipline with the consultation and approval of the appropriate department and the student's program committee. The minor emphasizes the achievement of methodological and related skills necessary to extend the student's research capabilities within a chosen area of specialization. Supportive complementary relationships between the two program components must be demonstrated.

It is important that the Ph.D. Admissions Committee be able to identify an applicant's program interests from application materials submitted for review to The Graduate School and to the department. In addition to any supplemental material the applicant may wish to submit in support of the application, the statement called for in the department's supplemental application should describe the proposed area of concentration and specific program course work and research interests, and provide information on relevant prior academic and professional training. The admissions process consists of two related phases. First, the Admissions Committee renders judgment about the academic qualifications of the Ph.D. applicant. Second, if academic qualifications are met, the committee attempts to identify the applicant's program interests and the stage of development of those interests, and then considers the extent to which departmental and University-wide resources may be marshaled in support of those stated interests. Thus, academic qualifications are necessary but are not the only basis for admission into the doctoral program. Applicant interests must be clear and University resources must be supportive to ensure the development of a strong Ph.D. program.

Persons wishing to be considered for admission to the doctoral program and for fellowships and assistantships that may be available to doctoral candidates are advised to communicate with the department as far in advance as possible of the date they wish to enter. While the University financial awards are made in the spring semester each year, the deadline

for applications for certain fellowships available to Ph.D. candidates is in January of the year preceding the August in which the applicant plans to begin the doctoral program. Applicants benefit by a visit to the department to discuss program requirements and interests prior to making formal application for admission.

Dual Degree Programs

Program in Law and Planning

Under a dual-degree program sponsored by the School of Law and the Department of City and Regional Planning, students may pursue the J.D. and M.C.R.P. degrees together. Taken concurrently, the two degrees may be obtained in four years rather than the five years ordinarily required. The program seeks to develop professionals capable of dealing with both the legal and planning aspects of urban and regional development and policy. Course work is designed to prepare students for a variety of professional roles in which knowledge of planning methodology and process, coupled with the analytical skills and professional expertise of the lawyer, are essential. Graduates join private law firms, consulting firms, and public legal and planning staffs.

To enter this program, students must apply separately to the School of Law and to the Department of City and Regional Planning, and must be accepted independently by both. Students entering the program spend their entire first year in either the planning department or the law school, and students must make this choice at the time of admission. The second year is normally spent full-time in the program not selected in the first year. After the first two years, the student has an additional 43 semester credits to complete in the law school and 12 semester credits to complete in planning.

To request an admission packet for the law school, please contact:

Admissions Office
School of Law
Campus Box 3380
The University of North Carolina at Chapel Hill
Chapel Hill, NC 27599-3380

Program in Business and Planning

The Kenan–Flagler Business School and the Department of City and Regional Planning offer a dual-degree program leading to the M.B.A. and M.C.R.P. degrees, usually in three years. The program builds management and planning skills that enable graduates to pursue rewarding, flexible, and socially useful careers in the private, nonprofit, or public sectors. Graduates work in real estate and economic development consulting, financial institutions, and entrepreneurial firms. Increasingly, applicants to the business and planning program want to pursue career paths that combine planning and management and seek the flexibility to move between jobs in the public and private sectors.

To enter this program, students must apply separately to both the Department of City and Regional Planning and the Kenan–Flagler Business School, and must be accepted independently by both. Students entering the program spend their entire first year in either the planning department or the business school. The second year is spent full-time in the other program. In the third year, students take courses in both business and planning. Sufficient electives can be taken in planning and business so that a curriculum can be tailored to each student's career objectives. Admission to the business school is based on demonstrated potential for responsible leadership, the quality of the student's academic transcripts, and the applicant's score on the Graduate Management Admission Test (GMAT), administered by the Educational Testing Service of Princeton, NJ.

To request an admission packet for the Kenan–Flagler Business School, please contact:

Director of M.B.A. Admissions
The Kenan–Flagler Business School
Campus Box 3490, McColl Building
The University of North Carolina at Chapel Hill
Chapel Hill, NC 27599-3490
Web: www.kenanflagler.unc.edu

Program in Public Administration and Planning

Planners often gravitate to management positions in local and state government that require knowledge of budgeting, personnel, and government administration and politics. City and county managers grapple with planning and development issues, which constitute a large portion of local government agendas. This dual-degree program prepares professionals who want the flexibility of moving between planning and management positions in government. The department and the Public Administration program in the School of Government collaborate to enable students to receive both the M.C.R.P. and the M.P.A. degrees in three years, plus a summer professional field experience in public administration.

The intent of the combined program is to ensure that students have two complete and complementary, but distinct, areas of training. The M.P.A. requirements ensure adequate training in public management. The M.C.R.P. requirements ensure adequate training in core planning knowledge and skills, and in an area of planning specialization.

Students must obtain admission to both the M.P.A. and M.C.R.P. programs independently. With prior approval from faculty advisors in both programs, students may then count certain courses toward both degrees. The combined program requires a total of 75 semester credit hours. Students are advised to gain approval from faculty advisors for their specific program of courses during the first semester of residence to ensure that they can meet all requirements of both programs within three years.

To request an admission packet for the Master of Public Administration program, please contact:

Sharon Pickard
M.P.A. Program Manager
Master of Public Administration Program
School of Government
CB # 3330 Knapp–Sanders Building
The University of North Carolina at Chapel Hill
Chapel Hill, NC 27599-3330
Phone: (919) 962-0425; Fax: (919) 962-8271
E-mail: mpastaff@iogmail.iog.unc.edu
Web: www.mpa.unc.edu

Program in Public Health and Planning

The intellectual, professional, and historical connections between public health and city planning have assumed new urgency in the 21st century, as the challenges of chronic illness, urban livability, and public safety have come to the fore. The built environment is increasingly seen as an important factor influencing physical activity, which in turn has positive impacts on health promotion and disease prevention. The growth and redevelopment of urban areas impact public health and safety in many ways. It is important to reconnect the public health and urban planning fields through professional training that will encourage greater connections in professional practice.

The Department of City and Regional Planning and the School of Public Health have three dual degree programs to facilitate the

reconnection of the professions. Dual programs exist with the Department of Health Behavior and Health Education (HBHE), Environmental Sciences and Engineering (ESE), and Health Policy and Management (HPM). To enter these programs, students must apply separately to the Department of City and Regional Planning and the departments in the School of Public Health, and must be accepted independently by both. Students entering the program spend their entire first year either in SPH or DCRP. The second year is spent full-time in the other program. In the third year, students take both public health and planning courses. Students should be able to complete both programs in three years (instead of four years). Students are expected to complete master's projects or other capstone requirements for each department at the end of the program that demonstrate mastery of the two fields and an understanding of the interconnections between the fields.

The Department of City and Regional Planning offers the master of city and regional planning degree (M.C.R.P.).

The departments in the SPH offer the following degrees:

- HBHE: Master of public health (M.P.H.)
- ESE: Master of public health (M.P.H.), master of science (M.S.), master of science in environmental engineering (M.S.E.E.), and master of science in public health (M.S.P.H.).
- HPAA: Master of public health (M.P.H.), master of science in public health (M.S.P.H.), and master of healthcare administration (M.H.A.).

To request an admission packet for the School of Public Health, please contact:

Linda Cook, Registrar
Department of Health Behavior and Health Education
CB# 7440, Rosenau Hall
The University of North Carolina at Chapel Hill
Chapel Hill, NC 27599-7440
Phone: (919) 966-5771; Fax: (919) 966-2921
E-mail: lwcook@email.unc.edu
Web: www.sph.unc.edu/hbhe

Program in Landscape Architecture and Planning
The dual-degree program in landscape architecture and planning strengthens the design dimension of the planning curriculum, and creates a venue for working closely with the College of Design at North Carolina State University. The Department of Landscape Architecture offers two graduate program tracks leading to the master of landscape architecture (M.L.A.), both of which emphasize creative problem solving and a long-term commitment to responsible design. The curriculum provides the professional skills needed to deal with the human and natural forces that shape the land. The department is especially concerned with the protection, restoration, enhancement, and regeneration of the natural and cultural environments in urban, rural, and wilderness settings.

To enter this program, students apply to each department separately and must gain admission to both. The amount of time required for the M.L.A. will depend on whether the student is pursuing the First Professional Degree track (82 credits) or Advanced Studies track (42 credits). Usually, students will be able to reduce the time needed to attain both the M.C.R.P. and the M.L.A. by about one year by taking course work in each department that counts toward the other department's degree program.

To request an admission packet for the Department of Landscape Architecture, please contact:

Pam Christie-Tabron
Department of Landscape Architecture
220 Brooks Hall, Box 7701
College of Design
North Carolina State University
Raleigh, NC 27695-7701
Phone: (919) 515-8308
E-mail: pamela_christie@ncsu.edu
Web: ncsudesign.org/content

Program in Civil Engineering
A dual degree program is under development with the Department of Civil Engineering at North Carolina State University.

Students in Other Departments
Students taking degrees in other departments may be admitted to courses in city and regional planning provided they have the necessary prerequisite training and permission of the instructor. Courses are also open to undergraduate students. Priority is given to students minoring in urban studies and planning.

Research Programs in Urban and Regional Studies
Through the Center for Urban and Regional Studies, the Odum Institute for Research in Social Science, the Water Resources Research Institute, the Institute for Environmental Studies, the Carolina Population Center, and the Institute for Economic Development, members of the faculty and graduate students in the Department of City and Regional Planning and in related departments collaborate on research in a wide range of subject areas concerning planning, human behavior, and the environment.

Established in 1953 and later expanded under a grant from the Ford Foundation, the program of the Center for Urban and Regional Studies is concerned with theoretical and empirical research in urban processes and area development. The center has a permanent staff for planning and administration of its program and for the development of an interdisciplinary research-oriented program of services to local and state governments in North Carolina and elsewhere. The department's faculty use the center to pursue research interests and collaborate with faculty members of other University departments on research projects.

In 1964 the Water Resources Research Institute was established to support research on all aspects of water resources, including the planning, programming, and analysis of urban and regional systems for development and control of quantity and quality of water and related land use. The institute serves as a focal point for faculty and student research and interdisciplinary seminars relating to water resources.

The Carolina Population Center (CPC), established in 1966, provides coordination of the University-wide interdisciplinary program in population research and training. The center provides population research services to faculty doing research in the social, behavioral, and health sciences in the United States and abroad. Departmental faculty and students are engaged in international research through the CPC.

The Institute for Economic Development was created in 1971 within the Extension Division of the University to sponsor the Basic Economic Development course. Now under the auspices of the Department of City and Regional Planning, the institute promises to strengthen the department's research and teaching mission and to enlarge its service capacity.

The Highway Safety Research Center (HSRC) is dedicated to improving transportation safety, with a major emphasis on highway safety. The center conducts basic and applied research that increases knowledge and contributes to reducing death, injury, and related societal costs. HSRC works to translate developed knowledge into practical interventions that can be applied at local, state, national, and international levels. HSRC conducts research in the three major areas of the highway safety problem—the driver/occupant, the vehicle, and the roadway. HSRC produces guidebooks, brochures, how-to manuals, news releases, public service announcements, and newsletters to communicate highway safety information to research colleagues, safety advocates, government officials, and motorists.

In addition to these activities organized under an institute or center, faculty members are engaged in research projects administered by the department.

Several other facilities in the nearby Research Triangle Park enrich and support the department's teaching and research programs:

The Research Triangle Institute (RTI) is a not-for-profit corporation that conducts research under contract to departments of federal, state, and local governments; public service agencies; foundations; and industry clients ranging from local firms to national corporations.

RTI was created as a separately operated affiliate of the three major universities that form the Research Triangle. Initial start-up funding for RTI was provided through a grant from the Research Triangle Foundation.

The institute is organized into major groups whose areas of capability span social and economic systems and human resources, statistical sciences, survey research, chemistry and life sciences, energy, engineering, and environmental sciences.

The Environmental Research Center of the U.S. Environmental Protection Agency (EPA), the largest field installation of the EPA, was dedicated in December 1971. Today it is an international center of scientific expertise in environmental research.

The Triangle Universities Center for Advanced Studies, Incorporated (TUCASI) represents an additional effort in the Research Triangle to capitalize on the presence in a small radius of three major doctoral-research institutions, their facilities, libraries, and auxiliary resources. TUCASI is a joint activity of the University of North Carolina at Chapel Hill, Duke University in Durham, and North Carolina State University in Raleigh. TUCASI is the parent body that sponsors development of advanced study enterprises on its 120-acre campus within the Research Triangle Park. The center, chartered in 1975, is governed by a board of trustees, representing the constituent universities, the Research Triangle Foundation, and elected members.

The National Humanities Center (NHC) was the first resident activity on the TUCASI campus. The center opened in 1978 as an institute for advanced study in history, literature, philosophy, and other fields of the humanities. Each year, approximately 45 leading scholars from the United States and other nations come to NHC to pursue individual research and engage in interdisciplinary seminars, lectures, and conferences. Their work results in books, articles, and other contributions to learning. Grants from major foundations, corporations, the National Endowment for the Humanities, the major universities in the Triangle, and individuals support the center's program funding and administrative costs.

The UNC Institute for Transportation Research and Education (ITRE) is a division of the University of North Carolina General Administration. Its responsibilities include facilitation of transportation-related programs throughout the 17 UNC system campuses. Affiliated faculty and staff of ITRE are located on various campuses of the University system and at ITRE's Research Triangle Park facilities. Included among ITRE's activities are workshops, short courses, research projects, and training programs for transportation professionals throughout North Carolina.

Courses for Graduate and Advanced Undergraduate Students

PLAN

491 Introduction to GIS (GEOG 491) (3). See GEOG 491 for description.

526 Principles of Public Finance for Public Policy and Planning (1.5). Provides the foundation of state and local government finance necessary to understand new developments in the provision of infrastructure for economic development.

550 Evolution of the American City (3). Examines shaping the urban built environments of the United States from the colonial era to present day. Critically examines forces that shaped our cities, and studies the values, ideals, and motivations underlying efforts to plan and direct physical development of American cities.

574 Political Economy of Poverty and Inequality (3). Introduces students to the political economy of poverty alleviation programs. Uses comparative cases to explore what types of projects, tasks, and environments lead to effective and equitable outcomes, and why.

585 American Environmental Policy (ENST 585, ENVR 585, PLCY 585) (3). See ENVR 585 for description.

590 Special Topics Seminar (1–9). Original research, fieldwork, readings, or discussion of selected planning issues under guidance of a member of the faculty.

591 Applied Issues in Geographic Information Systems (3). Prerequisite, GEOG 370 or 491. Applied issues in the use of geographic information systems in terrain analysis, medical geography, biophysical analysis, and population geography.

596 Independent Study (1–9). This course permits full-time undergraduate students enrolled in the Department of City and Regional Planning who wish to pursue independent research or an independent project to do so under the direction of a member of the department faculty.

636 Urban Transportation Planning (3). Fundamental characteristics of the urban transportation system as a component of urban structure. Methodologies for the analysis of transportation problems, planning urban transportation, and the evaluation of plans.

637 Public Transportation (3). Alternative public urban transportation systems including mass transit, innovative transit services, and paratransit, examined from economic, land use, social, technical, and policy perspectives.

638 Pedestrian and Bike Transportation (3). This graduate-level course examines the importance of multimodal transportation planning and provides a comprehensive overview of best planning practices to support increased walking and bicycling.

641 Ecology and Land Use Planning (3). Integration of the structure, function, and change of ecosystems with a land use planning framework. How land use planning accommodates human use and occupancy within ecological limits to sustain long-term natural system integrity.

651 Urban Form and the Design of Cities (3). Lecture course on comparative urbanism and the global evolution of the city form. Examines values and ideals embedded in urban landscapes, seeking to

understand how social, economic, and political forces have influenced the development of cities through history.

662 Gender Issues in Planning and Development (WMST 662) (3). Permission of the instructor for undergraduates. Examination of the environmental and health risks, policy institutions, processes, instruments, policy analysis, and major elements of American environmental policy. Lectures and case studies.

663 Diversity and Inequality in Cities (3). Permission of instructor needed for undergraduates. Introduces students in planning to issues related to diversity and inequality. Different aspects of diversity (e.g., gender, class, race, ethnicity, sexuality, nationality/citizenship) will be explored. Examines the relationship between diversity and the unequal distribution of resources and life trajectories.

685 Water and Sanitation Planning and Policy in Developed Countries (ENVR 685) (3). Permission of the instructor. Seminar on policy and planning approaches for improved community water and sanitation services in developed countries. Topics include the choice of appropriate technology and level of service; cost recovery; water venting; community participation in the management of water systems; and rent-seeking behavior in providing water supplies.

686 Policy Instruments for Environmental Management (ENST 686, ENVR 686, PLCY 686) (3). See PLCY 686 for description.

687 International Development and Social Change (3). Permission of the instructor. Course explores effect of the global economy on national and community development, effect of environmental degradation processes on development, and strategies to guide social change.

691H Honors Seminar in Urban and Regional Studies (3). Permission of the instructor. An overview of the subject matter and methods of investigation for the study of cities and regions. Presentations of original papers prepared by students.

Courses for Graduate Students

PLAN

701 Research Methods (1–6). Course combines material learned in other courses (theory/philosophy, methods, and their substantive area of interest). Familiarizes students with the skills necessary to conduct research and critically review and understand evaluation reports.

704 Theory of Planning I (3). The logic of planning as a professional activity. Critical overview of current process theories leading students to develop a personal philosophy applicable to their work as planners.

710 Microeconomics for Planning and Public Policy Analysis (3). Introduction to principles of demand and supply, elasticity, marginal utility opportunity cost, pricing, production decisions, and profit maximization, cost-benefit analysis, financial appraisal, role of government, and market instruments for environmental protection.

714 Urban Spatial Structure (3). Theories and empirical evidence of the contemporary spatial development of metropolitan areas. Industrial, residential and commercial location; neighborhood change; the role of technological change and public policies; and normative perspectives.

720 Planning Methods (3). Permission of the instructor for undergraduates. Accessing information from conventional and electronic sources, spatial data acquisition, analysis and mapping. Inferential statistics through multiple regression. Microcomputer laboratory.

721 Advanced Planning Methods (3). Permission of the instructor for undergraduates. More in-depth treatment of topics covered in PLAN 720. Particular emphasis on techniques of multiple regression analysis, forecasting, categorical data analysis, and spatial data analysis.

724 Introduction to Law for Planners (3). Governmental institutions, real property, constitutional law, land use law, and environmental law.

725 Development Dispute Resolution (3). Contemporary methods of resolving development disputes through negotiation, bargaining, and mediation. Techniques and skills applicable to solving controversies over planning and implementation of public and private development projects.

738 Transportation Policy and Planning (3). Prerequisite, PLAN 636. Permission of the instructor for students lacking the prerequisite. Examination of active transportation planning and policy questions: land use relationships, modal comparisons, environmental quality, transportation demand management, paratransit planning, the transportation needs of special populations, and international comparisons.

739 Transportation Planning Models (3). Permission of the instructor for undergraduates. The transportation planning process; data collection, trip generation, modal choice, trip distribution and assignment. Social, economic, and environmental impacts of transportation. Innovative modeling techniques.

740 Land Use and Environmental Policy (3). History, institutional setting, rationale of state and local land use, and environmental policies. Program and policy frameworks, political and market processes, resource utilization concepts, and contemporary development and resource management.

741 Land Use and Environmental Planning (3). Methods of land use planmaking. Use of GIS and spreadsheets to analyze land suitability and spatial needs. Preparation of land classification plans, land use design plans, and development management programs.

744 Development and Environmental Management (3). Coordination of public powers and private actions to implement development plans and conserve environmental resources. Regulatory, public investment, incentive, and policy instruments used in land use and environmental guidance systems.

745 Development Impact Assessment (3). Methods for data management and predictive analysis of the environmental, transportation, and other infrastructure; fiscal and social impacts of land development projects. Impact mitigation measures are also examined.

747 Coastal Management Policy (3). Analysis of national and state coastal management laws, policies, and programs. Private sector, interest group, government agency, and public roles in coastal resource allocation. Influence of science, values, and politics.

752 Project and Site Planning (3). Techniques of site analysis, project programming, and arrangement of structures on the land. Workshop covering design and review of urban development projects within limitations of regulatory standards and market criteria.

757 Planning for Historical Preservation (3). Concepts, processes, and policies for historic preservation; its role in the community planning and development process.

760 Real Estate Investment and Affordable Housing (3). Fundamentals and techniques of real estate investment analysis, including cases and computer modeling; applications of the public interest in private investment decisions; tax and other public policies influencing real estate investments; and affordable housing.

761 Housing and Public Policy (3). A theory-based course in housing and market dynamics; the justification for government intervention and the operations of the mortgage market and construction industry.

Students develop skills for housing market and policy analysis.

762 Central City Revitalization (3). Analyzes central cities over past 20 years and factors affecting their growth or decline. Analyzes how economic, social, physical conditions of central cities can be improved through large-scale urban-planning efforts.

763 Urban Neighborhood Revitalization (3). Social, political, and economic theory of local communities. Models of neighborhood change. Neighborhood revitalization: theoretical aspects; federal, state, and local programs; role of nonprofit organizations; step-by-step process for revitalizing an area.

764 Techniques in Community Development (3). The steps involved in developing neighborhood revitalization plans. Students work with local neighborhood associations in identifying both community assets and problems and the various stakeholders, conducting research on selected issues, developing and selecting strategies for addressing those issues, and formulating an implementation strategy.

765 Real Estate Development (1–12). The dynamics of real property development from the developer's perspective covering market research, government relations, site planning, financing, investment analysis, construction and project management, and marketing.

767 Diversity and Inequalities in Cities (3). Introduces students in planning to issues related to diversity and inequality. Different aspects of diversity (e.g., gender, class, race, ethnicity, sexuality, nationality/citizenship) will be explored. Examines the relationship between diversity and the unequal distribution of resources and life trajectories.

768 Seminar in Community Capitalism (PLCY 768) (3). See PLCY 768 for description.

770 Economic Development Policy (3). Introduction to basic theories, concepts, and strategies employed to pursue local and regional economic development. Clarifies similarities and distinctions with related planning perspectives including community development, investigates the economic logic behind various development initiatives, and reviews basic principles for critically examining alternative policies and programs.

771 Development Planning Techniques (3). Intermediate and advanced techniques for analyzing the development of local and regional economies. Social accounts, indicator construction, regional input-output models, economic and fiscal impact analysis, labor market analysis, and regional economic forecasting techniques.

773 Urban and Regional Development Seminar (3). Fundamental concepts and theories applied to local economic development including growth, trade, product-cycle, flexible specialization, and entrepreneurship theories. Urban and regional development issues addressed in the North American, South American, European, or South Asian contexts.

774 Planning for Jobs (3). This graduate seminar examines the policy and planning implications of changing labor market conditions and their impact on U.S. workers, especially the working poor.

776 Development Finance (3). Community development financial institutions and loan funds for local asset building and wealth creation. Investment analysis to structure and finance local projects. Real estate and business development cases.

781 Water Resources Planning and Policy Analysis (ENVR 781) (3). Water resources planning and management. Federal and state water resources policies. Analytical skills to identify environmental problems associated with urban water resources development.

784 Environmental Law (ENVR 784) (3). See ENVR 784 for description.

785 Public Investment Theory (ENVR 785, PLCY 785) (3). Prerequisite, PLAN 710. Basic theory, process, and techniques of public investment planning and decision making, involving synthesis of economic, political, and technologic aspects. Theory underlying benefit-cost analysis, adaptation to a descriptive and normative model for planning public projects and programs.

786 Environmental Quality Management (ENVR 786) (3). Planning and analysis of regional environmental system with a focus on management of mass flows that affect the quality of the regional environment.

788 Advanced Economic Analysis for Public Policy I (PLCY 788) (3). See PLCY 788 for description.

789 Advanced Economic Analysis for Public Policy II (PLCY 789) (3). See PLCY 798 for description.

799 Planning Seminar (1–21). Original research, fieldwork, readings, or discussion of selected planning issues under guidance of a member of the faculty.

801 Design of Policy-Oriented Research (PLCY 801) (3). Logic of designing research for the analysis of planning problems and the formulation of public policies. Elements of research design, case study, survey research, quasi-experimental designs, and the social experiment are covered.

802 Advanced Seminar in Research Design: Data, Methods, and Evaluation (PLCY 802) (3). See PLCY 802 for description.

805 Theory of Planning II (3). Construction of methodologies for evaluating various theories of planning and intensive analysis of the North American planning theory literature. Doctoral-level introduction to the area.

823 Planning Workshop (3). Problem-solving, client-based courses designed to give students experience in applying planning theory and methods to actual problem situations in economic development, housing and community development, real estate, environmental planning, and land use and transportation.

890 Special Topics in Planning and Urbanism (3). Reading, lectures, and discussions to provide opportunities to develop new concepts and courses in various city and regional planning topics.

891 Special Topics in Planning and Urbanism (3). Reading, lectures, and discussions to provide opportunities to develop new concepts and courses in various city and regional planning topics.

892 Ph.D. Seminar in Environmental Management and Policy (ENVR 892, PLCY 892) (3). See PLCY 892 for description.

896 Independent Study (1–21). This course permits full-time graduate students enrolled in the Department of City and Regional Planning who wish to pursue independent research or an independent project to do so under the direction of a member of the department faculty.

911 Ph.D. Research Seminar (1–21). Original research, fieldwork, readings, or discussion of selected planning issues under guidance of a member of the faculty.

992 Master's Project (3). The master's project is original work, involving a substantial degree of independent research and/or analysis. May be a research paper, critical essay, development and evaluation of a program, project, or plan.

994 Doctoral Dissertation (3–21).

Department of Classics

www.classics.unc.edu
JAMES B. RIVES, *Chair*
WILLIAM H. RACE, *Interim Chair* (Fall 2013)

Professors
Robert Babcock, Medieval Latin
Donald Haggis (40) Greek Archaeology, Aegean Prehistory, Bronze Age and Early Iron Age Crete
James J. O'Hara (2) Latin Poetry, Latin and Greek Literature
William H. Race (42) Pindar, Greek Poetry, the Classical Tradition
James B. Rives, Ancient Religion, Roman Literature and Culture (on leave Fall 2013)
G. Kenneth Sams (13) Greek Archaeology, Anatolian and Near Eastern Archaeology

Associate Professors
Sharon L. James (5) Latin Poetry, Women in Antiquity

Assistant Professors
Emily Baragwanath, Greek Historiography (on leave 2013–2014)
Luca Grillo, Latin Historiography and Oratory
Jennifer Gates-Foster, Roman Archaeology, Ptolemaic and Roman Egypt
Owen Goslin, Greek Poetry

Adjunct Professors
Eric Downing, Ancient Literary Theory, Ancient/Modern Relations
Bart Ehrman, Hellenistic Religion, New Testament
J. H. Lesher, Ancient Greek Philosophy
Mariska Leunissen, Ancient Greek Philosophy
Jodi Magness, Classical and Near Eastern Archaeology
Fred Naiden, Greek History
Zlatko Plese, Ancient Mediterranean Religions
C.D.C. Reeve (39) Ancient Philosophy, Moral Psychology, History of Philosophy
Mary C. Sturgeon (31) Greek Art
Richard J. A. Talbert (18) Roman History

Professors Emeriti
Edwin L. Brown
Carolyn L. Connor
George W. Houston
Henry R. Immerwahr
Jerzy Linderski
Sara Mack
Kenneth J. Reckford
Peter M. Smith
Philip A. Stadter
William C. West III
Cecil W. Wooten

Graduate work in the Department of Classics is primarily designed to meet the needs of students who intend by intensive study and research to specialize in the classics. The M.A. prepares especially for teaching at the secondary level; the Ph.D. for research and teaching at the university level.

The University is a contributing member of the American Academy in Rome, the American School of Classical Studies at Athens, the Archaeological Institute of America, the American Research Institute in Turkey, and the Institute of Nautical Archaeology. There are thus numerous opportunities for study and archaeological activity abroad.

Requirements for Advanced Degrees
The degree of master of arts is offered with a concentration in Greek, Latin, or classical archaeology. The degree of doctor of philosophy is offered with a concentration in Greek and Latin, classics with historical emphasis, classical archaeology, or classical and medieval Latin. A minor in related departments may be permitted on application. Students may broaden their program by taking supporting work in related languages or literatures or in art, history, linguistics, philosophy, religious studies, or women's and gender studies.

Requirements for advanced degrees are stated in general in the section "Graduate Degree Requirements". A more detailed description of the requirements for the specific graduate degree programs in the Department of Classics may be found on the department's website at http://classics.unc.edu/academics/graduate-programs-in-classics.

Classical Archaeology

Courses for Graduates and Advanced Undergraduates
CLAR

411 Archaeological Field Methods (3). Systematic introduction to archaeological field methods, especially survey and excavation techniques.

440 Problems in the History of Classical Ideas (3). Permission of the department.

460 Greek Painting (ARTH 460) (3). See ARTH 460 for description.

461 Archaic Greek Sculpture (ARTH 461) (3). See ARTH 461 for description.

462 Classical Greek Sculpture (ARTH 462) (3). Permission of the instructor. A focused study of Greek sculpture during the classical period.

463 Hellenistic Greek Sculpture (ARTH 463) (3). See ARTH 463 for description.

464 Greek Architecture (ARTH 464) (3). Prerequisite, CLAR 244. Permission of the instructor for students lacking the prerequisite. A survey of Greek architectural development from the Dark Ages through the fourth century BCE. Special topics include the beginnings of monumental architecture, the development of the orders, and interpretations of individual architects in terms of style and proportions.

465 Architecture of Etruria and Rome (ARTH 465) (3). Prerequisite, CLAR 245. Permission of the instructor for students lacking the prerequisite. The development of architecture in the Roman world from the ninth century BCE through the fourth century CE. The course focuses on the development of urbanism and the function, significance, and evolution of the main building types and their geographic distribution.

470 History and Archaeology of Bathing (3). Cross-cultural survey of the sociocultural and archaeological history of bathing from antiquity (500 BCE) to today, including bathing customs, baths, bathing images, and toilets of different cultures around the world.

474 Roman Sculpture (ARTH 474) (3). Survey of Roman sculpture (200 BCE–300 CE), including portraiture, state reliefs, funerary monuments, and idealizing sculpture, with emphasis on style, iconography, and historical development of sculpture in its sociocultural, political, and religious contexts.

475 Rome and the Western Provinces (3). Survey of the material remains of the Western provinces of the Roman Empire, with attention to their historical context and significance.

476 Roman Painting (ARTH 476). Surveys Roman painting from 200 BCE to 300 CE, with emphasis on style, iconography, historical development of painting in its sociocultural, political, and religious contexts. Treats current debates in scholarship.

488 The Archaeology of the Near East in the Iron Age (3). Prerequisite, CLAR 241. Permission of the instructor for students lacking the prerequisite. A survey of the principal sites, monuments, and art of the Iron Age Near East, ca. 1200 to 500 BCE.

489 The Archaeology of Anatolia in the Bronze and Iron Ages (3). Prerequisite, CLAR 241. Permission of the instructor for students lacking the prerequisite. A survey of Anatolian archaeology from the third millennium through the sixth century BCE.

491 The Archaeology of Early Greece (1200–500 BCE) (3). This course surveys the development of Greek material culture from 1200 to 500 BCE, exploring the origins of Greek art, architecture, cities, and sanctuaries in the Aegean and eastern Mediterranean.

512 Ancient Synagogues (JWST 512, RELI 512) (3). See RELI 512 for description.

561 Mosaics: The Art of Mosaic in Greece, Rome, and Byzantium (3). Required preparation, any course in classics, art history, or religious studies. Traces the development of mosaic technique from Greek antiquity through the Byzantine Middle Ages as revealed by archaeological investigations and closely analyzes how this dynamic medium conveyed meaning.

650 Field School in Classical Archaeology (6). This course is an introduction to archaeological field methods and excavation techniques, through participation in archaeological excavation.

683 Etruscan Art (ARTH 683) (3).

Courses for Graduate Students
CLAR

781 Aegean Civilization and Near Eastern Backgrounds (3).

782 The Archaeology of Dark Age Greece (3). Prerequisite, CLAR 243, 244, or 781. Permission of the instructor for students lacking the prerequisite. Issues and problems in the analysis of the Greek Dark Age and its material culture from the collapse of the Bronze Age palaces to the earliest Greek city states.

790 Field Practicum in Archaeology (3). Seminar in archaeological excavation techniques to be conducted in the field. Previous excavation experience is expected.

794 Greek Topography (ART 794) (3). Study of chief archaeological sites of Greece and of existing buildings and monuments. Attention to the problems of excavation and the role of the sites in Greek history.

796 The Archaeology of the Roman Province (3). This course explores the interaction between Rome and the provinces between the third century BCE and the third century CE, focusing on issues of globalization, resistance, gender, and multiculturalism.

798 Roman Topography (ART 798) (3).

812 Diaspora Judaism (RELI 812) (3). See RELI 812 for description.

841 Special Reading in Archaeology (3).

910 Seminar in Archaeology (3). Topics vary from year to year.

960 Seminar in Ancient Art (ART 960) (3). See ART 960 for description.

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Classics in English/Classical Civilization

Courses Not Requiring a Reading Knowledge of Greek and Latin

The following courses in classical literature and civilization are especially designed to supply the necessary foundation for those who, without a reading knowledge of the ancient languages, wish a broader culture or plan to specialize in modern literature, history, art, etc. When approved these courses may count as part of the major requirements in other departments. The courses may also be taken to satisfy the requirements of a minor in literature. See also English and Comparative Literature.

Courses for Graduate and Advanced Undergraduate Students
CLAS

409 Historical Literature Greek and Roman (3). The study in English translation of selections from Herodotus, Thucydides, Livy, Tacitus, and others, with consideration of their literary qualities and their readability as historians.

415 Roman Law (3). Introduction to Roman law, public and private. On the basis of Roman texts in translation (or the original if desired), consideration of the principles of Roman constitutional law and the legal logic and social importance of Roman civil law.

540 Problems in the History of Classical Ideas (3). Permission of the department.

541 Problems in the History of Classical Ideas (3). Permission of the department.

547 Approaches to Women in Antiquity (3). Permission of the instructor. Graduate students and senior classics majors. Intensive interdisciplinary introduction to women in antiquity, using literary, historical, and visual materials.

691H Honors Course (3). Honors course for departmental majors in classical archaeology, classical civilization, Greek, and Latin.

692H Honors Course (3). Honors course for departmental majors in classical archaeology, classical civilization, Greek, and Latin.

Greek

Courses for Graduate and Advanced Undergraduate Students
GREK

409 Greek New Testament (RELI 409) (3). See RELI 409 for description.

506 Greek Dialects (LING 506) (3). Permission of the instructor. Survey of the major dialects of Classical Greek and study of their derivation from Common Greek. Texts include both literary and epigraphical sources from the eighth century BCE to the Hellenistic period.

507 Greek Composition (3). Prerequisite, GREK 221.

508 Readings in Early Greek Poetry (3). Prerequisite, GREK 221 or 222.

509 Readings in Greek Literature of the Fifth Century (3). Prerequisite, GREK 221 or 222.

510 Readings in Greek Literature of the Fourth Century (3). Prerequisite, GREK 221 or 222.

540 Problems in the History of Classical Ideas (3). Permission of the department.

541 Problems in the History of Classical Ideas (3). Permission of the department.

Courses for Graduate Students

NOTE: One or two Greek courses numbered in the 700s are offered each semester.

GREK

722 Greek Epigraphy (3).

744 An Introduction to Greek Law (3). This class has three goals: familiarizing students with Greek language, introducing them to concepts of Greek law by reading secondary literature, and directing them to current debates in the field.

750 Homer (3).

753 Greek Lyric Poetry (3).

755 Greek Tragedy (3).

757 Sophocles (3).

759 Greek Comedy (3).

761 Greek Philosophical Literature (3).

763 Greek Historical Literature (3).

765 Thucydides (3).

767 Greek Rhetoric and Oratory (3).

769 Demosthenes (3).

771 Hellenistic Poetry (3).

775 Later Greek Prose (3).

841 Special Reading (3).

891 Special Reading (3).

901 Greek Seminars (3). Topics vary from year to year.

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Latin

Courses for Graduate and Advanced Undergraduate Students

LATN

510 Introductory Latin Composition (3). Prerequisite, LATN 222. Review of Latin grammar and idiom, exercises in composition, introduction to stylistics.

511 Readings in Latin Literature of the Republic (3). Prerequisite, LATN 221 or 222.

512 Readings in Latin Literature of the Augustan Age (3). Prerequisite, LATN 221 or 222.

513 Readings in Latin Literature of the Empire (3). Prerequisite, LATN 221 or 222.

514 Readings in Latin Literature of Later Antiquity (3). Prerequisite, LATN 221 or 222.

530 An Introduction to Medieval Latin (3). Prerequisite, LATN 221 or 222. Survey of medieval Latin literature from its beginnings through the high Middle Ages.

540 Problems in the History of Classical Ideas (3). Permission of the department.

541 Problems in the History of Classical Ideas (3). Permission of the department.

601 Elementary Latin for Graduate Students (3). Designed as a preparation for the reading knowledge examination for higher degrees. Passing the examination at the end of LATN 602 certifies that the requirement has been satisfied, although the course does not count for graduate credit. One semester.

602 Elementary Latin for Graduate Students (3). Designed as a preparation for the reading knowledge examination for higher degrees. Passing the examination at the end of LATN 602 certifies that the requirement has been satisfied, although the course does not count for graduate credit. One semester.

Courses for Graduate Students

NOTE: One or two Latin courses numbered in the 700s are offered each semester.

LATN

722 Latin Epigraphy (3).

723 Latin Paleography (3).

724 Latin Textual Criticism (3). Introduction to textual criticism of Latin texts. Addresses transmission, principles of editing, constructing and interpreting an apparatus criticus. Practical editorial experience working from original manuscripts, microfilms, and digital reproductions.

725 Latin Composition and Prose Styles (3).

726 History of Latin (3).

741 Special Reading (3).

753 Fragments of Early Latin Poetry (3).

762 Roman Historical Literature (3). Study of Sallust, Caesar, Suetonius, or the minor historians of the empire.

764 Roman Dramatic Literature (3). Study of the comedies of Plautus and Terence or the tragedies of Seneca.

765 Roman Lyric and Elegiac Poetry (3). Study of the forms of lyric and elegiac poetry with special attention to Catullus, Horace, Tibullus, or Propertius.

766 Roman Satire (3). Study of the development of satiric forms with special attention to Horace or Juvenal.

767 Ovid and Literary Theory (3). Introduction to literary theory through a study of Ovid and scholarly approaches to his poetry.

768 Horace and Catallus (3).

770 Topics in Medieval Latin Literature (3). Reading in selected medieval Latin prose and verse authors.

771 Cicero: Political Career (3).

772 Cicero: Literary Career (3).

773 Lucretius (3).

774 Virgil (3).

775 Livy (3).

776 Ovid (3).

780 The Roman Novel (3). Selections from Petronius and/or Apuleius and related texts.

784 Tacitus (3).

841 Special Reading (3).

901 Latin Seminars (3). Topics vary from year to year.

993 Master's Thesis (3-6).

994 Doctoral Dissertation (3–9).

Department of Communication Studies

KEN HILLIS, *Chair*

Professors

V. William Balthrop, Rhetorical Theory and Criticism, Cultural Studies, Argumentation
Carole Blair, Rhetorical Theory and Criticism, Cultural Studies, Argumentation
Paul Ferguson, Performance of Literature, Directing, Adaptation and Script Writing
Lawrence Grossberg, Cultural Studies, Popular Culture, Popular Music, Philosophy of Communication and Culture
Madeleine Grumet, Performance Studies and Education
Ken Hillis, Communication Technology
Gorham A. Kindem, Documentary Production, Film History, Media Aesthetics
Dennis Mumby, Organizational Communication, Critical Theory
Della Pollock, Performance Theory and Criticism, Cultural Studies, Performance and Memory
Lawrence B. Rosenfeld, Interpersonal Communication, Family Communication, Empirical Research Methodology
Francesca Talenti, Media Studies, Animation

Associate Professors

Richard C. Cante, Media and Cultural Studies, Sexuality Studies, Global Cinema
Cori Dauber, Rhetoric and Public Address, Military Rhetoric
Sarah Dempsey, Organizational Communication, Organizing in Global Contexts
Christian O. Lundberg, Rhetoric and Public Culture, Cultural Studies, Critical Theory, and Religion
Steven K. May, Organizational Communication, Cultural Studies
Torin Monahan, Technology Studies, Surveillance Studies
Patricia S. Parker, Organizational Communication and Culture, Critical Studies in Gender, Race, Organizational Leadership
Tony Perucci, Performance, Performance and Media, Performance Activism, Cultural Studies
Edward Rankus, Media Studies, Film Production
Joyce Rudinsky, Media Studies, Electronic and Interactive Media
Sarah Sharma, Media Studies, Cultural Studies and Communication Technology
Michael S. Waltman, Interpersonal Communication, Social Cognition, Hate Studies
Eric Watts, Rhetorical Studies, African American Communication and Culture, Critical Media Studies

Assistant Professors

Renee Alexander-Craft, Critical/Performance Ethnography, Performance of Literature, Critical Studies in Race and Gender
Michael Palm, Media Studies, History of Technologies
Kumi Silva, Gender, Race and Identity, Transnational and Postcolonial Studies
Neal Thomas, Digital Media and Technology

Courses for Graduate and Advanced Undergraduate Students

NOTE: Courses are offered on demand except as otherwise noted.

COMM

411 Critical Perspectives (3). This course explores theories of criticism and symbolic action through readings, lecture, and practical criticism of literature, media, discourse, and other symbolic acts.

412 Critical Theory (3). Overview of those realms of modern and contemporary thought and writing that are known as, and closely associated with, "critical theory."

413 Freud (3). Examination of Freudian thought within and across historical contexts, with special attention to the centrality of gender and sexuality in the operations of the "human organism."

422 Family Communication (3). Prerequisite, COMM 120. Growth in technologies, more frequent travel, and movements of products and people across the borders of nation states change concepts of family and community. Foregrounded by these realities, this course combines theories of family and communication with documentation of lived experience to interrogate family communication patterns in contemporary culture.

423 Critical Perspectives on Work, Labor, and Professional Life (3). This upper level seminar develops a critical perspective on work, labor, and professional life within the global context. Throughout, we will engage in moral and philosophical debates about the status of labor and the meanings of work in our daily lives.

430 History of American Screenwriting (3). This viewing and research-intensive course examines the history of American narrative film through the screenwriter's experience, using a decade-by-decade approach to examine the political, social, global, psychological, religious, and cultural influences on the art, process, and careers of screenwriters.

431 Advanced Audio Production (3). Prerequisite, COMM 130. Grade of C or better in COMM 130. Permission of the instructor for students lacking the prerequisite. Advanced analysis and application of the principles and methods of audio production.

432 Visual Culture (3). Prerequisites, COMM 140. Permission of the instructor for students lacking the prerequisites. Overview of, and intensive practice in, advanced directing techniques for film, video, and digital media.

433 Intermediate Scriptwriting (3). Prerequisite, COMM 131. Required course for the minor in writing for the screen and stage. Conceiving and outlining a feature length screenplay.

435 Memory Acts (3). Advanced introduction to foundational work in memory and performance studies, emphasizing theory and practice of various forms of remembering.

436 Gender and Performance (WMST 437) (3). See WMST 437 for description.

437 United States Black Culture and Performance (3). Prerequisite, COMM 160. Permission of the instructor for nonmajors. Examines how the United States Black experience is constituted in and through performance across a range of cultural contexts including the antebellum South, Reconstruction, the Harlem Renaissance, the Black Aesthetic, and contemporary urban life.

450 Media and Popular Culture (3). Prerequisite, COMM 140. Permission of the instructor for nonmajors. Examination of communication processes and cultural significance of film, television, and other electronic media.

452 Film Noir (3). Prerequisite, COMM 140. Permission of the instructor for nonmajors. Course combines reading about and viewing of 1940s and 1950s films combining narrative techniques of storytelling, novels, and the stage with purely filmic uses of spectacle, light, editing, and image.

464 Performance Composition (3). Prerequisite, COMM 160. Theory and practice of collaborative performance, emphasizing image, intertextual adaptation, site-specific and installation work, avant-garde

traditions, and the play of time and space.

466 Advanced Study of Literature in Performance (3). Prerequisite, COMM 160. This course engages the theory and embodiment of prose fiction, poetry, and other kinds of literary texts, including nonfiction. Students practice adaptation and script preparation, solo/group performance, and performance critique.

470 Political Communication and the Public Sphere (3). A course covering the relationship between communication and political processes and institutions. Topics include media coverage and portrayal of political institutions, elections, actors, and media influence on political beliefs.

471 Rhetorics of Public Memory (3). Takes up the fundamental assumptions of contemporary memory studies and the centrality of rhetoric to memory. Research focus on how constructions of the past respond to the present and the future.

472 Rhetorical Criticism (3). Prerequisite, COMM 170. Approaches to the analysis and assessment of rhetorical practice with a focus on how rhetoric reflects and shapes public culture.

490 Special Topics in Media and Popular Culture (3). Prerequisite, COMM 140. Permission of the instructor for nonmajors. A special topics course on a selected aspect of communication studies.

493 Production and Practice (3). Prerequisite, COMM 230. Permission of the instructor for students lacking the prerequisite. Course serves as a "production house" for projects that serve the UNC and broader communities. Students will serve on professionally run crews, spend two weeks determining what the projects will be, and devote the remainder of the semester making the projects.

500 Visual and Material Rhetoric (3). Prerequisite, COMM 170. This course explores the use of rhetorical criticism as a way to understand how the visual and material are used for symbolic and political purposes. Examples ranging from news images to public art will be studied.

521 Communication and Social Memory (3). Permission of the instructor for nonmajors. An investigation of psychological aspects of communication, particularly the perceptual and interpretive processes underlying the sending and receiving of messages.

523 Communication and Leadership (3). Prerequisite, COMM 120. Permission of the instructor for nonmajors. Critical examination of alternative theories of leadership and trends in the study of leadership; focuses on the communicative dimensions of leadership.

524 Gender, Communication, and Culture (3). Prerequisites, COMM 224 and 372. Permission of the instructor for nonmajors. Course examines the speeches and other texts that announced and embodied the goals and political strategies of multiple branches of three waves of feminist activism in the United States.

525 Organizational Communication (3). Prerequisites, COMM 120 and 325. Permission of the instructor for nonmajors. Provides a critical exploration of organizational communication theory, research, and application, examining the factors involved in the functioning and analysis of complex organizations.

526 Critical-Cultural Approaches to Organizational Communication (3). Prerequisite, COMM 325. Permission of instructor for students lacking the prerequisite. The study of "organizational culture" operates on a set of assumptions distinct from traditional management perspectives. This course explores the cultural perspective as an alternative approach to understanding organizational communication processes.

527 Organizational Ethics (3). Prerequisite, COMM 325. A critical examination of the theory, research, and practice of organizational ethics.

532 Performing the Screenplay (3). Introduces students to approaches for creating performance from screenplays and other texts for electronic media forms, focusing on scripts as literature and the tensions between live and electronically delivered performances.

534 Aesthetic and Technical Considerations in Making Short Videos (3). Prerequisite, COMM 230. The course examines the aesthetic and technical elements at work and play in cinematic storytelling. The student is required to complete three projects and will gain hands-on experience in narrative filmmaking.

535 Introduction to Screen Adaptation (3). Prerequisite, COMM 131, 330, ENGL 130, or 132H. Students practice the craft of screen adaptation by conceptualizing, outlining, and writing scenes based on material from another medium (both fiction and nonfiction). Work is presented, discussed, and performed in a workshop environment. Topics include compression of time, composite characters, creation of new scenes, and fidelity to the original work.

537 Master Screenwriting (3). Prerequisite, COMM 433. Permission of the instructor for nonmajors. Students will write and workshop a full-length feature film screenplay. In addition, students will learn about the film and television business through a combination of research, in-class discussions, and live interactive interviews with industry insiders.

546 History of Film I, 1895 to 1945 (3). Prerequisite, COMM 140. Permission of the department. Studies the development of the art of film through World War II by examining individual films and filmmakers and the emergence of national cinemas through interaction among aesthetic, social, economic, and technological factors.

547 History of Film II, 1945 to Present (3). Prerequisite, COMM 140. Study of the development of the art of film from the end of World War II to the present day by examining individual films and filmmakers and the emergence of national cinemas through interaction among aesthetic, social, economic, and technological factors.

548 Humor and Culture (3). Prerequisite, COMM 140. Permission of the instructor for nonmajors. Investigates how humor, comedy, and laughter function socially and culturally through close examination of selected United States popular media texts and the primary modern theoretical writings on these issues.

549 Sexuality and Visual Culture (3). Examines questions about sexuality and how it has changed over time, through various media of visual communication.

550 American Independent Cinema (3). Prerequisite, ARTH 159, COMM 140, or ENGL 142. Permission of the instructor for students lacking the prerequisite. Intensive investigation of some particularly influential strains for United States independent narrative cinema, with a focus on sociocultural contexts and the fuzziness of the word "independent."

551 Hitchcock and the Sign (3). Prerequisite, ARTH 159, COMM 140, or ENGL 142. Permission of the instructor for students lacking the prerequisite. Course gives Alfred Hitchcock's cinema careful attention while tracking longstanding debates about signification and reference from philosophy, semiotics, literary theory, narratology, and visuality into recent critical and cultural theory.

553 Media and Activism (3). A study of the electronic media as a feedback mechanism for community organization and social change. A variety of broadcast and nonbroadcast uses of the media are studied.

561 Performance of Women of Color (WMST 561) (3). Prerequisite, COMM 160. Permission of the instructor for nonmajors. Explores through performance contemporary poetry, fiction, nonfiction, and feminist thought by women of color in the United States.

562 Oral History and Performance (FOLK 562, HIST 562, WMST 562) (3). This course combines readings and field work in oral history with study of performance as a means of interpreting and conveying oral history texts.

563 Performance of Children's Literature (3). Prerequisite, COMM 160. Permission of the instructor for students lacking the prerequisite. The course explores advanced performance theory while focusing exclusively on contemporary poetry, prose fiction, and drama intended for young audiences. Both solo and group performances for young viewers are included.

564 Performance and Popular Culture (3). Prerequisite, COMM 160. Critical examination of the operation of performance as a cultural phenomenon, with an emphasis on meaning, power, and resistance in cultural events, social practices, and media spectacles.

566 Media and Performance (3). Practical and theoretical study of live, multimedia performance.

571 Rhetorical Theory and Practice (3). Prerequisite, COMM 170. Permission of the instructor for nonmajors. Investigates the theoretical definitions and uses of rhetorical interpretation and action in spoken, written, visual, material practices, discourses, and events.

572 Public Policy Argument (3). Prerequisite, COMM 170. Permission of the instructor for nonmajors. Analyzes argument in a variety of contexts with an emphasis on public policy and exploring tensions involved in addressing both expert and public audience in the political sphere.

573 The American Experience in Rhetoric (3). Prerequisite, COMM 170. Permission of the instructor for nonmajors. Examines public discourse from the colonial period to the present. Discourses, critical perspectives, and historical periods studied will vary.

574 War and Culture (PWAD 574) (3). Examines American cultural myths about war generally and specifically about the causes of war, enemies, weapons, and warriors, and the way these myths constrain foreign and defense policy, military strategy, and procurement.

575 Presidential Rhetoric (3). Prerequisite, COMM 170. The power of the presidency depends in part upon the president's ability to rally public opinion, which depends upon the president's ability to use the "bully pulpit." This course examines the hurdles presidents face and the steps presidents take to shape opinion.

576 Making and Manipulating "Race" in the United States (3). This course will examine how tropes of "race" are symbolically invented and experienced psychologically and emotionally. This course assesses how "race" reflects and shapes cultural politics.

577 African American Rhetoric (3). This course will explore the complex ways in which Black aesthetic forms and creative expression function as public discourse.

593 Practicum in Performance Studies (3). Prerequisite, COMM 160. Course provides a workshop setting for the process of creation, dramaturgy, development, analysis, and critique of graduates' and undergraduates' original performance work, focusing on the needs of each project in progress.

596 Advanced Independent Study/Directed Reading (1–3). Permission of the department. Majors only. 3.0 cumulative grade point average and 3.5 communication studies grade point average required. For the communication studies major who wishes to pursue an advanced independent research project under the supervision of a selected instructor. Intensive individual research on a problem designed by instructor and student in conference.

610 Reading Quantitative Research in Communication Studies (3). Permission of the instructor for nonmajors. Review of the basics of quantitative research (e.g., scientific method, modes of data collection, instrument development, data analysis techniques) with the goal of gaining skill in reading published articles in communication studies journals.

620 Theories of Interpersonal Communication (3). Prerequisite, COMM 120. Permission of the instructor for nonmajors. Course focuses on how communication is used to build and sustain interpersonal relationships. Forms and functions of communication are examined as a means of testing and defining relationships.

624 Hate Speech (3). The primary focus of hate speech is on the ways that interactants manipulate hatred to accomplish a variety of social and personal goals. The pursuit of this focus will allow the student to appreciate the operation of hatred in a variety of contexts. Often taught as a service-learning course.

625 Communication and Nonprofits in the Global Context (3). Introduces students to the opportunities, challenges, and rewards of participation within the nonprofit/NGO sector. The course also equips students with the skills needed to design and conduct engaged scholarship.

635 Documentary Production (3). Prerequisite, COMM 230. A workshop in the production of video and/or film nonfiction or documentary projects. The course will focus on narrative, representational, and aesthetic strategies of documentary production.

636 Interactive Media (ARTS 636) (3). Explores interactive media through creative projects that include sound, video, and graphic elements. Technical information will serve the broader goal of understanding the aesthetics and critical issues of interactive media.

638 Game Design (3). Prerequisite, COMM 150. Permission of the instructor for nonmajors. Studio course that explores gaming critically and aesthetically. Practice in game design and production including three-dimensional worlds and scripting.

642 Special Topics in Cultural Studies (3). Prerequisite, COMM 442. Permission of the instructor for nonmajors. This course will explore various specific topics, theories, and methodologies in cultural studies.

645 The Documentary Idea (3). Prerequisite, COMM 140. Permission of the instructor for nonmajors. Historical and theoretical examination of expressions of the documentary idea in different eras and various modes including film, television, and radio.

646 Introduction to the Art and Mechanics of Two-Dimensional Digital Animation (3). Prerequisite, COMM 130 or 150 with a grade of C or better. Students use Adobe After-Effects and Adobe Photoshop as their primary image software to create several original animations. Assignments are given weekly, and a substantial final project is expected.

647 Advanced Projects (3). Prerequisites, COMM 230 and one of COMM 534, 635, 646, 653, or 654. Recommended preparation, several production courses above COMM 230. Course provides a structured environment, instructor and peer feedback, along with production and postproduction resources for completing an advanced near-to-graduation media project. Projects can be narrative, documentary, experimental, or interactive, with a running time for videos of no longer than 20 minutes.

650 Cultural Politics of Global Media Culture (3). Prerequisite, COMM 140. Permission of the instructor for students lacking the prerequisite. Primary subjects will be popular culture and media technology, and guiding questions will be organized around the relationships of each to commerce and/as social change.

652 Media and Difference (3). Prerequisite, COMM 140. Permission of the instructor for nonmajors. This course examines critical and theoretical issues concerning the representation and study of various modes of difference, such as sexuality, race, and gender, in specific media texts.

653 Experimental Video (3). Prerequisite, COMM 230. Permission of the instructor for students lacking the prerequisite. This course allows students to create video productions that play with forms that lie outside of mainstream media.

654 Motion Graphics, Special Effects, and Compositing (3). Prerequisite, COMM 130 with a grade of C or better, or COMM 150. Permission of the instructor for students lacking the prerequisite. In this course students learn a wide range of video postproduction techniques working mostly with the application After Effects.

655 Television Culture (3). Prerequisite, COMM 140. This course introduces students to critical television studies. The course emphasizes not television or culture as separate entities but instead "Television Culture." The focus of the class is on the interrelationship between television and contemporary culture.

656 Women in Film (WMST 656) (3). See WMST 656 for description.

657 Audio Production (3). Experience in nonlinear editing is recommended, although not required. Explore audio production as art and engineering; from acquisition to mastering. Flexibility for varying skill levels is designed into the course.

661 Race and Ethnicity (3). Prerequisite, COMM 160. Permission of the instructor for nonmajors. Examines race and ethnicity in specific geopolitical contexts as discursive formations, performative identities, and lived realities. Studies disciplinary/political boundaries that are produced and maintained through acts of performance.

662 Black/African Diaspora Performance (3). Recommended preparation, COMM 160. Relying on critical race theories, colonial and postcolonial theories, and theories of performance, this course engages comparative discourses of Black/African diaspora citizenship through the literature, poetry, fiction, nonfiction, drama, and cultural performances of people of African descent, particularly in Africa, Europe, and the Americas.

665 Performing Consumer Culture (3). Prerequisite, COMM 160. Course addresses the operation of corporate power and consumer practices as political and cultural performances, and performance as a means of pursuing social and economic justice.

667 Performance Activism (3). Prerequisite, COMM 160 or 260. History and practice of performance in contemporary social movements. Practical exploration of direct action, guerilla theatre, and performance interventions.

668 The Ethnographic Return (3). This course explores the intersection of ethnographic theory/practice and discourses of sustainable community change with the aim of making appropriate and effective contributions to community development.

675 Environmental Communication and the Public Sphere (ENST 675) (3). Examines communication practices that accompany citizen participation in environmental decisions, including public education campaigns of nonprofit organizations, "risk communication," media representations, and mediation in environmental disputes.

681 Contemporary Film Theory (3). Prerequisite, ARTH 159, COMM 140, or ENGL 142. Permission of the instructor for undergraduates. Overview of poststructuralist, or "contemporary" film theory. Traces its development, its techniques, fierce critiques lobbed at it since the early 1980s, and its points of continuing importance.

682 History of the Moving Image: Pasts, Presents, Futures (3). Prerequisite, ARTH 159, COMM 140, or ENGL 142. Permission of the instructor for undergraduates. Theories of moving images and imaging technologies—from the primitive to the not-yet-existing—that focus on their multifaceted relations with various registers of time, memory, flux, and futurity.

683 Moving-Image Avant-Gardes and Experimentalism (3). Prerequisite, ARTH 159, COMM 140, or ENGL 142. Permission of the instructor for students lacking the prerequisite. History and theory of international avant-garde and experimentalist movements in film, video, intermedia, multimedia, and digital formats. Content and focus may vary from semester to semester.

690 Advanced Topics in Communication Studies (3). Prerequisite, COMM 170. Permission of the instructor for nonmajors. A special topics course on a selected aspect of communication studies. May be repeated.

691H Honors in Cultural Studies (3). Permission of the instructor. Required of all senior honors candidates in cultural studies. First semester of senior honors thesis.

692H Honors in Cultural Studies (3). Permission of the instructor. Required of all senior honors candidates in cultural studies. Second semester of senior honors thesis.

693H Honors (3). Permission of the department. Majors only. 3.2 cumulative grade point average required. Individual projects designed by students and supervised by a faculty member.

694H Honors (3). Permission of the department. Majors only. 3.2 cumulative grade point average required. Individual projects designed by students and supervised by a faculty member.

695 Field Methods (3). Recommended preparation, COMM 562 or 841. A bridge course designed to offer graduate students and advanced undergraduates a practicum in fieldwork methods and performance ethnography.

Courses for Graduate Students

NOTE: Courses are offered on demand except as otherwise noted.

COMM

700 Introduction to Research and Theory in Communication Studies I (3). Admission to graduate program or permission of the department. Considers theory and philosophy in the study of communication. Surveys major paradigms of contemporary social/cultural theory (and their roots in modern philosophy) in relation to examples of communication research and practice. First of two semesters.

702 Teaching in Communication Studies (3). Communication studies graduate students only. An introduction to teaching at the university level for new teaching assistants and graduate students hoping to have teaching-related responsibilities in communication studies. It is designed to encourage us to have intellectually rigorous and personally meaningful conversations about our teaching.

703 Interdisciplinary Studies in Communication (3). This course will be offered with three separate foci, each cutting across interdisciplinary concerns in communication studies: the social, **the** political, and discourse.

712 The Body and Performance (3). This course will explore through performance the various ways the human body is "marked" or signified in culture.

713 Performance Criticism (3). Deals with the key methods of describing and evaluating literature and literature in performance.

722 Seminar in Human Relationships (3). In-depth examination of contemporary research on communication and human relationships. Foci vary and may include intimacy, groups, families, and other communication relationships.

723 Research in Organizational Communication (3). Explores theoretical, methodological, and practical issues encountered in ethnographic, case study, and field research on communication phenomena in organizations.

724 Feminism, Science, and Communication (3). Critical examination of key feminist arguments about science and communication scholarship as conventionally defined; exploration of alternative goals, assumptions, and practices for research consistent with feminist theories and methodologies.

725 Interpretive Studies in Organizational Communication (3). Prerequisite, COMM 525. Permission of the instructor for students lacking the prerequisite. Focuses on the theory and practice of interpretive organizational communication research, including organizational phenomena such as culture, metaphor, symbolism, ritual, and narrative.

726 Critical Studies in Organizational Communication (3). Prerequisite, COMM 525. Permission of the instructor for students lacking the prerequisite. Focuses on the theory and practice of critical organizational communication research, including organizational phenomena such as power, discourse, and culture.

738 Production Studies (3). Studies the integration of audio/video/film theory and practice through lectures, readings, discussions, oral presentations, and the completion of audio, video, and film projects.

739 Media Production (3). Permission of the department. Study of problems involved in writing and producing various forms of media programming. Emphasis on script and production elements necessary to translate scripts into media products.

750 Cultural Studies (3). Graduate standing required. Introduction for graduate students to the current literature and critical perspectives in the areas of media and cultural studies.

752 Media and Social Change (3). This seminar inquires into the range of relationships between media and social life, with a particular emphasis on media's role in movements for social, economic, and/or cultural transformation.

753 Theories of the Audience/Public (3). This course offers a sustained analysis of the ways in which the media, audience, and/or public have been variously conceptualized historically, in critical theory.

754 Political, Institutional, and Economic Contexts of Media and Culture (3). Prerequisite, COMM 700. A detailed analysis of the relationship between government, policy making, corporate and business interests, and various theoretical approaches to their impact on media and culture.

755 History of Cultural Studies (3). This class introduces cultural studies through its British "origins," especially but not only the work of the Centre for Contemporary Cultural Studies and the Open University.

756 National, International, Transnational, and Global Movie/Media History (3). Explores the economic, social, ideological, technological, and aesthetic development of film and television as international, transnational, transcultural, and global entities, questioning the viability of the concept of national cinema/media in the 21st century.

758 Studies in Film and Television (3). Graduate introduction to the study of film, television, and video. This course traces the theoretical and methodological development of media studies.

761 Adaptation Seminar (3). This seminar recognizes and applies narrative theory in understanding texts, lives, and cultural practice broadly.

769 Topics in Performance Studies (3). Second-year graduate students and/or permission of the instructor. Special problems in performance studies.

770 History of Rhetoric I (3). A critical survey of the history of rhetoric, focusing on Classical theories of rhetoric from Greece and Rome through the Medieval period.

771 History of Rhetoric II (3). A critical survey of the history of rhetoric, focusing on theories of rhetoric from the Renaissance through the 19th century.

772 Seminar in Contemporary Rhetorical Theory (3). A critical survey of the history of rhetoric, focusing on rhetorical theory from the 20th century to the present.

774 Visual and Material Rhetorics (3). Addresses conceptual and practical issues in the rhetorical analysis and criticism of visual and material objects, practices, and events.

790 Seminar in Kenneth Burke (3). Seminar is an in-depth analysis of the writings of Kenneth Burke, concentrating on primary source materials.

792 Philosophy of Communication and Culture (3). Prerequisite, COMM 700. Considers the history of and developments in the philosophy of communication and culture, as well as the role these concepts have played in western philosophy.

798 Topics in Research Methods (3). Advanced study of selected topics in research methods. Topics vary.

811 Rhetorical Criticism (3). Prerequisite, COMM 571. Permission of the instructor for students lacking the prerequisite. Investigates the function of rhetorical criticism, the critical method, and a variety of approaches to the performance of rhetorical criticism.

812 Practicum in Rhetorical Criticism (3). Focuses on practice in writing rhetorical criticism and on mid-range theoretical concepts that inform critical analysis and argument.

821 Communication in Close Relationships (3). Prerequisite, COMM 620. Examination of contemporary theory and research on communication in close relationships. Topics include communication in relational formation, change, and termination.

822 Seminar in Family Communication (3). This course is an advanced seminar in which students may study family communication and produce original research.

824 Seminar in Feminist Studies in Communication (3). Prerequisite, COMM 722. This course compares and critically

evaluates the work of major feminist scholars in the field of communication.

825 Seminar in Interpersonal and Organizational Communication (3). A variable topic seminar that permits faculty and graduate students the opportunity to explore significant historical and emerging issues in the field of communication.

841 Performance Ethnography (FOLK 841) (3). This seminar focuses on methods of ethnography and fieldwork ethics. Performance as theory and practice informs methodological inquiries as well as the analysis of specific ethnographic texts and case studies.

842 Seminar in Performance and Cultural Studies (FOLK 842) (3). This course focuses on performance-related issues in the emergent field of cultural studies.

843 Seminar in Contemporary Performance Theory (FOLK 843) (3). An advanced graduate seminar, this course will address recent developments and problems in performance theory. It will consider cross- and multidisciplinary approaches to performance as sites for consideration and debate.

844 Seminar in Performance and History (3). This course explores diverse relations among performance and history, including the performance of life histories, the use of spectacle in history, everyday performances of historical protocols, and performance itself as an historical construct.

845 The Political Economy of Performance (3). This course examines social relations, particularly power relations, by focusing on resistance as performance and the performance of resistance arising from the dynamics and conflicts within specific locations of a political economy.

846 Performance Pedagogy (3). Draped in the political, economic, and domestic histories of western culture our current pedagogies still point out the world that matters to each new generation. We will study these pedagogies from the perspectives of institutions, economies, and human relationships they simultaneously reflect and work to transform.

849 Seminar in Culture and Identity (3). This course looks at issues of the representation and production of identity, subjectivity, and agency—in various forms—in the practices of media.

850 Seminar in Media Studies (3). Selected problems in media aesthetics. Exact topic to be covered is announced before classes begin.

851 Research Methods in Media and Cultural Studies (3). Graduate standing required. Introduction to the issues, methods, and materials of research in media and cultural studies.

852 Seminar in the History of Media (3). Application of historical research techniques to problems in the mass media. Exact topic is announced before classes begin. May be repeated.

853 Seminar in Popular Culture (3). This course will look at special topics in the study of popular culture. Designed for advanced graduate studies, it will consider critical responses to existing scholarship with original research.

854 Seminar in Media Difference (3). This seminar explores critical theories of difference and puts them into dialogue with media representations of difference.

855 Seminar in Cultural Studies (3). Prerequisite, COMM 755. This class explores the impact of some developments in postmodernism—as an interpretive, historical, and philosophical discourse on the possible development of cultural studies.

856 Seminar in Communication Technology (3). Prerequisite, COMM 700. Examines new communication technologies, their spatial and social diffusion, and how these relate to theories of culture, politics, and technology and the real-world contexts in which technologies are received. May be repeated.

857 Seminar in Cultural Studies and Popular Culture (3). Prerequisite, COMM 700. This course will focus on specific topics, issues, or queries of popular culture as these have been or can be studied within cultural studies.

858 Seminar in Feminist Studies of Film and Television (WMST 858) (3). Graduate standing required. This graduate seminar explores theoretical and practical points of contact between feminism, film, and television using psychoanalysis, narrative analysis, ideological analysis, and cultural studies.

859 Seminar in Media and Cultural Studies (3). This course, designed for advanced graduate students, will explore specialized topics in interpretive, critical, and cultural research in media studies.

860 Aesthetics and Communication (3). Explores how theories of aesthetics have struggled with notions of beauty, value, pleasure, and pain in the human communicative experience.

871 Rhetoric and Social Theory (3). This course will draw upon contemporary discussions in both rhetorical theory and critical social theory to explore a set of tensions in the western philosophical/political ideals of the public sphere and the political subject as a discursive agent within such public spaces **and venues.**

872 Public Policy Argument (3). Advanced theory and practice of public argument. Examines the history of the public sphere, critical theories of its operation, and its relevance to contemporary politics. Case studies change by semester.

873 African American Rhetoric (3). This course will examine the manner in which Black aesthetic and intellectual expressions and controversies function as public discourse in cultural politics.

874 Rhetorics of Space and Place (3). Considers place in relation to space and time. Primary concentration on implications of theorizing place as communicative practice rather than communicative context.

875 Rhetoric and Public Memory (3). Addresses the fundamentally rhetorical character of public memory. Analyzes theoretical presuppositions about memory. Openings for rhetorizing memory.

879 Topics in Rhetorical and Cultural Studies (3). Special problems in rhetorical and cultural studies. May be repeated.

900 Research Practicum (1–3). Permission of the internship coordinator. Individualized practical experience supervised by a faculty advisor and by the departmental coordinator of internships. May be repeated.

901 Directed Research (3). Permission of the instructor. Individual research on a problem defined by the graduate student and graduate faculty member in conference. May be repeated.

902 Research Practicum in Media and Cultural Studies (3–6). Prerequisites, COMM 750 and 851. Permission of the instructor. Individualized directed research by advanced students supervised by a member of the graduate faculty. May be repeated.

903 Research Practicum in Communication Studies (1–3). Individualized practical research.

904 Research Practicum in Communication Studies (1–3). Individualized practical research.

905 Research Practicum in Communication Studies (1–3). Individualized practical research.

906 Research Practicum in Communication Studies (1–3). Individualized practical research.

907 Research Practicum in Communication Studies (3). Individualized practical research.

909 Proseminar in Professional Development (1). This course advances graduate students' exposure to academic resources and common norms, practices, and procedures related to academic professionalism in Communication Studies.

992 Non-Thesis Option (3–9). Focuses on the development of a master's project or a major paper other than a thesis.

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–21).

Department of Computer Science

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ANSELMO A. LASTRA, *Chair*

Professors

Stanley Ahalt (82) Director of the Renaissance Computing Institute (RENCI); Signal, Image, and Video Processing; High-Performance Scientific and Industrial Computing; Pattern Recognition Applied to National Security Problems; High-Productivity, Domain-Specific Languages

James Anderson (62) Real-Time Systems, Distributed and Concurrent Algorithms, Multicore Computing, Operating Systems

Sanjoy K. Baruah (78) Scheduling Theory, Real-Time and Safety-Critical System Design, Computer Networks, Resource Allocation and Sharing in Distributed Computing Environments

Gary Bishop (39) Hardware and Software for Man-Machine Interaction, Assistive Technology, 3D Interactive Computer Graphics, Virtual Environments, Image-Based Rendering

Frederick P. Brooks Jr. (9) 3D Interactive Computer Graphics, Human-Computer Interaction, Virtual Worlds, Computer Architecture, the Design Process

Prasun Dewan (63) User Interfaces, Distributed Collaboration, Software Engineering Environments, Mobile Computing, Access Control

Henry Fuchs (11) Virtual Environments, Telepresence, Future Office Environments, 3D Medical Imaging, Computer Vision and Robotics

Kevin Jeffay (40) Computer Networking, Operating Systems, Real-Time Systems, Multimedia Networking, Performance Evaluation

Anselmo A. Lastra (52) Interactive 3D Computer Graphics, Hardware Architectures for Computer Graphics

Ming C. Lin (72) Physically Based and Geometric Modeling, Applied Computational Geometry, Robotics, Distributed Interactive Simulation, Virtual Environments, Algorithm Analysis, Many-Core Computing

Dinesh Manocha (58) Interactive Computer Graphics, Geometric and Solid Modeling, Robotics Motion Planning, Many-Core Algorithms

Fabian Monrose (91) Computer and Network Security, Biometrics and User Authentication

Stephen M. Pizer (6) Image Display and Analysis, Medical Imaging, Human and Computer Vision, Graphics

David A. Plaisted (28) Mechanical Theorem Proving, Term Rewriting Systems, Logic Programming, Algorithms

Jan F. Prins (33) High Performance Computing: Parallel Algorithms, Programming Languages, Compilers, and Architectures; Scientific Computing with Focus on Computational Biology and Bioinformatics

Michael K. Reiter (95) Computer and Network Security, Distributed Systems, Applied Cryptography

Jack S. Snoeyink (79) Computational Geometry, Algorithms for Geographical Information Systems and Structural Biology, Geometric Modeling and Computation, Algorithms and Data Structures, Theory of Computation

David Stotts (59) Computer-Supported Cooperative Work, Especially Collaborative User Interfaces; Software Engineering, Design Patterns and Formal Methods; Hypermedia and Web Technology

Associate Professors

Jan-Michael Frahm (97) Structure From Motion, Camera Self-Calibration, Camera Sensor Systems, Multi-Camera Systems, Multi-View Stereo, Robust Estimation, Fast Tracking of Salient Features in Images and Video, Computer Vision, Active Vision for Model Improvement, Markerless Augmented Reality

Jasleen Kaur Sahni (88) Design and Analysis of Networks and Distributed Systems, High-Speed Congestion Control, Resource Management, Internet Measurements, and Transport Protocols

Ketan Mayer-Patel (80) Multimedia Systems, Networking, Multicast Applications

Leonard McMillan (87) Computational Biology, Genetics, Genomics, Bioinformatics, Information Visualization, Data-Driven Modeling, Image Processing, Imaging Technologies, Computer Graphics

Marc Niethammer (98) Quantitative Image Analysis, Shape Analysis, Image Segmentation, Deformable Registration, Image-Based Estimation Methods

Montek Singh (84), High-Performance and Low-Power Digital Systems, Asynchronous and Mixed-Timing Circuits and Systems, VLSI CAD Tools, Energy-Efficient Graphics Hardware, Applications to Computer Security, Emerging Computing Technologies

Assistant Professors

Ron Alterovitz (99) Medical Robotics, Motion Planning, Physically Based Simulation, Assistive Robotics, Medical Image Analysis

Vladimir Jojic (124) Bioinformatics, Computational Biology, Machine Learning

Research Professors

Marc Pollefeys (89) Computer Vision, Image-Based Modeling and Rendering, Image and Video Analysis, Multi-View Geometry

Diane Pozefsky (93) Software Engineering and Environments, Computer Education, Serious Games Design and Development, Social, Legal and Ethical Issues Concerning Information Technology

F. Donelson Smith (42) Computer Networks, Operating Systems, Distributed Systems, Multimedia

Russell M. Taylor II (69) 3D Interactive Computer Graphics, Virtual Worlds, Distributed Computing, Scientific Visualization, Human-Computer Interaction

Gregory F. Welch (71) Human Motion Tracking Systems, 3D Telepresence, Projector-Based Graphics, Computer Vision and View Synthesis, Medical Applications of Computers

Research Associate Professor

Martin Styner (94) Medical Image Processing and Analysis Including Anatomical Structure and Tissue Segmentation, Morphometry Using Shape Analysis, Modeling and Atlas Building, Intra and Inter-Modality Registration

Mary C. Whitton (81) Developing and Evaluating Technology for Virtual and Augmented Reality Systems, Virtual Locomotion, Tools for Serious Games

Research Assistant Professors

Jay Aikat (126) Experimental Methods and Models in Networking Research and Education, Measurement and Modeling of Internet Traffic, Protocol Benchmarking, Internet Traffic Generation, Wireless Networks, Congestion Control and Active Queue Management

Enrique Dunn-Rivera (131) View Planning for Autonomous 3D Model Acquisition, Evolutionary Computation for Multi-Objective Opimization.

Lecturers

Tessa Joseph Nicholas (86) New Media Arts and Poetics, Digital Communities, Digital-Age Ethics

Leandra Vicci (35) Information Processing Hardware: Theory, Practice, Systems, and Applications; Computer-Integrated Magnetic Force Systems; Wave Optics, Tracking and Imaging; Electricity and Magnetism; Low Reynolds Number Fluid Dynamics; Biophysical Models of Mitotic Spindles; Quantum Theory

Adjunct Professors

Nicholas England (119) Systems Architectures for Graphics and Imaging, Scientific Visualization, Volume Rendering, Interactive Surface Modeling

Rob Fowler (110) High-Performance Computing

Guido Gerig (75) Image Analysis, Shape-Based Object Recognition, 3D Object Representation and Quantitative Analysis, Medical Image Processing

M. Gail Jones, (113) Science Education, Gender and Science, High-Stakes Assessment, Nanotechnology Education, Haptics and Learning

Ashok Krishnamurthy

J. Stephen Marron (114) Smoothing Methods for Curve Estimation

John McHugh (129) Computer and Network Security

Steven E. Molnar (108) Architectures for Real-Time Computer Graphics, VLSI-Based System Design, Parallel Rendering Algorithms

John Poulton (120) Graphics Architectures, VLSI-Based System Design, Design Tools, Rapid System Prototyping

Julian Rosenman (112) Computer Graphics for Treatment of Cancer Patients, Contrast Enhancement for X-Rays

Diane H. Sonnenwald (106) Collaboration among Multidisciplinary, Cross-Organizational Teams, Collaboration, Human Information Behavior, Digital Libraries

Richard Superfine (115) Condensed Matter Physics, Biophysics, Microscopy

Alexander Tropsha (111) Computer-Assisted Drug Design, Computational Toxicology, Cheminformatics, Structural Bioinformatics

Wei Wang (90) Bioinformatics and Computational Biology, Data Mining, Database Systems

Sean Washburn (116) Condensed Matter Physics, Materials Science

Turner Whitted (122)

Adjunct Associate Professors

Stephen R. Aylward (109) Computer-Aided Diagnosis, Computer-Aided Surgical Planning, Statistical Pattern Recognition, Image Processing, Neural Networks

Shawn Gomez (102) Bioinformatics, Computational Biology, Systems Biology

Chris Healey (105) Computer Graphics, Scientific Visualization, Perception and Cognitive Vision, Color, Texture, Databases, and Computational Geometry

Hye-Chung Kum (103) Social Welfare Intelligence and Informatics, Health Informatics, Government Informatics, Data Mining, KDD (Knowledge Discovery in Databases), Government Administrative Data

Lars Nyland (117) High Performance Computing, Hardware Systems, Computer Graphics and Image Analysis, Geometric Modeling and Computation

Dinggang Shen (104) Medical Image Analysis, Computer Vision, Pattern Recognition

Adjunct Assistant Professors

Derek Chiang (127)

Brad Davis (107) Image Analysis, Shape Analysis, Image Processing, Statistical Methods in Nonlinear Spaces, Medical Applications, Visualization, Software Engineering

Mark Foskey (118) Medical Image Analysis, Especially in Cancer Therapy, Geometric Computation

Svetlana Lazebnik (96) Object Recognition and Scene Interpretation; Internet Photo Collections; Reconstruction of 3D Objects from Photos/Video; Machine Learning Techniques for Visual Recognition Problems; Clustering and Vector Quantization; Nonlinear Dimensionality Reduction and Manifold Learning

Yun Li (128)

Ben Major

Ipek Oguz (125) Medical Image Analysis

William Valdar (130)

Professors Emeriti

Peter Calingaert

John H. Halton

Gyula A. Magó

John B. Smith

Donald F. Stanat

Stephen F. Weiss

Research Professor Emeritus

William V. Wright

The Department of Computer Science at UNC–Chapel Hill, established in 1964, was one of the first independent computer science departments in the United States. Its primary missions are research and graduate and undergraduate teaching. Research particularly emphasizes

- bioinformatics and computational biology
- computer architecture
- computer graphics
- computer-supported collaborative work
- computer vision
- databases and data mining
- geometric computing
- high-performance computing
- human-computer interaction
- medical image analysis
- networking
- real-time systems
- robotics
- security
- software engineering
- theory

The M.S. and Ph.D. curricula are oriented toward the design and application of real computer systems and toward that portion of theory that guides and supports practice. The Ph.D. program prepares teachers and researchers for positions with universities, government research

laboratories and industry. Academic employment ranges from four-year colleges, where teaching is the primary focus, to positions at major research universities. The M.S. program prepares highly competent and broadly skilled practitioners. A majority of the master's graduates work in industry, in companies ranging from small start-up operations to government labs and large research and development corporations.

Most of the department's approximately 150 graduate students are full-time. Students contribute to nearly every aspect of the department's operation. In addition to taking a wide variety of courses, they participate in groundbreaking research, teach, attend research group meetings, and can serve on committees that affect all aspects of life in the department.

The Computer Science Students Association sponsors both professional and social events and represents the students in departmental matters. Its president is a voting member at faculty meetings.

Facilities

The Department of Computer Science is housed in two adjacent buildings, the Frederick P. Brooks Jr. Computer Science Building and J. Carlyle Sitterson Hall. These two buildings are connected by hallways on all floors so that they function as a single, larger building.

The Brooks Building was dedicated in 2008 and named for the department's founding chair, Frederick P. Brooks Jr. It opened up 32,000 square feet of new research space, offices, and classrooms. These include a 50-seat classroom; the Stephen F. Weiss Seminar Room, with seating for 20 around a table; the Registrar's classroom, with theater seating for 80; and the Faculty Conference Room, which seats 50 at tiers of curved desktops. Meetings or discussion groups take place in the chair's conference room and in five smaller meeting areas, each with projectors. Perhaps the most striking area of the building is the new noise-controlled graphics lab, which is divided into three areas by floor-to-ceiling blackout curtains for light and sound suppression. It has 11-foot ceilings and a unistrut mounting grid to mount hardware as needed.

Sitterson Hall, which opened in 1987 and is named for former University Chancellor J. Carlyle Sitterson, provides 74,000 square feet of sophisticated, state-of-the-art research facilities and office space. It is organized in "clusters" to create research communities featuring shared laboratories and open conference areas to facilitate interaction among students and faculty. Included are the 60-seat C. Hugh Holman video teleclassroom, named for the former provost and dean of The Graduate School who was instrumental in establishing this department; a 125-seat auditorium; the Lib Moore Jones Classroom, named for the department's first secretary; a reading room; and various research laboratories, conference areas, and study areas.

Graduate students have access to all of the department's research and teaching facilities, including specialized research laboratories for graphics and image processing, computer building and design, and collaborative, distributed, and parallel systems. The laboratories, offices, conference areas, and classrooms are bound together by the department's fully integrated, distributed computing environment.

General Computing Environment

The department's computing environment includes over 1,000 computers, ranging from older systems used for generating network traffic for simulated Internet experiments to state-of-the-art workstations and clusters for graphics- and compute-intensive research. Departmental servers provide compute service, disk space, email, CVS (version control software), Web service, database services, backups, and many other services. All systems are integrated by means of high-speed networks and are supported by a highly skilled technical staff that provides a consistent computing environment throughout the department. Most students are assigned to a two- or three-person office, though we also have one larger office that can hold 11 students. Each student is assigned a computer, with computer assignments based on the students' research or teaching assignments and their seniority within the department. In addition to the departmental servers and office systems, our research laboratories contain a wide variety of specialized equipment and facilities.

General computing systems include 800+ Intel-based computers plus about 50 Macintosh systems. The department's most powerful system is the Biomedical Analysis and Simulation Supercomputer (BASS, pronounced like base), which consists of 452 CPUs tightly coupled to each other and to 180 GPU computing processors that function as image and geometry calculation accelerators, providing the equivalent computing power of more than 13,000 processors for image-intensive applications.

Our systems primarily run the Windows 7 operating system, with some still running Windows XP and a smaller number of systems, including many of the servers, running Red Hat Linux. We have other flavors of Linux as well, including some desktops and servers running Ubuntu and Fedora. In addition, a large number of network research systems run FreeBSD. We use the AFS file system for central file storage. Languages most commonly used include J++, C++, Java, and C. Document preparation is usually accomplished with standard applications on PC systems. Our extensive software holdings are continually evolving.

Libraries

Students have access to the entire University library system, which includes a major academic affairs library and numerous satellite libraries containing more than 6,000,000 books and periodicals, and access to libraries at North Carolina State, Duke, and North Carolina Central universities with a unified online searching capability. The Brauer Library, located in adjacent Phillips Hall, is a satellite library with extensive holdings in computer science, mathematics, operations research, physics, and statistics.

Degree Requirements

Graduate Curriculum

A flexible course of study for the M.S. and Ph.D. degrees focuses on areas of choice and accommodates differences in students' backgrounds. The two degree programs share a basic distribution requirement chosen from theory and formal thinking, systems and hardware, and applications subject areas. The Ph.D. program includes work in specialized areas, preparation for teaching, and active involvement in advanced research.

Master of Science

An M.S. candidate must earn 30 semester hours of credit in courses numbered 400 or higher, of which up to six hours may be transferred from another institution or graduate program, and of which 18 hours must be completed in the Computer Science Department. A candidate must also satisfy the program product requirement and must demonstrate the ability to write a professional-quality technical document. A comprehensive exam (written or oral) is required for degree completion. For more in-depth information see www.cs.unc.edu/cms/academics/graduate-programs/mastersreqofficial.

Doctor of Philosophy

Admission to the doctoral program is by a vote of the department faculty and is determined by performance on the preliminary research presentation and exam, course grades, admissions information, accomplishment on assistantships, and other testimony from the faculty. Admission is normally considered following the research presentation

and exam. Students who have been major contributors to a paper submitted to a well-known, refereed conference or journal may apply for a waiver of the admissions exam. There is no credit hour requirement for the Ph.D. program, but a Ph.D. candidate must complete courses to satisfy the distribution requirement and any needed background preparation, and must write a comprehensive paper. A candidate must also satisfy the program product requirement, teach a course, participate in the technical communication seminar, pass an oral examination in the proposed dissertation area, and submit and defend a dissertation that presents an original contribution to knowledge. The normal time needed to complete the degree by a full-time student with an assistantship is five years. For more in-depth information see www.cs.unc.edu/cms/academics/graduate-programs/doctoralreqofficial.

Admissions and Financial Aid

Admission to the department is highly competitive and preference is given to applicants who are solidly prepared. Although the department welcomes promising students from all disciplines, entering students must have a substantial background in both mathematics and computer science. This background normally includes at least six semester courses in mathematics and six in computer science. Students who are admitted but who have not completed all the requirements must complete them after admission. For more in-depth information on the admissions process see www.cs.unc.edu/cms/admissions/admissions-graduate-programs/admitreq and gradschool.unc.edu/admissions/.

Sponsorship. Because of the large number of applicants, the department's faculty members are unable to provide individual assessments of an applicant's chances for admission. Applicants cannot improve their chances of admission by finding a faculty sponsor within the department, because all admissions decisions are made by a faculty committee that reviews all applications, ranks the applicants by overall merit, and makes decisions on admission and financial support based on the application material submitted. Students are assigned to specific research projects just prior to the start of each semester, after faculty members and students have had an opportunity to meet and to discuss their interests.

Deadlines. Applicants for fall admission are encouraged to submit all application materials, complete with a personal statement, all transcripts and recommendations to The Graduate School by January 1. To ensure meeting that deadline, applicants are encouraged to take the Graduate Record Examination (GRE) no later than December 1. Early submission of applications is encouraged. International applicants should complete their applications earlier to allow time for processing financial and visa documents.

For more information, send electronic mail to admit@cs.unc.edu. Interested persons are encouraged to visit the department's Web site, www.cs.unc.edu.

Courses for Graduate and Advanced Undergraduate Students

COMP

401 Foundation of Programming (4). A first formal course in computer programming required. Advanced programming: Program specifications, preconditions, postconditions, loop invariants. Linear data structures, searching, and sorting. Algorithm paradigms and analysis.

410 Data Structures (3). Prerequisite, COMP 401. The analysis of data structures and their associated algorithms. Abstract data types, lists, stacks, queues, trees, and graphs. Sorting, searching, hashing.

411 Computer Organization (4). Prerequisite, COMP 401. Digital logic, circuit components. Data representation, computer architecture and implementation, assembly language programming.

416 Introduction to WWW Programming (3). Prerequisite, COMP 401. Developing browser-based applications for the World Wide Web. Introduction to XHTML, CSS, HTTP, and client-side programming. This course is intended for nonmajors and prospective minors and does not count toward the major.

426 Advanced WWW Programming (3). Prerequisite, COMP 410. Developing applications for the World Wide Web including both client-side and server-side programming. Emphasis on Model-View-Controller architecture, AJAX, RESTful Web services, and database interaction.

431 Internet Services and Protocols (3). Prerequisites, COMP 410 and 411. Application-level protocols HTTP, SMTP, FTP, transport protocols TCP and UDP, and the network-level protocol IP. Internet architecture, naming, addressing, routing, and DNS. Sockets programming. Physical-layer technologies. Ethernet, ATM, and wireless.

455 Models of Languages and Computation (3). Prerequisites, COMP 110 or 401, and MATH 381. Introduction to the theory of computation. Finite automata, regular languages, pushdown automata, context-free languages, and Turing machines. Undecidable problems.

486 Applications of Natural Language Processing (INLS 512) (3). See INLS 512 for description.

487 Information Retrieval (INLS 509) (3). See INLS 509 for description.

493 Computer Science Internship (3). Permission of the director of undergraduate studies. Computer science majors only. Work experience in nonelementary computer science. May be repeated for up to six credits.

496 Independent Study in Computer Science (1–3). Permission of the director of undergraduate studies. Computer science majors only. For advanced majors in computer science who wish to conduct an independent study or research project with a faculty supervisor. May be taken repeatedly for up to a total of six credit hours.

520 Compilers (3). Prerequisites, COMP 410 and 411. Design and construction of compilers. Theory and pragmatics of lexical, syntactic, and semantic analysis. Interpretation. Code generation for a modern architecture. Run-time environments. Includes a large compiler implementation project.

521 Files and Databases (3). Prerequisites, COMP 410 and 411 and MATH 381. Placement of data on secondary storage. File organization. Database history, practice, major models, system structure and design.

523 Software Engineering Laboratory (4). Prerequisites, COMP 410 and 411 and two or more three-credit COMP courses numbered 426 or higher. Organization and scheduling of software engineering projects, structured programming, and design. Each team designs, codes, and debugs program components and synthesizes them into a tested, documented program product.

524 Programming Language Concepts (3). Prerequisite, COMP 410. Concepts of high-level programming and their realization in specific languages. Data types, scope, control structures, procedural abstraction, classes, concurrency. Run-time implementation.

530 Operating Systems (3). Prerequisites, COMP 410 and 411. Types of operating systems. Concurrent programming. Management of storage, processes, devices. Scheduling, protection. Case study. Course includes a programming laboratory.

535 Introduction to Computer Security (3). Prerequisites, COMP 410 and MATH 381. Principles of securing the creation, storage, and transmission of data and ensuring its integrity, confidentiality, and availability. Topics include access control, cryptography and cryptographic protocols, network security, and online privacy.

536 Enterprise Computing (3). Prerequisite, COMP 426. Designing and building enterprise systems. Basic principles, design considerations, and technologies for large multiserver systems. Requirements include a project in which teams design and build a substantial system.

541 Digital Logic and Computer Design (4). Prerequisite, COMP 411. This course is an introduction to digital logic as well as the structure and electronic design of modern processors. Students will implement a working computer during the laboratory sessions.

550 Algorithms and Analysis (3). Prerequisites, COMP 410 and MATH 381. Formal specification and verification of programs. Techniques of algorithm analysis. Problem-solving paradigms. Survey of selected algorithms.

555 Bioalgorithms (3). Prerequisites, COMP 410 and MATH 381. Bioinformatics algorithms. Topics include DNA restriction mapping, finding regulatory motifs, genome rearrangements, sequence alignments, gene prediction, graph algorithms, DNA sequencing, protein sequencing, combinatorial pattern matching, approximate pattern matching, clustering and evolution, tree construction, Hidden Markov Models, randomized algorithms.

575 Introduction to Computer Graphics (3). Prerequisites, COMP 410 and MATH 547. Hardware, software, and algorithms for computer graphics. Scan conversion, two-dimensional and three-dimensional transformations, object hierarchies. Hidden surface removal, clipping, shading, and antialiasing. Not for graduate computer science credit.

580 Enabling Technologies (3). Prerequisite, COMP 410. We will investigate ways computer technology can be used to mitigate the effects of disabilities and the sometimes surprising response of those we intended to help.

581 Introduction to Robotics (4). Prerequisites, COMP 401 and 410. Permission of the instructor for students lacking the prerequisites. Hands-on introduction to robotics with a focus on the computational aspects. Students will build and program mobile robots. Topics include kinematics, actuation, sensing, configuration spaces, control, and motion planning. Applications include industrial, mobile, personal, and medical robots.

585 Serious Games (3). Prerequisite, COMP 410 or 411. Concepts of computer game development and their application beyond entertainment to fields such as education, health, and business. Course includes team development of a game.

590 Topics in Computer Science (1–21). Permission of the instructor. This course has variable content and may be taken multiple times for credit.

593 Co-op Experience (6–12). Permission of the director of undergraduate studies. Computer science majors only. Practical extension of computer science knowledge through industrial work experience. Pass/Fail only. Does not count in the computer science major or minor.

631 Computer Networks (3). Required preparation, a first course in operating systems, a first course in networking (e.g., COMP 431 and 530), and knowledge of probability and statistics. Topics in computer networks, including link layer protocols, switching, IP, TCP, and congestion control. Additional topics may include peer-to-peer infrastructures, network security, and multimedia applications.

633 Parallel and Distributed Computing (3). Required preparation, a first course in operating systems and a first course in algorithms (e.g., COMP 530 and 550). Principles and practices of parallel and distributed computing. Models of computation. Concurrent programming languages and systems. Architectures. Algorithms and applications. Practicum.

651 Computational Geometry (3). Required preparation, a first course in algorithms (e.g., 550). Design and analysis of algorithms and data structures for geometric problems. Applications in graphics, CAD/CAM, robotics, GIS, and molecular biology.

655 Cryptography (3). Prerequisites, COMP 455 and STOR 435. Permission of the instructor for students lacking the prerequisites. Introduction to the design and analysis of cryptographic algorithms. Topics include basis of abstract algebra and number theory, symmetric and asymmetric encryption algorithms, cryptographic hash functions, message authenication codes, digital signature schemes, elliptic curve algorithms, side-channel attacks, and selected advanced topics.

662 Scientific Computation II (ENVR 662, MATH 662) (3). See MATH 662 for description.

665 Images, Graphics, and Vision (3). Required preparation, a first course in data structures and a first course in discrete mathematics (e.g., COMP 410 and MATH 383). Display devices and procedures. Scan conversion. Matrix algebra supporting viewing transformations in computer graphics. Basic differential geometry. Coordinate systems, Fourier analysis, FDFT algorithm. Human visual system, psychophysics, scale in vision.

Courses for Graduate Students

COMP

715 Visualization in the Sciences (MTSC 715, PHYS 715) (3). Computational visualization applied in the natural sciences. For both computer science and natural science students. Available techniques and their characteristics, based on human perception, using software visualization toolkits. Project course.

720 Compilers (3). Prerequisites, COMP 455, 520, and 524. Tools and techniques of compiler construction. Lexical, syntactic, and semantic analysis. Emphasis on code generation and optimization.

721 Database Management Systems (3). Prerequisites, COMP 521 and 550. Database management systems, implementation, and theory. Query languages, query optimization, security, advanced physical storage methods and their analysis.

722 Data Mining (3). Prerequisites, COMP 550 and STOR 435. Data mining is the process of automatic discovery of patterns, changes, associations, and anomalies in massive databases. This course provides a survey of the main topics (including and not limited to classification, regression, clustering, association rules, feature selection, data cleaning, privacy, and security issues) and a wide spectrum of applications.

723 Software Design and Implementation (3). Prerequisites, COMP 524 and 550. Principles and practices of software engineering. Object-oriented and functional approaches. Formal specification, implementation, verification, and testing. Software design patterns. Practicum.

724 Programming Languages (3). Prerequisites, COMP 455, 520, and 524. Selected topics in the design and implementation of modern programming languages. Formal semantics. Type theory. Inheritance. Design of virtual machines. Garbage collection. Principles of restructuring compilers.

730 Operating Systems (3). Prerequisite, COMP 530. Theory, structuring, and design of operating systems. Sequential and cooperating processes. Single processor, multiprocessor, and distributed operating systems.

734 Distributed Systems (3). Prerequisite, COMP 431. Permission of the instructor for students lacking the prerequisite. Design and implementation of distributed computing systems and services. Inter-process communication and protocols, naming and name resolution, security and authentication, scalability, high availability, replication, transactions, group communications, distributed storage systems.

735 Distributed and Concurrent Algorithms (3). Prerequisites, COMP 530 and 550. Verification of concurrent systems. Synchronization; mutual exclusion and related problems, barriers, rendezvous, nonblocking algorithms. Fault tolerance: consensus, Byzantine agreement, self-stabilization. Broadcast algorithms. Termination and deadlock detection. Clock synchronization.

737 Real-Time Systems (3). Prerequisite, COMP 530. Taxonomy and evolution of real-time systems. Timing constraints. Design, implementation, and analysis of real-time systems. Theory of deterministic scheduling and resource allocation. Case studies and project.

740 Computer Architecture and Implementation (3). Prerequisites, COMP 411 and PHYS 352. Architecture and implementation of modern single-processor computer systems. Performance measurement. Instruction set design. Pipelining. Instruction-level parallelism. Memory hierarchy. I/O system. Floating-point arithmetic. Case studies. Practicum.

741 Elements of Hardware Systems (3). Prerequisite, COMP 411. Issues and practice of information processing hardware systems for computer scientists with little or no previous hardware background. System thinking, evaluating technology alternatives, basics of electronics, signals, sensors, noise, and measurements.

744 VLSI Systems Design (3). Prerequisite, COMP 740. Required preparation, knowledge of digital logic techniques. Introduction to the design, implementation, and realization of very large-scale integrated systems. Each student designs a complete digital circuit that will be fabricated and returned for testing and use.

750 Algorithm Analysis (3). Prerequisites, COMP 455 and 550. Algorithm complexity. Lower bounds. The classes P, NP, PSPACE and co-NP; hard and complete problems. Pseudo-polynomial time algorithms. Advanced data structures. Graph-theoretic, number-theoretic, probabilistic, and approximation algorithms.

752 Mechanized Mathematical Inference (3). Prerequisite, COMP 825. Propositional calculus. Semantic tableaux. Davis-Putnam algorithm. Natural deduction. First-order logic. Completeness. Resolution. Problem representation. Abstraction. Equational systems and term rewriting. Specialized decision procedures. Nonresolution methods.

761 Introductory Computer Graphics (1). A computer graphics module course with one credit hour of specific COMP 665 content.

762 Discrete Event Simulation (STOR 762) (3). See STOR 762 for description.

763 Semantics and Program Correctness (3). Prerequisite, COMP 724. Formal characterization of programs. Denotational semantics and fixed-point theories. Proof of program correctness and termination. Algebraic theories of abstract data types. Selected topics in the formalization of concurrent computation

764 Monte Carlo Method (3). Prerequisites, COMP 110, MATH 233, 416, 418, and STAT 435. Permission of the instructor for students lacking the prerequisites. Relevant probability and statistics. General history. Variance reduction for sums and integrals. Solving linear and nonlinear equations. Random, pseudorandom generators; random trees. Sequential methods. Applications.

766 Visual Solid Shape (3). Prerequisites, MATH 233 and 416. 3D differential geometry; local and global shape properties; visual aspects of surface shape. Taught largely through models and figures. Applicable to graphics, computer vision, human vision, and biology.

767 Geometric and Solid Modeling (3). Prerequisites, COMP 575 or 770, and MATH 661. Curve and surface representations. Solid models. Constructive solid geometry and boundary representations. Robust and error-free geometric computations. Modeling with algebraic constraints. Applications to graphics, vision, and robotics.

768 Physically Based Modeling and Simulation (3). Prerequisite, COMP 665.Permission of the instructor for students lacking the prerequisite. Geometric algorithms, computational methods, simulation techniques for modeling based on mechanics and its applications.

770 Computer Graphics (3). Prerequisites, COMP 665 and 761. Study of graphics hardware, software and applications. Data structures, graphics, languages, curve surface and solid representations, mapping, ray tracing and radiosity.

775 Image Processing and Analysis (BMME 775) (3). See BMME 775 for description.

776 Computer Vision in our 3D World (3). Prerequisites, MATH 416, 566, COMP 550, 665, and 775. Permission of the instructor for students lacking the prerequisites. Fundamental problems of computer vision. Projective geometry. Camera models, camera calibration. Shape from stereo, epipolar geometry. Photometric stereo. Optical flow, tracking, motion. Range finders, structured light. Object recognition.

781 Robotics (3). Prerequisites, COMP 550 and MATH 547. Permission of the instructor for students lacking the prerequisitues. Introduction to the design, programming, and control of robotic systems. Topics include kinematics, dynamics, sensing, actuation, control, robot learning, tele-operation, and motion planning. Applications will be discussed including industrial, mobile, assistive, personal, and medical robots.

782 Motion Planning in Physical and Virtual Worlds (3). Prerequisite, COMP 550. Permission of the instructor for students lacking the prerequisite. Topics include path planning for autonomous agents, sensor-based planning, localization and mapping, navigation, learning from demonstration, motion planning with dynamic constraints, and planning motion of deformable bodies. Applications to robots and characters in physical and virtual worlds will be discussed.

787 Visual Perception (3). Prerequisites, COMP 665 and PSYC 730. Surveys form, motion, depth, scale, color, brightness, texture and shape perception. Includes computational modeling of vision, experimental methods in visual psychophysics and neurobiology, recent research and open questions.

788 Expert Systems (3). Prerequisite, COMP 750. Languages for knowledge engineering. Rules, semantic nets, and frames. Knowledge acquisition. Default logics. Uncertainties. Neural networks.

790 Topics in Computer Science (1–21). Permission of the instructor. This course has variable content and may be taken multiple times for credit.

822 Topics in Discrete Optimization (STOR 822) (3). See STOR 822 for description.

824 Functional Programming (3). Prerequisite, COMP 524. Programming with functional or applicative languages. Lambda calculus; combinators; higher-order functions; infinite objects. Least fixed points, semantics, evaluation orders. Sequential and parallel execution models.

825 Logic Programming (3). Prerequisite, COMP 524. Propositional calculus, Horn clauses, first-order logic, resolution. Prolog: operational semantics, relationship to resolution, denotational semantics, and nonlogical features. Programming and applications. Selected advanced topics.

831 Internet Architecture and Performance (3). Prerequisite, COMP 431. Permission of the instructor for students lacking the prerequisite. Internet structure and architecture; traffic characterization and analysis; errors and error recovery; congestion and congestion control; services and their implementations; unicast and multicast routing.

832 Multimedia Networking (3). Prerequisites, COMP 431 and 530. Audio/video coding and compression techniques and standards. Media streaming and adaptation. Multicast routing, congestion, and error control. Internet protocols RSVP, RTP/RTCP. Integrated and differentiated services architecture for the Internet.

841 Advanced Computer Architecture (3). Prerequisite, COMP 740. Concepts and evolution of computer architecture, machine language syntax and semantics; data representation; naming and addressing; arithmetic; control structures; concurrency; input-output systems and devices. Milestone architectures.

842 Advanced Computer Implementation (3). Prerequisite, COMP 740. Required preparation, knowledge of digital logic techniques. The application of digital logic to the design of computer hardware. Storage and switching technologies. Mechanisms for addressing, arithmetic, logic, input/output and storage. Microprogrammed and hardwired control.

844 Advanced Design of VLSI Systems (3). Prerequisite, COMP 744. Advanced topics in the design of digital MOS systems. Students design, implement, and test a large custom integrated circuit. Projects emphasize the use of advanced computer-aided design tools.

850 Advanced Analysis of Algorithms (3). Prerequisite, COMP 750. Design and analysis of computer algorithms. Time and space complexity; absolute and asymptotic optimality. Algorithms for searching, sorting, sets, graphs, and pattern-matching. NP-complete problems and provably intractable problems.

870 Advanced Image Synthesis (3). Prerequisite, COMP 770. Advanced topics in rendering, including global illumination, surface models, shadings, graphics hardware, image-based rendering, and antialiasing techniques. Topics from the current research literature.

872 Exploring Virtual Worlds (3). Prerequisite, COMP 870. Project course, lecture, and seminar on real-time interactive 3D graphics systems in which the user is "immersed" in and interacts with a simulated 3D environment. Hardware, modeling, applications, multi-user systems.

875 Recent Advances in Image Analysis (3). Prerequisite, COMP 775. Lecture and seminar on recent advances in image segmentation, registration, pattern recognition, display, restoration, and enhancement.

892 Practicum (0.5). Permission of the instructor. Work experience in an area of computer science relevant to the student's research interests and pre-approved by the instructor. The grade, pass or fail only, will depend on a written report by the student and on a written evaluation by the employer.

910 Computer Science Module (0.5–21). A variable-credit module course that can be used to configure a registration for a portion of a class.

911 Professional Writing in Computer Science (3). Graduate computer science majors only. Analysis of good and bad writing. Exercises in organization and composition. Each student also writes a thesis-quality short technical report on a previously approved project.

915 Technical Communication in Computer Science (1). Graduate computer science majors or permission of the instructor. Seminar on teaching, short oral presentations, and writing in computer science.

916 Seminar in Professional Practice (1). Required preparation, satisfaction of M.S. computer science program product requirement. The role and responsibilities of the computer scientist in a corporate environment, as an entrepreneur, and as a consultant. Professional ethics.

917 Seminar in Research (1). Graduate computer science majors only. The purposes, strategies, and techniques for conducting research in computer science and related disciplines.

918 Research Administration for Scientists (3). Graduate standing required. Introduction to grantsmanship, research grants and contracts, intellectual property, technology transfer, conflict of interest policies. Course project: grant application in NSF FastLane.

980 Computers and Society (1). Graduate computer science majors only. Seminar on social and economic effects of computers on such matters as privacy, employment, power shifts, rigidity, dehumanization, dependence, quality of life.

990 Research Seminar in Computer Science (1–21). Permission of the instructor. Seminars in various topics offered by members of the faculty.

991 Reading and Research (1–21). Permission of the instructor. Directed reading and research in selected advanced topics.

992 Computer Science Master's Project (Non Thesis Option) (3–21). Permission of the department.

993 Master's Thesis (3–6). Permission of the department.

994 Doctoral Dissertation (3–9). Permission of the department.

School of Dentistry

www.dentistry.unc.edu
JANE A. WEINTRAUB, *Dean*

Professors

Roland R. Arnold, Immunology, Host-Microbial Biology
James D. Beck, Oral Epidemiology
Lyndon Cooper, Bone Cell Physiology, Implantology
Terry Donovan, Operative Dentistry and Dental Materials
Greg Essick, Dental Research Center
Eric Everett, Associate Dean for Research, Pediatric Dentistry
Richard Gracely, Endodontics
Janet Guthmiller, Associate Dean for Academic Affairs, Periodontology
H. Garland Hershey, Orthodontics
Harald Heymann, Operative Dentistry, Biomaterials
Ching-Chang Ko, Orthodontics
Jessica Lee, Pedatric Dentistry
John Ludlow, Oral and Maxillofacial Radiology

William Maixner, Neurobiology, Pain Perception and Modulation, Pain Management, Endodontics
Sally Mauriello, Dental Hygiene
Kenneth N. May Jr., Operative Dentistry
Valerie Murrah, Oral Carcinogenesis, Salivary Gland Malignancies
Steven Offenbacher, Inflammatory Mediators, Host Response, Periodontal, Systemic Diseases
Lauren Patton, Oral Medicine, Dental Ecology
Ceib Phillips, Assistant Dean for Advanced Education/Graduate Programs, Orthodontics
William Proffit, Orthodontics
Andre Ritter, Operative Dentistry
Emile Rossouw, Orthodontics
Gary Slade, Oral Epidemiology
John W. Stamm, Oral Epidemiology
Ronald P. Strauss, Medical Sociology and Health Promotion/Disease Prevention
Edward J. Swift, Operative Dentistry
Timothy Turvey, Consequences of Craniofacial and Maxillofacial Surgery
Donald A. Tyndall, Oral and Maxillofacial Radiology
Raymond P. White Jr., Oral Surgery Therapies
Aldridge Wilder, Clinical and Laboratory Dental Materials Research
Rebecca Wilder, Dental Hygiene
J. Tim Wright, Pediatric Dentistry
Mitsuo Yamauchi, Collagen Biochemistry, Physiology and Metabolism of Bone

Associate Professors
Silvana Barros, Periodontology
Alice Curran, Oral Pathology
Luda Diatchenko, Endodontics
Sylvia Frazier-Bowers, Orthodontics
Albert Guckes, Prosthodontics
Lorne D. Koroluk, Pediatric Dentistry and Orthodontics
Mark Kutcher, Oral Medicine
Glenn E. Minsley, Prosthodontics
Rocio Quinonez, Pediatric Dentistry
Eric Rivera, Endodontics
Rose Sheats, Orthodontics
John Sturdevant, Operative Dentistry
Jennifer Webster-Cyriaque, Oral Medicine, Dental Ecology
David Zajac, Craniofacial Disorders
Thomas Ziemiecki, Prosthodontics
Lee Boushell, Operative Dentistry
Andrea Nackley, Endodontics

Assistant Professors
Sompop Bencharit, Prosthodontics
Xi Chen, Dental Ecology
Ingeborg DeKok, Prosthodontics
Asma Khan, Endodontics
Tung Nguyen, Orthodontics
Anne Sanders, Dental Ecology

Clinical Professors
Ralph Leonard, Diagnostic Sciences and General Dentistry
Samuel Nesbit, Diagnostic Sciences and General Dentistry
Luis Pimenta, Dental Ecology
Enrique Platin, Oral and Maxillofacial Radiology
Michael Roberts, Pediatric Dentistry
Clinical Associate Professors
Jay Anderson, Oral Surgery
Carlos Barrero, Prosthodontics
George H. Blakey, Oral and Maxillofacial Surgery, Anesthesia
Richard Eidson, Operative Dentistry
Carol Haggerty, Diagnostic Sciences
Robert Hollowell, Dental Ecology, Hospital Dentistry
Lewis Lampiris, Dental Ecology, DISC
Michael Milano, Pediatric Dentistry
Shannon Mitchell, Dental Ecology
Antonio Moretti, Periodontology
Vickie P. Overman, Dental Hygiene
Ricardo Padilla, Diagnostic Sciences
James Parker, Operative Dentistry
Glenn Reside, Oral and Maxillofacial Surgery
Allen Samuelson, Dental Ecology
Douglas Solow, Diagnostic Sciences and General Dentistry
Margot Stein, Dental Ecology

Clinical Assistant Professors
Jennifer Brame, Dental Hygiene
Hong Chen, Endodontics
Derek Duggan, Endodontics
Ibrahim Duqum, Prosthodontics
Lynn Fox, Dental Ecology
Glenn Garland, Diagnostic Sciences and General Dentistry
Brent Golden, Oral Surgery
Matthew Hopfensperger, Prosthodontics
Lynne Hunt, Dental Ecology
Pei Feng Lim, Endodontics
Gustavo Mendonca, Prosthodontics
Andre Mol, Oral and Maxillofacial Radiology
Thiago Morelli, Periodontology
Amy Nguyen, Dental Hygiene
Jongbae Park, Endodontics
Jonathan Reside, Periodontology
Lynn Smith, Dental Assisting
Lisa Stoner, Prosthodontics
Peter Tawil, Endodontics
Karen Tiwana, Urgent Care
Research Assistant Professors
Eric Bair, Endodontics
Kimon Divaris, Pediatric Dentistry
Shad Smith, Endodontics
Inna Tchivileva, Endodontics

Professors Emeriti
Kent W. Healey
Phillip Hirsch

Graduate instruction in the School of Dentistry is offered in dental hygiene education, endodontics, operative dentistry, oral biology, oral epidemiology, oral and maxillofacial pathology, oral and maxillofacial radiology, oral and maxillofacial surgery, orthodontics, pediatric dentistry, periodontology, and prosthodontics and in the Curriculum in Oral Biology.

The specialty practice programs, endodontics, operative dentistry, oral and maxillofacial pathology, oral and maxillofacial radiology, orthodontics, pediatric dentistry, periodontology, and prosthodontics, are dual specialty certificate and master of science degree programs. The minimum requirements for the certificate are prescribed by the Commission on Dental Accreditation of the American Dental Association (CODA) and the respective specialty boards for the approved CODA specialties. The master of science degree is conferred by the University of North Carolina Graduate School and requires the successful completion of required course work, oral and/or written

comprehensive examinations, a research project, and a thesis. Graduates who possess an appropriate degree and who meet the requirements of The Graduate School are considered for admission. Enrollment for study in these specialty programs requires approximately three years of residency. The curricula have been designed to permit maximum flexibility in preparation for practice, teaching, and/or research, as well as to meet the educational requirements of the specialty boards.

Other advanced education programs available within the School of Dentistry include the dental hygiene education program, oral biology, oral epidemiology, and oral and maxillofacial surgery. The oral biology and oral epidemiology programs lead to the doctoral degree (Ph.D.) and require four or more years to complete. The dental hygiene education program spans two years and is a master of science program designed to prepare dental hygienists for teaching, research, or corporate employment. The Oral and Maxillofacial Surgery program is a six-year dual degree (M.D.) program with a certificate in oral and maxillofacial surgery

Information regarding admission, entrance requirements, and/or curricula of a specific advanced education program may be obtained online at www.dentistry.unc.edu/academic or www.unc.edu/gradrecord/programs/dentistry.html.

Tuition and Fees

Tuition and fees are subject to change at any meeting of NC Board of Trustees and a yearly increase should be anticipated each year. Tuition and fees apply for all years of study and training. Current tuition and fees for in-state and nonresidents may be obtained online at www.unc.edu/ugradbulletin/finances.html. Required instruments, books, computers, and laboratory fees are determined by each program. Tuition and fees are due at the time of registration.

Student loans are available on the same basis as for undergraduates. Additional information can be obtained online at admissions.unc.edu/Aid_and_Scholarships/default.html.

Oral Biology

Oral biology is a highly translational, multi-disciplinary program of study that focuses on the growth, development, and pathologies of the craniofacial complex and associated physiological structures, as well as the study of disease and healing mechanisms related to these structures. The program has three concentrations:

- Host-Pathogen Interactions
- Pain Neurobiology
- Skeletal Biology and Extracellular Matrices

The discipline of oral biology applies and extends the concepts of immunology, embryology, physiology, cellular and molecular biology, neurobiology, pharmacology, microbiology, and biochemistry to understanding the growth and development and pathologies associated with the craniofacial complex and oral cavity. Attention in dental research and practice is now focusing on the dynamics of oral disease and prevention and treatment at the earliest stages of development, including research on risk factors for disease as well as the cellular and molecular events in disease pathogenesis. Molecular approaches for oral disease analysis and the complexity of disease elements require advanced training in the discipline of oral biology. Modern biomedical research is also identifying systemic relationships between oral conditions, health status, and diseases such as atherosclerosis, HIV, and cancer; the oral cavity also offers an ideal model to study biological structures and cellular mechanisms important throughout the body and important in immune response.

The Concentration in Host-Pathogen Interactions focuses on chronic inflammatory conditions and encompasses the study of infectious diseases and host responses. This concentration focuses on the underlying pathologies associated with infectious diseases, as well as the nature and regulation of host responses which result in acute and chronic inflammatory disorders, in order to develop therapeutic approaches to the treatment of these conditions. The Concentration in Pain Neurobiology encompasses a translational approach to study maladaptive pain conditions. This concentration integrates genetics, molecular biology, animal models, psychophysical testing, neuroimaging, and clinical epidemiological approaches to better understand the mechanisms driving chronic pain as well as to identify unique markers for diagnosis and treatment. The Concentration in Skeletal Biology and Extracellular Matrices encompasses the study of the development, structure and function of mineralized and connective tissues. This program uses basic, translational, and biomedical engineering approaches to the study of bone, tooth and connective tissue physiology, pathology and repair.

Expertise and authority in these particular concepts are well-represented within the research and training qualifications of program faculty located in numerous UNC programs and departments, including the School of Dentistry, School of Medicine, Lineberger Comprehensive Cancer Center, the Neurosciences Center, the Center for Cystic Fibrosis, and the Center for AIDS Research.

Curricular requirements are based on training areas, with common core requirements for all students. Research interests and qualifications will also determine course requirements. Research is a key element of the program, and students start laboratory rotations during their first semester to allow maximum time for research involvement.

Admissions

There are two pathways for admission to the Curriculum in Oral Biology:

1) Direct Application to Oral Biology:

   Individuals (domestic or international) *with a doctoral or biomedical professional degree,* including DDS, DMD, MD or equivalent, should apply directly to the program through the UNC Graduate School: gradschool.unc.edu

2) Application through Biological and Biomedical Sciences Program:

   Individuals (domestic or international) *without* an advanced professional biomedical degree must apply through the Biological and Biomedical Sciences Program (BBSP): www.med.unc.edu/bbsp

Research Facilities

The Curriculum in Oral Biology graduate program is located in the North Carolina School of Dentistry. The central base for much of the basic science research in the curriculum is in the Koury Oral Health Sciences Building with access to SEM/TEM microscopy, tissue culture facilities, anaerobic microbiology support, ALAC-accredited animal facilities, computers and software for image analyses/enhancement and finite element analyses, and a clinical research unit, which includes an eight-patient operatory. Biostatistical assistance is readily available as well as medical illustration, photography, radiology, and grants management.

Financial Aid

Graduate research assistantships are awarded competitively for students accepted into the oral biology Ph.D. program. These competitive assistantships provide support through program resources during the first year with health insurance, and may include a special tuition rate for out-of-state students. Support for dissertation research (beginning

in the student's second year) is generally made available by faculty mentors. Students are eligible for financial aid through The UNC Office of Scholarships & Student Aid. International students are encouraged to contact the International Student & Scholar Services for resource contacts if financial aid is needed.

Correspondence and information:

Cindy Blake
Graduate Program Manager
Oral Biology Ph.D. Program
School of Dentistry
5502 Koury Oral Health Sciences Building, The University of North Carolina at Chapel Hill
Chapel Hill, NC 27599-7455
Telephone: (919) 537-3230 Fax: (919) 966-3683
Web: www.dentistry.unc.edu.

Dual Degree Program in Oral Biology and Doctor of Dental Surgery (D.D.S.)

There is an opportunity for students who have an interest in pursuing both a Ph.D. degree in oral biology with The Graduate School to simultaneously pursue a doctor of dental surgery (D.D.S.) degree in the School of Dentistry. This special program is a seven-year program that allows the pursuit of both degrees simultaneously, and results in awarding of both the Ph.D. and the D.D.S. degree upon completion of the requirements for both programs.

Applying for this dual degree program is an option when applying for either the oral biology graduate program or for the D.D.S. program in the School of Dentistry. The applicant must indicate an interest in pursuing the dual degree program at the time of application, and will be interviewed and accepted into the program as a dual degree student. The application deadline for this dual degree program is November 1 (the deadline for the D.D.S. program). Students applying for the dual degree program must take either the Graduate Record Examination (GRE) OR the Dental Aptitude Test (DAT), but are not required to take both exams. All other requirements for application to the dual degree program are identical to the application process for the oral biology graduate program. Students not chosen to enter the dual degree program would still be eligible for admittance into either the D.D.S. program or the oral biology graduate program through the regular application process.

Students accepted into the dual degree program will follow a specialized curriculum, which combines scientific and clinical training with research activities designed to promote a career in academic dentistry. The first two years of the program will consist of basic didactic courses in the Ph.D. program coupled with laboratory experiences, followed by a four-year period of the D.D.S. comprehensive clinical care education and continued dissertation research. The final year(s) consists of completion of the Ph.D. dissertation. Students who successfully complete the program will then be awarded both the Ph.D. and D.D.S. degrees at the completion of the requirements for both degrees. Students who are not eligible or who choose not to complete both programsbut rather pursue only the D.D.S. degree must apply to the D.D.S. program and be accepted through the regular application process.

Oral Epidemiology

The University of North Carolina offers a program leading to a Ph.D. degree in epidemiology under the cooperative auspices of the School of Dentistry's Department of Dental Ecology and the School of Public Health's departments of Epidemiology and Health Policy and Management. The strong, nationally recognized Department of Epidemiology at the Gillings Global School of Public Health has a well-established doctoral program, and oral epidemiology has been taught as part of the Program in Dental Public Health for many years. The integration of the wealth of resources in the three departments makes this program unique.

The goal of the oral epidemiology program is to provide students with the ability to identify, analyze, and predict changes in oral diseases and conditions. These conditions include dental caries, oral cancer, oral mucosal lesions, periodontal diseases, craniofacial and dentofacial anomalies, and systemic diseases that affect, and are affected by, oral health. Degree recipients will have the academic foundation, advanced knowledge, and skills needed to conduct, interpret, and evaluate sophisticated epidemiologic investigations and clinical research projects.

Information, including advice regarding application, is at www.sph.unc.edu/epid.

Endodontics

The Department of Endodontics offers a three-year program leading to a certificate in endodontics and a master of science degree. The program is designed to prepare candidates for careers in academics, research, or the clinical practice of endodontics, and for certification by the American Board of Endodontics.

The endodontics graduate program involves an integrated study of biological sciences as they pertain to endodontics, development of the clinical skills required in the broad area of the endodontic specialty, review of classic and current literature in endodontics, teaching experience, research design and methodology, and the development and completion of a research project.

Application requires submission of the required transcripts and documentation to the Postdoctoral Application Support Service (PASS) www.adea.org/dental_education_pathways/pass/Pages/default.aspx by August 15th for the following summer class beginning July 1. A personal interview is required for admission. After review by the program, applicants will be informed regarding application to the Graduate School. Admission to The Graduate School is granted only after the department reviews and approves the application, transcripts or prior academic work, letters of reference, and other credentials

The number of students is limited to three each year. Stipends are available depending upon available resources.

Oral and Maxillofacial Pathology

The advanced dental education program in oral and maxillofacial pathology prepares qualified oral and maxillofacial specialists for positions of responsibility in institutions of higher dental education, research, or in private practice. Students develop competence in surgical oral pathology, acquire skills in the clinical management of patients with disorders of the head and neck, gain experience in pathology laboratory management, and develop teaching and research skills for enhancement of an academic career. Upon completion of the necessary requirements, each student is eligible for fellowship in the American Academy of Oral and Maxillofacial Pathology and certification by the American Board of Oral and Maxillofacial Pathology.

Applications for admission to the program are made online through the UNC Graduate School:
www.gradschool.unc.edu/students_prospective.html.

Stipends are available depending upon available resources.

Oral and Maxillofacial Radiology

The advanced education program in oral and maxillofacial radiology begins on July 1 of each year and extends for three years. The primary goal of the program is to prepare specialists who are fully qualified in the clinical practice of oral and maxillofacial radiology and to provide patient care, teach, and conduct research in an oral health care institution or to provide patient care in the private practice setting.

The program includes training in radiological sciences (radiological physics, radiation biology, radiation protection, imaging science), clinical sciences (intraoral, extraoral and cone beam CT imaging, radiographic interpretation of conditions affecting the oral and maxillofacial region), medical sciences (oral and maxillofacial pathology, head and neck anatomy) and research sciences (research design and biostatistics). Each graduate student develops an original research project as an integral part of the graduate program, resulting in a written thesis. The program meets the eligibility requirements of the American Board of Oral and Maxillofacial Radiology.

Applications for admission to the program are made online through the UNC Graduate School:
www.gradschool.unc.edu/students_prospective.html.

Stipends may be available depending on available resources.

Oral and Maxillofacial Surgery

The oral and maxillofacial surgery residency is a six-year program resulting in a specialty certificate in oral and maxillofacial surgery and an M.D. degree from the UNC–Chapel Hill School of Medicine. The programs goals are to:

- Train the oral and maxillofacial surgery resident so he/she will be competent to practice a broad scope of oral and maxillofacial surgery; be knowledgeable concerning the theoretical basis, as well as clinical sciences of oral and maxillofacial surgery; and be qualified to become board certified in oral and maxillofacial surgery.
- Prepare oral and maxillofacial surgeons for a career in teaching, research, and/or practice in the specialty of oral and maxillofacial surgery.

The integrated dual degree program is structured such that the second and third years are spent obtaining the medical degree, which is followed by a year (fourth) of general surgery. The remaining years are spent within the oral and maxillofacial surgery area.

The clinical experience is progressively graduated and includes a number of hospital service rotations at UNC Hospitals, Mission St. Joseph Hospital, and the Durham VA Medical Center.

All residents are strongly encouraged to develop and/or participate in research projects during their residency. Elective time is dedicated for research activities. The department is committed to the education of future educators and leaders of its specialty.

Application requires submission of the required transcripts and documentation to the Postdoctoral Application Support Service (PASS) www.adea.org/dental_education_pathways/pass/Pages/default.aspx by September 1 in order for an applicant to be considered for the class that begins the following July. All candidates must register with the Postdoctoral Dental Matching Program, 595 Bay Street, Suite 300, Toronto, Ontario, Canada M5G 2C2 www.natmatch.com/dentres/

Operative Dentistry

The Department of Operative Dentistry offers a three-year program leading to an M.S. degree granted by the UNC–Chapel Hill Graduate School. The program involves component areas of research, teaching, and patient care. The curriculum includes 1) general core courses including topics in basic and clinical sciences, 2) courses in educational sciences, 3) a research component including courses on research design and statistical methods, and 4) a clinical component in contemporary operative dentistry. A formal thesis based on a selected research topic is required, including its defense before an examining committee. The department also requires a comprehensive written examination.

The admission policy for graduate training in operative dentistry follows the regular requirements for admission to The Graduate School. Applications for admission to the program are made online through the UNC Graduate School: www.gradschool.unc.edu/students_prospective.html. All application materials should be submitted by December 1 for the class beginning the program July 1 of the following year. The number of students is typically limited to two per class.

Stipends are available depending upon available resources.

Orthodontics

The orthodontic postgraduate program at the University of North Carolina at Chapel Hill provides a combined clinical experience in orthodontics and a critical thinking and research experience that lead to a certificate in orthodontics and a master of science degree conferred by the UNC Graduate School. Students in the advanced orthodontic education program are required to demonstrate clinical and professional proficiency as well as complete the didactic and research components of the M.S. degree prior to graduation. During the program's first year, students participate in core courses, didactic and clinical seminars, and begin patient care. As the program progresses, didactic seminars gradually are replaced by research participation, while clinical seminars continue and the volume of patient care increases. All students must perform satisfactorily on oral and written comprehensive examinations to complete the program successfully.

The Department of Orthodontics offers a 33-month program. Six residents begin the program each August. Students are educationally qualified to take the written portion of the American Board of Orthodontics in the second or third year. The successful completion of the research project is required for the receipt of the certificate in orthodontics as well as the M.S. degree.

Application requires submission of the required transcripts and documentation to the Postdoctoral Application Support Service (PASS) www.adea.org/dental_education_pathways/pass/Pages/default.aspx by September 1 in order for an applicant to be considered for the class that begins the following August. All candidates must register with the Postdoctoral Dental Matching Program, 595 Bay Street, Suite 300, Toronto, Ontario, Canada M5G 2C2; www.natmatch.com/dentres.

A personal on-site interview is required and interviews are made by invitation of the department after reviewing applicants' records. Interviews are usually held in late October or early November. Once a student has matched through the Match program, the student must apply to the UNC Graduate School in order to receive the requisite course credit to earn the master's degree.

Stipends are available depending upon available resources.

Pediatric Dentistry

The advanced education program in pediatric dentistry requires participation in both the centralized application and matching services. Application requires submission of the required transcripts and documentation to the Postdoctoral Application Support Service (PASS) (www.adea.org/dental_education_pathways/pass/Pages/default.aspx) by September 3 in order for an applicant to be considered for the class that begins the following July. All candidates must register with the Postdoctoral Dental Matching Program, 595 Bay Street, Suite 300, Toronto, Ontario, Canada M5G 2C2; www.natmatch.com/dentres. A

personal interview is required and interviews are made by invitation of the department after reviewing applicants' records. Once a student has matched through the Match program the student must apply to The Graduate School. Please contact the program director for information regarding the Graduate School application.

The department offers a graduate program in pediatric dentistry leading to the M.S., M.P.H., or Ph.D. degree. The minimum program length is 36 months, beginning July 1 of each year. The program's goal is to prepare the student for a career in academic research, dental education, clinical practice, or public health. Developing leadership skills and training advocates for children's health is emphasized. For interested students, this program can be combined with other educational programs in the social sciences, basic sciences, or allied health professions leading to an additional master's degree, postdoctoral fellowship, an individual Dentist-Scientist award, or a doctoral degree.

During the first year each student completes courses in research design and statistics. A protocol for the research project is completed in conjunction with the course work during the first year. This project provides a background in the scientific method and scientific writing. During the second year data are collected, and during the third year the thesis is written and defended. Under the direction of leaders in many fields of research, research opportunities are available in a wide range of topics and can be undertaken in the School of Dentistry, at a facility in nearby Research Triangle Park, or at a neighboring institution of higher learning. Numerous projects have received national acclaim and have resulted in publications in dental literature. Hospital training is gained through the University of North Carolina Hospitals. Graduate students are active members of the department's teaching team during all years. Development of leadership skills in the health profession is supported by externships at the local, state, and national levels.

Stipends are available depending upon available resources.

Periodontology

The graduate program in periodontology is designed to prepare dentists to enter the clinical practice of periodontics or to assume positions in academics and research. The program consists of a 36-month course of study leading to a certificate in periodontics and a master of science degree. Alternative degree programs include a master of public health or a Ph.D. in oral biology. The curriculum is devoted to the study of biological concepts and literature that encompass the prevention, diagnosis and treatment of diseases of the supporting and surrounding tissues of the teeth or their substitutes and the maintenance of the health, function and esthetics of these structures and tissues. Clinical acquisition of skills in periodontology and implantology is a primary focus of the program. Resident experiences include a combination of patient care, teaching, and research. Elective courses relating to areas of research interests are available.

The admission policy for graduate training in periodontology follows the regular requirements for admission to The Graduate School. Admission to The Graduate School is granted only after the department reviews and approves the application, transcripts of prior academic work, letters of reference, and other credentials. All applications, transcripts, and letters of reference should be mailed to the Postdoctoral Application Support Service (PASS) (www.adea.org/dental_education_pathways/pass/Pages/default.aspx) by August 15 for the following summer class beginning July 1. A personal interview is required for admission.

The number of students is limited to three each year.

Stipends are available depending upon available resources.

Prosthodontics

The admission policy for graduate training in prosthodontics follows the regular requirements for admission to The Graduate School. Admission to The Graduate School is granted only after the application, transcript of prior academic work, letters of reference, and other credentials are reviewed and approved by the appropriate committee. All applications, transcripts, and letters of reference should be mailed to the Postdoctoral Application Support Service (PASS) (www.adea.org/dental_education_pathways/pass/Pages/default.aspx) by September 1 for the following summer class beginning July 1. A personal interview is required for admission. The admission policy for the MS in prosthodontics follows the regular requirements for admission to The Graduate School. Admission to The Graduate School is granted only after the application, transcript of prior academic work, letters of reference, and other credentials are reviewed and approved by the appropriate committee.

The graduate program in prosthodontics is currently a 36-month course of study in fixed and removable prosthodontics, dental implant prosthodontics, and maxillofacial prosthetics leading to a master of science degree. The primary goals of the program are to prepare a student for clinical practice and/or a teaching and research career. The curriculum offers a broad educational experience in clinical, research, didactic, and teaching activities. The program satisfies the formal training requirements of the American Board of Prosthodontics for certification examination in prosthodontics.

A number of graduate courses from allied clinical and biomedical disciplines are available as electives for prosthodontic graduate students. Though not required,elective courses are encouraged. Interest in electives (from within or outside the School of Dentistry) should be discussed with the program director so that the core curriculum can be adjusted to accommodate the student's needs.

Stipends are available depending upon available resources.

Dental Hygiene Education

The primary objective of the dental hygiene education master of science program is to prepare well-qualified educators for dental hygiene programs. At the successful completion of this program, the student should be able to 1) give evidence of having acquired advanced knowledge and skills in one of the following minors: dental management/administration, biological sciences, oral pathology, and clinical education, 2) develop the knowledge, skills, and attitudes necessary in the conduct of dental hygiene programs, 3) teach courses in more than one dental hygiene field and 4) define their own problems from the present body of knowledge in dental and dental hygiene education, solve the problems, and present their work in a scholarly fashion.

Credit hour requirements vary and are based on the individual background of the student and on the minor selected by the student. Thirty-nine credit hours are required in the core (including thesis or research) and nine to 12 hours in the minor. The length of the program is approximately two years. Minimum admissions requirements for the program include current licensure and a bachelor's degree from an accredited institution, and graduation from a dental hygiene program accredited by the Commission on Dental Accreditation, American Dental Association. Work experience in dental hygiene education or dental hygiene practice is strongly recommended.

Applicants must have a grade point average of B or better in the professional undergraduate curriculum. Three letters of recommendation are required, as well as completion of an admissions questionnaire by the applicant. The course of study begins in August of each year. An electronic application to the University can be obtained at

www.gradschool.unc.edu. For further information, contact the Director, Dental Hygiene Education Program, School of Dentistry, CB# 7450, The University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-7450, (919) 966-8221.

Stipends are available depending upon available resources.

Core Courses Required of Graduate Students in Dental Hygiene Education

DHED 715
DHED 720
DHED 730
DHED 736
DHED 760
DHED 837
DHED 860
DHED 993
DENG 701
DENG 702
DENG 703

Total of 28–33 credit hours in core curriculum

Additional courses are required for each minor as follows:

Minors	Credits
Biological Sciences	12
Clinical Education	9
Management/Administration	9
Oral Pathology	11

Courses for Graduate Students
DENG

701 Introduction to Research Design (1).

702 Biostatistics (2).

703 Applied Dental Research Methods (2). This course builds on previous courses, DENG 701 Introduction to Research Methods and DENG 702 Biostatistics. The goal is to help students prepare and complete the thesis with emphasis on the results section.

704 Interdisciplinary Care Conference (1). For first & second-year dental graduate students. Review and discussion of the diagnoses, treatment plans, prognoses, and interdisciplinary care of selected patients.

707 Regional Anatomy (3). Review of the anatomy of the head and neck region, including osteology, cardiovascular system, head and neck embryology, special sensory modalities, nervous system, functional nervous system, and extraoral correlation with the oral cavity.

720 Applied Pharmacology (1). This course is designed for dental practitioners with sufficient general and specific clinical pharmacology knowledge to appropriately and safely utilize drugs in treatment. The course will be concentrated in three areas: general clinical pharmacology principles, general clinical pharmacology of medications, specific clinical pharmacology of drugs utilized by dental practitioners.

751 Advanced Pain and Anxiety Control (2). Introduction to: operating room and recovery room protocol; patient cardiovascular and pulmonary evaluation; adjunct and inhalant agents; nitrous oxide; pharmacology of IV anesthetic agents; EKG interpretation; arterial blood gases; anesthesia equipment monitoring; anesthetic complications and emergencies; fluid and electrolyte and blood therapy; airway management; venipuncture; pediatric anesthesia; and pre-op evaluation, orders, and rounds.

890 Special Topics in Dentistry (1-3). This course will cover emerging issues or specialized content not represented in the main curriculum.

901 Research (1-6). The goal of this course is to provide students an opportunity to investigate and explore different research areas prior to their choice of a mentor and specific project for their master's or doctoral degree.

Courses for Graduate Students
DHED

715 Current Concepts in Clinical Skills (2). This course reviews and updates students in current treatment and diagnostic modalities in dental allied education. Students who satisfactorily pass the evaluation will be exempt.

720 Educational Concepts (2). This course is designed to introduce the graduate student to various teaching philosophies and methodologies. A variety of educational concepts such as methods of presentation, testing, and measurement are explored. Emphasis is placed on the practical application of theory.

730 Organization and Administration (3). Provides information and experience in leadership, administration and accreditation for allied dental education programs.

736 Clinical/Laboratory Teaching Practicum (2). This course provides students with the knowledge and skills to function as a competent clinical instructor. Psychomotor skill development and analysis and remediation of performance problems are two topics related to clinical teaching that are stressed.

760 Seminar in Education and Research (1). This course is designed to provide knowledge and stimulate discussion about pertinent topics in dental and allied dental education and research.

837 Internship (6–9). This full semester internship provides the student with the opportunity to student teach in an allied dental program.

860 Seminar in Education and Research (1).

896 Independent Study in DHED (1–4).

993 Thesis (3).

Courses for Graduate Students
ENDO

710, 720, 730, 740 Advanced Clinical Endodontics (6). 870 hours of clinical practice.

750 Advanced Clinical Endodontics (5). 870 hours of clinical practice.

811, 821, 831, 841 Endodontics Seminar and Case Analysis (3). 180 hours conference.

812, 822, 832, 842 Endodontics Literature Review Seminar (4). 270 hours.

993 Thesis (3–21). Third year.

Courses for Graduate Students
OBIO

701, 702, 703, 704 Research Techniques in Oral Biology (3). Permission of the instructor. The course familiarizes participants with a selection of specialized research techniques employed in interdisciplinary basic science approaches to problems in oral biology. Four lecture laboratory hours a week.

710, 711, 712, 713 Discussion in Oral Biology (1). Permission of the instructor. A series of seminars on topics relevant to research and scientific knowledge in the field of oral biology. Visiting scientists from other research centers in the country and abroad participate in the discussion series. One lecture hour a week.

720 Advanced Oral Biology (1). Significant developments and trends in basic medical sciences that have applications in specialized dentistry are discussed. Recent publications taken from medical and dental scientific literature are discussed. Three hours a week.

721, 722, 723, 724 Directed Studies in Oral Biology (1). Topics include extracellular matrices, immunology, inflammation, neurobiology, and pain management.

730, 731, 732 Biological Concepts (1.5). Overview of structures and biological determinants of conditions and diseases of the oral cavity. Both growth and development and pathophysiology will be introduced in the context of three areas of oral biology: biology of extracellular matrices, host-pathogens interactions, and orofacial neurobiology.

740 Extracellular Matrices (3). Introduction to structures and biological functions of major extracellular matrix components, their interactions with cells, chemistry and biology of mineralized tissues, and biological and molecular aspects of connective tissue disorders. Lectures, discussions.

741 The Molecular Control of Bone Mass (2). This course will examine bone formation and bone maintenance. Cellular and molecular determinants of osteogenesis and resorption will be explored. Course format will be faculty lecture and assigned student presentation of current literature.

750 Orofacial Neurobiology (3). An overview of normal human orofacial sensation and function, evaluation of orofacial sensory and motor capacities, orofacial pain mechanisms, and neural control of orofacial behaviors. Lectures, literature review, discussions, and seminars.

760 Host-Pathogen Interactions (3). Overview of basic etiology of pathogens and associated medical conditions, immune factors, immune response, and oral microbiology/immunology, with emphasis on infectious disease processes and innate defense factors. Lectures, discussions.

761 The Molecular and Cellular Pathogenesis of Inflammatory Diseases (3). Required preparation, biochemistry and immunology. Permission of the instructor. Course presents recent information on the pathogenesis of inflammatory conditions from the molecular, cellular, and systems perspectives. The two-semester course covers molecular signals, cellular processes, pathogenesis of specific inflammatory conditions, and the immunopharmacology of inflammation. Lecture, seminar.

762 The Molecular and Cellular Pathogenesis of Inflammatory Diseases (3). Required preparation, biochemistry and immunology. Permission of the instructor. Course presents recent information on the pathogenesis of inflammatory conditions from the molecular, cellular, and systems perspectives. The two-semester course covers molecular signals, cellular processes, pathogenesis of specific inflammatory conditions, and the immunopharmacology of inflammation. Lecture, seminar.

770, 771, 772, 773 Selected Topics in Oral Biology (1). Review of current findings in selected areas of oral biology. Students will critique current literature dealing with the newest discoveries in neuroscience, inflammation, or pathogenesis in an interactive forum between students and faculty.

780 Introduction to Scientific Writing (1). Seminar series that will give generic instructions covering grant writing skills and structure, as well as offer insight for scientific writing.

993 Master's Thesis (3–6). Permission of the instructor.

994 Doctoral Dissertation (3–6). Permission of the instructor.

Courses for Graduate Students

ORPA

711 Surgical Oral Pathology Seminar I (1). This weekly seminar uses unknown cases as the basis for discussion of a variety of biopsy specimens taken from the head and neck. Clinical management of cases also is discussed. Students will develop skills for interacting with their medical and dental colleagues.

712 Current Perspectives on Oral and Maxillofacial Pathology I (1). This seminar series will focus on current research in oral and maxillofacial pathology (OMP) and related fields. Current scientific literature will be critically reviewed. In addition, students will review historical literature to gain a perspective on the development of OMP as a specialty.

713 Advanced Oral Pathology I (1). This lecture and clinicopathologic correlation series includes study of the etiology, pathogenesis, clinical and histopathologic aspects of diseases of the head and neck.

721 Current Perspectives on Oral and Maxillofacial Pathology I (1–3). This seminar series will focus on current research in oral and maxillofacial pathology (OMP) and related fields. Current scientific literature will be critically reviewed. In addition, students will review historical literature to gain a perspective on the development of OMP as a specialty.

722 Current Perspectives on Oral and Maxillofacial Pathology I (1–3). This seminar series will focus on current research in oral and maxillofacial pathology (OMP) and related fields. Current scientific literature will be critically reviewed. In addition, students will review historical literature to gain a perspective on the development of OMP as a specialty.

723 Advanced Oral Pathology I (1–3). This lecture and clinicopathologic correlation series includes study of the etiology, pathogenesis, clinical and histopathologic aspects of diseases of the head and neck.

731 Current Perspectives on Oral and Maxillofacial Pathology I (1–3). This seminar series will focus on current research in oral and maxillofacial pathology (OMP) and related fields. Current scientific literature will be critically reviewed. In addition, students will review historical literature to gain a perspective on the development of OMP as a specialty.

732 Current Perspectives on Oral and Maxillofacial Pathology I (1–3). This seminar series will focus on current research in oral and maxillofacial pathology (OMP) and related fields. Current scientific literature will be critically reviewed. In addition, students will review historical literature to gain a perspective on the development of OMP as a specialty.

733 Advanced Oral Pathology I (1–3). This lecture and clinicopathologic correlation series includes study of the etiology, pathogenesis, clinical and histopathologic aspects of diseases of the head and neck.

750 Surgical Pathology in the Hospital Setting (1–3). Under the supervision of the hospital pathologists, the student will rotate in anatomic pathology, laboratory medicine, dermatopathology, hematopathology, molecular medicine, surgical specialties, and other elective areas to develop advanced concepts of disease as well as a working relationship with medical colleagues.

762 Oral and Maxillofacial Pathology Seminar (2). Course includes developmental disturbances of soft and hard tissues, syndromes, inflammation, immunology, pulp and periapical disease, periodontal disease, tumor-like proliferations, microbial disease, endocrine and metabolic diseases. Also include odontogenic cysts, salivary gland disease, oral epithelial and mesenchymal neoplasms, bone and joint diseases, nerve muscle diseases, dermatological diseases, and blood diseases.

763 Oral and Maxillofacial Pathology Seminar (2). Continuation of ORPA 762.

811, 821, 831 Surgical Oral Pathology Seminar III (1). Continuation of ORPA 731.

812, 822, 832 Current Perspectives on Oral and Maxillofacial Pathology III (1). Continuation of ORPA 732.

813, 823, 833 Advanced Oral Pathology III (1). Continuation of ORPA 702.

993 Master's Thesis (3).

Courses for Graduate Students
OMSU

712A, 712B, 712C Oral and Maxillofacial Surgery—Advanced Oral and Maxillofacial Surgery (4). (Dental School and UNC Hospitals.)

714A, 714B, 714C Oral and Maxillofacial Surgery—General Anesthesia (2). (UNC Hospitals.)

715A, 715B, 715C Oral and Maxillofacial Surgery—Physical Diagnosis (4). (UNC Hospitals.)

730 Oral and Maxillofacial Surgery—Basic Surgical Skills (4). (UNC Hospitals.) This course includes an experimental animal surgery laboratory portion, as well as lectures and demonstrations of surgical principles and techniques.

740 Oral and Maxillofacial Radiology (1).

760A Oral and Maxillofacial Surgery I (1).

760B Oral and Maxillofacial Surgery II (1).

801 Research (6). To be arranged.

993 Thesis (3–21).

Courses for Graduate Students
OPER

701A Operative Dentistry Seminar I (1). This course is an intensive review of the basic principles of operative dentistry, cariology, and treatment planning; thus, it provides a foundation for all other courses in operative dentistry. The core text for this review is Sturdevant's Art and Science of Operative Dentistry.

701B Operative Dentistry Seminar II (1). (Aesthetic and Adhesive Dentistry.) In this seminar, graduate students will learn the scientific principles and clinical techniques involved in dental aesthetics and adhesive restorations. Students may be required to develop a case presentation for this seminar.

701C Operative Dentistry Seminar III (1). (Topics in Operative Dentistry.) A review of selected topics in operative dentistry, including biomaterials, clinical research, and aesthetic dentistry.

702A, 702B, 702C, 702D Operative Literature Review I (1). This is a weekly seminar offering a forum for presentation and discussion of relevant scientific papers on various operative dentistry related topics. Typically, a resident or faculty member presents one or more relevant papers, which is followed by a critical analysis of the study and discussion of the topic.

703A Critical Appraisal of the Literature I (1). Seminar which introduces and/or reinforces the skill of critical appraisal of the scientific literature through application of the method to current literature addressing clinical issues in operative and preventative dentistry.

703B Critical Appraisal of the Literature II (1). Seminar which introduces and/or reinforces the skill of critical appraisal of the scientific literature through application of the method to current literature addressing clinical issues in operative and preventive dentistry.

704A Operative Clinical Seminar A (1). This seminar will involve a series of presentations where the student will present clinical cases resolved in the graduate clinic.

704B Operative Clinical Seminar B (1). Continuation of Operative Clinical Seminar A course, involving a series of presentations where the student will present clinical cases resolved in the graduate clinic.

705A Teaching Internship (1–9). Student will be actively involved in teaching Functional Dental Anatomy course. Student will participate in preclinical laboratory instruction and evaluation procedures.

705B Teaching Internship (1–9). The student will be actively involved in teaching Advanced Operative Dentistry course. The student will participate in preclinical laboratory instruction and evaluation procedures.

705C Teaching Internship (1–9). Student will be actively involved in teaching Advanced Operative Dentistry course. The student will participate in preclinical laboratory instruction and evaluation procedures.

705D Teaching Internship - Clinical Teaching (1–9). The student will participate in the teaching of predoctoral dental students in the clinic environment.

731 Cariology (1). Discusses specific topics related to Cariology. Students will provide care in clinic identifying and treating patients based on caries risk assessment. Seminar formats include lectures, discussions, literature reviews, and practical (hands-on) exercises. Students must present a clinical case discussing alternative treatment based on patient's caries risk assessment.

732 Introduction to Operative Dentistry (3). Provides students with broad introduction to key Operative Dentistry concepts. Students will be exposed to a wide variety of topics, including intensive training in direct restorations, dental photography, fabrication of diagnostic casts and implant stents. Prepares incoming graduate students for clinical patient care and teaching in predoctoral courses and clinics.

736A Graduate Dental Biomaterials I (3).

736B Graduate Dental Biomaterials II (3).

790A Operative Dentistry Clinic I (4). Basic operative dentistry treatment planning and procedures.

790B Operative Dentistry Clinic II (4). (Patient treatment.) Primary focus is on patients requiring more advanced considerations for operative dentistry treatment planning and/or procedures. There will be a strong focus on aesthetic dentistry, prevention, and "medical management" of caries, and the use of advanced technologies to provide operative dentistry treatment.

790C Operative Dentistry Clinic III (4). Continuation of Operative Dentistry Clinic II.

790D Operative Dentistry Clinic IV (3). Continuation of Operative Dentistry Clinic III.

790E Operative Dentistry Clinic V (4). Continuation of Operative Dentistry Clinic IV.

790F Operative Dentistry Clinic VI (4). Continuation of Operative Dentistry Clinic V.

993 Operative Dentistry Thesis (3). The student will begin writing a master's thesis.

Courses for Graduate Students
ORAD

702 Advanced Oral Radiologic Technology (4). Seminars, laboratory, and clinical sessions to provide experience in advanced oral radiologic procedures.

704 Advanced Radiologic Diagnosis II (3). Literature review, seminars, and clinical experience in advanced radiologic diagnosis.

705 Principles for Advanced Diagnostic and Therapeutic Radiology (4). Literature review and seminars in the application of radiologic procedures such as computed tomography, digital imaging, and magnetic resonance for diagnosis of oral and maxillofacial conditions. Fundamentals of radiation therapy are also included.

706 Advanced Oral Radiology (2). Radiographic selection criteria, dental radiographs efficacy, panoramic radiology, extraoral techniques, radiation risks and radiological hygiene in dental practice, principle of radiologic interpretation, radiology of cysts and tumors, radiology of the TMJ, radiology of systemic disease, quality improvement, radiology for dental implants, digital imaging in dentistry, and advanced craniofacial region imaging.

707 Graduate Clinical Oral Radiology (3).

710 Oral and Maxillofacial Radiology Literature Review (1). Course is designed for graduate students with a strong interest in OMFR and seeks to expose students to classical articles in the radiology literature.

802 Clinical Radiology Conference (1). Case studies in the interpretation of unusual conditions of the oral and maxillofacial region.

993 Master's Thesis (3).

Courses for Graduate Students
ORTH

801 Orthodontic Technique (4). Introduction to orthodontic technique and procedures for beginning orthodontic graduate students.

802A, 802B, 802C, 802D Current Topics in Orthodontics (2). Seminars on pertinent orthodontic literature for advanced orthodontic students.

803A Orthodontic Diagnosis (2). Principles of orthodontic diagnosis and analysis of diagnostic records for orthodontic specialists.

805A Advanced Clinical Orthodontics (5).

805B Advanced Clinical Orthodontics (3).

805C, 805D, 805E Advanced Clinical Orthodontics (7).

805F Advanced Clinical Orthodontics (1–10).

806 Science of Tooth Movement (2). Mechanical principles in orthodontic force production and control; biological response to orthodontic force.

807 Orthodontic Biomaterials (1–3). Introduction to orthodontic biomaterials and integration with the basic principles of engineering, science, and orthodontics.

808 Growth and Development (4). Principles of growth and development, emphasizing dento-facial development from an evolutionary and molecular biology perspective, as well as the traditional anatomical perspective.

809A, 809B, 809C, 809D Preventative Orthodontics (3).

810 Multidisciplinary Management of Craniofacial Anomalies (1). This course introduces the graduate student to the management of patients with craniofacial anomalies using a multidisciplinary team approach. The course gives the graduate student a basic understanding of the role of specialties involved, the procedures, and timing of interventions in the management of craniofacial patients from birth to adulthood.

813 Principles of Orthodontic Treatment for Adults (2). Orthodontic treatment procedures for adults; for AEGD, periodontic, and prosthodontic graduate students.

815 Oral-Pharyngeal Function (1). Maturation of oral and pharyngeal function, including speech and its relation to dento-facial development.

820 Advanced Biomechanics (3). Concepts in orthodontic mechanics emphasizing segmented arch approaches and laboratory tests of appliance components and designs.

822 Environment of Specialty Practice (3). Trends in health care delivery; organization and management of orthodontic specialty practice.

901A Research (2). Arranged.

901B Research (1). Arranged.

901C Research (2). Arranged.

993 Master's Thesis (3–21).

Courses for Graduate Students
PEDO

800A, 800B, 800C, 800D Maternal and Child Health Seminar Series (1). (One hour a week for each fall and spring semester.) This is a seminar series that focuses on a broad range of topics related to pediatric dentistry and pediatric medicine, including general medical issues, practice management, social issues, child advocacy, and presentation of unusual clinical cases.

801A, 801B, 801C, 801D Pediatric Diagnosis and Treatment Planning Seminar (1). (One hour a week each fall and spring semester for two years.) This course is a seminar wherein diagnosis and treatment planning options are considered through a problem-oriented approach. For cases in progress and completed, outcomes are reviewed and critiqued.

803A, 803B, 803C, 803D Principles of Pediatric Dentistry (1). (Six hours a month for fall and spring semesters for 24 months.) This seminar covers the fundamentals of pediatric dentistry from behavior management to pulp therapy. The course relies on readings of classic and contemporary literature with seminars that include discussions and critiques of readings.

804A, 804B, 804C, 804D Advanced Clinical Pediatric Dentistry (8). (Six to twelve hours a week for 36 months.) This course provides clinical experience in all phases of pediatric dentistry, including dental treatment under conscious sedation and general anesthesia.

805 Contemporary Practice Management (1). (One hour monthly during the spring semester for three years.) This course provides an understanding of the design, implementation, and management of a modern pediatric dental practice. Most seminar leaders are private practitioners who are adjunct faculty in the department.

806A, 806B, 806C, 806D Treatment of Pediatric Dental Emergencies (1). (One hour a week each week for 36 months.) This seminar series serves as a faculty/resident forum for reviewing the

previous week's emergency cases and in which diagnosis and treatment options are reviewed and critiqued. Endodontic faculty and residents also participate in this course.

993 Master's Thesis (3–6).

Courses for Graduate Students
PERI

710 Periodontal Therapy (1). This graduate seminar reviews techniques and procedures for treating periodontal diseases. Topics include gingival grafting, surgical flap management, osseous surgery, periodontal regeneration, antimicrobials, host modulation, and periodontal medicine.

711 Periodontal Therapy (1). This graduate seminar reviews techniques and procedures for treating periodontal diseases. Topics include gingival grafting, surgical flap management, osseous surgery, periodontal regeneration, antimicrobials, host modulation, and periodontal medicine.

720 Case Analysis (1). Course participants present comprehensive cases with periodontal conditions. Discussion focuses on periodontal diagnosis, treatment planning, treatment execution, and results.

721 Case Analysis (1). Course participants present comprehensive cases with periodontal conditions. Discussion focuses on periodontal diagnosis, treatment planning, treatment execution, and results.

722 Case Analysis (2). Course participants present comprehensive cases with periodontal conditions. Discussion focuses on periodontal diagnosis, treatment planning, treatment execution, and results.

723 Case Analysis (2). Course participants present comprehensive cases with periodontal conditions. Discussion focuses on periodontal diagnosis, treatment planning, treatment execution, and results.

730 Seminar in Periodontology (3). In this first-year literature review course, graduate students present and evaluate the evidence on periodontal disease etiology, pathogenesis, risk factors, and treatments including mechanical, surgical, and pharmacological approaches.

731 Seminar in Periodontology (3). In this first-year literature review course, graduate students present and evaluate the evidence on periodontal disease etiology, pathogenesis, risk factors, and treatments including mechanical, surgical, and pharmacological approaches.

760 Seminar in Periodontology (3). In this second- and third-year literature review course, graduate students discuss evidence on advanced topics in periodontology or related disciplines.

761 Seminar in Periodontology (3). In this second- and third-year literature review course, graduate students discuss evidence on advanced topics in periodontology or related disciplines.

820 Introduction to Implants (1). This graduate seminar traces the biology of osseointegration, surgical techniques in dental implant placement and prosthetic restoration. The seminar includes didactic lectures, case presentations, and journal club components.

821 Clinical Implantology (1). This graduate seminar continues themes introduced in PERI 820 and discusses advanced implant topics including bone augmentation, peri-implantitis, and implant efficacy assessment. The seminar includes didactic lectures, case presentations, and journal club components.

890Advanced Clinical Periodontics and Clinical Practice (3). Within this first-year specialty clinic, graduate students begin diagnosing and comprehensively treating patients with periodontal diseases. Cases may involve interdisciplinary care, medical management, dental implants, and sedation procedures.

891 Advanced Clinical Periodontics and Clinical Practice (3). Within this first-year specialty clinic, graduate students begin diagnosing and comprehensively treating patients with periodontal diseases. Cases may involve interdisciplinary care, medical management, dental implants, and sedation procedures.

892 Advanced Clinical Periodontics and Clinical Practice (3). Within this second- and third-year specialty clinic, graduate students gain proficiency in managing patients with periodontal diseases, using both surgical and nonsurgical approaches. Cases may involve interdisciplinary care, medical management, dental implants, and sedation procedures.

893 Advanced Clinical Periodontics and Clinical Practice (3). Within this second- and third-year specialty clinic, graduate students gain proficiency in managing patients with periodontal diseases, using both surgical and nonsurgical approaches. Cases may involve interdisciplinary care, medical management, dental implants, and sedation procedures.

993 Thesis (3–21).

Courses for Graduate Students
PROS

701, 702, 703 Introduction to Prosthodontic Literature (2). A seminar designed to review early and classic prosthodontic literature common to fixed and removable prosthodontics.

704, 705, 706 Introduction to Prosthodontic Literature (1).

721–726 Prosthodontic Principles, Diagnosis and Treatment Planning—Fixed and Removable (2). Principles of diagnosis and treatment relative to the prosthodontic patient are covered in depth in this seminar series.

731–736 Prosthodontic Diagnosis and Treatment Planning (1). This course provides the prosthodontic student with adequate knowledge in fixed prosthodontics to promote continued lifelong learning, offer quality treatment to a diverse population with various needs using fixed prosthesis, manage complications and failures of fixed prostheses, and to challenge the ABP examination.

751–754 Maxillofacial Prosthodontic Principles, Diagnosis, and Treatment (1). Principles of diagnosis and treatment relative to maxillofacial prosthodontic patients are covered in depth in this seminar series.

801–808 Advanced Clinical Fixed and Removable Prosthodontics (6). This clinical offering is designed to permit the graduate student to experience all phases of advanced patient management in fixed and removable prosthodontics.

851–854 Clinical Maxillofacial Prosthodontics (2). This clinical offering is designed to permit the graduate student to manage the comprehensive prosthodontic care of congenital and/or acquired maxillofacial defects in both the dental school and hospital environment.

993 Master's Thesis (3–21). Completion of thesis for master of science degree.

In addition to the courses listed, core courses are required in anatomy, microbiology, pharmacology, oral pathology, research methodology, scientific writing, and dental education. Flexibility in the curriculum also allows opportunity for appropriate electives.

Additional courses are required for each minor as follows:

Biological Sciences
DENT

102 Gross Anatomy (4).

104 Microscopic Anatomy (4).

114 Physiology (PHYI 741) (4).

Clinical Education
DHED

753 Advanced Intraoral Functions (3).

754 Advanced Intraoral Functions (Periodontics) (3).

833 Seminar and Practicum in Dental Radiology Education (4).

836 Advanced/Clinical Teaching (3).

Dental Radiology
RADI

662 Instrument and Imaging Methods (4).

Management/Administration
DHED

774 Personnel Management Seminar (2).

834 Dental Management Seminar (4).

Oral Pathology
DENT

104 Microscopic Anatomy (4).

127 Pathology I (3).

202 Pathology II (2).

Department of Dramatic Art

www.unc.edu/depts/drama
McKAY COBLE, *Chair*
Jeffrey Cornell, *Associate Chair*

Professors
McKay Coble, Chair, Design
Raymond L. Dooley, Head of M.F.A. Acting, Actor
Roberta A. Owen, Costume History and Design
Craig W. Turner, Head of Graduate Studies, Movement for the Actor
Adam N. Versenyi, Dramaturgy

Associate Professors
Janet A. Chambers, Design
Michael J. Rolleri, Head of Technical Production
Professor of Practice
Judith L. Adamson, Head of Costume Production

Assistant Professors
Julia Gibson, Acting
John Patrick, Voice and Speech

Lecturer
Adam Maxfield, Technical Director

The Department of Dramatic Art offers professional training programs in acting, costume production, and technical production leading to the master of fine arts degree. The production facilities in the Center for Dramatic Art include the Paul Green Theatre and the Elizabeth Price Kenan Theatre along with studios, rehearsal hall, costume complex, and scene shops.

Each student is responsible for becoming familiar with the general regulations of The Graduate School and particularly with the dates indicated on the calendar for the academic year. This information is contained elsewhere in the Graduate Record. Please note that, due to the nature of the professional training programs, the calendar for graduate students in the Department of Dramatic Art will not always coincide with that of the University. Graduate students in the department are frequently required to work on productions during University-scheduled holidays.

A limited number of graduate appointments are available in the department. Appointments are presently awarded in the areas of acting, technical production, costume production, and in support of introductory courses (DRAM 115, 116, and 135). All appointments involve instructional or laboratory supervisory responsibility.

Master of Fine Arts
Purpose. Through disciplined classroom training and a progressive involvement in performance or production opportunities, students in the master of fine arts (M.F.A.) programs are challenged to develop the skills and attitudes that enable them to compete in the professional theatre. Emphasizing accomplishment in a wide range of performance and production styles, the programs complement the variety of theatrical experiences available in the PlayMakers Repertory Company (PRC), a professional full-season equity company and a member of The League of Resident Theatres. Within his or her area of specialization, upon graduation students will be ready to perform a variety of roles or assume a range of responsibilities onstage or backstage in stage, film, or television. The University of North Carolina at Chapel Hill is a member of URTA (University/Resident Theatre Association, Inc.).

Prerequisites. All applicants must meet admission requirements established by The Graduate School of the University of North Carolina at Chapel Hill. Each area of specialization within the department requires additional application materials. In the costuming and technical areas, applicants are required to submit portfolios. Candidates should check with the department for further information as to what is entailed for each area. All acting candidates must audition. In addition to on-campus auditions, the department holds auditions two out of every three years in February in New York and Chicago. Applications must be received by January 31 to be considered.

Curriculum. Each candidate pursues a course of study in a conservatory environment. Classroom training offers a variety of approaches, each designed to develop and refine the candidate's artistic and professional potential. Classroom work is augmented by participation in the professional season of PlayMakers Repertory Company. In addition to the PRC, students find performance opportunities in studio projects and productions.

Evaluation. At least once each semester, the faculty formally evaluates the candidate's progress and makes recommendations concerning his or her continuation in the program. Evaluations are made of each individual on the basis of classroom and performance or production work. Letter grades (H, P, L, F) are assigned for work in all courses.

Admission. Generally, only first-year applicants are considered for admission. Candidates should check with the department for admission information pertaining to their specific area of specialization (i.e., acting, technical production, or costume production).

Residency and Requirements. All candidates are required to be in residence for three years, six consecutive semesters. The departmental system of evaluation requires that the student be invited to continue in the second and then in the final year of the program. While all programs require their students to complete 60 credit hours, those hours are apportioned differently from program to program. In addition to 60 credit hours, each area of specialization carries its own graduation requirements. Candidates are encouraged to ascertain individual requirements for graduation as soon as possible.

Detailed information can be obtained by addressing inquiries to the Director of Graduate Studies, Department of Dramatic Art, CB# 3230, Center for Dramatic Art, The University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-3230. Additional information is available on the Web at www.unc.edu/depts/graduate/home_graduate.htm.

Courses for Graduate and Advanced Undergraduate Students

DRAM

450 Shakespeare in the Theatre (3). Prerequisite, DRAM 120. A study of the literary, stage history, and production problems of representative plays.

460 Stage Management (3). Permission of the department. A study of the basic principles and practices of modern stage management.

465 Sound Design (3). The study of general principles of sound design for the theatre. Theory and application of sound design techniques for the stage, including script analysis, staging concepts, special effects, sound plots, and technology.

466 Scene Design (3). Permission of the instructor. General principles of visual design as applied to scenery for the theatre. Instruction in standard techniques of planning and rendering scene design.

467 Costume Design I (3). Permission of the instructor. Studies and practicum in play analysis and costume design for the theatre. Instruction in techniques of planning and rendering costume design.

468 Lighting Design I (3). Permission of the instructor. General principles of lighting design as applied to the performing arts. Theory and instruction in standard techniques of lighting for the stage.

470 Survey of Costume History (3). A survey of historic costume forms from ancient Egypt to the present time.

473 Costume Construction I (1–3). Permission of the instructor. Beginning instruction in pattern making through flat pattern for theatrical costume.

474 Costume Construction II (1–3). Prerequisite, DRAM 473. Permission of the instructor for students lacking the prerequisite. Beginning instruction in pattern making through draping on a dress form for theatrical costume.

475 Costume History: Africa, Asia, and Arabia (3). A survey of the traditional costume forms on the African Continent, in Asia (China, Japan, India), and on the Arabian Peninsula.

477 Theatrical Design (3). General principles of scenic, costume, and lighting design for the theatre.

480 Period Styles for Production (3). Students may not receive credit for both DRAM 280 and 480. A study of the historical development of Western minor arts and the ramifications of reproducing them for the theatre.

484 Studies in Dramaturgy and Criticism (3). This seminar seeks to introduce students to the principles of arts criticism through study of the work of a variety of different critics, by distinguishing between the nature of criticism and reviewing the arts, and through the students' own practice of critical writing.

486 Latin American Theatre (3). This course explores the historical and aesthetic development of Latin American theatre, focusing on particular factors that distinguish this theatre from the Western European tradition.

487 Chicana/o Drama (3). This course surveys Chicana/o history and culture from 1965 to the present through the examination of plays by and about Chicana/os. It also interrogates Chicana/o performance practices as political acts.

488 United States Latino/a Theatre (3). Investigation of United States Latino/a theatre texts and performance practices as a discreet genre. United States Latino/a theatre will be distinguished from the dominant culture, and diversity of forms and styles discussed.

489 Carnivals and Festivals of the African Diaspora (3). This course will examine the role of Carnival in the African Diaspora, exploring its history, its many theatrical forms and its fusion with European and indigenous American cultures. Through examining published and unpublished texts the development of the Carnival will be understood as an expression of freedom and cultural survival.

491 Issues in Arts Management (3). Arts management issues taught through analysis of case studies. Course includes management theories, organizational structures, and current issues.

493 Theatre Management (3). Practicum in theatre management procedures and business of the theatre involving box office, audience development, research, publicity, operational, and contract procedures in regard to artists, technicians, managers, and producers. Students actively engage in management areas of the PlayMakers Repertory Company and productions of the Department of Dramatic Art.

566 Advanced Scene Design (3). Prerequisite, DRAM 466. Permission of the instructor for students lacking the prerequisite. Advanced study of the principles and practice of designing scenery for the theatre.

567 Costume Design II (3). Prerequisite, DRAM 467. Permission of the instructor. Practicum in costume design for the theatre, focusing on the requirements of professional theatre production and alternative costume design solutions.

586 Costume Seminars I: Dyeing and Painting (1–3). Prerequisite, DRAM 192. Permission of the instructor. Taught in a four-semester rotation. May be repeated for credit for a total of six hours for undergraduates and 12 hours for graduate students. Series of topics in costume for use in design and production for the stage.

587 Costume Seminars II: Millinery and Hair (1–3). Permission of the instructor. Advanced costume production techniques with an emphasis on millinery and hair design.

588 Costume Seminars III: Masks and Armor (1–3). Permission of the instructor. Advanced costume production techniques with an emphasis on creating masks and armor.

589 Costume Seminars IV: Decorative Arts (1–3). Permission of the instructor. Advanced costume production techniques with an emphasis on decorative arts.

590 Advanced Special Topics in Dramatic Art (0.5–3). The study of a topic in dramaturgy, theatrical design, or theatrical production for advanced undergraduates and graduate students. Content and instructor will vary. May be repeated for credit.

650 Costume Production I: Couture Methods (0.5–3). Prerequisite, DRAM 192. Advanced construction techniques in theatrical costuming with an emphasis on couture methods.

667 Advanced Costume Design I (1–3). Permission of the instructor. Study of costume design for students concentrating in costume production.

691H Honors Project in Dramatic Art (3). Required preparation, 3.5 cumulative grade point average and permission of the department. The commencement of a special project (essay or creative endeavor), approved by the department, by a student who has been designated a candidate for undergraduate honors.

692H Honors Project in Dramatic Art (3). Prerequisite, DRAM 691H. Permission of the department. The completion of a special project by a student who has been designated a candidate for undergraduate honors.

697 Senior Seminar (3). Close study of the interrelationships between theory and practice in contemporary world theatre, placing developments in their cultural contexts, and exploring current theatrical trends in an international framework.

Courses for Graduate Students

DRAM

720 Acting I (3). Admission to the M.F.A. Acting program required. Intensive professional training for the actor. Must be taken fall and spring.

721 Acting II (3). Admission to the second year of the M.F.A. Acting program required. Advanced professional training for the actor. Must be taken fall and spring.

722 Voice I (3). Admission to the M.F.A. Acting program required. Development of the individual actor's voice and speech. Must be taken fall and spring.

723 Voice II (3). Admission to the second year of the M.F.A. Acting program required. Expansion of the individual's vocal versatility in performance. Must be taken fall and spring.

724 Movement I (3). Admission to the M.F.A. Acting program required. Development of the actor's body as an expressive instrument. Must be taken fall and spring.

725 Movement II (3). Admission to the second year of the M.F.A. Acting program required. Advanced projects in movement. Special sessions in tumbling and stage combat. Must be taken fall and spring.

726 Rehearsal and Performance I (1-6). Admission to the M.F.A. Acting program required. Rehearsal and performance of special ensemble projects. Must be taken fall and spring. May be repeated for credit.

727 Rehearsal and Performance II (1–6). Admission to the second year of the M.F.A. Acting program required. Practical application of techniques in rehearsal and performance in studio and main stage production. Must be taken fall and spring. May be repeated for credit.

728 Acting Practicum I (3–12). Admission to the third year of the M.F.A. Acting program required. Intense practicum as a member of the PlayMakers Repertory acting company. Preparation and presentation of assigned projects and work in departmental productions. Work in voice and movement as scheduled.

750 Advanced Special Studies: Costume Production II: Advanced Couture Methods (.5–3). Advanced construction techniques with an emphasis on advanced couture methods.

752 Special Studies: Costume Production III: Tailoring (.5–3). Costume graduates only. Advanced construction techniques with an emphasis on bodice development.

760 Costume Construction III: Advanced Flat Pattern (1–3). Prerequisite, DRAM 473. Continued study of pattern making with flat pattern in advanced shapes for the stage.

762 Costume Construction IV: Advanced Draping (1–3). Prerequisite, DRAM 474. Continued study of draping theatrical costumes with advanced shapes.

764 Costume Construction V (1–3). Prerequisites, DRAM 473, 474, 760, and 762. Using combination of patternmaking and dressmaking techniques to achieve unusual shapes in theatrical costume.

766 Costume Construction VI: Computer Pattern (1–3). Prerequisite, DRAM 473. Continuation of the study of flat pattern using computer software with AutoCAD.

770 Period Pattern I: Pre-Victorian (1–3). Permission of the instructor. Advanced study of historical pattern, costume crafts, or costume shop management through directed study. May be repeated for credit.

772 Period Pattern II: Victorian (1–3). Costume graduates only. Study of historical pattern with an emphasis in Victorian era.

774 Period Pattern III: 20th Century (1–3). Costume graduates only. Study of historical pattern with an emphasis in 20th century.

776 Period Pattern IV: 19th and 20th Century Men's Wear (1–3). Costume graduates only. Study of sartorial arts with an emphasis in 19th to 20th centuries.

780 Costume Management I: Supplies and Suppliers (1–3). Costume graduates only. Study of supplies and suppliers needed to produce theatrical costumes.

782 Costume Management II: Budget Methods (1–3). Costume graduates only. Study of cost analysis for costume production.

784 Costume Management III: Personal (1–3). Costume graduates only. Study of organization and personnel management for costume production.

790 Costume Laboratory I (3). Admission to the M.F.A. Costume program required. Practical work in the costume shop. Must be taken fall and spring.

791 Costume Laboratory II (3). Admission to the second year of the M.F.A. Costume program required. Advanced practical work in the costume shop. Must be taken fall and spring.

792 Costume Laboratory III (3). Costume graduates only. Continuation of practical work through production assignments.

793 Costume Laboratory IV (3). Costume graduates only. Continuation of practical work through production assignments.

796 Costume Laboratory V (1–3). Admission to the third year of the M.F.A. Costume program required. Advanced practical work in the costume shop. Must be taken fall and spring.

797 Costume Laboratory VI (1–3). Costume graduates only. Continuation of practical work through production assignments.

799 Costume Program Internship (3–6). Intensive practicum in Costume Arts, with tutorial and class assignments on an individual basis as required. May be repeated for credit.

800 Technical Direction (3–6). Prerequisite, DRAM 491. Permission of the instructor. Study of the technical and engineering problems in production and standard theatrical drafting and construction conventions. Must be taken fall and spring.

801 Technical Direction II (3–6). Technical graduates only. Additional study of technical and engineering problems in production.

802 Advanced Technical Direction (3–6). Admission to the second year of the M.F.A. Technical Production program required. An advanced study of the management, technical, and engineering problems involved in theatrical production. Must be taken fall and spring.

803 Advanced Technical Direction II (1–6). Admission to the third year of the M.F.A. Technical Production program required. An advanced study of the management, technical, and engineering problems involved in theatrical production. Must be taken fall and spring.

805 Special Studies: Technical Production (.5–12). Prerequisite, DRAM 192. Permission of the instructor. Advanced scenic construction techniques leading to specific project or production responsibility in the area of scenic construction in Department of Dramatic Art productions and PlayMakers Repertory Company. A minimum of 15 hours per week is required during the rehearsal period. Faculty evaluation at the close of the production. May be repeated for credit.

806 Technical Planning and Production (3–6). Admission into the third year of the M.F.A. Technical Production program required. Intensive practicum in production projects for departmental and PlayMakers Repertory Company productions. Must be taken fall and spring.

813 Special Studies: Technical Production (1–6). Technical graduates only. Continuation of advanced scenic construction techniques with specific project or production responsibility in the area of scenic construction.

814 Professional Theater Laboratory: Technical Production (.5–12). Technical graduates only. Individual programs in scenic construction techniques.

821 Advanced Lighting Design (3). Permission of the instructor. This course acquaints the student with professional practice in lighting design through lecture by faculty and visiting professionals and through evaluation of lighting designs executed by students and critiqued by professionals.

830 Seminar in Professional Practice: Technical Production (1–21). Admission to the M.F.A. program in Technical Production required. An examination of professional theatre practice through contact with students, staff, faculty, and visiting artists in technical theatre. Generally taken fall and spring. May be repeated for credit.

841 Design Technical Theatre Practicum I (3–6). Admission into the M.F.A. Technical program required. Practical work in scene shop. Must be taken fall and spring.

842 M.F.A /Technical Theatre Practicum II (1–6). Technical graduates only. Continuation of practical work in scene shop.

843 Design Technical Theatre Practicum II (3–6). Prerequisite, DRAM 841. Admission to the second year of the M.F.A. Technical program required. Advanced practical work in scene shop. Must be taken fall and spring.

844 M.F.A./Technical Practicum IV (3–6). Continuation of advanced practical work in scene shop.

845 Design Technical Internship (6–12). Intensive practicum in production projects for departmental and PlayMakers Repertory Company productions, with independent studies as assigned on an individual basis. May be repeated for credit.

875 Seminar in Dramatic Literature (1–3). Admission to the M.F.A. program in any area required. An examination of the literature of the theatre in terms of dramatic construction, theory, and interpretation. May be repeated for credit.

992 Graduate Final Practicum: Thesis (3–6).

Department of Economics

www.unc.edu/depts/econ
PATRICK CONWAY, *Chair*

Professors
John S. Akin, Health Economics, Public Finance, Human Resources
Gary A. Biglaiser, Microeconomic Theory, Industrial Organization
Patrick J. Conway, Economic Development, International Economics
Richard T. Froyen, Macroeconomics, Monetary Policy
Eric Ghysels, Econometrics, Finance
Donna B. Gilleskie, Health Economics, Econometrics, Labor
David K. Guilkey, Econometrics
Steven S. Rosefielde, Comparative Economic Systems
John F. Stewart, Industrial Organization
Helen V. Tauchen, Applied Microeconomics

Associate Professors
Anusha Chari, International Finance, Open-Economy Macroeconomics
Neville R. Francis, Macroeconomics, Time Series
Lutz A. Hendricks, Macroeconomics, Human Capital, Economic Growth, Wealth Inequality
Jonathan B. Hill, Time Series Econometrics, Econometric Theory
Brian McManus, Empirical Industrial Organization, Applied Microeconomics, Public Economics
Peter Norman, Microeconomics, Public Economics
William R. Parke, Econometrics
Sergio O. Parreiras, Game Theory, Microeconomics
Boone A. Turchi, Demography

Assistant Professors
Saraswata Chaudhuri, Econometrics
Clement Joubert, Labor, Development, Applied Econometrics
Klara Peter, Labor, Development, Applied Microeconomics, Public Policy
Toan Phan, International Macroeconomics, Macroeconomics
Andrew Yates, Environmental Economics

Lecturers
Michael D. Aguilar, Financial Econometrics, Applied Macroeconomics, Econometric Theory
Rita A. Balaban, Applied Microeconomics, Economic Education
Burton B. Goldstein, University Entrepreneur in Residence
Stephen W. Lich-Tyler, Labor Economics, Public Economics, Applied Microeconomics, Household and Family Economics
Jeremy Petranka, Game Theory, Conflict Theory, Political Economics, Industrial Organization, Microeconomic Theory
Geetha Vaidyanathan, Macroeconomics, Statistics, Monetary Economics, International Economics

Professors Emeriti
Dennis R. Appleyard
Arthur Benavie
Stanley W. Black
Ralph Burns
William A. Darity Jr.
Alfred J. Field Jr.
James W. Friedman
A. Ronald Gallant
Dell B. Johannesen
David McFarland
James L. Murphy
Ralph W. Pfouts
Michael K. Salemi

Vincent J. Tarascio
Roger Waud
James A. Wilde
Xiaodong Wu

The graduate program in the Department of Economics prepares students for teaching and research careers in the fields of econometrics, financial econometrics, health economics, international trade and development, labor economics, microeconomic theory/industrial organization, and monetary and open economy macroeconomics. During the first year of the program, students concentrate on the core areas of econometrics, macroeconomics, and microeconomics. Later, each student chooses two fields of specialization within those mentioned. The department's objective is to provide students both with broad training in theory and econometrics and with specialization in the major and minor fields.

A number of students supplement their study in economics at UNC–Chapel Hill with work in finance, statistics, mathematics, biostatistics, urban and regional studies, computer science, and operations research, along with courses at Duke University and North Carolina State University. Strong offerings in these and other related areas enhance the overall graduate training offered to students.

Master of Science

The focus of the graduate program in economics is on the doctorate offerings. Most of the students in the master's program have already been admitted to a Ph.D. or professional program at UNC–Chapel Hill.

The master's degree requires ECON 710, 720, and 700, one course in econometrics (ECON 771 or 870), two courses in a major field, three electives, and a research course (ECON 992). Courses are to be selected in consultation with, and with the approval of, the director of graduate studies and the faculty in the major field. A master of science student writes a research paper under the direction of the faculty advisor. Also, all candidates must pass a written exam in the major field, with the paper advisor responsible for the examination. The Graduate School Handbook describes the general requirements for the master's examinations and for the papers.

Doctor of Philosophy

Course Requirements. A doctoral candidate must complete 15 Ph.D.-level courses plus two semesters of the doctoral dissertation course (ECON 994). Unless otherwise specified by the faculty in the major field, at least 12 of the 15 courses must be from the Economics Department. All courses must be approved by the director of graduate studies.

Courses in the Fundamentals of Economics. The following seven courses or their equivalents are required: ECON 710, 711, 720, 721, 700, 770, and one additional econometrics course.

Courses in the Major and Minor Fields within Economics. Each student selects a major and a minor field from among the following fields within economics:

- Econometrics
- Financial Econometrics
- Health Economics
- International Trade and Development
- Labor Economics
- Microeconomic Theory/Industrial Organization
- Monetary and Open Economy Macroeconomics

At least three courses in the major field and two courses in the minor field are required. One of the courses in the major field is usually a seminar course.

Courses in Supporting Fields. The remaining courses are supporting courses chosen by the student in consultation with the director of graduate studies and other faculty. The supporting courses may be within the major or minor field or in areas that complement the major and minor fields.

Foreign Languages-Research Skill. Additionally, a student must demonstrate competence in one foreign language or fulfill a research skill requirement. Courses satisfying the research skills requirement are usually in econometrics, quantitative methods, mathematics, statistics, or computer science.

Doctoral Exams and Dissertation. Students must pass qualifying exams in macroeconomics, microeconomics, and the major field. The faculty in each field determines whether the major field qualifier is a four-hour written exam or a paper. The qualifiers are given in August and January of each academic year; major field papers are due early in the semester. The three-hour macroeconomics and microeconomics qualifying exams are first taken in August of the second year and the major field qualifier in August of the third year. The exams are also given in early January. Students have two chances to pass each of the exams and may petition the Appeals Committee for permission to take the macroeconomics or microeconomics qualifier for the third time.

The *Graduate School Handbook* describes the requirements for the doctoral oral exam, doctoral dissertation, and final oral defense of the dissertation. The doctoral oral exam includes an evaluation of the thesis prospectus.

The general regulations of The Graduate School apply to students receiving graduate degrees in economics from the University of North Carolina at Chapel Hill.

Fellowships and Assistantships. The department offers several fellowships and a number of research and teaching assistantships. All applicants to the Ph.D. program are considered for financial support, and most students enrolled in the Ph.D. program receive a stipend, tuition assistance, and health insurance from the Economics Department or other sponsors for the first five years of the program. Detailed information regarding the fellowships, assistantships, and instructorships may be obtained from the director of graduate studies in economics or at www.unc.edu/depts/econ.

Graduate standing in economics or permission of the director of graduate studies in economics is required for all courses numbered 700 or higher.

Courses for Graduate and Advanced Undergraduate Students

ECON

400 Elementary Statistics (3). Comprehensive introduction to statistics, including descriptive statistics and statistical graphics, probability theory, distributions, parameter estimation, hypothesis testing, simple and multiple regression, and use of powerful statistical estimation software.

410 Intermediate Theory: Price and Distribution (3). Prerequisite, MATH 231 or STOR 113. The determination of prices and the distribution of income in a market system. Students may not receive credit for both ECON 310 and 410.

420 Intermediate Theory: Money, Income, and Employment (3). Prerequisite, ECON 410. An introduction to contemporary macroeconomic concepts and analysis. Topics include the level,

fluctuations, and growth of national income, and monetary and fiscal policies designed to achieve economic goals. Students may not receive credit for both ECON 320 and 420.

423 Financial Markets and Economic Fluctuations (3). Prerequisite, ECON 420. An examination of financial institutions and markets, their role in economic conditions, and the use of macroeconomic policies in affecting those conditions. Students may not receive credit for both ECON 320 and 423.

430 Economic Development of the United States (3). Prerequisites, ECON 410 and 420. Students may receive credit for either ECON 330 or 430 but not for both. This course parallels ECON 330 but is designed for students with a higher level of theoretical preparation.

434 History of Economic Doctrines (3). A survey of the fundamental forms of economic thought from the scholastics through Keynes.

440 Analysis of Public Finance (3). Prerequisite, ECON 410. Application of economic analysis to the taxing and spending functions of government. Students may not receive credit for both ECON 340 and 440.

445 Industrial Organization (3). Prerequisite, ECON 410. Theoretical and empirical development of structure-conduct-performance relationships in the industrial sector; description and analysis of United States industry. Students may not receive credit for both ECON 345 and 445.

450 Health Economics: Problems and Policy (3). Prerequisite, ECON 410. Permission of the instructor for students lacking the prerequisite. Economic analysis applied to problems and public policy in health care.

454 Economics of Population (3). Prerequisite, ECON 310 or 410. Permission of the instructor for students lacking the prerequisite. Analysis of economic-demographic interrelations including demographic analysis, population and economic growth and development, economic models of fertility and migration, and population policy.

455 Environmental Economic Theory (3). Prerequisite, ECON 410. A rigorous economic analysis of environmental issues, with particular emphasis on the problem of designing appropriate institutions and regulations under private information and the interaction between economic and ecological systems. Topics include emission fees and marketable permits, pollution models, carbon regulation, and ecosystem service markets.

460 International Economics (EURO 460, PWAD 460) (3). Prerequisite, ECON 410. An introduction to international trade, the balance of payments, and related issues of foreign economic policy.

461 European Economic Integration (3). Prerequisite, ECON 410. Permission of the instructor for students lacking the prerequisite. Economic and political aspects of European economic integration, the EC customs union, barriers to integration, convergence vs. divergence of inflation rates and income levels, enlargement of the EC.

465 Economic Development (3). Prerequisite, ECON 410. Permission of the instructor for students lacking the prerequisite. An introduction to the economic characteristics and problems of the less developed countries and to the theories and policies applicable to the developing economy.

468 Principles of Soviet and Post-Soviet Economic Systems (3). Prerequisite, ECON 310 or 410. Study of the principles, design, organization, and performance of state-controlled economies relying on planning or regulated markets, with an emphasis on continuity and post-communist transition.

469 Western and Asian Economic Systems (ASIA 469) (3). Prerequisite, ECON 310 or 410. Policy seminar on the systemic factors distinguishing Western economies from their rivals in the former Soviet bloc and Asia, focused on conflict resolution and global integration.

480 Labor Economics (3). Prerequisite, ECON 410. An introduction to the field of labor economics with emphasis on how the interactions between firms and workers influence wages, employment, unemployment, and inflation. Students may not receive credit for both ECON 380 and 480.

485 Economics of Sports (3). Prerequisites, ECON 400 and 410. Applies microeconomic techniques to professional and amateur sports through the examination of real-world issues and problems. Employs statistical analysis to test some of the theoretical predictions of the models in the sports literature.

490 Special Topics (1–3). Topic varies from semester to semester. Permission of the instructor.

491 Seminar in Economics (1–3). Detailed examination of selected problems in economics and a critical analysis of pertinent theories. Permission of the instructor.

495 Research Course (1–3). Topic varies from semester to semester. Permission of the instructor.

510 Advanced Microeconomic Theory (3). Prerequisite, ECON 410. A treatment of topics in microeconomic theory not normally covered in ECON 410.

511 Game Theory in Economics (3). Prerequisites, ECON 410 and MATH 233. Permission of the instructor for students lacking the prerequisites. Topics in noncooperative and cooperative game theory are covered, along with a selection of applications to economics in areas such as industrial organization, international trade, public finance, and general equilibrium.

520 Advanced Macroeconomic Theory (3). Prerequisite, ECON 420. This course will emphasize theoretical and empirical topics such as growth, labor search, Phillips curves, stagflation, and optimal government policy.

540 Advanced Public Finance (3). Prerequisite, ECON 440. Selected topics in taxation, public expenditures, and governmental transfer programs.

545 Advanced Industrial Organization and Social Control (3). Prerequisite, ECON 445. Theory of market failure and its relationship to antitrust and regulatory policy; exploration of empirical literature of industrial organization; current issues in social control.

560 Advanced International Economics (3). Prerequisite, ECON 460. Analysis and interpretation of selected problems and policy issues. Content varies, but attention is given to such topics as trade barriers, trade patterns, floating exchange rates, and international monetary policy.

570 Economic Applications of Statistical Analysis (3). Prerequisite, ECON 400. Statistical methods in the construction, estimation, testing, and application of linear economic models; computer programs and interpretation of their output in empirical analysis of common economic theories.

575 Econometric Topics: Applied Time Series Analysis and Forecasting (3). Prerequisites, ECON 400, 410, 420, and 570. Permission of the instructor for students lacking the prerequisites. Econometric techniques for time series data. Topics include ARMA models, forecasting, nonstationarity, conditional heteroskedasticity, and multiple equation models.

580 Advanced Labor Economics (3). Prerequisite, ECON 480. A theoretical and empirical analysis of current social problems involving individuals and their jobs. Included are such topics as poverty, discrimination, and working conditions.

586 Economics of the Family (3). Prerequisite, ECON 410. Permission of the instructor for students lacking the prerequisite. Analyzes the family with respect to the marriage market; divorce; reproductive behavior; the baby black market; intra-family allocation of goods, time, and power; labor supply; migration; and family policy.

590 Special Topics (1–3). Topic varies from semester to semester.

595 Research Course (1–3). Topic varies from semester to semester.

596 Independent Study (1–3). Topic varies from semester to semester.

691H Honors Course (3). Permission of the instructor. Readings in economics and beginning of directed research on an honors thesis. Required of all candidates for graduation with honors in economics.

692H Honors Course (3). Prerequisite, ECON 691H. Permission of the instructor. Completion of an honors thesis under the direction of a member of the faculty. Required of all candidates for graduation with honors in economics.

698 Philosophy, Politics, and Economics II: Capstone Course (PHIL 698, POLI 698) (3). See PHIL 698 for description.

Courses for Graduate Students

Graduate standing in economics or permission of the director of graduate studies in economics is required for all courses numbered 700 or higher.

ECON

700 Basic Quantitative Techniques (3). Topics from linear algebra, calculus, linear and nonlinear programming, and the theory of difference and differential equations with applications to economics.

710 Advanced Microeconomic Theory I (3). Pre- or corequisites, ECON 410 and 700. Consumer and producer theory, expected utility, perfect competition and monopoly, introduction to general equilibrium and welfare economics.

711 Advanced Microeconomic Theory II (3). Prerequisite, ECON 710. General equilibrium and welfare economics, game theory and oligopoly, information economics.

720 Advanced Macroeconomic Theory I (3). Prerequisite, ECON 420. Keynesian and classical equilibrium models; the neo-Keynesian synthesis; monetarist and other alternative analytic frameworks.

721 Advanced Macroeconomic Theory II (3). Prerequisite, ECON 720. Growth models, general equilibrium approach to monetary theory; input-output; disequilibrium theory; extensions of Keynesian and classical models.

770 Introduction to Econometric Theory (3). Probability theory, expectation, conditional expectation, modes of convergence, limit and interchange theorems, and the asymptotics of maximum likelihood, generalized method of moments and efficient method of moments.

771 Econometrics (3). Prerequisite, ECON 770. One semester coverage of basic econometrics. Topics include: regression under ideal and nonideal conditions; special models, including simultaneous equations models; and applications and econometric computer programs.

799 Experimental (1–3). Varied.

806 Seminar in Teaching Methods in Economics (3). Doctoral candidacy in economics or permission of the instructor. Covers skills in lecturing, encouraging student participation and active learning, writing exams, planning and evaluating courses. Students design and teach a module that includes class discussion and hands-on learning.

810 Game Theory I (3). Prerequisite, ECON 710 and 711. Permission of the instructor for students lacking the prerequisites. Noncooperative games in strategic and extensive form, with perfect and imperfect information. Other topics from: information economics, mechanism design, auctions, repeated games, bargaining, bounded rationality, learning, evolutionary games, cooperative games.

811 Game Theory II (3). Prerequisite, ECON 810. Permission of the instructor for students lacking the prerequisite. This course is a continuation of ECON 810. Topics covered will be chosen from those listed, but not covered in ECON 810.

820 Monetary Theory (3). Examination of theory and evidence on money demand, money supply, and portfolio analysis. Barter versus monetary economics, portfolio school, monetarism, monetary theories of interest rate determination.

821 Monetary Policy (1–3). Prerequisite, ECON 720. Permission of the instructor for students lacking the prerequisite. Optimal policy under uncertainty, financial intermediation and monetary control, channels of monetary influence, monetary policy and inflation, rules versus authority.

840 Advanced Finance: Expenditure (3). Analysis of market failure and reasons for public spending, cost-benefit analysis and program budgeting, public decision making, redistribution and fiscal equity, intergovernmental transfers.

841 Advanced Public Finance: Revenues (3). Prerequisite, ECON 840. Permission of the instructor for students lacking the prerequisites. Criteria for judging tax structures, incidence and impact of taxation, user charges and debt finance, intergovernmental coordination, and macroeconomic effects.

845 Advanced Business Organization and Social Control (3). Permission of the instructor. Extensive readings in the literature are required. Emphasis is placed upon the role of economic analysis in dealing with problems in this field.

846 Economic Regulation of Industry (3). Economic regulation in theory and practice. Principles of optimal regulation are developed, and regulatory performance in various industries is appraised.

850 Health Economics (3). Prerequisites, ECON 710 and 771. Permission of the instructor for students lacking the prerequisites. Measurement and modeling of the demand for medical care, the demand for and supply of health insurance, and the incorporation of health, medical care, and health insurance in determining both short and long run labor supply.

851 Health Economics for Developing Countries (3). Prerequisites, ECON 710 and 771. Permission of the instructor for students lacking the prerequisites. Major topics are: how health and development are related, the demand for health services, cost-benefit and cost-effectiveness analysis, and methods for financing health care in developing, resource-constrained nations.

855 Economics and Population (3). Graduate standing in economics or permission of the instructor. Analysis of economic-demographic interrelationships including: population and economic development; population, environmental decay, and zero population growth; models of fertility, migration, and spatial organization; population policy.

860 Theory of International Trade (3). Graduate standing in economics or permission of the instructor. The theory of international values;

comparative advantage and the gains from trade; commercial policy.

861 International Monetary Economics (3). Graduate standing in economics or permission of the instructor. Analysis of the international monetary system; exchange rates; the process of adjustment in the balance of payments.

865 Economic Development: Theory and Policy (3). Permission of the instructor. Intensive study of the development processes and problems of the less developed countries, with emphasis on theories of growth and development, internal and external policies, and planning strategies.

866 Selected Topics in Economic Development and Development Planning (3). Prerequisite, ECON 865. Examination of various topics in economic progress of the less developed countries, with special emphasis on the role of international issues.

867 Comparative Economic Systems (3). This course focuses on alternative theories of United States capitalism, French indicative planning, Yugoslavian worker-managed market socialism, Soviet central planning, and the Chinese worker-controlled decentralized planning model.

868 Socialist Economic Thought in Historical Perspective (3).

870 Advanced Econometrics (3). Prerequisites, ECON 770, 771, and MATH 547. ECON 870 constitutes a one-semester treatment of the fundamental theory of econometrics. Topics covered include asymptotic distribution theory, linear and nonlinear models, specification testing techniques, and simultaneous equations models.

871 Time Series Econometrics (3). Prerequisite, ECON 870. Covers stationary univariate and multivariate time series models, spectral analysis methods, nonstationary models with time trends, unit roots and cointegration, and special topics such as conditional volatility, the Kalman filter, and changes of regime.

872 Nonlinear Econometric Methods (3). Prerequisite, ECON 870. Density estimation, nonparametric regression, neural nets, nonlinear regression, generalized method of moments, seminonparametric time series, estimating stochastic differential equations and nonlinear latent variables.

873 Microeconomics (3). Prerequisite, ECON 870. Limited dependent variable models such as binary outcome models, multinomial outcome models, and censored and truncated outcome models. Count data models. Duration models. Panel data analysis.

876 Advanced Topics in Empirical Finance (3). Prerequisite, ECON 871. This course will cover a selected list of current empirical research topics in finance and related econometric methods.

877 Foundations for Continuous Time Asset Pricing (3). Prerequisites, STOR 634 and 635. This course introduces students to mathematical foundations and economic interpretation of the main probabilistic tools (stochastic calculus, martingale methods) in continuous time finance.

880 Labor Economics I (3). Prerequisite, ECON 710. Permission of the instructor for students lacking the prerequisite. Analysis of short- and long-run aspects of supply and demand of labor, including empirical analysis of labor force behavior of males, females, blacks, and whites. Microeconomic effects of marriage, fertility, mobility on labor supply, and macroeconomic effects of unemployment on inflation.

881 Labor Economics II (3). Life cycle analysis of supply and demand for labor as a determinant of individual wages. Topics include an analysis of discrimination, union power, and governmental manpower policies on the distribution of earnings across the population.

890 Seminar (1–21). Permission of the instructor. Individual research in a special field under direction of a member of the department.

892 Research Practicum (1–3). Students complete a pre-approved internship under the direction of a faculty member and the director of graduate studies. A paper summarizing the research work is required.

896 Independent Study (1–3). Varied.

899 Experimental (1–3). Varied.

900 Dissertation Workshop: Topics in Economics (1–3). Permission of the instructor. Discussion of current research with topics varying from year to year. Oral and written reports on dissertation research. May be repeated for credit.

910 Dissertation Workshop in Microeconomic Theory (1–3). Permission of the instructor. Discussion of current research in microeconomic theory and industrial organization. Oral and written reports on dissertation research. May be repeated for credit.

920 Dissertation Workshop in Macroeconomics (1-3). Permission of the instructor. Discussion of current research in macroeconomics and monetary economics. Oral and written reports on dissertation research. May be repeated for credit.

958 Seminar in Population (3). Graduate standing in economics required. For advanced population students, this course addresses the newest and most advanced economic demography literature.

960 Dissertation Workshop in International and Development Economics (1–3). Permission of the instructor. Discussion of current research in international and development economics. Oral and written reports on dissertation research. May be repeated for credit.

966 Seminar in Economic Development (1–3). This course is an introduction to the literature and research methods of economic development and transition economies. May be repeated for credit.

968 Seminar in Soviet Economics (3). Permission of the instructor. Studies of selected problems of the Soviet economy and related aspects of Soviet economic thought. Seminar members are expected to present reports on assigned research topics.

970 Dissertation Workshop in Econometrics and Financial Econometrics (1–3). Permission of the instructor. Discussion of current research in econometrics and financial econometrics. Oral and written reports on dissertation research. May be repeated for credit.

971 Research in Econometrics (3). The course introduces students to theoretical and applied research topics in econometrics. May be repeated for credit.

981 Seminar in Labor (1–3). The course introduces students to research topics in labor economics. May be repeated for credit.

985 Dissertation Workshop in Applied Microeconomics (1–3). Permission of the instructor. Discussion of current research in applied microeconomics. Student presentations of dissertation and other research. Oral and written reports on dissertation research.

990 Special Topics (1–3).

992 Master's Paper (3).

993 Master's Thesis (3).

994 Doctoral Dissertation (3).

School of Education

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G. WILLIAMSON McDIARMID, *Dean*

Professors
Kathleen Brown, Educational Leadership
Marta Civil, Mathematics Education
Gregory J. Cizek (176) Educational Assessment and Evaluation
Fenwick English (998) Educational Administration, Curriculum Inquiry and Leadership
Susan Friel (115) Mathematics Education
John P. Galassi Jr. (028) Strengths Based School Counseling
Madeleine R. Grumet (170) Culture, Curriculum, and Change
Catherine Marshall (105) Politics, Qualitative Inquiry, Gender, Race, and Class Issues
Judith L. Meece (055) Educational Psychology, Measurement and Evaluation, Elementary Education
George W. Noblit (057) Sociology of Education, Qualitative Research Methods, Critical Race Studies
Sam Odom, Early Childhood, Disability
Xue Lan Rong (146) Social Studies Education, Social Foundations of Education, Large Data Set Research
Rune J. Simeonsson (073) Child Development and Disability, Psychological Assessment, Primary Prevention
Lynda Stone (147) Philosophy of Education, Social Theory, Feminism
Linda Tillman (036) Educational Leadership
Lynne Vernon-Feagans, Early Childhood Intervention, Literacy
William B. Ware (085) Educational Psychology, Measurement and Evaluation, Research Design Analysis
Barbara H. Wasik (086) Child Psychology, Social/Emotional and Cognitive Development, Literacy

Associate Professors
Harriet Able (149) Early Intervention, Family Support, Ethics
Patrick Akos, School Counseling, School Transitions
Cheryl Mason Bolick (029) Education Technology and Social Studies Education
Lora Cohen-Vogel, Educational Leadership and Policy
Jocelyn Glazier, Diversity and Multiculturalism, Literacy, Equity
Leigh Hall, Literacy Studies, Early Childhood, Families
Jill Hamm, Adolescent Development
Eric Houck, Educational Leadership, School Finance, Policy
Steve Knotek (2001) School Psychology
Rebecca New, Early Childhood Intervention
Rita O'Sullivan (180) Educational Assessment and Evaluation
Eileen Parsons, African American Science Achievement, Racial Equity
James Trier, English Education—Secondary

Assistant Professors
Janice Anderson, Science Education, Gender and Science Education, Technology
Juan Carillo Latino/a Chicano/a Education Social and Cultural Foundations of Education
Claudia Cervantes-Soon, Bilingual and ESL Pedagogy, Gender and Minority Issues
Dana Thompson Dorsey, Educational Leadership, School Law
Jeffrey Greene, Cognition and Learning
Dana Griffin, Diversity and Multiculturalism, Professional Development of School Counselors
Melissa Miller, Special Education

Research Professors
Don Bailey, Early Intervention, Family Support, Assessment
James Bodfish, School Psychology, Developmental Disabilities
Martha Cox, Early Childhood, Families and Literacy
Karen Erickson, Allied Health Sciences
Jill Fitzgerald, Literacy
James Marshall, Philosophy of Education
Malbert Smith, Educational Psychology, Measurement and Evaluation
A Jackson Stenner, Educational Psychology, Measurement and Evaluation
Carl Swartz, Educational Psychology, Measurement and Evaluation
Dennis Orthner, School Counseling
Pamela J. Winton (092) Families, Early Intervention, Pre-service and In-Service Training

Research Associate Professors
Virginia Buysse (159) Community-Based Programs for Young Children with Disabilities and Their Families
Dina Castro-Burgos, Early Childhood Intervention, Literacy
Kirsten Kainz, Early Childhood Intervention, Literacy
Ellen Peisner-Feinberg, Early Childhood Intervention, Literacy
Sharon Ritchie, Early Childhood Intervention, Literacy

Research Assistant Professors
Marnie Ginsberg, Early Childhood Intervention and Literacy
Kelly Maxwell, School Psychology, Program Evaluation, Early Intervention
Lorraine Taylor, Early Childhood, Families and Literacy

Clinical Professors
Suzanne A. Gulledge (033) Social Studies Education
Daniel M. Huff, Choral Music Education, Teacher Preparation, Teacher Socialization
Sharon Palsha, Child Development and Family Studies
Stanley Schainker, Educational Leadership: Systems Functions, School Management, Group Dynamics
James Veitch, Educational Leadership—Budget, Staff Development, Technology, Instructional Supervision

Clinical Assistant Professors
Nick Cabot, Science Education, Professional Development in Science Teaching, Distance Learning
Deborah Eaker-Rich, Social Foundations
Sandra Evarrs, School Psychology, Psychoeducational Assessment
Martinette Horner, Elementary Education
Cheryl Horton, Science Education
Molly Lloyd, Literacy Education
Cathy Scott, Secondary Mathematics, Teacher Prep, STEM Program Evaluation
Jennifer Wooten, Foreign Language Education, Spanish Education

Professors Emeriti
Richard A. Brice
Linda Brooks
William I. Burke
Richard H. Coop
James W. Cunningham
Barbara Day
Jill Fitzgerald
James J. Gallagher
R. Sterling Hennis Jr.
Paul B. Hounshell
Richard C. Hunter
David L. Lillie
Bobbie B. Lubker

Carol Malloy
William Malloy
William S. Palmer
Richard C. Phillips
Walter Pryzwansky
William C. Self
Dixie Lee Spiegel
Donald J. Stedman
Gary B. Stuck
Alan Tom
Neal H. Tracy
Gerald Unks
Eugene R. Watson
Kinnard P. White
Ronald Wiegerink
Ralph E. Wileman Jr.

The School of Education, in keeping with the general goals of the University of North Carolina at Chapel Hill, embraces a threefold mission of teaching, research, and service. With these purposes in mind, the school's graduate programs are designed to meet the needs of professional educators who seek to further their knowledge, understanding, and skills relating to educational processes. These professionals vary in their career orientations. Some are employed in (or wish to become employed in) educational institutions and others in agencies and organizations performing non-instructional educational functions.

The research mission involves continuing inquiry into the development of knowledge of the teaching-learning process, human development, the organization of schools and educational agencies, the historical, social, and philosophical bases for educational institutions, and the processes of program development and implementation.

The service mission provides public and private institutions and agencies with the benefits of research and consultation, thereby enhancing these institutions and agencies' ability to satisfy their educational objectives.

The teaching mission involves the faculty and graduate students in applying the knowledge base in field settings and translating it into coursework.

The School of Education has attempted to present correct information as of the printing date of this Record. However, this information does not establish a contractual relationship and the school reserves the right to alter any statement when review is complete. Therefore, applicants should contact the School of Education to obtain updated information on programs prior to final application procedures.

Degree Programs

Note: Additional information may be found on the School of Education's Web site at soe.unc.edu.

The School of Education offers two doctoral degrees: 1) the doctor of philosophy (Ph.D.) in education with five research areas (applied developmental sciences and special education, cultural studies and literacies, learning sciences and psychological studies, policy, leadership and school improvement and teacher education and curriculum) and in school psychology and 2) the doctor of education (Ed.D.) in educational leadership and in curriculum and instruction.

The master's programs include the following degrees: 1) the master of arts in teaching (M.A.T.) with a concentration in secondary education for English, social studies, foreign language and English as a second language, 3) the master of education (M.Ed.) in school counseling and the master's for experienced teachers, and 4) the master of school administration (M.S.A.) in educational leadership. The Graduate School administers all but the master of school administration program and the master's for experienced teachers, which the School of Education administers.

Two off-campus, part-time programs are offered: the master of education (M.Ed.) for experienced teachers and the flexible master of school administration (M.S.A. Flex). The potential specialty areas for the M.Ed. program are early childhood intervention and family support (birth through kindergarten); literacy, social studies, mathematics, science, technology and special education.

The part-time, off-campus M.S.A. Flex program is designed for working professionals and stretches the normal two-year program offered on campus over an extended period of two and a half academic years, beginning each January with a new cohort. While the program emphasizes preparation for the school principalship, individuals with other educational career aspirations (such as district-level leadership positions) will find it appropriate.

Education Degree Requirements

M.A. Degree Requirements

The MA in Education is currently under administrative review. We anticipate opening admissions to this program again for fall 2014.

M.Ed. Degree Requirements

1. A bachelor's degree from a four-year college or university.
2. Completion of the minimum required number of semester hours of advanced course work. (Check with individual programs to ascertain the minimum requirements.)
3. Completion of at least two full semesters of residence.
4. Completion of all required and elective courses within five years of admission.
5. A grade of Pass on a written comprehensive examination or equivalent.
6. The degree application to be filed no later than the date specified in the academic calendar.
7. A grade of P or better is required in all EDUC courses. One grade of F in an EDUC course makes a student academically ineligible to continue in the program.

M.A.T. Degree Requirements

1. A bachelor's degree from a four-year college or university.
2. The equivalent of an undergraduate major in the chosen subject area.
3. Completion of a minimum of 38 semester hours of advanced course work.
4. Completion of at least two full semesters of residence.
5. Completion of all required and elective courses within five years of admission.
6. Satisfactory completion of a comprehensive teaching portfolio that synthesizes course work and experiences as related to state and national standards.
7. Successful completion of the full time student teaching internship
8. The degree application to be filed no later than the date specified in the academic calendar.
9. A grade of P or better is required in all EDUC courses. One grade of F in an EDUC course makes a student academically ineligible to continue in the program.

Ed.D. (Doctor of Education) Degree Requirements

1. A bachelor's degree from a four-year college or university and a master's degree in the field of educational leadership or administration, or another approved field Students without such a degree can still be admitted into the program, under the conditions described below.
2. Completion of six hours of graduate work for two consecutive semesters in residence.
3 Completion of all required course work on an approved program of study within six years.
4. Completion of written and oral exams within six years. Completion of all degree requirements in eight years.
5. A grade of P or better is required in all EDUC courses. One grade of F in an EDUC course makes a student academically ineligible to continue in the program.
6. Completion of twelve semester hours of research courses.
5. Completion of a research seminar and a supervised field experience in the student's area of specialization.
6. A grade of Pass on a written comprehensive examination.
7. A grade of Pass on an oral examination.
8. Successful completion of a final oral examination, which is the defense of the dissertation.
9. Satisfactory completion of a dissertation.
10. A degree application to be filed no later than the date specified in the academic calendar.
11. A grade of P or better is required in all EDUC courses. One grade of F in an EDUC course makes a student academically ineligible to continue in the program.

Ph.D. Degree Requirements

In addition to the requirements of The Graduate School for the Ph.D., the School of Education also requires:

1. full-time enrollment until all formal course work is completed; and
2. completion of an individual program of studies comprised of required and elective courses.
3. A grade of P or better is required in all EDUC courses. One grade of F in an EDUC course makes a student academically ineligible to continue in the program.

Programs of Study

Master of Arts (M.A.) in Education

The MA in Education is currently under administrative review.

Master of Education (M.Ed.) for Experienced Teachers

The M.Ed. for experienced teachers is a part-time, field-based program for teachers currently employed in local schools, public and private. The program is designed to assist licensed teachers with at least three years of experience in reflecting upon their experiences and developing further skill and art as professional educators. It is a 31- to 35-hour program (depending on the content area) that begins in the summer, extends through the next two years, and concludes in the third summer. Courses are offered at local sites, not on the University campus, for the convenience of practicing teachers. Courses during the school year are offered generally from 4–7 p.m. Courses include the use of the Blackboard software suite of programs, as some portion of students' work is done online via computer.

The M.Ed. in Early Childhood Intervention and Family Support prepares the experienced early childhood professional with leadership skills in developing and implementing inclusive programs for infants/toddlers, preschoolers, and kindergartners with and without developmental delays. It is a 34- to 36-hour program that is typically completed by part-time students in two to two and one-half years; and by full-time students, in one and one-half calendar years. The program is designed to accommodate practicing professionals' schedules by offering courses in the late afternoon, evenings, and during the summer months.

The School of Education offers and administers the M.Ed. for experienced teachers program. For program information or an application, please visit the school's Web site at soe.unc.edu or call 966-1346.

Master of Education (M.Ed.) in School Counseling

The M.Ed. program in School Counseling at the University of North Carolina is predicated on the Strengths-Based School Counseling (SBSC) model that asserts that the school counselor's primary role is to promote and advocate for positive youth development for all students and for the environments that enhance and sustain that development.

The SBSC approach characterizes positive youth development as nurturing and enhancing empirically identified student strengths or competencies rather than focusing on student weaknesses and problem areas.

SBSC provides a framework to guide the practice of school counseling in the 21st century that is both compatible with and operationalizes many of the features of the ASCA National Model for School Counseling Programs.

Strengths-based school counselors employ a variety of direct (e.g., counseling, classroom guidance) and systemic (e.g., consultation, advocacy) level interventions to promote culturally relevant student development in the academic, personal/social, and career domains. The strengths-based perspective identifies the counselor as a school leader who works with students, teachers, administrators, parents, and other members of the community and promotes strengths-enhancing environments for all students.

Requirements

The M.Ed. program in school counseling consists of four semesters of full-time study, 60 semester hours of course work, over a 14-month period. Students normally begin classes during the last week in May. Students finish the program by August of the year following their entrance into the program.

Because the 60 semester hours of course work are completed in a 14-month period rather than the more traditional two-year period for programs of this type, this is a very concentrated and intense program. As a result, only full-time students are admitted and students may not enter the program at times other than the one specified above.

1. Thirty (30) hours of content courses.
2. Twenty-four (24) hours of skill/clinical courses
3. Six (6) hours of graduate level electives, approved by the advisor

The program of study can be found on the School of Education Web site at soe.unc.edu

4. + Fall Practicum runs August through October. Fall Internship runs October through December. Students must spend a minimum of 100 (40 direct service) clock hours in practicum and 600 (240 direct service) in internship in their field experiences during the August to June K–12 public school year. The schedule for

accumulating the required 700 hours is typically completed in three full-time days per week at the school site and/or arranged with both the field supervisor and the EDUC 611 and 705 instructors.

Master of Arts in Teaching (M.A.T.)

The Master of Arts in teaching (M.A.T.) program is designed for individuals wishing to teach in secondary school (grades 9–12) or in kindergarten–grade 12 special subjects. Secondary school subjects include English, Latin, and social studies. Special subjects include English as a second language, French, German, Japanese, and Spanish. This school-based, student-centered program relies on partnerships between public schools and the University and uses the realities of the classroom as the motivation for students to connect theory and practice. It provides opportunities for students to accomplish three general objectives:

1. Expand their understanding of methodology in their content specialization
2. Gain an understanding of curriculum and instruction primarily at the secondary level (but in K–12 in foreign languages, and ESL) and
3. Provide knowledge of the social and psychological foundations of education

This program is designed to prepare candidates for initial and advanced teaching licensure in North Carolina.

Several interrelated strands of knowledge run throughout the program:

The Teaching and Methods Strand focuses upon the structure of disciplines, tools of inquiry, and methodologies concerned with instructional strategies, planning and assessment in varied learning experiences and communities.

The Learner and Learning Strand helps teachers design and implement learning experiences for students based on subject matter knowledge, the nature of the learning process, and the nature of learners.

The Context Strand focuses on teacher-student-community relationships in schools and classrooms. Students will prepare case studies of each type of relationship; analyze them from cultural, historical, and pedagogical perspectives; and develop strategies to address these issues in practice.

The M.A.T. is a 12-month, full-time program that requires a minimum of 33 hours of course work.

The program of study can be found on the School of Education Web site at soe.unc.edu. Some clinical placements will include multiple settings and levels of instruction.

Seminars, methods, contexts, learner and learning courses are ongoing over the entire 12-month period and are both interdisciplinary and subject area oriented.

Master of School Administration (M.S.A.)

The M.S.A. on-campus and M.S.A. FLEX programs prepare individuals to lead schools and other educational organizations for the schools of North Carolina and the nation. These programs include three dimensions: 1) Awareness (i.e., acquiring concepts, information, definitions, and procedures), 2) Understanding (i.e., interpreting knowledge to school environments, integrating concepts with practice, and using knowledge and skills in context), and 3) Capability (i.e., applying knowledge and skills to specific problems of practice). While most of those who complete this program move into administrative positions at the school-site level, some assume roles within state, regional, or national organizations that focus on educational professional development, research, or policymaking. The completion of this program leads to eligibility for licensure from the North Carolina State Department of Public Instruction and qualifies one for administrative certification in most states. The M.S.A. programs are administered by the School of Education. Visit the Web site at soe.unc.edu.

Doctor of Education (Ed.D.) in Curriculum and Instruction

The Ed.D. program in curriculum and instruction is designed specifically for people who seek to become curriculum leaders for the 21st century. While the main target population for this program will be those who will work in central office and policy-level positions at district and state levels, the program will also enroll experienced teachers and other school personnel who have or seek leadership roles within school or other educational settings. Potential professional leadership roles for C&I doctoral program graduates include district or state level directors of curriculum and instruction or a specialty area, specialty area supervisors, or school-based leaders working with mentor teachers. A variety of specialty areas may be selected in which program graduates might play a leadership role are , including such 21st-century demands as technology, cultural and linguistic diversity, special education, universal pre-kindergarten, and international education. Additionally, this program will accommodate individuals—both full- and part-time—who seek positions in Curriculum and Instruction within higher education, governmental or policy institutions.

Applicants are admitted on the basis of their academic credentials and potential for outstanding contributions to education.

Ed.D. (Doctor of Education) Degree Requirements

1. A bachelor's degree from a four-year college or university and a master's degree in the field of education, or another approved field.
2. At least three years of experience in public schools or other types of educational institutions
3. Completion of all required course work (core courses, electives, internships, dissertation writing, etc.) and on the approved program of study and written and oral exams within six years. Completion of all degree requirements in eight years.
4. Students can choose from two strands: None-licensure strand (57 hours in total) and licensure strand (66 hours in total). The additional nine hours for students seeking licensure as a curriculum and instruction specialist in North Carolina include six hours in leadership and organization and three hours in a practicum setting. In addition, students in licensure strand must take and pass PRAXIS test (0411): Educational Leadership: Administration and Supervision.
5. A grade of Pass on a written comprehensive examination.
6. A grade of Pass on an oral examination.
7. Successful completion of a final oral examination, which is the defense of the dissertation.
8. Satisfactory completion of a dissertation.
9. The degree application to be filed no later than the date specified in the academic calendar.
10. A grade of P or better is required in all EDUC courses. One grade of F in an EDUC course makes a student academically ineligible to continue in the program.

Doctor of Education (Ed.D.) in Educational Leadership

The educational leadership doctoral program develops senior administrative leaders for K–12 school districts throughout the nation. The program prepares central level leaders to excel in an ever-changing national, state, and local educational environment. A director of student support services option prepares leaders as central office level directors/assistant superintendents for student support services.

Courses are offered in the evenings during the fall and spring terms, and sometimes on weekends. Most students are enrolled part-time and typically take two courses per semester. Classes are scheduled so that many students take two classes in one evening (e.g., on Thursday night, a class from 4 to 6:50 p.m. and another class from 7 to 9:50 p.m.).

Students may transfer up to nine credit hours, subject to program faculty approval. Credits must have been taken at the graduate level, for a grade, and within the past five years.

Educational Specialist, Ed.S.

The educational specialist licensure program in educational leadership is advanced study beyond the master's degree, which is designed to prepare students for leadership and administration at the district office level of a K–12 school system. Completion of the program typically leads to either North Carolina Level I (Entry-level Principal) or North Carolina Level II (Advanced Principal) licensure and includes a Superintendent concentration.

The Ed.S. licensure program is essentially a subset of the Ed.D. degree program. Obtaining the Ed.S. and North Carolina administrative licensure (AP/AS) can lead to salary increases for some administrative professionals in North Carolina.

Below is a suggested sequence in which to take courses for the Ed.S./Ed.D. program. Students have five years to complete program course work and, if continuing with the Ed.D., an additional three years to complete and successfully defend their dissertation.

Students may transfer up to nine credit hours, subject to program faculty approval. Credits must have been taken at the graduate level, for a grade, and within the past five years.

If students do not have a master's degree in educational leadership/school administration, they will be required to take a minimum of nine additional M.S.A. credits.

Educational Specialist, Ed.S.

The program of study for the Specialist license can be found on the School of Education Web site at soe.unc.edu.

Educational Leadership, Ed.D.

The program of study for the Ed.D. in Educational Leadership can be found on the School of Education Web site at soe.unc.edu.

Students without a master's degree in educational leadership or administration:

If an Ed.D. student has a master's degree in an education-related field, but not in educational leadership/school administration, he or she is required to take a minimum of nine additional M.S.A. credits for a total of 63 credits. He or she may take up to three of the following seven M.S.A. courses listed below, which are offered at UNC–Chapel Hill, and/or, with the chair's permission, transfer up to nine M.S.A./educational leadership credits from another accredited institution.

EDUC 724 (old# 631) Program Development for Special Pops,	3 hrs
EDUC 725 (old# 632) Problems of Supervisory Practice (highly recommended—TPAI)	3 hrs
EDUC 730 (old# 634) Curriculum Leadership	3 hrs
EDUC 759 (old# 645) Problems in Educational Leadership I	3 hrs
EDUC 741 (old# 636) School-Based Inquiry and Reform	3 hrs
EDUC 750 (old# 638) Managing Schools within a District Context	3 hrs
EDUC 731 Problems in Educational Leadership II	3 hrs

Doctor of Philosophy (Ph.D.) in Education

The schools in North Carolina and in the nation face myriad complex issues and challenges. These challenges range from meeting the educational and social-emotional needs of diverse student populations to designing, implementing, and evaluating educational programs within cultural contexts. The Ph.D. in education prepares leaders in educational research who understand these issues and who can improve educational practice using state-of-the-art knowledge and research skills. The design of the program fosters collaboration among faculty and students from diverse disciplines. Such cooperation across levels and areas of interest provides the opportunity to develop relevant research agendas. Graduates of this program are prepared for leadership positions in research and teaching at major universities and institutes in the state and nation.

The Ph.D. in education is a single program with five research emphases: applied developmental sciences and special education, cultural studies and literacies, learning sciences and psychological studies, policy, leadership and school improvement and teacher education and curriculum. These five fields blend areas of inquiry that were formerly discrete.

The mission of *Applied Developmental Science, School Psychology,* and *Special Education (ADSSE*) program area is to train doctoral students in the interdisciplinary, theoretical foundations of Developmental Science. These foundations will provide young scholars with the tools to advance knowledge about human development from birth through adolescence, with a particular focus on studying children/students at risk for learning and behavioral challenges. This mission is accomplished by offering research perspectives in (a) the developmental trajectories of families and children/students from diverse socio-culturally backgrounds in the multiple contexts in which they live, including school, home, neighborhoods, and communities as well as a grounding in (b) evidence-based models of prevention that seek to provide equitable opportunities for learning and successful adjustment for all children by emphasizing education and instruction directed towards individual differences among learners.

We have a strong program dedicated to developing a new generation of interdisciplinary scholars that have acquired a rigorous research knowledge base with expertise in a quantitative, mixed method, and single case methodology. Graduates will work closely with their advisor and committee members to develop the skills and experiences necessary to work as leaders in a variety of research settings, including institutions of higher education as well as governmental entities at the state or federal level as well as private research firms. Throughout the doctoral experience, students will engage in research activities, grant writing, and the dissemination of their research and prevention efforts, such as presenting their research at local, state, and national conferences, and teaching college level classes.

The Cultural Studies and Literacies strand is designed for future scholars and researchers who will study the linguistic, social and cultural contexts of education and how culture, language and education are produced locally, nationally and globally. This strand prepares future scholars, researchers and faculty who work in the areas of multiple and critical literacies, social and cultural foundations of education, the intersectionality of race , gender, language, sexual orientation and class, qualitative research methods broadly conceived, and how all to these contribute to creating social and educational inequities. Our focus is both critical and constructive. Our efforts first describe, interpret and critique current practice and belief and then move to strategizing about how to create a more equitable society and world. We prepare scholars to be first rate educators, theorists, and qualitative research methodologists-- and advocates for change.

The *Learning Sciences and Psychological Studies (LSPS)* Ph.D. program draws upon the relatively new field of learning sciences that has emerged to address the increasingly inter- and multidisciplinary nature of work within and beyond the academy. Program faculty represent a diverse set of academic backgrounds and fields (e.g., critical theory, educational psychology, psychometrics, school psychology, socio-cultural studies, mathematics and science education, technology studies, statistics). LSPS focuses on learning, a cognitive, social, and cultural activity that is distributed among the participating actors as individuals and groups within a specific context. The strand examines formal and informal learning within and across multiple contexts (e.g., teaching and learning in classrooms, centers, communities, homes, museums, schools, virtual environments) from multiple perspectives (e.g., critical, disciplinary, design-based, post-positivist, post-structuralist, and structuralist). The rigorous study of formal and informal learning utilizes multiple paradigms and employs quantitative, qualitative, and mixed methods approaches most appropriate for the questions investigated. The examination of formal and informal learning seeks to understand how people learn and how this learning is influenced by knowledge, networks, social and societal structures, tools (e.g., technology), and an array of socio-cultural factors. The goals of this examination of learning is to produce theory, generate research, inform policy, and develop practice that lead to the construction and design of environments that facilitate optimal opportunity, and access for and development of all participants, within the contexts in which formal and informal learning occurs. LSPS is committed to the preparation of doctoral students who develop an interdisciplinary and multidisciplinary-based expertise within a concentration (e.g., mathematics and science education, education and technology, cognition and learning, quantitative methods and evaluation). LSPS intends to develop doctoral candidates who thoroughly understand theory, research, the paradigmatic underpinnings of each, and the plausible implications of each for policy and practice; who are able to generate scholarship and design and conduct rigorous theory-driven research appropriate for the issues identified; and who are able to foster mutually informative, translational relationships among the diverse stakeholders in academic, policy, and practice communities.

Students interested in LSPS can elect to concentrate in a number of areas including Mathematics Education, Science Education, Educational Technology, Cognition, and Quantitative Methods and Evaluation.

The Ph.D. program in Education, Learning Sciences and Psychological Studies (LSPS) prepares students to: a) conduct rigorous theory development and research that spans multiple academic disciplines, using multiple and mixed methodologies, to understand how people learn in an array of formal and informal educational settings, b) integrate and critique these multiple perspectives on learning, c) design environments, contexts, and interventions that facilitate learning and development in these educational settings, and d) foster mutually informative, translational relationships between academic, policy, and practice communities. The design of the LSPS program requires committed engagement on the part of students, and faculty, in order to benefit from the dynamic interaction that occurs when multiple, interdisciplinary perspectives are used to inform learning and achievement.

The faculty of the LSPS program represent diverse of academic backgrounds (e.g., educational psychology, sociocultural studies, STEM education, technology studies, educational testing, statistics). The faculty are committed to the preparation of multidisciplinary doctoral students who will be highly competitive for top positions in academia, research organizations, private industry, non-profits, and school and other environments. A key aspect of that preparation is the engagement of doctoral students as key participants in maintaining robust research agendas around the both the science and practice of learning.

The aim of the PhD program in *Policy, Leadership and School Improvement (PLS)* is to prepare leaders who will influence the direction of educational organizations at home and around the world. The program produces scholars, administrators, and analysts for leadership roles in K-12 systems, universities, research organizations and policy-making bodies. It does so by developing students' understanding of the societal, political and economic conditions affecting schools; the capacity to analyze educational problems and their proposed solutions; and the ability to design innovations and implementation processes that work.

The PhD program in PLS is among the few programs at elite public universities in the nation to offer opportunities to study with a faculty whose work in K-12 administration, education policy, and school improvement is internationally known. As leaders in these areas, our faculty work collaboratively with students to develop research questions and hypotheses, study them in state and national settings, and link findings to practice. Faculty and students in PLS are engaged in the examination and critique of today's important and contested issues in education, including:

- Teacher quality
- Turn-around schools
- High school effectiveness
- Resource allocation
- Principal instructional leadership
- Issues of class, gender, immigration and race in education

In addition to disciplinary core and research courses, students pursue programs of study that include courses in policymaking, education program evaluation and policy analysis, school law, leadership, educational innovation, implementation, and taking reforms to scale. In combination with courses in quantitative, qualitative and mixed research methods, students develop their research skills through a professional seminar and assistantships with faculty. Committed to professional service, our faculty are also members of editorial boards and advisory forums at the national, state and local levels. They also work directly with school systems, consulting on issues of staffing, instructional delivery, and governance. PLS faculty are currently working with the federal Race to the Top initiative in North Carolina and a national education research center funded by the U.S. Department of Education.

The *Teacher Education and Curriculum(TEC)* strand provides advanced study for students who wish to situate their research and scholarship in these fields which are sites for considerable national debate. There is a growing need for scholarship that incorporates school-based inquiry along with research that considers policy and socio-cultural contexts of teaching and learning so as to inform educational practice. The strand provides a venue for advanced study and research in interdisciplinary curriculum areas and in teacher education. Students who select this strand will take additional courses in other doctoral strands in the School of Education and in other programs and colleges across UNC's campus. Graduates will be ready to assume teacher education positions and/or curriculum studies positions.

Teacher Education Core:

- Teacher and Professional Knowledge and Change
- Diversity in Teacher Education OR Comparative Perspectives of Teacher Education
- Research and Policy in Teacher Education
- Intellectual History
- Learning Theories

Curriculum Core:

- Intellectual History
- Learning Theories
- Advanced Curriculum in the Disciplines OR Curriculum Theory
- Institutional Logics of Curriculum and Teaching
- One additional curriculum course (as approved by the student's POS committee)

Students in the Ph.D. program are required to maintain full-time enrollment through the completion of course work, with the expectation that they will graduate in three to four years. Programs of study are available on the School of Education Web site.

Note: EDUC 710 (Introductory Statistics) or its equivalent must be completed prior to admission to the program or taken during the first year of study. If taken during the first year of study, the hours do not count towards the hours for the Ph. D. A minimum of six hours of dissertation credit is required.

Doctor of Philosophy (Ph.D.) in School Psychology

The doctoral program in school psychology, fully accredited by the American Psychological Association and approved by the National Association of School Psychologists, prepares school psychologists as scientist-practitioners to assume leadership positions in academic, research, and applied settings.

Program graduates are eligible for psychological and educational licensing in North Carolina and national certification by the National Association of School Psychologists.

The doctoral program of studies is comprised of seven areas: assessment, intervention, consultation, research and evaluation, professional development, externship/internship, and foundations. Students are required to take courses from each of the psychological foundations.

Doctoral students in school psychology should enter the program with course work in personality theory, abnormal psychology, learning theories, and developmental psychology. Students must enter with at least three prerequisites. A missing prerequisite must be made up the first semester of enrollment.

The program of study for the Ph.D. in school psychology can be found on the School of Education Web site at soe.unc.edu.

Licensure

The School of Education recommends eligible graduates of its approved teacher education programs to the North Carolina State Department of Public Instruction for licensure as teachers, administrators, school counselors, school psychologists, and curriculum and instruction specialists. In addition, the school recommends licensure candidates from the following University degree programs: the School of Information and Library Science (for school media coordinators), the School of Social Work (for school social workers), and graduates of the speech-language pathology program in the Division of Speech and Hearing Sciences.

The master of arts in teaching and master of education in school counseling prepare students for their initial professional license at the master's and advanced specialist level. The master's for experienced teachers provides the opportunity for practicing teachers to achieve the advanced competencies of master's level licensure in a variety of specialty areas. School administrators are eligible for licensure at the master's and doctoral levels. School psychologists are eligible for licensure at the advanced (educational) specialist (for master's students) or doctoral level. Curriculum and instruction specialists may earn the add-on license at the master's level or complete an Ed.D. for doctoral-level licensure.

Courses for Graduate and Advanced Undergraduate Students

EDUC

401 Childhood Development: Understanding Birth to 12 (3). This course examines the field of child development as it contributes to the teaching and learning of children in early childhood and elementary educational settings, ages birth to 12.

402 Models of Early Childhood Service Delivery (3). This seminar serves as an introduction to the field of child development and early childhood education and special education. Students learn about the primary professional disciplines and agencies serving young children and their families. Current policy, recommended practices, and research innovations are reviewed.

403 Families, Schools, and Communities (1-3). This course examines issues of diversity among and across families within 21st-century schools and communities. The course stresses strategies for effective communication and collaboration with families, professional team members, and school and community resources.

404 Infant/Toddler Assessment and Intervention (3). Prerequisite, EDUC 401. Restricted to majors. Permission of the instructor for non-majors. Provides students with knowledge of program models and curricula/intervention strategies for working with infants and toddlers with and without disabilities. Information is provided regarding identification and assessment strategies for infants, toddlers, and two-year-olds. Program models for working with families are emphasized.

412 Introduction to Children and Schools and Field Experience (3). Permission of the instructor for non-majors. This course helps prospective teachers gain the necessary knowledge to work sensitively and effectively with all elementary children and design appropriate learning experiences for elementary-aged students.

413 Language and Literacy Learning (3). Permission of the instructor for non-majors. This course covers the theoretical and developmental aspects of language and literacy processes and practices. The course will cover reading, writing, speaking, listening and viewing practices, birth to age 12.

416 Curriculum Integration: Science, Math, and Technology (3). Permission of the instructor for non-majors. The focus of this course is children's development in mathematical and scientific ways of knowing and the use of technology to support this development.

421 Community Organizations and Children I (1). Provides an understanding of the community contexts of schools and an experience working in community group. This is the first semester of a two-semester course.

422 Community Organizations and Children II (1). Prerequisite, EDUC 421. Provides prospective teachers with an understanding of the community contexts of the schools. Second semester of a two-semester course.

441 Education in American Society (3). A reflective examination of beliefs and attitudes associated with 1) the historical, philosophical, sociological, political, and economic forces affecting education and schooling in the United States; 2) the structure and function of the school system; and 3) current issues and trends in American schooling and education.

465 Introduction to Teaching (2). Offered concurrently with EDUC 466. Restricted to students admitted to the middle grades teacher education program. Initiates students into the teaching profession. The course stresses what it is like to be a teacher, with concurrent emphasis on the life of the student and the study of schools.

466 Planning for Teaching in the Middle Grades. (3). Offered concurrently with EDUC 465. Restricted to students admitted to the middle grades teacher education program. Helps students learn how to plan and develop skills to meet the unique and diverse needs of young adolescents as they prepare to teach.

469 Developing Skills for Teaching (3). Prerequisites, EDUC 465 and 466. Helps students develop a variety of basic teaching skills used by classroom teachers. This course will be conducted primarily as a laboratory course.

493 Practicum (1-6). Permission of the instructor for nonmajors. Students gain familiarity with the operations and complexity of teaching. Students observe instruction, assist in teaching, learn about the curriculum and specific resources, interact with school personnel, work with students, and apply skills learned in previous courses. Prepares students for internship or student teaching.

496 Independent Study (1–3). Permission of the instructor. Provides readings and research under the direction of a faculty member. May be repeated for a maximum of six credit hours.

503 Leadership Seminar (1-3). Course asks students to consider what it means to participate in schools as educational leaders. Students consider how to collaborate effectively with school colleagues, advocate for children and families, participate in the politics of schools and education, and examine what it means to be change agents in classrooms and schools.

504 Educational Psychology and Learning Sciences (3). Students learn about current educational emphases and controversies as well as what the research and scholarship in the fields of education and cognition can contribute to our understanding of these phenomena.

505 Leadership in Educational/Nonprofit Settings (3). Introduces students to a research-based, highly practical understanding of leadership frames/styles prominent in educational/nonprofit organizations. Emphasizes continued student engagement with various leadership models and principles.

506 Politics, Policymaking, and America's Schools (3). Through extensive case study and conversations with policy actors, students will learn the stages model of policy making and understand conflicting values that play out in policy decisions.

508 Cultural Competence, Leadership, and You (3). This course was developed to confront and address questions of global cultural competence and self-critique. Culturally competent leaders work to understand their own biases and patterns of discrimination.

509 Helping Youth Thrive in K-12 Schools (3). Learn strengths-oriented approaches in education practice, research, and policy. The course takes up contemporary literature on positive psychology, developmental assets, resiliency, cultural competence, school readiness, school engagement/ connectedness, and positive youth development.

510 Mexican American and Chicana/o Experience in Education (3). This course examines the political, cultural, and historical dimensions of the Mexican American and Chicana/o experience in education. A critical exploration of K-12 schools, higher education, and various social initiatives intended to address inequities in education for Mexican Americans and Chicanas/os will also be a focus of this class.

513 Methods for Teaching in the Elementary School (9). Permission of the instructor for non-majors. This methods block is a field based, integrated collection of science, literacy, and math courses designed to prepare pre-service teachers for planning and implementing instruction in elementary schools.

515 The Arts as Integrative Teaching (2). Restricted to students admitted to the elementary education program or the child development and family studies program. Explores integration of the arts in the curriculum.

516 Introduction to the Education of Exceptional Learners (3). Offers an overview of the special education field and its relevance to the classroom teacher. The course is based on an interdisciplinary perspective toward serving exceptional learners and collaboratively coordinating services. Course content emphasizes inclusive programming and the teacher's role in facilitating students' unique learning needs.

519 Senior Seminar (3). Prerequisite, EDUC 593. Course is restricted to majors. Permission of the instructor for nonmajors. The senior seminar is inquiry based and directly connects student teachers with classroom practices. Throughout the semester student teachers develop and implement inquiry projects.

520 Early Language and Literacy Learning-Birth to Third Grade (3). Course is restricted to majors. Permission of the instructor for non-majors. Course focuses on the language, reading, and writing development of children birth through third grade. Promotes early literacy learning for all children with and without disabilities, including those at risk.

521 Schools, Cultures, and Communities I (3). Permission of the instructor. Explores current issues dealing with schools and the cultures and communities they encompass.

522 Schools, Cultures, and Communities II (3). Prerequisite, EDUC 521. Permission of the instructor for students lacking the prerequisite. Continues to explore current issues dealing with schools and the cultures and communities they encompass.

523 Teaching Early Mathematics-Birth to Third Grade (3). Course is restricted to majors. Permission of the instructor for non-majors. Students study the teaching and learning of mathematics for young children, birth to third grade. Emphasis is placed on content for math, as well as materials, techniques, and teaching aids.

531 Effective Teaching: First Steps (2). Characteristics of effective teachers, classroom management, instructional methods, instructional planning and presentation, monitoring and assessing student behavior and learning, differentiating instruction, yearly plans and pacing guides.

532 Child and Adolescent Development (2-3). This course examines the field of human development as it contributes to the teaching and learning of all children. The emphasis is on understanding the nature of development in educational contexts and the implications of research and theory on human development for teacher practice and the creation of supportive learning environments for all children.

533 Social Justice in Education (3). Course examines how education can help create more fair and just societies, ultimately contributing to high performing educational systems internationally. Students explore multiple perspectives on social justice; examine efforts at local, state, national, and global levels; and learn to articulate efforts in classrooms and schools with wider community initiatives.

534 Effective Teaching: Assessment (2). Methods of assessment, multiple measures, monitoring student performance to inform and improve instruction, understanding students with special needs with individual education plans, test scores, and other information in student files.

535 Teachers and Schools (2). Leadership in classroom and school with families, standards of practice, advocating equity, supporting teaching profession, school organization, school finance, legal issue/education strategies for environments that promote learning, issues and trends.

540 Mathematics Teaching (2). NCTM Standards, Standard Course of Study, developing student understanding of mathematics, problem-solving skills, and professional commitment.

541 Mathematics Problems for Instruction (2). Mathematical tasks for learners in grades six through 12 and instructional methods necessary to maintain a task at a high cognitive level.

542 Planning for Mathematics Instruction (2). Examining patterns of practice and assessment, modifying and improving planned units, pacing instruction, reconsidering individual differences and differentiation.

550 Science Teaching (2). Nature of science, national science standards, teaching science as inquiry, safety in the science classroom, materials management.

551 Designing Science Tasks (2). Prerequisite, EDUC 550. Developing and redesigning science instruction to engage students actively, with emphasis on classroom management for energetic curricula, modifying tasks and projects, assessment strategies, and utilization of resources.

552 Improving Science Instruction (2). Prerequisite, EDUC 551. A practitioner's look at instruction in middle and high school science classrooms using many current pedagogical approaches of instruction: constructivism, models of inquiry, reflective practice, and conceptual change theory.

555 Constructive Coaching I: Starting Out Right (2). Designed to support lateral entry candidates, solving the most urgent problems in the classroom. Includes frequent online communication, individualized attention to immediate problems and combines supervision, coaching, and mentoring.

556 Constructive Coaching II: Effective Management of Student Behavior (2). Prerequisite, EDUC 555. Course designed to help lateral entry candidates by improving their classroom management skills, specifically those related to student behavior.

557 Constructive Coaching III: Helping Students Learn (2). Prerequisite, EDUC 556. Course designed to support the lateral entry candidates through individualized feedback about concerns, focusing on strategies for increasing student learning using content area literacy strategies.

560 Second Language Teaching (2). Methods of teaching a second language, how people learn foreign languages, planning instruction, getting students to communicate, using and adapting foreign language textbooks, and developing lessons.

561 Designing Second Language Tasks (2). Students examine instruction as effective mechanism for classroom management, choosing and redesigning tasks and projects to engage students in active learning. Assessment of student understanding investigated as necessary for development of effective instruction.

562 Improving Second Language Instruction (2). Students will consider national standards frameworks as organizing principles for instructional strategies. They will develop skills by use of culturally authentic materials, performance-based assessment, and units and lessons promoting successful language learning.

563 Teaching Language Arts in the Middle Grades (3). Restricted to students admitted to the middle grades education program. Focuses on the goals and methods of teaching language arts in the middle grades, including planning for student diversity and unit planning.

564 Teaching Social Studies in the Middle Grades (3). Restricted to students admitted to the middle grades education program. Focuses on the goals and methods of teaching social studies in the middle grades.

565 Teaching Science in the Middle Grades (3). Restricted to students admitted to the middle grades education program. Focuses on methods for teaching science in the middle grades and includes emphasis on the individual needs of students, reading and writing in the content area, and unit planning.

566 Teaching Math in the Middle Grades (3). Restricted to students admitted to the middle grades education program. Focuses on methods for teaching mathematics in the middle grades and includes emphasis on the individual needs of students, reading and writing in the content area, and unit planning.

567 Children's Literature in Elementary and Middle Schools (3). Explores literature in the contexts of interdisciplinary elementary and middle school curricula and the interests and needs of children and young adolescents. Topics include reader-response theory, censorship, Internet resources, school resources, and methods.

568 Seminar on Teaching (3). Prerequisites, EDUC 465, 466, and 469; corequisite, EDUC 593.

593 Internship/Student Teaching (1-12). Permission of the instructor for nonmajors. Student teaching internships are full-time, authentic, field-based experiences in an educational setting. Preservice teachers are responsible for planning lessons, delivering instruction, assessing students, managing the classroom, and demonstrating their teaching effectiveness. This internship is devoted exclusively to the student's functioning in a professional capacity.

595 Introduction to Exceptional Children (3). Permission of the instructor for non-majors. Surveys giftedness and mental disabilities, emotional and behavioral disorders, learning disabilities, speech, hearing, vision, and physical impairments. Emphasizes the role of professionals, families, and the community in supporting the whole child.

601 Education Workshops (1–3). Permission of the program director. Workshops designed around education topics primarily for licensed K-12 teachers.

617 Introduction to Communication Disorders (COMM 617) (3). See COMM 617 for description.

626 Pedagogical English Grammar for ESL Teachers (3). Enhances foreign and second language educators' understanding of English grammar, expands their skills in linguistic analysis, and helps them develop a more pedagogically sound approach to the teaching of English grammar.

627 Pedagogical Linguistics for ESL Teachers (3). Provides future English as a second language teachers with advanced concepts in linguistics and comparative linguistics. Topics such as phonology and morphology will be covered.

628 Methods of Teaching English as a Second Language (3). Covers teaching methods, assessment, and resource issues related to helping the ESL learner. Additional topics include theories of language learning and the relationships between culture and language.

629 Language Minority Students: Issues for Practitioners (ANTH 629) (3). Permission of the instructor. Explores issues of culture and language associated with teaching English as a second language.

689 Foundations of Special Education (3). This course provides an advanced introduction to key concepts, issues, and service delivery approaches pertaining to the educational needs of students with high incidence disabilities.

691H Honors Seminar in Education (3). Restricted to honors candidates in the School of Education. Required for graduation with honors in education. Integration of critical analysis of selected educational themes, introduction to methods of educational research, and intensive work in skills of reading critically and writing.

693 Practica Student Internship (1-12). Provides students the opportunity to observe and become involved with all aspects of teaching and schools within their content area.

694H Honors Thesis in Education (3). Prerequisite, EDUC 691H. A grade of B or better in EDUC 691H is required to take this course. Required of all candidates for graduation with honors in education. Preparation of an honors thesis under the direction of a member of the School of Education faculty and an oral examination on the thesis.

Courses for Graduate Students

EDUC

702 Introduction to Strengths-Based School Counseling (3). Introduction to the counseling profession and ethical codes. Primary focus on the history and ethical practice of school counseling, specifically the Strengths-Based School Counseling framework.

703 Theories of Counseling (3). Permission of the instructor. Explores current theories of counseling, with emphasis on theory as a means of conceptualizing behavior change in the counseling process.

704 Promoting College Access and Career Development (3). Examines major theories and practices that promote college access and life-career development for K-12 students. Restricted to school counseling students or those with the permission of the instructor.

705 Internship in School Counseling and Consultation (3–9). Prerequisites, EDUC 606 and 608. Permission of the instructor. Places students in counseling and consultation under supervision in a school setting in order to develop competencies in individual counseling, group counseling, and consultation. May be repeated for credit for a maximum of 12 credit hours.

706 Collaboration and Leadership in School Counseling (3). Students are required to have taken 18 hours in counseling courses. Emphasizes the collaboration and leadership skills needed to effectively organize and implement a comprehensive school counseling program.

707 Promoting Cultural Competence and Social Justice in School Counseling (3–6). Permission of the instructor. Explores the cognitive and affective considerations of counseling in culturally different social systems. This includes ways to incorporate specific sociocultural dimensions into the counseling process.

708 School Consultation Methods (3–12). Examines various models of consultation and the role of the consultative model in the schools and related agencies; uses role playing and experience in the school. May be repeated for credit.

709 Seminar in Applied Investigations (3). Permission of the instructor. Provides opportunities to expand understanding of research in education, psychology, counseling, and school psychology.

710 Statistical Analysis of Educational Data I (4). Studies descriptive and inferential statistics for educational research, including an introduction to fundamentals of research design and computer data analysis.

711 Promoting Academic Development (3). The course addresses the school counselor's role in promoting student academic development. Interventions for impacting academic achievement at both the individual and systems level are explored.

712 Prepracticum in School Counseling (3). Prerequisites, EDUC 702 and 703. School counseling graduate students only. Permission of the instructor. Develops basic strengths-based counseling and interviewing techniques at specified levels of mastery through role playing, feedback sessions, and other experiential counseling activities to enhance counselor competence.

713 Tests and Measurements (3). Prerequisite, EDUC 702. Studies basic concepts in measurement and their application in the use and interpretation of tests. The student may be required to purchase tests.

714 Group Counseling and Guidance (3). Permission of the instructor. Applies counseling theory and research to the organization and implementation of group work (e.g., guidance, task, psychoeducational, counseling groups) in schools.

715 Introduction to School Psychology (3). Introduces the student to concepts and methods involved in school psychology.

716 Technology across the Curriculum (3). Explores the field of educational technologies, situating the field within the context of historical and theoretical foundations, current practices, and future directions.

717 Theory and Research in Education Technology (3). This course is based on the review and critique of research and theoretical literature in the field of education technology. Students will conduct critical analyses of theory, research, and methodology in the field of education technology and design a proposed education technology research study.

718 Psychological Assessment and Intervention I (1–3). Permission of the instructor. Addresses knowledge and skills in techniques of observation, interviewing, assessment of environment, intelligence, achievement, perceptual motor skills, and interpersonal perceptions. May be repeated for credit.

719 Behavioral Intervention in Counseling and School Psychology (3). Permission of the instructor. Covers behavior management and therapy as well as individual and group therapy. (The school psychology sections include consideration of theoretical interventions beyond those of a behavioral perspective.) May be repeated for credit.

720 Seminar in Professional School Psychology (2–3). Deals with the goals and roles of school psychology, ethical concerns, privileged information, certification and licensing, and other relevant areas. May be repeated for credit.

721 Externship in School Psychology (1–6). Permission of the instructor. Provides supervised observation and participation in school psychological services in schools and school-related field facilities. May be repeated for credit.

722 Master's Internship in School Psychology (1–6). Prerequisite, EDUC 721. Permission of the instructor. Provides supervised full-time field experience for master's students in school psychology in a school setting.

723 Advanced Assessment and Intervention Approaches for Students with Traumatic Brain Injury (3). Assessment and treatment of students who have sustained traumatic brain injury; for school and clinical psychologists.

724 Parent and Community Engagement for the School Executive (3). Permission of the instructor. Reviews issues associated with program development for children who are experiencing uneven success in school because of poor attendance, poverty, drug and alcohol abuse, disabling conditions, parental abuse, or violent behaviors.

725 Supervisory Practice for the School Executive (3). Admission to the master of school administration program required. Focuses on the role of school administrators in facilitating the continuous improvement of the clinical supervision process and on a variety of observation and conferencing skills that school leaders may employ with teachers and other support staff.

726 Practica in Second Languages (1). Permission of the instructor. Provides students an opportunity to observe and become involved with all school aspects of teaching and learning second/foreign languages.

727 The Social Context of Educational Leadership (3). Provides retrospective, contemporary, and prospective examinations of the social, cultural, political, and philosophical contexts from which the current issues that affect schools and schooling have evolved.

728 Practicum in ESL II/Foreign Languages (3). Provides an internship to teach ESL/FL under the supervision of an experienced ESL teacher.

729 Culture and Politics in Second Language Education (3). This course provides an overview of current issues in second language teaching (ESL, foreign languages, and bilingual education) with a focus on culture, politics, and diversity.

730 Curriculum Leadership for the School Executive (3). Applies curriculum skills required of school executives today, including the development of an alternative school schedule with a different curricular focus; analysis of test data to discern achievement trends; test item deconstruction; instructional mapping; and the creation of a group-based curriculum management plan for a specific elementary or secondary school.

731 Organizational Management for the School Executive (3). This course provides pre-service school executives with a skill set and practical experiences that address effective organizational management behaviors. Topics include time management, budget and resource allocation, use of data to assess decisions and initiatives, implementation of appropriate rules and procedures, and open communication with all stakeholders.

732 Group Dynamics, Decision Making, and Problem Solving (3). Develops understanding and skills for working with various organizational groups. Focus is on teams, leadership of teams, team problem solving, and team decision making.

734 Planning in Educational Organizations (3). Examines a conceptual and practical approach to planning in educational organizations. Includes a focus on environmental scanning, futures research, and strategic planning.

735 Internship Seminar on Instructional Leadership and Supervision (3). Relates internship experiences and applications about instructional design techniques of teaching/learning, evaluation of the teaching/learning process, and ways in which school-based leaders can support excellence in education.

736 Seminar and Supervised Internship in Educational Administration I (3–6). Provides supervised internship in school administration to facilitate the student's progress toward certification in the principalship. May be repeated for credit.

737 Seminar on Internship II (3). In addition to dealing with a variety of issues that candidates are dealing with in their internships, there is a heavy emphasis on creation of required artifacts needed for both program completion and State Licensure.

738 Seminar and Supervised Internship in Educational Administration II (3–6). Prerequisite, EDUC 834. Required preparation, six semester hours in educational administration, including EDUC 834. Permission of the instructor. Provides supervised internship in school administration to facilitate the student's progress toward certification in the principalship. May be repeated for credit.

739 Educational Policy Studies (3). Reflectively examines issues and trends associated with models and theories of educational policy development. The tension between practice and theory is analyzed and models of educational change are considered.

740 Cultural Leadership for the School Executive (3). Course focuses on the importance of school executives' understanding the organizational culture of their schools and then exerting symbolic leadership strategies to reshape that culture so it is more conducive to promoting the academic achievement of students.

741 School Inquiry and Reform for the School Executive (3). Course focuses on the use of various types of data that can be used to impact decisions regarding school improvement and increased student achievement. It also introduces a number of proven strategies and tactics for improving schools.

742 Law for the School Executive (3). Course focuses on the basic legal principles that school executives need to know and follow in their day-to-day leadership activities.

743 Teaching Secondary Students with Disabilities (1). Following a case format and utilizing online instruction, M.A.T. students learn to teach secondary learners in inclusion settings.

744 Advanced Assessment Techniques (3). Prerequisites, EDUC 755. Permission of the instructor for nonmajors. Covers the knowledge and abilities necessary to create and interpret assessments of academic progress, engagement, and motivation. Emphasis on (a) technology and (b) assessments for ESL and special needs students.

745 Contexts of Education II (2). Prerequisite, EDUC 759. Provides a weekly seminar (part two of a two-semester sequence) for interns with full-time teaching responsibilities. Interns will connect their teaching experience to social, cultural, and philosophical issues in education.

746 Practica Student Internship (9). Permission of the instructor. Provides full-time internship in teaching in the content area under the supervision of experienced teachers and a university supervisor for the semester.

747 Methods and Materials for Teaching Secondary/K–12 Subjects II (3). Teaches student teachers to be aware of trends and issues in their content area in North Carolina and the nation, therefore improving their understanding and skills in curriculum development and instruction.

748 Advanced Leadership (3). Course restricted to graduate students in the M.A.T. program. The course will provide a foundation for advanced students to consider what it means to participate in schools as educational leaders. This course builds on experience gained from the student teaching internship and is one-half of the capstone module of the MAT program of study.

749 Advanced Exploration of Families, Schools and Communities (3). Admission into the M.A.T. program required. This advanced course examines strategies for effective communication and collaboration with families, professional team members, and school resources. Topics will include a return to contextual issues and reflection on initial preparation experiences. This course is one-half of the capstone module of the MAT program of study.

750 Empowerment Strategies for the School Executive (3). Course focuses on the factors that hinder both school executives and their teachers from feeling empowered to fulfill their leadership potential and examines a variety of strategies for overcoming those challenges.

751 Introduction to Teaching Diverse Learners (3). Admission to the M.A.T. program required. Introduces the principles of effective teaching with emphasis on the first year of teaching.

753 Introduction to Curriculum (3). Open to graduate students in education or permission of the instructor. Surveys the nature of curriculum development and contemporary changes as they relate to social aims, learner characteristics, and social problems.

754 Teacher Education in the United States (3). Studies the research relating to teacher effectiveness and programs for the preparation of teachers. Designed for students planning to work in teacher education.

755 Development, Learning, and Assessment (3). Course restricted to graduate students in the M.A.T. program. Permission of the instructor for nonmajors. This course provides prospective secondary teachers with a conceptual understanding of development, learning, and assessment to promote all students' school achievement and adjustment in the 21st century.

756 Principles and Methods in Parent Education and Involvement (3). Examines principles, theory, models, and methods for work with parents and families in educational settings, with relevant research and practical applications.

757 College Teaching (3). Introduces students to the planning of courses and educational programs for college students. Emphasis is on a systematic approach to developing, implementing, and evaluating instruction. This course is intended for graduate students in any academic department who plan teaching careers.

758 Immigration and Education (3). Investigates social (including political, economic, legal, and demographic) and cultural impacts on immigration and education.

759 Teacher Leadership for a Diverse Society (3). Course restricted to graduate students in the M.A.T. program. Permission of the instructor for nonmajors. For educational institutions to be effective in a diverse society, teachers must take on key leadership roles. This course helps prepare future teachers for such leadership.

760 Methods and Materials for Teaching Secondary/K-12 Subjects I (4). Prepares students to teach discipline-area material at the secondary level. The immediate purpose of this course is to prepare participants for full-time student teaching during the spring semester.

762 Child Development and Disability (3). Emphasizes typical development and developmental deviation exhibited by children in cognitive, language, social, and affective areas.

763 Biological Bases of Children's Development (3). Focuses on the theory and research related to the biomedical and psychological aspects of exceptionality.

764 Current Issues in Literacy (3). The main purpose of this seminar is to engage students in the synthesis and critical examination of current research and policy issues in literacy education.

766 Practicum in School Counseling (1-9). Prerequisites, EDUC 703 and 712. Permission of the instructor. Develops individual counseling skills and an understanding of the school as a setting for counseling through an apprenticeship experience.

767 Seminar in Educational Studies (3). Focuses on educational issues involving culture, curriculum, and change. Issues addressed will vary.

768 Education in Latin America (LTAM 768) (3). See LTAM 768 for description.

769 Schooling of Latinos (LTAM 767) (3). See LTAM 767 for description.

770 Multicultural Ways of Knowing (3). Dialectically explores narratives about race, class, and gender through critical, multicultural, aesthetic, and post-modern lenses.

771 Seminar in Social Foundations of Education (1). Explores topics in the social and philosophical context of American public education.

772 Educational Sociology (3). Applies sociological theory and research to problems of concern to educators.

773 Social Change and Education (3). Analyzes social change within a theoretical framework and describes its probable impact on education. Considers the role of the school in the development of human capital.

774 Social and Educational History of the United States (3). Provides a survey of the social forces influencing the development of American education from the period of colonization to the early years of the 20h century.

775 Introduction to Ethics and Education (3). Identifies issues arising in the professional activities of education personnel in the context of systematic consideration of the nature of ethical choice.

776 Gender, Race, and Class Issues in Education (WMST 776) (3). Provides an understanding of (and remedies for) the racism, sexism, and class divisions that schools can perpetuate. Examines curriculum, counseling, and interaction in classrooms; structure and leadership; and fundamental assumptions.

777 Gender, Policy, and Leadership in Education (WMST 777) (3). Covers feminist critiques of organizational and political power structures in readings and discussions leading to group and individual research projects.

779 Introduction to Philosophy of Education (3). Provides a comparative study of current philosophies of education, with particular attention to their impact on solutions offered to problems currently recognized in American education.

781 Theories and Research in Human Development (3). Permission of the instructor. Covers the basic theories and the research bases for instructional decisions. This is an advanced-level course in human development.

782 Psychology of Learning in the School (3). Studies learning in the school setting, with emphasis on fundamental concepts, issues, and evaluation of materials and experiences.

783 Applied Measurement Theory for Education (3). An examination of the logic and theory of educational measurement. Practical applications of measurement theory to the construction and use of a variety of educational measurement devices.

784 Statistical Analysis of Educational Data II (4). Prerequisite, EDUC 710. Permission of the instructor for students lacking the prerequisite. A linear model approach to the analysis of data collected in educational settings. Topics include multiple regression, analysis of variance, and analysis of covariance, using computer packages.

785 Program Evaluation in Education (3). Prerequisites, EDUC 710 and 871. An examination of major approaches to program evaluation with emphasis on differences between evaluation and research.

786 Problems in Educational Psychology (3-6). Permission of the instructor. Study and development of original investigations in the area of educational psychology.

787 Problems in Educational Measurement (3). Prerequisites, EDUC 710 and 783. Permission of the instructor. Provides an opportunity for advanced doctoral students to study a particular problem area in educational measurement under the supervision of a faculty mentor. May be repeated for credit.

788 Instructional Theories (3). Prerequisite, EDUC 744. Examines the nature and application of various theories of instruction to instructional goals, individual differences, teaching strategies, sequencing, motivation, and assessment.

790 Special Topics in Education – Graduate (3). This course provides graduate students the opportunity for intensive exploration and discussion of selected topics in education.

792 Research on Technology (3). Explores and discusses the application of emerging technologies in education.

795 Seminar in Learning Disabilities Education (3). Prerequisite, EDUC 687. Pre- or co-requisite, EDUC 688. (Students enrolled in the licensure-only program require initial competencies with regard to law and assessment that are not currently available). Instructs students about the requirements of the Individuals with Disabilities Education Act (IDEA) and case law, particularly those pertaining to learning disabilities. Also covers the basics of measurement concepts.

796A Independent Study Master's Level (1-12). Permission of the instructor.

796B Independent Study Doctoral Level (1-12). Independent study at the doctoral level.

797 Collaboration with Families and Other Professionals (3). Instructs students about the resources available to them, their students, and their students' families. Students will develop skills in working with parents and professionals as partners in the instruction and planning of programs for students with learning disabilities.

798 Master's Internship in Learning Disabilities Education (1-12). Provides supervised experience in a phase of special education or literacy studies appropriate to the student's qualifications and future educational goals. May require a minimum of 300 clock hours at the internship site per semester depending on student placement. See your advisor for credit hours needed.

800 Diversity in Education (3). Restricted to graduate students in the M.A.T. program. Permission of the instructor for nonmajors. Along with providing overview of schools, their structure, and their role in American society, the course introduces students to the necessity of differentiated instruction based on race, culture, special education, and English as second language learners.

801 Fundamentals of Educational Research (3). Explores and analyzes the range of educational research designs including experimental, correlational, survey, descriptive, case study, ethnography, narrative, policy, and longitudinal research.

802 Foundations of Educational Research (3). Applies the philosophies of science, social science, language, and history (including recent theoretical issues) to the understanding of how educational research is conducted and what contribution it makes.

803 Pro-seminar in Education (3). Students develop an in-depth understanding of scholarly traditions within education, histories of curricular area and current issues facing these areas and education as a whole, and application of these histories and issues to classrooms and schools.

804 Seminar in Culture, Curriculum, and Change (3). Open to doctoral students only. Critical examination of topics and policy issues related to curriculum and educational change, considered in cultural context.

805 Seminar in Early Childhood, Special Education, and Literacy (3). Introductory seminar for master's and doctoral students in ECSEL program. Review current issues in early childhood, special education, and literacy and introduces students to the research of current faculty members.806 Seminar in Psychological Measurement and Evaluation (3). Open to doctoral students only. Critical examination of theoretical and research issues related to learning, development, teaching, assessment, and quantitative methods of research, from a psychological perspective.

805A Professional Seminar I (3). Introductory seminar for graduate students. Review current issues in early childhood, special education, and literacy and introduces students to the research of current faculty members.

805B Professional Seminar II: Research and Scholarship in the Educational Sciences (3). Course explores history of psychological studies in education and examines areas of current inquiry such as cognition and learning, teaching and instruction, academic motivation, contextual influences, and theory-based intervention.

807 Social Studies and Arts (1-9). Looks at social studies as a discipline that easily integrates other disciplines, particularly the arts, which includes literature. It emphasizes curriculum and instruction, as well as theoretical underpinnings.

808 Seminar in Learning Disabilities Education (3). Prerequisite, EDUC 687. (Students enrolled in the licensure-only program require initial competencies with regard to law and assessment that are not currently available). Instructs students about the requirements of the Individuals with Disabilities Education Act (IDEA) and case law, particularly those pertaining to learning disabilities. Also covers the basics of measurement concepts.

809 Problems in Special Education (3). Permission of the instructor. Provides an opportunity for post-master's students who wish to engage in supervised field and pilot research. May be repeated for credit.

810 Psychology of Career Development (3). Open to doctoral students only. Reviews theories and research in the psychology of career development and counseling. Emphasis is on theory and implications for practice.

811 Problems in School Counseling (1–21). Provides students the opportunity for directed study in school counseling.

812 Doctoral Practicum in School Counseling (1–21). Provides students experiences that may include working with individual, family, or group counseling and consultation.

813 Doctoral Internship in School Counseling (1). Provides students a supervised professional pre-doctoral internship training experience in counseling.

814 Supervision and Teaching in School Counseling (3). Enables students to gain supervision and teaching skills that will enhance their functions as professors and as leaders in counseling agencies. Strategies of practicum supervision are summarized and research literature is reviewed.

815 Doctoral Seminar in School Counseling (3). Provides an in-depth appraisal of topics of theoretical and/or clinical nature that are of particular relevance to the field.

816 Transformational Education (3). Examines 20th-century schools that have attempted to redefine and deepen United States democracy, embracing pedagogies and values that offer alternatives to mainstream education.

817 Introduction to Educational Research (3). Course provides introduction to purposes of educational research, roles of theories, hypotheses, questions, and ethical issues. While being exposed to a range of research designs, students are to become critical reviewers and develop research proposals or a master's thesis.

820 Doctoral Seminar in Professional School Psychology (3). Required preparation, appropriate courses. Permission of the instructor. Considers advanced topics in the field of school psychology such as professional issues, standards and ethics, and interdisciplinary relations.

821 Doctoral Externship in School Psychology (1–6). Permission of the instructor. Supervised field placement experiences for doctoral-level students in school psychology, integrating training with field responsibilities at a systems level in schools and school-related settings.

822 Doctoral Internship in School Psychology (1–3). Prerequisite, EDUC 821. Supervised doctoral internship in school psychology for advanced training in professional skills and research in schools and school-related settings.

827 Human Development (3). School of Education majors only. Emphasizes theories of child and adolescent development as well as research findings that aid in the understanding of human behavior and development.

828 Educational Measurement and Evaluation (3). Identifies the basic concepts in measurement and evaluation, describes the role of evaluation in curriculum construction and revision, and describes the development and use of teacher-constructed tests.

830 Field Techniques in Educational Research (3). Prerequisite, EDUC 710. Introduces students to field research methods and analysis of qualitative data that focuses on the application of these techniques in evaluation and policy research.

831 School Law: Justice and Equity (3). Required preparation, six semester hours of graduate school work in school administration. Provides an overview of the legal structure of education, liability, constitutional rights, contractual relationships, federal regulations, and collective action. May be repeated for credit.

832 Educational Politics and Policy (3). Examines theory of competing conceptions of policy. Actors and agencies are examined at federal, state, and local levels. Interactions across levels are studied in relation to current policy alternatives.

833 Leading System Functions (3). Prerequisites, EDUC 839 and 842, Permission of the instructor. This course is focused on the issues pertaining to personnel, planning, facilities, administrative applications of technology, superintendent/board relations, district-level curriculum and assessment issues, and creating and sustaining community inter-agency partnerships.

834 Organizational Behavior and Theory in Education (3). Permission of the instructor. Analyze the theoretical assertions and empirical knowledge claims that have led to the dominant structures, power relationships, and performance expectations of American schools.

835 Instructional Leadership for Supervision, Curriculum, and Technology (3). Provides fundamental knowledge of instructional design, techniques of teaching/learning, evaluation of the teaching/learning process, and ways in which school-based leaders can support excellence in classroom instruction.

836 School Finance and Economic Equity (3). Covers the area of financing school corporations in the current economic and political setting, with emphasis on the interrelationships of educational, economic, and political decisions. May be repeated for credit.

837 Cultural Aspects of Leadership and Instruction in School Reform (3). Designed to provide students with perspectives regarding the interplay of cultural issues that challenge the partnership between administration and instruction.

838 School Governance (3). Permission of the instructor. Focuses on governance and policy at the school building level and how district-wide governance, state educational policy, federal involvement in education, and educational special interest groups impact school-sized governance.

839 The Excellent School Seminar I (3). Permission of the instructor. Research and models on high-performing organizations, instructionally effective schools and school systems, and national school reform efforts presented in the context of traditional and emerging organizational theory and research.

840 Advanced Leadership Theories (3). Prerequisites, EDUC 727, 750, 832, and 834. Requires students to integrate previous studies to focus on management applications, dilemmas, and conflicts.

841 The Development of a Research Proposal (3). Prerequisites, EDUC 727, 832, and 834. Requires students to integrate previous studies to focus on theory, inquiry, and organizational practice.

842 The Excellent School Seminar II (3). Permission of the instructor. Research and models on high-performing organizations, instructionally effective schools and school systems, and national school reform efforts presented in the context of traditional and emerging organizational theory and research.

843 Seminar in Educational Studies (3). Focuses on educational issues and theories involving culture, curriculum, and change. Issues and theories addressed will vary.

844 Advanced Seminar and Supervised Internship in Educational Administration (1–6). Prerequisites, EDUC 727, 750, 832, 834. Permission of the instructor. An advanced internship and seminar relevant to the program in administration and to the student's progress toward advanced administrative certification. May be repeated for credit.

851 Curriculum Theory (3). Relates curriculum development to relevant theories and research in humanistic and behavioral studies. This is an advanced course.

852 Instructional Systems Development (3). Delineates strategies for developing instructional systems, including needs assessment, job analysis, goal setting, use of criterion tests, delivery systems, project management, and evaluation of learners and programs.

853 Supervision and Instruction (3). Examines the history, nature, and purposes of educational supervision, with an emphasis on the supervisor's role in improving teaching, curriculum development, and staff development.

854 Research in Curriculum and Instruction (3). Prerequisites, EDUC 515, 752, 753,784, and 851. Permission of the instructor for students lacking the prerequisites. Review and interpretation of existing research in the area of curriculum and instruction, including an exploration of areas of needed research.

855 Problems in Curriculum and Instruction (3–6). Required preparation, two courses in graduate education. Provides an opportunity for advanced students to do independent study under supervision in an area of study. (Sections include early childhood, intermediate, secondary subjects, media, literacy, and general.) May be repeated for credit.

856 Practicum in Curriculum and Instruction (3–6). Experiences may include projects, field studies or internships with one of a number of agencies concerned with education. (Sections include early childhood, intermediate, secondary subjects, media, literacy, and general.)

861 Seminar in Special Education (3). Emphasis on developmental deviation exhibited by exceptional children in cognitive, language, social, and affective development.

862 Teaching and Personnel Development (SPHS 862) (3). Focuses on teaching and personnel development at the pre-service and in-service levels. Topics include: application of adult learning principles and styles; syllabus development; technology and teaching; supervision; mentorship and research innovations in college teaching.

863 Supervised Post-Master's Internship in Special Education (1–21). Permission of the instructor. A full-time field placement under the joint direction of a University staff member and a selected professional at the internship site.

864 Families, Schools, and Child Development: Successful Intervention Strategies (3). The purpose of this seminar is to provide an introduction to the theory, research, methods, and current issues related to the influence of families and schools on children's development.

865 College Teaching Internship (1–3). Open to graduate students only. Permission of the instructor. This course is designed to give doctoral and masters' students experience at college teaching prior to taking on full responsibility for a class of her/his own. The student will fully participate as a teaching assistant in the class of an experienced tenured, tenure track, or clinical professor.

866 Policy to Practice (3). Examine relationships between broader social, economic, and political currents and the chosen instruments for education reform. Students examine what purposes stakeholders believe schools serve and how policy is/isn't translated into practice.

867 Issues in Educational Policy and Research (3). Course familiarizes students with public policy in education and its influence on schools and schooling. Students learn methodological perspectives of education policy research. Examine major policy initiatives in education.

868 Advanced Qualitative Analysis and Interpretation (3). This advanced seminar focuses on the needs of doctoral students immersed in qualitative research, with an emphasis on data analysis and representation.

871 Seminar in Education (3). Required preparation, two courses in graduate education. Permission of the instructor. Provides for seminar treatment of appropriate topics.

872 Seminar in Educational Studies (3–6). Topics in educational philosophy to be determined by the students with the instructor. May be repeated for credit.

873 Problems in the Philosophical Foundations of Education (3–21). Prerequisite, EDUC 779. Provides an opportunity for advanced doctoral students to do independent study under supervision.

874 Problems in the Sociological Foundations of Education (3–21). Prerequisite, EDUC 772. Provides an opportunity for advanced doctoral students to do independent study under supervision.

876 Problems in the History of Education (3–21). Prerequisite, EDUC 774. Provides an opportunity for advanced doctoral students to do independent study under supervision.

877 Critical Multicultural Education (3). Examination of the current issues in multicultural education, cultural study, and the development of curriculum for critical multicultural education.

878 Seminar in Educational Studies (3). Involves an in-depth exploration of theories and issues involving culture, curriculum, and change. Topics will vary.

881 Seminar in Human Development and Individual Differences (3). Required preparation, at least one course in human development at the graduate level or permission of the instructor. Analyzes research data and theoretical positions pertaining to individual differences in human development in the educational setting.

882 Seminar in Human Learning and Cognition (3). Required preparation, one or two courses in educational and developmental psychology. Studies theoretical aspects and practical implications of psychologies of learning.

883 Case Study Methods (3). Provides students with an overview of the methodology of case study research and to enhance students' skills in using research techniques.

884 Statistical Analysis of Educational Data III (3). Prerequisites, EDUC 710 and 784. An extension of the general linear model to analysis of educational data with multiple dependent variables, with computer applications.

885 Secondary Data Analysis (3). Provides students who have an introductory background in statistics with an overview of secondary data analysis and enhances students' skills in using data analysis to test hypotheses.

888 Introduction to Structural Modeling (3). Introduces structural equation modeling with both observed and latent variables. Applications include confirmatory factor analysis, multiple group analyses, longitudinal analyses, and multi-trait-multi-method models.

890 Special Topics in Education (1-3). This course provides students the opportunity for intensive exploration and discussion of selected topics in education.

892 Seminar in Educational Studies (3-6). Topics in educational philosophy to be determined by the students with the instructor. May be repeated for credit.

904 Exploring Representations of Education in Popular Culture (3). Students in this course explore and analyze how education has been represented in popular culture. Theoretical foundation of the course from seminars and readings.

909 Applied Quantitative Methods in Curriculum and Teacher Education (3). Applied statistics course designed to introduce students to how descriptive and inferential statistics are used in curriculum studies and teacher education. Students explore how statistical procedures are used in school, school district, state, and national settings.

915 Introduction to Learning Sciences (3). Course is designed to provide an overview of the field of learning sciences. Goals of learning sciences are: 1) understand the physical, cognitive, and social aspects of learning environments and 2) use these understandings to design more effective learning environments.

918 Learning Theories: Translations into Research, Policy, and Practice (3). Course provides an overview of learning theories in education with a special emphasis upon a sociocultural perspective. Course examines how learning theories are or can be enacted in research, policy, and practice.

930 Economics of Education (3). Students consider and critically reflect upon the contributions of economic theory to educational policy issues. Course provides an overview of economic theories as they pertain to the provision of public education and an overview of econometrics. Focuses on salient topics in educational policy and their analysis through an economic lens.

945 Intellectual Histories of Educational Thought (3). Course will explore ideas about children, families, knowledge, and the state that resonate through European and U.S. histories, primarily, and, though changed, continue to be debated now.

948 Research in Teacher Education and Diversity (3). Course looks at research in teacher education that addresses diversity issues, with a particular focus on sociocultural and sociopolitical approaches. Course will emphasize the relationship between theory and practice by focusing on the teacher as an agent of change in addressing issues of equity and social justice in diverse classrooms.

950 Advanced Curriculum in the Humanities (3). Course brings together those with interests in academic disciplines of literature, history, foreign languages and literatures, English as a second language, and the arts to examine the status of the humanities in our society and in our P-12 schools. Students will consider socio-cultural and political contexts and contributions to the humanities.

970 Applied Theory and Research: Dissertation Proposal Prep (3). Course explores planning and conducting qualitative research. Students will apply knowledge of qualitative research to dissertation proposal/projects. They will also explore different research proposals and data collection strategies.

972 Critical Race Theory: History, Research, and Practice (3). Course will explore the historical development of Critical Race Theory (CRT) from its origins in Critical Legal Studies through the more recent frameworks established in education, including intersections with LatCrit Theory, AsianCrit, QueerCrit, TribalCrit, and Critical Race Feminism.

974 Critical Theory and Media (3). General introduction to the field of cultural studies and explanation of key intersections between cultural studies and the field of education. Students study concepts and critical social theories that have been central to both fields. Course challenges the perception that popular culture texts have little to offer in the way of educational discourse.

977 Autoethnography Educational Research (3). Course will focus on the theory and practice of autoethnography, or "reading" significant patterns in everyday experience and connecting those patterns to the self and to broader social concerns. Students will read models of autoethnography, methodological works, do writing exercises, and create independent autoethnographic projects.

981 Field Techniques in Educational Research (3). Prerequisite, EDUC 684. Introduces students to field research methods and analysis of qualitative data that focuses on the application of these techniques in evaluation and policy research.

982 Advanced Qualitative Analysis and Interpretation (3). This advanced seminar focuses on the needs of doctoral students immersed in qualitative research, with an emphasis on data analysis and representation.

990 Supervised Research (1). Open to graduate students only. Provides students with the opportunity to work with individual faculty members in collaborative research activities in association with a seminar during the second, third, and fourth semesters of study. May be repeated for credit.

992 Master's Project (3). Focuses on the development of a master's project or a major paper other than a thesis.

993 Master's Thesis (3).

994 Doctoral Dissertation (3).

Courses for Graduate Students

EDMX

704 Literacy Reflection (3). Focuses on reflective literacy teaching: problematizing, processes of understanding students' thinking about reading and writing.

706 Assessment and Accountability (3). Provides students with the opportunity to review, renew, and expand their understanding of assessment and program evaluation procedures, as well as the role of accountability in educational settings.

707 Reinventing Teaching (3). Admission to the M.Ed. for experienced teachers program required. Addresses contexts of teaching, teaching in the world, and teaching students in schools. This course is designed for experienced educators to "reinvent teachers and teaching."

708 Teacher Researcher I (1-3). Prerequisite, EDMX 707. Enrollment in the M.Ed. for Experienced Teachers Program required. Explores the meanings of research and the potential roles of teachers in conducting research. Teachers formulate possible individual or small group research projects that they can carry out during the year.

709 Teacher Researcher II (1-3). Teachers will plan and conduct advanced inquiry/research projects informed by their knowledge of teacher-research and their experience as teacher-researchers garnered through their successful completion of EDMX 708.

710 Teacher Leadership for a Democratic Society (3). Focuses on the nature of change and teachers' roles as leaders within a changing environment. Several themes are addressed: shaping school cultures, schools as communities, schools as sites for reform, and politics and schools.

715 Assessment and Differentiation (1). Prerequisite, EDMX 707. Enrollment in the M.Ed. for experienced teachers program required. Enhances teachers' understanding of how to differentiate assessment.

716 Teaching and Differentiation (3). Enrollment in the M.Ed. for experienced teachers program required. Enhances teachers' understanding of how to differentiate instruction. Using a case-based approach, teachers examine the areas of human development, special education and inclusion, cultural diversity, linguistic diversity, cognitive styles, and multiple intelligences as frames through which to consider creative environments to promote students' classroom success.

721 Content-Area Reading and Writing (3). Focuses on current theory, research, and issues in the teaching and use of reading and writing in the content areas. This is an introductory course.

722 Advanced Reflective Literacy Teaching (3). Teachers will learn how to problematize assessment of students' thinking about reading and writing in this practicum course.

723 Number Systems and Operations: K-5 Mathematical Tasks (3). Course has major restrictions. Analysis and construction of effective mathematical tasks in teaching number systems and operations at the K-5 level; attention is also given to the expansion of content knowledge.

724 Data Analysis and Measurement: K-5 Classroom Interactions (3). Course has major restrictions. Focuses on statistical literacy of elementary teachers and the teaching of data analysis and measurement to K-5 students; attention is also given to learning methods that facilitate appropriate classroom interactions.

725 Rational Numbers and Operations: K-5 Learning Trajectories (3). Prerequisite, EDMX 723. Course has major restrictions. Focuses on rational number concepts through learning trajectories at the K-5 level. Attention also given to problem solving and content knowledge.

726 Revisiting Real Numbers Concepts (3). Uses a problem-based format and group work to explore the mathematics of the real numbers with an emphasis on rational numbers.

727 Algebraic Reasoning: K-5 Discourse and Questioning (3). Prerequisite, EDMX 723. Course has major restrictions. Focus on the early algebra concepts of functional thinking and generalized arithmetic in relationship to pedagogical practices centered on questioning in the mathematics classroom.

728 Topics in Mathematics Education: Geometry (1-3). Provides students with a mathematical foundation and cognitive support for elementary and middle school geometry. Specific goals address structure of elementary and middle school geometry.

730 Geometry and Spatial Visualization: K-5 Assessment (3). Course has major restrictions. Geometric concept development along with formative and summative assessment strategies of students' geometric thinking. Attention also is given to geometric content knowledge and diagnosis of student errors.

731 Writing in the 21st Century (3). Focuses on the writing process and the theoretical foundations necessary to become practitioners who can develop and implement effective writing instruction using 21st-century skills.

732 Explorations in Literacy (3). Explores what it means to be a reader and writer, the nature of development of literacy.

733 Spanish for Educators (3). This graduate-level course is an introductory immersion-style Spanish course for anyone involved in education. Learners will acquire novice-level proficiency in Spanish and an awareness of Hispanic culture.

734 Revisiting Literacy (3). Explores literacy topics as capstone course for master's or licensure program in literacy.

735 Math and Content Area Methods: Special Education, General Curriculum (3). Students will learn characteristics of students with mild to moderate learning disabilities in math, social studies, and science. They will also learn assessment techniques and instructional methods to address these specific characteristics.

736 Mathematical Modeling: K-5 Leadership (3). Prerequisites, EDMX 723, 724, 725, 727, and 730. Restricted to majors. Generating mathematical representations and making explicit connections between concepts. Pedagogy designed to equip elementary teachers to become mathematics teacher-leaders in school settings. Focuses on topics integrated within mathematical strands.

757 Social Studies Pedagogy A (1-9). Designed to extend students' professional content knowledge by exploring the content and methods of a social science discipline.

758 Social Studies Pedagogy B (3). Designed to extend students' professional content knowledge by exploring the content and methods of a social science discipline.

759 Contemporary Research for Social Studies Teaching (3). Focuses on current research topics and methodologies in the field of social studies education and examines their implications on the field.

760 Integrated Learning (3). Builds on earlier coursework and will include teachers from each of the two concentrations in the M.Ed. for Experienced Teachers. It focuses on exploring what is meant by integrated curriculum and understanding the process of developmental research as it relates to the design and use of curricula.

761 Social Studies/Humanities (1-9). Aims to develop social studies teachers' understanding of social science and humanities through an interdisciplinary inquiry process.

762 Advanced Emergent Literacy (3). Advanced course on emergent literacy, focusing on the research and theory in the development of reading and writing processes from birth through first grade, emphasizing the cognitive and socio-cultural perspectives.

763 Diversity Global Education (1-9). Provides a linked perspective on international studies and multicultural education. Students explore issues relevant to these two topics as they relate to teaching and learning in social studies.

764 Families and Teams in Early Childhood Intervention: Interdisciplinary Perspectives (3). Open to graduate students only. Explores issues and models of family-professional and interprofessional relationships in early childhood settings. Collaborative communication and problem-solving strategies are emphasized in the context of diversity.

765 Early Childhood Assessment Strategies (3). Open to graduate students only. Provides an overview and application of strategies for developmental screenings, normative evaluations, curriculum, and play-based assessments for young children ages birth through five.

766 Preschool/Kindergarten Curriculum and Learning Environments (3). Open to graduate students only. Focuses on individually, developmentally, and culturally appropriate learning environment and curriculum strategies for young children with and without disabilities ages three to five.

767 Infant/Toddler Curriculum and Learning Environment (3). Focuses on infant/toddler development and mental health strategies for facilitating development in the home and in child care.

768 Professional Development and Leadership in Early Childhood Intervention (3). Prerequisites, EDMX 764, 765, and 766. Focuses on leadership skills in mentoring, supervision, staff development, resource gathering, and applied research related to early childhood settings.

775 Seminar in Science Education (3). Teaches students curriculum and instruction strategies in science education. The focus of the course is on teaching and assessing science for conceptual understanding.

776 Perspectives on Science Education: Physical Science (3). Examines physical science domains in depth. Students reflect on their own understandings of science phenomena and research their students' understandings.

777 Perspectives on Science Education: Life Science (3). Studies the history of science education, curriculum design, and national reform ideas as well as projects and programs currently used in United States classrooms.

778 Perspectives of Science Education: Earth, Space, and Environmental Science (3). Explores current reforms in science education through an examination of critical topics in earth-space science.

779 Big Ideas in Science Education (3). Through investigations, research, and guest speakers, this course engages students in discussions about teaching science in conjunction with issues of technology and society.

782 Behavioral Support Techniques (3). Emphasizes effective behavior management and applied behavior analysis techniques for intervening in the environments of exceptional children to increase learning.

789 Designing Problem Tasks for Mathematics (1-3). Focuses on the analysis and construction of mathematics instructional activities.

792 Problem-Based Learning in Mathematics (1-3). Focuses on the analysis and construction of mathematics instructional activities: tasks, problems, and materials with which students and teachers engage.

794 Developing Mathematical Knowledge (3). Designed to help teachers think through the major mathematical ideas of the curriculum and to examine how students develop these ideas.

810 Culturally Responsive Teaching (2). This course initiates thoughtful discussion of race and culture in our schools by exploring history, identity, and issues in academic achievement.

Department of English and Comparative Literature

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BEVERLY TAYLOR, *Chair*

English Program

Professors

Daniel R. Anderson, Rhetoric, Composition and Literacy
William L. Andrews, African American, American
Christopher M. Armitage, Renaissance, Poetry
David Baker, Renaissance, Drama, Renaissance Studies
A. Reid Barbour, Renaissance, Renaissance Studies
Erin Carlston, 20th-Century American and British, Comparative Literature, Cultural Studies, Women's Studies
James W. Coleman, American, African American, 20th-Century American, Southern
María DeGuzmán, Latino/Latina Studies, 20th-Century American, Critical Theory
Pam Durban, Creative Writing
Connie C. Eble, English Language, Medieval
Mary Floyd-Wilson, Renaissance, Drama, Renaissance Studies
Marianne Gingher, Creative Writing
Darryl J. Gless, Renaissance
Philip Gura, American, American Studies
Minrose Gwin, Southern, 20th-Century American
Mae Henderson, African American, 20th-Century American, Critical Theory
Joy Kasson, American, American Studies
Randall Kenan, Creative Writing
Laurie Langbauer, 19th-Century British, Critical Theory
George S. Lensing Jr., 20th-Century American and British, Poetry
Megan Matchinske, Renaissance, Cultural Studies, Renaissance Studies, Women's Studies
Michael A. McFee, Creative Writing
John P. McGowan, Critical Theory, 19th-Century British, Comparative Literature, Cultural Studies, Novel, Women's Studies
Jeanne Moskal, 19th-Century British, Critical Theory, Women's Studies
Patrick P. O'Neill, Medieval, English Language, Celtic, Medieval Studies
Ruth Salvaggio, 18th Century, Critical Theory
James Seay, Creative Writing
Alan R. Shapiro, 20th-Century American, Creative Writing
Bland Simpson, Creative Writing
Beverly W. Taylor, 19th-Century British, Novel, Women's Studies
Todd W. Taylor, Rhetoric, Composition and Literacy
James P. Thompson, 18th-Century British, Critical Theory, Novel
Joseph S. Viscomi, 19th-Century British
Daniel Wallace, Creative Writing
Joseph S. Wittig, Medieval, English Language

Associate Professors

Inger S. B. Brodey, 18th and 19th-century British novel, Comparative Literature, Philosophy
Pamela Cooper, 20th-Century British, Cultural Studies, Novel, Women's Studies
Tyler Curtain, Critical Theory, Cultural Studies, Novel
Jane M. Danielewicz, English Language, Rhetoric, Composition and Literacy
Florence Dore, 20th-Century American, Southern Literature, Post-1945 Literature
Rebecka Rutledge Fisher, African American, American, Black Intellectual Thought, Critical Theory
Gregory Flaxman, Film Studies, 20th-Century British, Critical Theory, Cultural Studies
Jennifer Ho, Asian American, Contemporary American, Cultural Studies
Jordynn Jack, Rhetoric and Composition
Ritchie D. Kendall, Renaissance, Drama, Renaissance Studies
Theodore H. Leinbaugh, Medieval, Medieval Studies, Comparative Literature
Thomas Reinert, 18th-Century British, Novel, Poetry
Eliza Richards, American
Jane Thrailkill, American, 20th-Century American
Jessica Wolfe, Renaissance, Renaissance Studies

Assistant Professors

Neel Ahuja, Critical Theory, Cultural Studies
Laura Halperin, Latino/Latina Studies, 20th-Century American, Cultural Studies
Heidi Kim, 20th-Century American, Asian American Literature
Matthew Taylor, American Literature, Cultural Studies, Theory and Criticism
Rick Warner, Film, Global Cinema Studies

Professors Emeriti

Laurence G. Avery
Allen Dessen
Joseph Flora
Johnny Lee Greene
William Harmon
Trudier Harris
Howard M. Harper Jr.
Fred Hobson
Edward Donald Kennedy
J. Kimball King
Allan R. Life
Erika C. Lindemann
C. Townsend Ludington Jr.
Margaret A. O'Connor
Daniel W. Patterson
Julius R. Raper III
Richard D. Rust
Thomas A. Stumpf
Weldon E. Thornton
Linda Wagner-Martin
David Whisnant
Charles G. Zug III

Comparative Literature Program

Inger S. B. Brodey, *Director*

Professors

Marsha S. Collins, Modern Peninsular Literature, Golden Age Spanish Literature
Eric S. Downing, 18th- and 19th-Century Literature, Literary Theory, Classics
Clayton Koelb, Modern Literature, Literary Theory, Philosophy and Aesthetics, Comparative Literature
John P. McGowan, Critical Theory, Cultural Studies, Novel, Women's Studies

Associate Professors

Inger S. B. Brodey, Prose Fiction in Late 18th- and Early 19th-Century Europe and Meiji Japan
Gregory Flaxman, Film Studies, Critical Theory
Diane R. Leonard, Modern Narrative, Modern Criticism and Theory

Jessica Wolfe, Comparative Renaissance Literature, Classical Reception

Assistant Professors
Shayne Legassie, Medieval, Medieval Studies, Comparative Literature
Rick Warner, Global Cinema Studies

Adjunct and Affiliate Professors (all ranks)
Dino Cervigni, Professor, Italian. Medieval and Renaissance Italian Literature
Rebecka Rutledge Fisher, Associate Professor, English. African American Literature, Caribbean Literature, Theory and Criticism, Cultural Studies, American Studies
Sharon James, Associate Professor, Classics
Janice H. Koelb, Adjunct Assistant Professor, English. British Romanticism, Poetry and Poetics
Federico Luisetti, Associate Professor, Italian
Hassan Melehy, Associate Professor, French
James L. Peacock, Professor, Anthropology. Symbolic Systems
Inga Pollman, Assistant Professor, German, Cinema Studies
William Race, Professor, Classics
Monica Rector, Professor, Spanish
Eliza Richards, Associate Professor, English
Alicia Rivero, Associate Professor, Spanish Language and Literature. Contemporary Spanish American Literature, Modern Critical Theory, Gender Issues, Literature and Science, Intellectual History
Michael Silk, Professor, King's College London. Classics
Robin Visser, Associate Professor, Asian Studies, Chinese Literature and Culture

Professors Emeriti
Paul Debreczeny
S. K. Heninger Jr.
Edward D. Kennedy
George A. Kennedy
G. Mallary Masters
Richard A. Smyth
Philip A. Stadter

The Department of English and Comparative Literature offers a Ph.D. in comparative literature and in English. Each program is described in detail below.

Ph.D. in English

The English program offers work leading to the doctor of philosophy degree, with a major in one of the following areas of specialization:

- The English language
- English literature from its beginnings to 1485
- English literature from 1485 to 1660 (including Milton)
- English literature from 1660 to 1789
- English literature from 1789 to 1900
- American literature to 1900
- American literature from 1900 to the present
- British literature from 1900 to the present
- Critical theory and cultural studies
- Rhetoric, composition, and literacy
- African American literature
- Southern literature
- Gender studies
- Queer studies

With faculty approval, students may also develop their own major field.

Ph.D. students also focus on a minor, chosen from one of these fields just listed, or from a genre (drama, novel, poetry) or the English language or from the following alternative minors: American studies, Celtic, comparative literature, cultural studies, Latina/Latino literature, medieval studies, Renaissance studies, and women's studies. Alternatively, students may develop their own minor within the department or take an appropriate minor outside the department, with the approval of the director of graduate studies.

For the doctor of philosophy degree in English, students must fulfill the following course requirements: ENGL 606, an Introduction to Graduate Study, three seminars in the major, one seminar in the minor, and two courses in allied fields. They will also participate in a third year colloquium. In addition to course work, a candidate for the Ph.D. must pass two examinations administered by the department for which he or she prepares by working closely with a faculty committee a year in advance: a written examination in the major and minor, and an oral examination in the major and minor. Doctoral candidates must also demonstrate a reading knowledge of two foreign languages. The program culminates with the candidate writing a dissertation (and registering for at least three semester hours of ENGL 994) and successfully defending it in an oral examination. Students must also satisfy residence credit requirements set by The Graduate School. The department strongly recommends that candidates for the Ph.D. have supervised classroom teaching experience before receiving the degree. Such experience, when it can be offered, is considered as fulfilling a requirement for the degree. Students generally take four years beyond the M.A. to complete the degree.

Ph.D. in Comparative Literature

Comparative Literature at UNC is inherently interdisciplinary, global, and transhistorical, and thus it remains one of the most innovative programs in the Academy today. The Program boasts particularly strong resources in medieval and early modern literature, comparative romanticisms, visual culture and global cinema, and romance language studies. We encourage our graduate students to discover their particular field, learn its histories, and define its problems on the basis of shared critical rigor. We draw together a number of core faculty and many more affiliated faculty from across the university as we strive to balance a belief in the value of a shared critical language with the exigencies of working in particular national languages, locations, literatures, and media.

A minimum of 16 courses is required for admission to doctoral candidacy; this minimum excludes consideration of the dissertation registration required by the Graduate School. All students are required to complete at least two CMPL courses during their first three semesters in residence, including both CMPL 700 (Literary Theory and the Practice of Comparative Literature) and CMPL 841 (Literary Theory and Criticism from Antiquity to 1700). In many cases the faculty advisor may recommend registering for other CMPL courses: for example, students specializing in modern literature are encouraged to take CMPL 842 (Literary Theory and Criticism from 1700 to 1900) and/or CMPL 843 (Literary Theory and Criticism from 1900 to the Present); students specializing in earlier literature or non-Western literature may be advised to take other courses in theory and methodology. Our curricular focal points include linguistic competence (of a minimum of three languages), theoretical fluency, and knowledge of the history of criticism.

Through course work, independent reading, and research, and with the support of an academic advisor, students develop a major "field" of study, as well as a minor "focus" of interest that often takes shape within or adjacent to the major field of study. The student's organization of the field

and focus should to be rigorous enough to situate the student within a discipline, tradition, or area, and supple enough to accommodate his or her specific interests, questions, and predilections. Subject to the approval of the academic advisor and the director of graduate studies, the field and focus will form the basis of the Ph.D. examination (written exams on each field, and an oral exam, on both, thereafter).

Students may choose from, but are not limited to, such fields as:
• African and /or African Diaspora literatures

• American literatures — either U.S. or North American and/or Central American and/or South American

• Caribbean literatures (in French, English, Spanish, and other languages)

• Classical literatures

• East Asian literatures

• English / Irish / Scottish / Welsh / "British" literatures

• French and/or Francophone literatures

• Germanic literatures

• Italian literature

• Latin American literatures (Spanish or Spanish / Portuguese)

• Middle Eastern / Arabic / Islamic literatures

• Postcolonial literatures — New World (Canadian/Caribbean), or South Asian, or Pacific Rim, etc.

• Russian and/or Slavic literatures

• South Asian literatures

• Spanish / Iberian literatures

Examples of areas of focus may include, but are not limited to:
• Classical (Greek, Roman, Late Antiquity/Early Christian)

• Medieval (or pre-modern Islam / Asian studies)

• Renaissance / Early Modern (usually up to 1700 in Northern Europe)

• Neoclassical / 18th Century / Enlightenment / "Age of Empire"

• Early Transatlantic / Colonial Americas (roughly 1450–1750, or a portion thereof)

• Enlightenment / Romanticism (roughly 1750–1840)

• Nineteenth Century

• Modernism (late 19th and early-to-mid 20th Century)

• Contemporary (1945 to the present)

Admissions Requirements

Application for admission must be made by The Graduate School's electronic application process. These also serve as applications for fellowships and assistantships if the applicant marks the appropriate statement on the form.

Applicants for advanced degrees must have completed an undergraduate degree, customarily with a major in English, comparative literature, a foreign language literature, or related field, at the time of enrollment. To be reviewed for admission by the department's Graduate Advisory Committee, applications must be supported by Graduate Record Examination (GRE) scores, at least three letters of recommendation, and official transcripts showing courses, grades, and degrees awarded. A writing sample and a personal statement should also be submitted. Those students applying to the Ph.D. Program in Comparative Literature should also submit (by mail on a CD or by email as an mp3 or mp4 file) a 5–7 minute long recorded sample of the student reading a selection of text in his or her second language beyond English. This recorded sample should be sent to the attention of the Director of Graduate Admissions in Comparative Literature.

Students who have already completed an M.A. degree in English, comparative literature, or a foreign language literature, or comparative literature at another institution may petition the relevant director of graduate studies for a reduction of up to nine credits (three courses) from their UNC requirements. More information about the department can be obtained via its Web site at englishcomplit.unc.edu.

Fellowships and Assistantships

Financial support for graduate students is described in the Admissions and Financial Information chapter. All applicants to the Department of English and Comparative Literature are eligible to compete for University fellowships and assistantships. In addition, the department awards two types of assistantships—research assistantships and teaching fellowships. Neither is usually available in the summer. Research assistants are assigned to faculty members to help with research projects. Teaching fellows have full instructional responsibility for sections of beginning composition courses. Graduate students in the third year of the English Ph.D. program who also have taught at least four sections of composition become eligible for teaching literature courses. Graduate students in the Comparative Literature Ph.D. program who also have taught at least four sections of foreign languages or composition become eligible for teaching comparative literature courses. Non-native speakers are not considered for teaching fellowships until they have been enrolled in the Ph.D. program for at least a year. Teaching fellows earn an annual stipend, which can vary depending on whether a fellow teaches two or three courses in a year. Teaching fellows are trained and supervised by the directors of composition and undergraduate studies and are subject to student and faculty evaluation.

Foreign Language Proficiency

The Comparative Literature program requires new Ph.D. students to arrive with fluency in a second language and at least a beginning level of a third. The program encourages study and research abroad, as well as summer language study to increase foreign language proficiency. Graduating Ph.D. students are expected to achieve a level of expertise in a foreign language that would enable them to teach in a foreign language department, as well as in a comparative literature or English department.

The English program also considers a reading knowledge of foreign languages essential to the educational and professional aims of its degree programs. Ph.D. candidates in the English program must demonstrate proficiency in two languages. The department recommends Latin, French, German, Italian, or Spanish. The use of other languages to fulfill the requirement must be approved by the director of graduate studies. An undergraduate major in an approved language automatically satisfies the requirement. Ordinarily, however, students fulfill the requirements by passing an examination administered through the University; by completing reading courses for graduate students offered by the Classics, German and Romance Languages departments; or, while enrolled as graduate students, by completing with a grade of at least B an undergraduate literature course in a foreign language. One foreign language requirement must be satisfied before the completion of English Ph.D. exams; the second requirement must be satisfied before the student schedules the Ph.D. defense.

Library and Research Facilities

The library system at the University of North Carolina at Chapel Hill is ranked among the top 20 research libraries in the United States. It

has excellent holdings for the study of English philology and British and American literature, including the Southern Historical Collection (containing manuscripts, letters, and diaries) and the Hanes Collection of Incunabula. Through cooperative arrangements, university libraries in the Triangle area are open to graduate students from the University of North Carolina at Chapel Hill.

Publications

Early American Literature, *Studies in Philology*, *The Southern Literary Journal*, *a/b: Auto/Biography Studies* and *The Keats-Shelley Journal* are edited by English Department faculty members and have their editorial offices in the ECL Department building.

Doctor of Philosophy Degree with a Minor in Renaissance Studies

Students working on their doctorate in one of the regular departmental programs may, with the approval of their departmental director of graduate studies, submit for the degree an interdisciplinary minor in Renaissance studies. The program is based in the Comparative Literature program and administered by the Arts and Sciences Committee for Renaissance Studies. The minor requires a minimum of five courses. Of those five, one must be CMPL 892, Seminar in Renaissance Studies. The remaining four courses must represent equally two fields other than the major field (e.g., a student with a major in Italian could offer from the approved list two courses in French, two in Latin, and CMPL 892).

CMPL 892, Seminar in Renaissance Studies, serves as a nucleus for the minor, affording students the opportunity to bring together seemingly divergent strains in an interdisciplinary context. Normally the faculty member giving the course invites other members of the Renaissance faculty to participate in the discussions and to present related materials from their own field of inquiry. Student participants choose a related topic or area for research and all report regularly on their own projects under investigation. The course is cross-listed as appropriate, under departmental offerings.

The minor in Renaissance studies for the Ph.D. is examined orally at the departmental oral examination (not the defense), unless written examination is required by departmental policy; normally faculty with whom the candidate has taken courses serve as examiners.

A working knowledge of Latin is strongly recommended for students in the program.

Faculty in Renaissance Studies and Related Areas

Art History: Mary Pardo

English: Christopher Armitage, David Baker, Reid Barbour, Mary Floyd-Wilson, Ritchie Kendall, Darryl Gless, Megan Matchinske, Jessica Wolfe

History: Melissa M. Bullard, Jay Smith

Music: John Nádas, Thomas Warburton

Romance Languages: Lucia Binotti, Dino Cervigni, Marsha Collins, Frank Dominguez, Carmen Hsu, Hassan Melehy, Ennio I. Rao

Courses for Graduate and Advanced Undergraduate Students

ENGL

400 Advanced Composition for Teachers (3). This course combines frequent writing practice with discussions of rhetorical theories and strategies for teaching writing. The course examines ways to design effective writing courses, assignments, and instructional materials.

401 Advanced Composition for Elementary Teachers (3). This course combines frequent writing practice with an introduction to teaching writing and reading in the elementary grades. Students explore composition theory and learn about effective practices for improving writing.

402 Investigations in Academic Writing (3). This course considers learning to write from three vantage points: personal, social, and contextual. Emphasis on theory, reflective practice, and pedagogy for peer tutoring.

405 Writing Literary Genres (3). Focuses on producing writing in a particular genre or form such as personal essay, autobiography, or creative nonfiction.

406 Advanced Fiction Writing (3). Prerequisite, ENGL 206. Permission of the program director. A continuation of the intermediate workshop with emphasis on the short story, novella, and novel. Extensive discussion of student work in class and in conferences with instructor.

407 Advanced Poetry Writing (3). Prerequisite, ENGL 207. Permission of the program director. A continuation of the intermediate workshop, with increased writing and revising of poems. Extensive discussion of student poetry in class and in conferences with instructor.

410 Documentary Film (3). This course provides a history of documentary cinema since the beginnings of the medium and surveys different modes and theoretical definitions; or the course may focus largely on a certain mode (such as ethnographic, observational, first-person, cinema vérité, politically activist, found footage compilation, or journalistic investigation).

418 The English Language—Contemporary Issues (3). Focused study of a specific subfield or issue of current or historical English linguistics not covered in depth in other courses, e.g., dictionaries, North Carolina dialects, language of advertising.

423 Old English Literature—Contemporary Issues (3). This course investigates themes or issues in Old English literature, thought, and culture.

424 Middle English Literature—Contemporary Issues (3). This course investigates themes or issues in Middle English literature, thought, and culture.

430 Renaissance Literature—Contemporary Issues (3). This course investigates cultural themes or problems across a wide spectrum of Renaissance authors.

436 Contemporary Approaches to 18th-Century Literature and Culture (3). Focuses on particular forms, authors, or issues in the period.

437 Chief British Romantic Writers (3). Survey of works by Blake, Wordsworth, Coleridge, Byron, Percy and Mary Shelley, Keats, and others.

438 19th-Century Women Writers (3). An investigation of important texts by 19th-century British women writers that considers issues of gender in relation to other important considerations: tradition, form, culture.

439 English Literature, 1832–1890 (3). Poetry and prose of the Victorian period, including such writers as Tennyson, the Brownings, Arnold, the Brontës, Dickens, G. Eliot.

440 English Literature, 1850–1910 (3). The Pre-Raphaelites, Wilde, Conrad, Shaw, and Yeats.

441 Romantic Literature—Contemporary Issues (3). Devoted to British Romantic-period literature's engagement with a literary mode (such as the Gothic) or a historical theme (such as war or abolition) or to an individual author.

442 Victorian Literature—Contemporary Issues (3). The study of an individual Victorian writer, a group (such as the Pre-Raphaelites), a theme (such as imperialism), or genre (such as Victorian epic or the serialized novel).

443 American Literature before 1860—Contemporary Issues (3). A junior- or senior-level course devoted to in-depth exploration of an author, group of authors, or topic in American literature to 1860.

444 American Literature, 1860–1900—Contemporary Issues (3). Intensive study of one or more authors or a topic in American literature from the Civil War through 1900.

445 American Literature, 1900–2000—Contemporary Issues (3). A junior- or senior-level course devoted to in-depth exploration of an author, group of authors, or a topic in American literature from 1900 to 2000.

446 American Women Authors (WMST 446) (3). American women authors from the beginnings to the present.

447 Memory and Literature (3). This course brings together theories of collective and individual memory with questions of aesthetics and narrative while exploring global connections between memory and literature.

462 Contemporary Poetry and Theory (3). This course introduces the student to historical and contemporary thinking about poetry and poetic language. Examines the place of poetry in theoretical thinking and theoretical thinking about poetry.

463 Postcolonial Literature (3). This course is a multigenre introduction to postcolonial literatures. Topics will include postcolonial Englishes, nationalism, anti-imperialism, postcolonial education, and the intersections between national and gender identities in literature.

464 Queer Texts, Queer Cultures (3). The literary and cultural critical arts of gay, lesbian, bisexual, transvestite, and other communities of sexual dissidents of the contemporary United States, United Kingdom, and other Anglophone cultures.

465 Difference, Aesthetics, and Affect (3). Examines interrelations between cultural difference, aesthetic form, and the representation, production, and conveyance of subjectivity (in particular affect or states of feeling) in texts, other media, and material culture.

466 Literary Theory—Contemporary Issues (3). Examines current issues in literary theory such as the question of authorship, the relation of literary texts to cultural beliefs and values, and to the formation of identities.

472 African American Literature—Contemporary Issues (3). Study of particular aspects of African American literature, such as the work of a major writer or group of writers, an important theme, a key tradition, or a literary period.

475 Southern Literature—Contemporary Issues (3). The study of a particular topic or genre in the literature of the United States South, more focused than students will find in ENGL 373.

481 Media Theory (3). This course investigates the ramifications of the development of mass media and popular culture, paying special attention to the transformation of literature.

486 Literature and Environment (3). Multidisciplinary, thematic investigations into topics in literature and environment that cut across boundaries of history, genre, and culture. Junior/senior level.

487 Folk Narrative (FOLK 487) (3). The study of three genres of folk narrative (fairytale, personal narrative, and legend) and their distinctive roles in contemporary life.

489 Cultural Studies—Contemporary Issues (3). The student will have an opportunity to concentrate on topics and texts central to the study of culture and theory.

490 Creative Writing Special Topics (3). Permission of the program director. Creative writing minors only. An occasional advanced course, which may focus on such topics as advanced creative nonfiction, editing and publishing, the lyric in song and collaboration between lyricists and composers, the one-act play, and short-short fiction.

496 Independent Research (1–3). Permission of the department. Recommended for students in junior or senior year of study. Intensive mentored research, service learning, field work, creative work, or internship. Requires 30 hours of research, writing, or experiential activities, or 100 hours of internship work, culminating in a written project.

525 Senior Seminar in Renaissance Literature (3). Seniors only. Senior-level survey of one or two key themes or issues in the literature of the English Renaissance.

580 Film—Contemporary Issues (3). This course is designed to introduce students to a particular historical or cultural aspect of the cinema.

583 Drama on Location (3). Offered as part of summer study abroad programs in Oxford, London, and Stratford-on-Avon. Students experience plays in performance and as texts, and discuss their literary, dramatic, cultural, and historical aspects.

600 Advanced Expository Writing (3). The course, restricted to graduate students in English, offers students practice writing vitae and job application letters, grant or conference proposals, dissertation or thesis chapters, book reviews, or journal articles.

601 Academic Writing for International Students (3). Designed to help international graduate students improve skills in academic writing. Attention to organization, flow, and presentation of an academic paper.

603 Oral Communication for International Students (1–3). Designed to help international graduate students refine oral communication skills in academic contexts. Attention to pronunciation, participating in group discussions, and making presentations.

605 History of Rhetoric and Composition (3). A survey of major figures in the history of rhetoric, beginning with classical rhetoric, but emphasizing contemporary rhetorical theory.

606 Rhetorical Theory and Practice (3). A study of rhetorical theories and practices from classical to modern times. Emphasis is on translation of theories into instructional practice for teaching in the college writing classroom.

607 Theory and Practice of Writing in the Disciplines (1–3). Introduction to theories of teaching writing in the disciplines for graduate instructors. Students will study discipline-specific conventions of argumentation, genre, and style with attention to pedagogical techniques, assignments, and activities.

610 Science as Literature: Rhetorics of Science and Medicine (3). The goal of this course is to develop skills in analyzing the rhetorical construction of scientific claims, with a focus on health and medicine as scientific discourse communities. Topics include the structure, argument, and style of scientific genres; visual and digital rhetorics; and the circulation of scientific rhetoric among publics.

613 Modern English Grammar (LING 613) (3). A study of current English structure and usage using a traditional approach modified by appropriate contributions from structural and generative grammar, with some attention to the application of linguistics to literary analysis.

619 Survey of Old and Middle English Literature (3). An introduction to English literature from the eighth to the 15th century, focusing on the primary works of Old English and Middle English literature.

621 Arthurian Romance (CMPL 621) (3). British and continental Arthurian literature in translation from the early Middle Ages to Sir Thomas Malory.

625 Shakespeare (3). A study of selected plays and poetry by Shakespeare and some of the key critical and theoretical approaches to his work.

626 Renaissance Drama (3). A study of a representative group of plays by dramatists writing between the establishment of the permanent theaters in the 1570s and the closing of those theaters in 1642.

627 Literature of the Earlier Renaissance (3). A graduate-level survey of the literature of the earlier Renaissance in England.

628 Literature of the Later Renaissance (3). In this course, students will interrogate the social, historical, and representational dimensions of 17th-century literature and culture in England.

629 Milton (3). A study of Milton's prose and poetry in the extraordinary context of 17th-century philosophy, politics, religion, science, and poetics, and against the backdrop of the English Civil War.

630 Shakespeare and His Contemporaries (3). This course will examine drama written and performed in England from 1570 to 1640, situating Shakespeare's plays in relation to others in his generation.

631 18th-Century Literature (3). Studies in a variety of British writers from Rochester to Cowper.

637 Chief British Romantic Writers (3). A survey of the major British Romantic writers, including Blake, Wordsworth, Coleridge, Byron, Percy and Mary Shelley, Keats, with an introduction to the chief scholarly and critical problems of this period.

639 Victorian Literature (3). Survey of major Victorian writers such as Tennyson, the Brownings, Arnold, Dickens, the Brontës, G. Eliot, Mill, Ruskin.

643 Introduction to American Literature to 1860 (3). A graduate-level survey of American literature from the European settlement of the New World through 1860. Consideration of authors in their aesthetic, historical, and contemporary critical contexts.

644 Introduction to American Literature, 1860–1900 (3). A graduate-level introduction to the range of American writing from the Civil War through 1900. Attention given to major critical concerns, e.g., the cultural force of realism, etc.

651 British and American Drama of the 20th Century (3). A survey of British and American drama, poetry, fiction, and criticism.

657 English and American Literature of the 20th Century (3). A survey of 20th-century English and American drama, poetry, fiction, and criticism.

659 War in 20th-Century Literature (PWAD 659) (3). A study of literary works written in English concerning World War I, or the Spanish Civil War and World War II, or the Vietnam War.

660 War in Shakespeare's Plays (PWAD 660) (3). The focus is on Shakespeare's various treatments of war in his plays: all his Roman histories, most of his English histories, all his tragedies, even some of his comedies.

661 Introduction to Literary Theory (3). Examines contemporary theoretical issues and critical approaches relevant to the study of literature.

662 History of Literary Criticism (3). A history of literary criticism from the Greeks to mid-20th century, focusing on recurrent concerns and classic texts that are indispensable for understanding the practice of literary criticism today.

663 Postcolonial Theory (3). This course covers major works of and topics in postcolonial theory.

664 The Challenge of Queer Theory to Literary Studies, Cultural Studies, and the Humanities (3). An advanced-level investigation of queer theory's challenges to literary criticism, cultural studies, and questions of critical methodology in the humanities. Cutting-edge research and just-published articles will be used.

665 Queer Latina/o Literature, Performance, and Visual Art (WMST 665) (3). This course explores literature, performance art, film, and photography by Latinas and Latinos whose works may be described as "queer" and that question terms and norms of cultural dominance.

666 Queer Latina/o Photography and Literature (WMST 666) (3). This course explores Latina/o literature about photography in relation to photography by "queer" Latina/o artists and through this double focus poses certain questions about identity, subjectivity, and culture.

670 Being and Race in African American Literature (3). An examination of phenomenology, the "philosophy of experience." Taking the perspective that literature helps clarify our experience, we will engage in readings of various genres—poetry, autobiography, fiction, and drama—as we examine how literature not only records experience, but also shapes it through a distinct method of reasoning.

673 Literature of the United States South (3). A study of the literature of the United States South, in most cases focusing on 20th-century Southern literature and on prose fiction.

680 Film Theory (3). This course offers a rigorous introduction to the various theories (aesthetic, narratological, historiographic, ideological, feminist, poststructuralist) inspired by the cinema.

685 Literature of the Americas (AMST 685, CMPL 685) (3). Two years of college-level Spanish or the equivalent strongly recommended. Multidisciplinary examination of texts and other media of the Americas, in English and Spanish, from a variety of genres.

686 Readings in Literature and Environment (3). Readings course selects an author, genre, or method as a means of deepening awareness of the politics, poetics, and paradoxes in the field of literature and environment.

691H English Senior Honors Thesis, Part I (3). Restricted to senior honors candidates. First semester of senior honors thesis. Independent research under the direction of an English department faculty member.

692H English Senior Honors Thesis, Part II (3). Restricted to senior honors candidates. Second semester of senior honors thesis. Essay preparation under the direction of an English department faculty member.

693H Creative Writing Senior Honors Thesis, Part I (3). Prerequisites, ENGL 130, 131, 132H, or 133H; ENGL 206 or 207; and ENGL 406 or 407. Permission of the program director. Restricted to senior honors candidates. The first half of a two-semester seminar. Each student begins a book of fiction (25,000 words) or poetry (1,000 lines). Extensive discussion of student work in class and in conferences.

694H Creative Writing Senior Honors Thesis, Part II (3). Prerequisites, ENGL 130, 131, 132H, or 133H; ENGL 206 or 207; ENGL 406 or 407; and ENGL 693H. Permission of the program director. Restricted to senior honors candidates. The second half of

a two-semester seminar. Each student completes a book of fiction or poetry. Extensive discussion of student work in class and in conferences with instructor.

Courses for Graduate Students

ENGL

701 Introduction to Medieval Studies (3). Introduction to medieval studies for graduate students in any department. Intended to expose students to research problems, tools and techniques in fields other than their own.

719 Old English Grammar and Readings (3). An introduction to Old English language and literature that also attempts to relate that language to Modern English and to the larger context of the history of the English language.

720 Old English Poetry (3). Required preparation, a working knowledge of Old English. The translation and interpretation of Old English poetry including works such as The Wanderer, The Seafarer, Deor, The Dream of the Rood, and Beowulf.

721 Early Middle English Literature (3). An introduction to Early Middle English, its varieties and genres from ca. 1150 (The Peterborough Chronicle) to ca. 1330 (the Harley lyrics).

722 Middle English Alliterative Poetry (3). Required preparation, a working knowledge of Middle English. An exploration of the Middle English poetry of the 14th-century alliterative "Revival," including the works of the Gawain/Pearl poet of the Langland.

723 Later Middle English Literature (3). English literature of the late 14th and 15th centuries, including Gower, the English and Scottish Chaucerians, and Sir Thomas Malory.

724 Chaucer (3). A study of Chaucer's major poetry, including Troilus and Criseyde, at least some of the "dream" poems such as Parliament of Fowls, and most of The Canterbury Tales.

747 Studies in the American Novel (3). A wide-ranging, graduate-level survey of the American novel from the late 18th century through the 20th century.

748 Studies in American Poetry (3). A wide-ranging, graduate-level survey of American poetry from the late 18th century through the 20th century.

762 Special Topics in Cultural Studies (3). An introduction to myriad texts, topics, controversies, institutions, and personalities that make up the ongoing knowledge projects that are loosely affiliated under the rubric "cultural studies."

776 Old Irish I (3). The main emphasis of the course will be on mastering the basic grammar of the language. There will be some readings from selected Old Irish glosses and from Aislinge Oenguso.

777 Old Irish II (3). Prerequisite, ENGL 776. Readings from a variety of genres of Old Irish literature: Stories from the Tain, Crith Gablach, Cambrai Homily, Early Irish Lyrics, Scela Mucce Meic Datho.

778 Medieval Welsh I (3). An introduction to Medieval Welsh language and literature.

779 Medieval Welsh II (3). Prerequisite, ENGL 778. Readings in Old and Middle Welsh Literature.

780 Proseminar in British Literature, 800–1500 (3).

781 Proseminar in British Literature, 1500–1660 (3).

782 Proseminar in British Literature, 1660–1770 (3).

783 Proseminar in British Literature, 1770–1870 (3).

784 Proseminar in American Literature, Prior to the Civil War (3).

785 Proseminar in Literature after 1870 (3).

786 Introduction to Graduate Study in English and Comparative Literature (3). This course introduces students to the field of literary studies in English and comparative literature. Students will survey a range of approaches, methods, and controversies that have emerged from the field. The focus on critical and institutional histories will provide a foundation for graduate work and for developing professional objectives.

800 Technology and the Humanities (3). Course explores the impacts of information technology on teaching and scholarship in the humanities. Students critique and learn to integrate emerging technologies into their pedagogy and research interests.

801 Research Methods in Composition and Rhetoric (3). Course introduces graduate students to methodologies of research in the field of Rhetoric and Composition. Emphasis is on theoretical and practical concerns that improve teaching and help develop research agendas.

805 Studies in Rhetoric and Composition (3). Focus varies by semester, but generally investigates intersections of literacy, pedagogy, and rhetorical theory. Courses range from explorations of technology and literacy, to investigations of forms of writing and pedagogy.

814 History of the English Language (LING 814) (3). Study of English from its Proto-Indo-European origins through the 18th century focusing on historic events and the major changes to the structure and usage of English they occasioned.

819 Seminar in Old English Language and Literature (3). Topics in Old English poetry and prose that vary with each seminar and instructor.

821 Seminar in Middle English Literature (3). Intensive study of major Middle English authors or genres or of medieval cultural influences. Topics have included Malory, Piers Plowman and its tradition, drama, and intellectual backgrounds of medieval literature.

824 Seminar in Chaucer (3). Advanced graduate seminar on Chaucer.

825 Renaissance Literature in Context (3). A study of select works of Renaissance literature, both dramatic and nondramatic, in its intellectual, social, political, or religious context.

826 Studies in Renaissance Genres (3). This course traces the historical trajectory of renaissance literary genres. Each offering focuses on a generic kind or set of kinds. (Topics may include pastoral, epic, satire, etc.)

827 Studies in Renaissance Authors (3). Concentrated studies of single authors, groups of authors thematically linked, or authors in their families or coteries.

828 Perspectives on Renaissance Literature and Culture (3). Students will study Renaissance literature while assessing the usefulness and status of a theoretical approach, such as feminist theory, queer theory, cultural materialism, new historicism or psychoanalytic theory.

829 Studies in Renaissance Literature: Drama (3). A study of Renaissance drama linked thematically, or framed by select cultural practices and historical issues.

830 Studies in Renaissance Literature: Primarily Nondramatic (3). A focused examination of an aesthetic, historical, or theoretical problem in the study of Renaissance literature.

831 Seminar in 18th-Century Literature (3). Selected topics in 18th-century literature.

832 Restoration and 18th-Century Drama (3). Studies in Restoration and 18th-century drama from Etherege to Sheridan.

833 Studies in English Literature, 1660–1740 (3). Studies in Restoration and Augustan writers from Dryden to Haywood.

834 Later 18th-Century Writers (3). Studies in later 18th-century writers from Gray to Wollstonecraft.

835 18th-Century Fiction (3). Studies in 18th-century fiction from Behn to Austen.

836 Studies in 18th-Century Women Writers (3). Behn, Haywood, Manley, Montague, Burney, Wollstonecraft, and Austen.

837 Studies in English Literature, 1780–1832 (3). Sections: 1) Blake, Wordsworth, Coleridge, 2) Byron, Shelley, Keats. Examination of the major Romantic poets, supplemented by readings in other Romantic authors.

838 19th-Century British Novel (3). Examination of important 19th-century British novels, such as those by Austen, Scott, Dickens, the Brontës, sensation novelists, Gaskell, Carroll, Thackeray, Eliot, Trollope, Doyle, Hardy, Meredith.

839 Victorian Nonfictional Prose (3). Examination of Victorian critics, travel writers, feminists, scientists, and historians in relation to the controversies of the period.

840 Studies in Victorian Literature: Poetry (3). Study of Victorian poets, focused on a group or a topic, including figures such as Tennyson, the Brownings, Arnold, and the Pre-Raphaelites.

841 Seminar in 19th-Century Romanticism in England (3). Topics concerning major authors and issues of the Romantic period.

842 Seminar in Victorian Literature (3). Topics concerning major authors and issues of the Victorian period.

843 Seminar in American Literature to 1860 (3). Topics vary: e.g., New England Puritanism, New England response to American literary nationalism; Emerson; Irving, Hawthorne, and Poe and the development of the American short story.

844 Seminar in American Literature, 1860–1900 (3). In-depth exploration for doctoral students of selected topics or authors in American literature from 1860 to 1900.

847 Seminar in the American Novel (3). Doctoral-level seminar in the selected topics or authors.

848 Seminar in American Poetry (3). Selected topics of authors.

850 Studies in English and American Poetry of the 20th Century (3). Usually taught as a survey of major poets: Yeats, Frost, Stevens, Williams, Pound, Eliot, Auden, with some more recent poets.

851 Studies in English and American Drama of the 20th Century (3). Usually taught as a survey of major playwrights of the modern era, from the continental influences (Ibsen and Strindberg) to such contemporary figures as Pinter and Stoppard.

852 Seminar in Modern Drama (3). Explores representative works of contemporary playwrights.

857 Studies in 20th-Century English and American Literature (3). Studies in special modern and/or contemporary topics; e.g., the Irish literary renaissance, Latina/o studies, Asian American studies, cultural, visual culture, postcolonial, gender and/or ethnic studies, and British and/or American literature.

858 Studies in English and American Fiction of the 20th Century (3). Usually taught as a survey of major writers: Joyce, Lawrence, Woolf, Hemingway, Faulkner, with some other writers.

860 Seminar in 20th-Century Literature, English and American (3). Seminar examining issues in modern English and American Literature.

861 Seminar in Literary and Cultural Theory (3). Seminar with varying topics, focusing on recent developments in literary and cultural theory, including narratology, feminism, psychoanalysis, and postcolonial and materialist theory.

862 Seminar in Cultural Studies (3). Advanced exploration of myriad tests, topics, controversies, institutions, and personalities that make up the ongoing knowledge projects that are loosely affiliated under the rubric "cultural studies."

863 Seminar in Postcolonial Literature (3). Course examines the shifting meanings of postcoloniality in 20th- and 21st-century literature from formerly colonized countries.

864 Studies in Latina/o Literature, Culture, and Criticism (3). Representative work by Latina/o writers and critics in relation to major social and historical trends and critical models-border theory, biculturalism, mestizaje, tropicalization, diaspora, pan-latinidad, Afro-Latina/o disidentifications, and LatinAsia studies.

867 African American and African Diasporan Literature to 1930 (3). Representative writers and literary and cultural traditions from the beginning of African American literature to 1930.

868 African American and African Diasporan Literature, 1930–1970 (3). Key writers within the context of selected literary, cultural, and critical traditions from 1930 to 1970.

869 African American and African Diasporan Literature, 1970 to the Present (3). Representative writers and literary, cultural, and critical traditions from 1970 to the present.

871 Seminar in African American Literature (3). An intensive study of a major writer or text, a group of writers or texts, or an important trend, tradition, or literary period.

872 Studies in African American and African Diasporan Literature (3). An intensive study of a particular aspect of African American literature, such as speculative fiction, subject formation, comparative diasporan literatures, gender issues, theoretical and critical approaches, or formal innovations.

873 Seminar in the Literature of the U.S. South (3). An in-depth treatment of selected writers of the U.S. South, focusing on a single genre or historical period.

874 Literature of the U.S. South: Special Topics (3). An in-depth treatment of selected topics (e.g., the Southern Renaissance, postmodern southern fiction, the racial conversion narrative) in Southern literature.

876 Introduction to Modern Irish I (3). An introduction to modern Irish grammar.

877 Introduction to Modern Irish II (3). Prerequisite, ENGL 876. Readings in modern Irish literature.

878 Critical Ireland (3). This course explores the creation of Irish culture in literature and history through the medium of 20th-century critical texts.

879 Writing the Northern Irish Troubles (3). This course examines literature's response to "the troubles" in Northern Ireland, that outbreak of civil violence which has taken place, most recently, since 1968.

880 Ireland in Modernity (3). This course will examine the relationships between Irish writing, culture, and modernism, in the context of international developments in literature and art.

881 Studies in Cinema (3). This course offers graduate students the opportunity to investigate, in a seminar setting, a particular subject within the domain of film studies.

886 Seminar in Ecological Theory and Practice (3). In-depth evaluation of ecological theory, ecocritical pedagogy, and literary criticism.

990 Directed Readings (3). Topics vary according to the needs and interests of the individual student and the professor directing the reading and writing project.

992 Non-Thesis Option (3).

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Courses for Graduate and Advanced Undergraduate Students

CMPL

411 Critical Theory (3). Overview of those realms of modern and contemporary thought and writing that are known as, and closely associated with, "critical theory."

420 Film, Photography, and the Digital Image (3). This course examines the shifting nature of the cinematic medium in relation to both traditional photography and newer digital forms of image production. The aesthetic, ethical, and ontological aspects of cinema are explored in light of emergent technological and cultural conditions that demand a full-scale reconsideration of cinema's specificity.

435 Consciousness and Symbols (ANTH 435, FOLK 435) (3). See ANTH 435 for description.

450 Major Works of 20th-Century Literary Theory (3). Comparative study of representative works on literary and cultural theory or applied criticism to be announced in advance.

452 The Middle Ages (3). Study of selected examples of Western medieval literature in translation, with particular attention to the development of varieties of sensibility in various genres and at different periods.

453 The Erotic Middle Ages (3). Readings of major works of medieval European literature in translation from the 12th to 15th centuries, focusing on topics such as courtship, marriage, adultery, homoeroticism, domestic violence, mystical visions, and prostitution.

454 Literature of the Continental Renaissance in Translation (3). Discussion of the major works of Petrarch, Boccaccio, Machiavelli, Castiglione, Ariosto, Tasso, Rabelais, Ronsard, Montaigne, Cervantes, and Erasmus.

456 The 18th-Century Novel (3). English, French, and German 18th-century narrative fiction with emphasis on the epistolary novel. The relation of the novel to the Enlightenment and its counterpart, the cult of sentimentality, and on shifting paradigms for family education, gender, and erotic desire.

458 Sense, Sensibility, Sensuality, 1740–1810 (3). The development of the moral aesthetic of sensibility or *Empfindsamkeit* in literature of western Europe in the late 18th and early 19th centuries.

460 Romanticism (3). An exploration of the period concept of Romanticism, using selected literary works by such writers as Blake, Wordsworth, Coleridge, Goethe, Novalis, Schlegel, Hugo, Nerval, Chateaubriand.

462 Realism (3). An exploration of the period concept of Realism through selected works by such writers as George Eliot, Dickens, James, Dostoevsky, Tolstoy, Balzac, Stendhal, Flaubert, Zola.

463 Cinema and Surrealism (3). This course examines surrealism as an inter-art development between the First and Second World Wars. Taking a comparativist view, it focuses mainly on cinema but explores surrealist literature, painting, and sculpture as well. Much of the course traces the continuing relevance of surrealist practices in contemporary cinema.

464 Naturalism (3). The Naturalist movement in European and American literature of the late 19th and early 20th centuries, focusing on its philosophical, psychological, and literary manifestations in selected plays and novels.

466 Modernism (3). An exploration of the period concept of modernism in European literature, with attention to central works in poetry, narrative, and drama, and including parallel developments in the visual arts.

468 Aestheticism (3). Aestheticism as a discrete 19th-century movement and as a major facet of modernism in literature and literary theory. Authors include Kierkegaard, Baudelaire, Nietzche, Huysmans, Wilde, Mann, Rilke, Nabokov, Dinesen, Barthes, Sontag.

469 Milan Kundera and World Literature (3). This course traces Milan Kundera's literary path from his communist poetic youth to his present postmodern Francophilia. His work will be compared with those authors he considers his predecessors and influences in European literature. Taught in English. Some readings in Czech for qualified students.

470 Concepts and Perspectives of the Tragic (3). History and theory of tragedy as a distinctive literary genre and as a more general literary and cultural problem. Authors include Aeschylus, Sophocles, Euripides, Shakespeare, Racine, Goethe, Nietzsche, Wagner, Mann, Samuel I and II, Faulkner. Also engages theorists, ancient and modern.

471 Classical Rhetoric and Modern Theory (3). Explores how the theory and practice of classical, medieval, and early modern rhetoric continue to challenge and stimulate contemporary theory. Two-thirds of the course examines texts written before 1750.

472 The Drama from Ibsen to Beckett (3). The main currents of European drama from the end of the 19th century to the present. Includes Chekhov, Strindberg, Pirandello, Lorca, Brecht, Anouilh.

473 Drama, Pageantry, and Spectacle in Medieval Europe (3). An exploration of different expressions of medieval drama and pagentry, including plays, tournaments, public executions, and religious processions.

478 The Medieval Frame Tale: Chaucer, Boccaccio, and the *Arabian Nights* (3). A comparative study of Chaucer's *Canterbury Tales,* Boccaccio's *Decameron,* and the earliest known version of *The Arabian Nights*. Knowledge of Middle English desirable, but students with no experience in the language will be able to attend tutorial sessions early in the semester.

481 Rhetoric of Silence: Cross-Cultural Theme and Technique (ASIA 481) (3). The uses of literary silence for purposes such as protest, civility, joy, oppression, nihilism, awe, or crisis of representation. Authors include Sterne, Goethe, Austen, Kawabata, Soseki, Oe, Toson, Camus, Mann.

482 Philosophy in Literature (PHIL 482) (3). See PHIL 482 for description.

483 Cross-Currents in East-West Literature (ASIA 483) (3). The study of the influence of Western texts upon Japanese authors and the influence of conceptions of "the East" upon Western writers. Goldsmith, Voltaire, Soseki, Sterne, Arishima, Ibsen, Yoshimoto, Ishiguro.

485 Approaches to 20th-Century Narrative (3). An examination of central trends in 20th-century narrative.

486 Literary Landscapes in Europe and Japan (ASIA 486) (3). Changing understandings of nature across time and cultures, especially with regard to its human manipulation and as portrayed in novels of Japan and Europe. Rousseau, Goethe, Austen, Abe, Mishima.

487 Literature and the Arts of Love (3). Love and sexuality in literary works from various historical periods and genres. Authors include Sappho, Plato, Catullus, Propertius, Ovid, Dante, Petrarch, Shakespeare, LaClos, Goethe, Nabokov, and Roland Barthes.

490 Special Topics (3). Topics vary from semester to semester.

492 The Fourth Dimension: Art and the Fictions of Hyperspace (3). An exploration of the concept of the fourth dimension, its origins in non-Euclidean geometry, its development in popular culture, and its impact on the visual arts, film, and literature.

494 Cinematic Uses of the Essay Form (3). Examines aesthetic, political, and philosophical aspects of essay films in international cinema. Focusing on works by figures such as Chris Marker, Orson Welles, Harun Farocki, Alexander Kluge, Guy Debord, and Jean-Luc Godard, the course traces the genre's literary roots and addresses how the essay deviates from more traditional documentary forms.

496 Reading Course (3). Readings vary from semester to semester. The course is generally offered for three credits.

558 The Lives and Times of Medieval Corpses (3). An investigation of the social, political, and literary uses of corpses in the Middle Ages.

560 Reading Other Cultures: Issues in Literary Translation (SLAV 560) (3). See SLAV 560 for description.

621 Arthurian Romance (ENGL 621) (3). See ENGL 621 for description.

622 Medieval Cosmopolitanisms (3). An examination of medieval engagements with the foreign and the extent to which those engagements challenged conventional ways of thinking about the world.

624 The Baroque (3). Required preparation, one course from CMPL 120–129. Analysis of the Baroque as an aesthetic movement, including major, representative literary works, comparisons of literature and the visual arts, and the study of theories of the Baroque and Neo-Baroque. Authors studied may include Tasso, Racine, Cervantes, and Shakespeare, among others.

685 Literature of the Americas (AMST 685, ENGL 685) (3). See ENGL 685 for description.

691H Comparative Literature Senior Honors Thesis Part I (3). Required of all students reading for honors in comparative literature.

692H Comparative Literature Senior Honors Thesis Part II (3). Prerequisite, CMPL 691H. Required of all students reading for honors in comparative literature.

697 Senior Seminar (3). This seminar allows comparative literature majors to work on an independent project to synthesize their curricular experience, and it introduces them to current, broadly applicable issues in comparative literature.

Courses for Graduate Students
CMPL

700 Problems and Methods in Comparative Literature (3). The course deals with the history of comparative literature, bibliographical materials, orientations of the subject in Europe and America, and problems of methodology, periodization, literary movements, and concepts of literary theory.

737 Topics in Contemporary Literary and Cultural Theory (3). Selected critical topics in poststructuralist thought, chosen by the instructor and announced in advance.

741 The Essay and Short Story (SPAN 741) (3). See SPAN 741 for description.

745 The Vanguards (SPAN 745) (3). See SPAN 745 for description.

747 The Contemporary Spanish American Novel (SPAN 747) (3). See SPAN 747 for description.

796 Reading Course (1–21).

821 Reading Ironies (3). Study of processes of recognizing and constructing ironies in texts, with consideration of both theoretical issues and practical readings.

841 History of Literary Criticism I: The Origins of Theory and Criticism (3). Traces major strains in literary criticism and theory from classical antiquity to the 18th century, pairing primary critical texts with contemporary literary examples and modern day theoretical responses. Authors read include: Plato, Aristotle, Aristophanes, Horace, Augustine, and Burke; Homer, Ovid, Virgil, Dante, and Pope; and Auerbach, Derrida, Ricoeur, and Benjamin.

842 History of Literary Criticism II: 1750–1950 (3). Study of major theoretical and critical writings in Europe from the middle of the 18th to the early 20th century.

843 20th-Century Literary Theory (3). An overview of major theoretical developments of the 20th century, including such movements as Saussurean linguistics, Russian Formalism, Prague Circle Semiotics, poststructuralism, phenomenology, psychoanalysis, feminism and Marxism.

844 Modern Women Writers (3). Exploration of 'l'ecriture feminine' through texts of modern women writers, artists, and critics who expanded the frontiers of expression beyond the conventionally articulable into spaces of silence and the 'non-dit.'

890 Special Topics in Comparative Literature (3).

892 Interdisciplinary Seminar in Renaissance Studies (3). Topic announced annually in advance.

894 Seminar (3). Topic announced annually in advance.

900 Research (0.5–21).

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Curriculum for the Environment and Ecology

www.cee.unc.edu
JAYE E. CABLE, *Chair*
MICHAEL F. PIEHLER, *Director of Graduate Studies*

Adjunct Professors
Richard N. Andrews, Environmental and Energy Policy, Policy Instruments and Incentives
Lawrence E. Band, Watershed Hydrology, Ecosystem Water, Carbon and Nutrient Cycling
Larry K. Benninger, Low-Temperature Geochemistry
Philip R. Berke, Energy; Urban Form and Environmental Impacts, Land-Use

Jaye Cable, Marine Sciences, Chemical Oceanography
Richard E. Bilsborrow, Economic Demography, Population, Development and the Environment
Joe Carter, Invertebrate Paleontology
Douglas J. Crawford-Brown, Environmental Risk Assessment, Strategies for Carbon Dioxide Reduction
Barbara Entwisle, Social Demography, Population and Environment
John W. Florin, Population Geography, Medical Geography
Patricia Gensel, Paleobotany, Patterns of Evolutionary Change
Joel G. Kingsolver, Environmental Physiology, Functional Morphology, Population Ecology and Evolution
Paul W. Leslie, Human Ecology, Population Biology
Hans Paerl, Microbial Ecology, Estuarine and Coastal Ecology, Water Quality Dynamics
Robert K. Peet, Plant Community and Population Ecology, Biogeography, Ecoinformatics
Charles H. Peterson, Marine Ecology, Population and Community Processes
David W. Pfennig, Evolutionary Ecology
Andreas P. Teske, Microbial Ecology, Evolution and Systematics
Stephen J. Walsh, Land-use and Land Cover Dynamics; Spatial Modeling and Analysis
Stephen C. Whalen, Nutrient Cycling, Greenhouse Gas Production and Dynamics
Peter S. White, Plant Population and Community Ecology, Conservation Biology
Thomas M. Whitmore, Emeritus, Historical Agro-Ecology of Middle America
R. Haven Wiley, Behavioral Ecology of Vertebrates, Avian Social Behavior

Adjunct Associate Professors

Marc Alperin, Carbon Cycling in Coastal Sediments, Global Carbon Budgets
John F. Bruno, Ecology and Conservation of Marine Communities
Charles E. Konrad, Synoptic Climatology and Climate Change
Charles Mitchell, Disease Ecology, Global Change, Biological Invasions
Aaron Moody, Remote Sensing, Landscape Ecology, Biogeography, Geographical Information Systems
Michael F. Piehler, Coastal Ecosystem Ecology and Nutrient Dynamics
Maria Servedio, Evolutionary Ecology, Behavioral Ecology
Conghe Song, Remote Sensing of Vegetation, Ecological Modeling, Geographic Information Systems
Donna Surge, Paleoclimatology, Paleoecology, Low-Temperature Geochemistry
Alan Weakley, Plant Systematics, Floristics, Biogeography, Conservation Biology, Bioinformatics

Adjunct Assistant Professors

Todd Bendor, Computer Modeling in Human Ecological Impacts, Land Use and Environmental Planning
Karl Castillo, Eco-physiology of Coral Reefs, Climate Change and Ocean Acidification Effects
Xiaodong Chen, Coupled Human-Natural Systems, Remote Sensing and GIS
Joel Fodrie, Coastal Biological Oceanography
Clark Gray, Population Mobility and Environmental Change
Allen Hurlbert, Community Ecology, Biogeography, Avian Ecology
Pamela Jagger, Environmental Policy, Environment and Development, Sub-Saharan Africa
Nihkil Kaza, Urban Development, Energy Planning and Landscape
Adrian Marchetti, Eco-physiology and Molecular Biology of Marine Phytoplankton
Ben Mirus, Hydrogeology, groundwater hydrology
Laura Moore, Large-Scale Geologic and Modern Evolution of Coastal Environments
Lauren Persha, Conservation and Development, Social-Ecological Systems, East Africa
Karin S. Pfennig, Behavioral Ecology and Evolution, Speciation, Host-Parasite Interactions
James Umbanhowar, Theoretical Ecology, Dynamics of Species Interactions Webs, Host-Parasutoid Interactions
Colin West, Human Ecology of Global Change, Ecological Anthropology
Andrew J. Yates, Resource Economics, Environmental Markets

Associated Faculty

Cecil Frost, Fire Ecology, Plant Ecology, Landscape Ecology
Sam Pearsall, Conservation Planning, Adaptive Management, Riparian Landscapes
Johnny Randall, Conservation Biology, Restoration Ecology
Jack Weiss, Biostatistics and Quantitative Ecology

The Curriculum for the Environment and Ecology (CEE) is a multidisciplinary, degree-granting program that seeks to foster an understanding and appreciation of ecological systems and to demonstrate the value of ecological approaches to the solution of current and future environmental problems. With the participation of faculty and students from many disciplines and departments, emphasis is placed on interdisciplinary activities that explicitly consider the complexity of the environment and integrated approaches to problem identification and solution. In particular, it seeks to foster an understanding and appreciation of ecological systems, human and nonhuman, and to demonstrate the value of ecological approaches to the solution of current and future environmental problems.

The CEE places an emphasis on interdisciplinary activities, and derives one of its major strengths from the participation of faculty and students from many disciplines and departments. Current faculty come from the departments of Anthropology, Biology, Biostatistics, City and Regional Planning, Communication Studies, Environmental Sciences and Engineering, Geography, Geological Sciences, Marine Sciences, Public Policy, and Sociology. Whereas degree programs with a strong ecology component may be arranged in other departments, the curriculum—by combining many approaches and methods and by linking the social and natural sciences—explicitly considers the complexity of the environment and the need for integrated approaches to problem identification and solution.

Using the resources of many departments, the CEE provides both broad and specialized training in ecology, human ecology, and the study of environmental systems. Graduate degrees available in the curriculum are the master of science, the master of arts, and the doctor of philosophy. Applications will be accepted from persons with varied backgrounds and goals with the specific program of study and research tailored to the needs of the individual.

Requirements for Admission

For admission to the Curriculum for the Environment and Ecology, an undergraduate degree is required in a natural science such as physics, chemistry, biology, bacteriology, botany, zoology, or geology; a social science such as anthropology, sociology, or economics; a mathematical area such as statistics, mathematics, or systems analysis; an engineering area; or environmental science. The deadline for a completed application in order for students to be considered for fall admission is in January. However, students must submit all curriculum and Graduate School admission materials by December if they wish to be considered for campus fellowships and other forms of graduate appointments. Late applications

will cause students to miss out on some opportunities. Detailed information is available on both the CEE Web site at www.cee.unc.edu and the UNC Graduate School Website at gradschool.unc.edu/admissions.

Degree Requirements

Every student must gain an understanding of the breadth and depth of the field of ecology as it is treated among various traditional disciplines. This is accomplished in two ways: first, through the ECOL 567 and 569 sequence; and second, through the composition of the student's advisory committee. Students are required to do their best to establish residency in their first year and must apply for residency after their first year in order to be considered for tuition remission in subsequent years.

Doctor of Philosophy

Each Ph.D. student, in addition to taking ECOL 567 and ECOL 569, must register for ECOL 994 at least once for three hours credit. There are no other course requirements for the Ph.D. except for those designated by the student's graduate advisory committee.

Owing to the diversity of research methods and approaches within the field of ecology, the curriculum has no explicit research skill course requirements for graduate degrees. The student's graduate advisory committee is responsible for seeing that the student has gained the proficiencies expected of a degree candidate in the student's selected area of expertise.

Master's Degrees

Two master's degrees are offered by the curriculum: the master of science degree requiring independent research and a thesis, and the master of arts degree requiring a written library report. All master's degrees are terminal degrees at UNC–Chapel Hill. Master's students must request readmission for Ph.D. work following completion of all requirements for the master's degree.

Master of Science: The master of science course requirements are determined by the student's advisory committee. They must include a minimum of 30 hours of graduate credit (of which no less than 24 hours must be earned in courses, and at least three hours in research), and completion of the thesis. One semester of registration is required in ECOL 567 and ECOL 569, and M.S. students must register for three hours in ECOL 993.

Master of Arts: Requirements for the master of arts are the same as those for the master of science, except a master of arts paper is prepared (ECOL 992) in place of a master's thesis (ECOL 993).

Courses for Graduate and Advanced Undergraduate Students

ECOL

461 Fundamentals of Ecology (BIOL 461, ENST 461) (4). See BIOL 461 for description.

562 Statistics for Environmental Scientists (BIOL 562, ENST 562) (4). Prerequisite, STOR 155. Introduction to the application of quantitative and statistical methods in environmental science, including environmental monitoring, assessment, threshold exceedance, risk assessment, and environmental decision making.

563 Statistical Analysis in Ecology and Evolution (BIOL 563, ENST 563) (4). See BIOL 563 for description.

567 Ecological Analyses and Application (ENST 567) (3). This course provides an overview of natural and social science approaches to addressing biodiversity conservation and resource management. Concepts and methods from population biology, evolutionary ecology, community ecology, and conservation biology will be complemented with approaches from common property theory, indigenous resource management, and human evolutionary ecology.

569 Current Issues in Ecology (ENST 569) (3). Required preparation, previous course work in ecology. Permission of the instructor. Topics vary but focus on interdisciplinary problems facing humans and/or the environment. May be repeated for credit.

602 Professional Development Skills for Ecologists and Biologists (BIOL 602) (3). The goal of this course is to help students who intend to become professional ecologists or biologists acquire critical skills and strategies needed for achieving their career goals.

669 Seminar in Ecology (BIOL 669) (1-3). See BIOL 669 for description.

Courses for Graduate Students

ECOL

765 Field Experience in Ecology (2). Graduate standing in ecology required. Organized field work in remote environments with a faculty instructor as approved by student's supervisory committee. May be repeated for credit.

891 Special Topics in Ecology (2–4). Permission of the instructor. May be repeated for credit.

961 Research in Ecology (2–21).

992 Master's Non-Thesis (3–5).

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3– 21).

Ecological courses in other departments that are considered appropriate for graduate students in the Curriculum in Ecology:

ANTH

703 Evolution and Ecology (3).

704 Evolution and Ecology (3).

755 Seminar in Ecology and Population (3).

766 Seminar in Ethnobotany (3).

BIOL

453 Animal Societies and Communication (3).

459 Field Biology at Highlands Biological Station (1–4).

462 Marine Ecology (MASC 440) (3).

463 Field Ecology (4).

465 Global Biodiversity and Macroecology (3).

469 Behavioral Ecology (3).

471 Evolutionary Mechanisms (4).

476 Avian Biology (3).

476L Avian Biology Laboratory (1).

514 Evolution and Development (3).

561 Ecological Plant Geography (3).

563 Statistical Analysis in Ecology and Evolution (ECOL 563, ENST 563) (4).

565 Conservation Biology (3).

657 Biological Oceanography (ENVR 520, MASC 504) (4).

661 Plant Ecology (4).

662 Field Plant Geography (2).

669 Seminar in Ecology (ECOL 669) (2).

857 Seminar in Comparative Animal Behavior (NBIO 857) (2).

859 Seminar in Marine Biology (2).

BIOS

664 Sample Survey Methodology (STOR 358) (4).

670 Demographic Techniques I (3).

PLAN

585 American Environmental Policy (ENST 585, ENVR 585, PLCY 585) (3).

641 Ecology and Land Use Planning (3).

685 Water and Sanitation Planning and Policy in Developed Countries (ENVR 685) (3).

710 Microeconomics for Planning and Public Policy Analysis (3).

740 Land Use and Environmental Policy (3).

744 Development and Environmental Management (3).

745 Development Impact Assessment (3).

781 Water Resources Planning and Policy Analysis (ENVR 781) (3).

784 Environmental Law (ENVR 784) (3).

785 Public Investment Theory (ENVR 785, PLCY 785) (3).

786 Environmental Quality Management (ENVR 786) (3).

COMM

675 Environmental Communication and the Public Sphere (ENST 675) (3).

ECON

454 Economics of Population (3).

855 Economics and Population (3).

ENVR

403 Environmental Chemistry Processes (ENST 403) (3).

412 Ecological Microbiology (3).

413 Limnology (3).

415 Biogeochemical Processes (ENST 450, GEOL 450, MASC 450) (4).

417 Oceanography (BIOL 350, GEOL 403, MASC 401) (3).

419 Chemical Equilibria in Natural Waters (3).

430 Health Effects of Environmental Agents (3).

461 Environmental Systems Modeling (ENST 415, GEOL 415, MASC 415) (3).

585 American Environmental Policy (ENST 585, PLAN 585, PLCY 585) (3).

701 Ecology of Aquatic Plants and Wetland Ecosystems (3).

765 Model-Based Exposure Mapping and Risk Assessment (3).

767 Modeling for Environmental Risk Analysis (3).

781 Water Resources Planning and Policy Analysis (PLAN 781) (3).

784 Environmental Law (PLAN 784) (3).

786 Environmental Quality Planning (PLAN 786) (3).

ENST

403 Environmental Chemistry Processes (ENVR 403) (3).

411 Oceanic Processes in Environmental Systems (GEOL 411, MASC 411) (4).

415 Environmental Systems Modeling (ENVR 461, GEOL 415, MASC 415) (3).

470 Environmental Risk Assessment (ENVR 470) (3).

480 Environmental Decision Making (PLCY 480) (3).

489 Ecological Processes in Environmental Systems (4).

520 Environment and Development (INTS 520, PLCY 520) (3).

585 American Environmental Policy (ENVR 585, PLAN 585, PLCY 585) (3).

675 Environmental Communication and the Public Sphere (COMM 675) (3).

EPID

600 Principles of Epidemiology (3).

785 Environmental Epidemiology (3).

786 Community-Driven Epidemiology and Environmental Justice (2).

GEOG

410 Modeling of Environmental Sciences (3).

412 Synoptic Meteorology (3).

414 Climate Change (3).

416 Applied Climatology (3).

419 Field Methods in Physical Geography (3).

420 Fundamental Concepts of Human Geography (3).

434 Cultural Ecology of Agriculture, Urbanization, and Disease (3).

435 Environmental Politics (3).

440 Earth Surface Processes (GEOL 502) (3).

441 Introduction to Watershed Systems (3).

442 River Processes (3).

444 Landscape Biogeography (3).

445 Medical Geography (3).

450 Population Geography (3).

477 Introduction to Remote Sensing and Digital Image Processing (3).

491 Introduction to GIS (PLAN 491) (3).

577 Advanced Remote Sensing (3).

591 Applied Issues in Geographic Information Systems (PLAN 591) (3).

595 Ecological Modeling (3).

705 Advanced Quantitative Methods in Geography (3).

710 Advanced Physical Geography—Biogeoscience (3).

711 Advanced Physical Geography— Hydroclimatology and Bioclimatology (3).

715 Land Use/Land Cover Dynamics and Human Environment Interaction (3).

790 Spatial Analysis and Computer Modeling (3).

801 Research Seminar in Earth System Science and Biophysical Geography (3).

802 Research Seminar in Geographic Information Sciences (3).

803 Research Seminar in Nature-Society Studies and Human-Environment Interactions (3).

811 Seminar/Readings in Earth System Science and Biophysical Geography (3).

812 Seminar/Readings in Geographic Information (3).

813 Seminar/Readings in Nature-Society Studies and Human-Environment Interactions (3).

MASC

401 Oceanography (BIOL 350, ENVR 417, GEOL 403) (3).

410 Earth Processes in Environmental Systems (ENST 410, GEOL 410) (4).

411 Oceanic Processes in Environmental Systems (ENST 411, GEOL 411) (4).

415 Environmental Systems Modeling (ENST 415, ENVR 461, GEOL 415) (3).

430 Coastal Sedimentary Environments (GEOL 430) (3).

440 Marine Ecology (BIOL 462) (3).

449 Ecology of Wetlands (ENVR 449) (4).

450 Biogeochemical Processes (ENST 450, ENVR 415, GEOL 450) (4).

472 Barrier Island Ecology and Geology (6).

504 Biological Oceanography (BIOL 657, ENVR 520) (4).

505 Chemical Oceanography (ENVR 505, GEOL 505) (4).

506 Physical Oceanography (GEOL 506) (4).

741 Seminar in Marine Biology (2).

POLI

741 Latin American Politics: Research and Analysis (3).

PLCY

480 Environmental Decision Making (ENST 480) (3).

520 Environment and Development (ENST 520, INTS 520) (3).

585 American Environmental Policy (ENST 585, ENVR 585, PLAN 585) (3).

SOCI

453 Social Change in Latin America (3).

707 Measurement and Data Collection (3).

803 Human Ecology (3).

830 Demography: Theory, Substance, Techniques, Part I (3).

831 Demography: Theory, Substance, Techniques, Part II (3).

832 Migration and Population Distribution (3).

Department of Exercise and Sport Science

www.unc.edu/depts/exercise
DARIN A. PADUA, *Chair*

Professors
Kevin M. Guskiewicz (24) Sports Medicine, Anatomy
Anthony C. Hackney (21) Exercise Physiology, Metabolism and Endocrinology
Darin A. Padua (22) Anatomy, Biomechanics, Sports Medicine
William E. Prentice (15) Athletic Training, Sports Medicine
Bonita L. Marks (26) Exercise Physiology

Associate Professors
Claudio L. Battaglini (32) Clinical Exercise Physiology, Exercise Assessment and Prescription
J. Troy Blackburn (33) Biomechanics, Neuromuscular Control, Sports Medicine
Diane G. Groff (34) Recreation and Leisure Studies
Joseph B. Myers (35) Anatomy, Biomechanics, Sports Medicine
Barbara J. Osborne (29) Legal Issues, Sport Administration
Edgar W. Shields Jr. (10) Applied Statistics, Research Design

Assistant Professors
Coyte G. Cooper (39) Sports Business (Economics, Finance, Marketing)
Kristen Kucera (46) Sports/Occupational Injury Epidemiology; Musculoskeletal Disorders; Surveillance Exposure Assessment
Michael D. Lewek, (51) Biomechanics
Jason P. Mihalik (40) Traumatic Brain Injury, Sports Related Traumatic Brain Injury
Brian Pietrosimone (45) Sports Medicine, Joint Injury, Neuromuscular Control
Eric D. Ryan (41) Exercise Physiology, Muscle Function
Abbie E. Smith (43) Exercise Physiology, Metabolism and Body Composition
Erianne A. Weight (42) College Sport Business (Entrepreneurship, Management, Finance)

Master Lecturer
Sherry L. Salyer

Senior Lecturer
Meredith A. Petschauer

Lecturers
Alain J. Aguilar
Roberto Aponte
Rebecca L. Battaglini
J.D. DeFreese
Amy S. Herman
Debra C. Murray
Lee Schimmelfing
Deborah J. Southall
Deborah L. Stroman
Heather Tatreau

Professor of the Practice
Richard A. Baddour

Adjunct Professor
Stephen W. Marshall, Epidemiology

Adjunct Associate Professors
William T. Generous, Physical Education
Laurence M. Katz, Emergency Medicine

Adjunct Assistant Professors

Elizabeth G. Hedgpeth (30) Sport Psychology
Johna R. Mihalik (44) Athletic Training, Sports Medicine

Professors Emeriti

M. Deborah Bialeschki
John E. Billing
Robert G. McMurray
Frederick O. Mueller
Francis Pleasants Jr.
John M. Silva

Mission

The mission of the Department of Exercise and Sport Science (EXSS) is to discover, create, and promote knowledge of human movement to improve the quality of life of individuals and society. We prepare individuals to function as scientists, educators, and practitioners. Our program offers a master of arts degree in Exercise and Sport Science with specialization in one of three areas: athletic training, exercise physiology, and sport administration. We seek to provide all students with focused, in-depth knowledge and skills, and an understanding of the challenges facing the areas of athletic training, exercise physiology, and sport administration as well as a global understanding of exercise and sport.

In pursuit of maximum fulfillment of our mission, we also offer quality practical experiences to our students. EXSS has an association with numerous other campus and local area units such as athletics, emergency medicine, orthopedics, Duke Center for Living, the Lineberger Comprehensive Cancer Center, Get Real & Heel, Meadowmont Wellness Center, Campus Health Services, Carolina Adventures, Campus Recreation, the North Carolina High School Athletic Association, and local public parks and recreation departments. Supervised assistantships and internships outside the department help students develop practical skills in the specific fields of study. Furthermore, the thesis, a required research experience, is an integral part of every student's program of study. Additional research experience opportunities are numerous, and it is an expectation of the department that graduate students will become actively involved in conducting research while studying at UNC–Chapel Hill.

Additional information regarding the Department of Exercise and Sport Science can be found at www.unc.edu/depts/exercise.

Master of Arts

The Exercise and Sport Science graduate program offers a master of arts degree in Exercise and Sport Science. There are three areas of specialization: athletic training, exercise physiology, and sport administration from which each applicant must choose only one when applying. The minimum number of credit hours required for the degree varies, depending on the area of specialization. Specific courses required are determined by the faculty in each area of specialization. In addition to course requirements, all students in all three areas must pass a written comprehensive examination, complete a thesis, and successfully defend the thesis in a final oral examination on the thesis.

Specialization Descriptions

Athletic Training

The Department of Exercise and Sport Science in cooperation with the Campus Health Service's Division of Sports Medicine, and the Department of Athletics offers a specialization in athletic training at the graduate level which has existed as a Post-Professional Athletic Training Education Program since 1975. This is one of only 15 such graduate programs in the United States that is accredited by the Commission on Accreditation of Athletic Training Education (CAATE). The primary mission of the Post-Professional Athletic Training Education Program is to educate and develop post-professionals to be leaders in the field of athletic training**.** The major objectives for students in the program are 1) to demonstrate excellence in evidence-based clinical practice, 2) to be able to evaluate and conduct clinical research, and**,** 3) to develop and enhance teaching skills in both the clinic and the classroom. We recruit graduate students who are Board of Certification certified athletic trainers who have distinguished themselves both academically and as highly competent clinicians. We provide the means for each graduate student to gain advanced knowledge and experience in prevention, evaluation, management, and rehabilitation of sport-related injuries through a combination of didactic lecture in the classroom, supervised practical application of this knowledge in a clinical setting, and a strong research experience oriented toward clinical practice. All students admitted to this program serve as Graduate Assistants teaching in the Lifetime Fitness Program and working as athletic trainers in the Department of Athletics.

Go to exss.unc.edu/graduate-programs/specializations/athletic-training for additional in-depth information.

Exercise Physiology

The mission of the exercise physiology specialization is to prepare individuals for careers in the wellness industry, including hospital and corporate fitness centers as well as clinical settings, or to pursue research careers in exercise physiology related fields. Students seeking a focus in fitness/wellness are provided the background, knowledge, testing skills, and practical experience to prescribe safe fitness/wellness programs in a variety of settings, as well as the knowledge to act as a liaison between the medical community and the layperson regarding the health implications of exercise. Students preparing for further advanced study in a Ph.D. program are provided in-depth understanding of how physiological constructs are applied to exercise and the environment, as well as an understanding of the research process. Concomitantly, the student develops laboratory techniques and skills. Many graduate students present their thesis research findings at national and regional meetings of the American College of Sports Medicine, and at other professional meetings or conferences. A minimum of 30 hours (excluding prerequisites) of graduate coursework is required.

Go to www.unc.edu/depts/exercise/exercise_physiology/index.htm for additional information.

Sport Administration

The mission of the sport administration specialization is "Integrating theory and practice to prepare graduate students for leadership positions in intercollegiate athletics." Based upon an innovative two year learning experience, the sport-administration cohort, comprised of a highly select and diverse group of students from across the United States, engages in both formal course work and intense practical experiences designed to prepare them for a college-sport administration career. During their first year, students are provided challenging coursework in administration, economics/finance, legal issues, sport marketing, governance and compliance, research methods/statistical analyses, and sport facility and event management. In addition, students engage in extensive "hands-on" event-operations experiences with the University of North Carolina (UNC) Athletic Department. During the second year, students complete a full-time, one-year internship in a functional area within the UNC Athletic Department and conduct a rigorous quantitative or qualitative-based research project. Thirty-two hours of graduate coursework are required.

Go to exss.unc.edu/graduate-programs/specializations/sport-administration for additional information.

Law and Sport Administration Dual Degree Program (J.D./M.A.)
The dual degree program provides an opportunity for students who are interested in both law and sport administration to earn both degrees over four years of study. Students benefit from a respected law curriculum, combined with a sport administration curriculum with a unique focus on intercollegiate athletics. There is a growing market in college athletics for professionals with both degrees. Graduates of the dual degree program may work in athletic compliance and enforcement at a university, conference office, or national governing body such as the National Collegiate Athletic Association (NCAA). Legal positions in athletic departments, fundraising and development, and at law firms that represent colleges and conferences are also likely. Students must be currently enrolled in their second year at the UNC–Chapel Hill School of Law to apply for the Law/EXSS dual degree program. Students will be responsible for paying tuition and fees separately to both the Law School & Graduate School. The M.A. in exercise and sport science must be completed prior to or simultaneously with completion of the J.D.

* Departmental Requirements – All Areas of Specialization

In addition to specialization course requirements, two classes in statistics and research methods (EXSS 700, 705), a comprehensive written examination on all coursework, and a thesis (EXSS 993) are required of all graduate students in the Department of Exercise and Sport Science.

Admission

The master's degree programs in exercise and sport science are open to individuals from differing backgrounds. However, the majority of past entrants into the program have earned undergraduate degrees in exercise science, kinesiology, physical education, or recreation/leisure studies. The department offers admission to the fall semester only, and does not admit non-degree-seeking students. Candidates should check with the department for admission information pertaining to their specific area of specialization.

Go to www.unc.edu/depts/exercise or gradschool.unc.edu/admissions/ for additional information.

Ph.D. Study

An interdisciplinary doctoral program in Human Movement Science is offered with the cooperative effort of the following departments at UNC–Chapel Hill: Allied Health Sciences—Division of Physical Therapy; Exercise and Sport Science; Biomedical Engineering; Physical Medicine and Rehabilitation; Orthopedics; and the Program on Aging.

This curriculum is designed to provide students an opportunity for doctoral study in areas that will increase knowledge of human movement performance. The program focuses on contributing to the scientific basis of human movement, developing theory and methods for maintaining health, preventing disability, and improving movement ability. Areas of concentration include 1) biomechanics of human movement, 2) physiology of human movement and 3) neuromuscular control of human movement.

Go to www.med.unc.edu for additional information.

Assistantships

The Department of Exercise and Sport Science awards a number of graduate assistantships annually to help fund students' education and to provide practical experiences related to their area of study. Assistantships may involve any of the following activities or combination of activities: exercise and fitness instructor, certified athletic trainer, athletic department assistant, recreation programmer, recreation research assistant, or teaching assistant in exercise and sport science. Students may apply for these assistantships by completing and returning the appropriate application form. Contact the executive assistant in the Department of Exercise and Sport Science for additional information at (919) 962-0018.

Courses for Graduate and Advanced Undergraduate Students
EXSS

408 Theory and Application of Strength Training and Conditioning for Fitness Professionals (3). Prerequisites, EXSS 175 and 276. This is an intermediate- to upper-level course designed to provide students with theoretical and practical knowledge of the physiological, biomechanical, functional, and administrative aspects of designing and supervising conditioning programs for various populations.

410L Exercise Testing (3). Prerequisites, EXSS 175, 276, and 376. This is an exercise testing laboratory course for hands-on training of methods and protocols for screening, evaluating, and prescribing exercise.

412 Exercise Prescription (3). Prerequisites, EXSS 175, 276, and 376. Introductory course in the theoretical basis of exercise prescription, enabling students to develop safe and effective exercise programs for healthy and at-risk populations.

478 Sports Performance Training (3). Prerequisites, EXSS 175 and 276. An upper-level course designed to provide students who have a fitness background with the theoretical and practical knowledge related to the Performance Enhancement Specialization for athletes of all ages.

479 Performance Enhancement Specialization for Health Professionals (1). Prerequisites, EXSS 175, 276, 366, and 368. An upper-level course designed to provide students who have a health profession background with the theoretical and practical knowledge related to the Performance Enhancement Specialization for athletes.

493 Field Experience in Sport Administration (1–3). Prerequisites, EXSS 221 and at least two of the following: 322, 323, 324, 326. Permission of the instructor for students lacking the prerequisites. This field experience offers implementation of theory and the practical application of sport administration in a sport organization worksite, under the direct supervision of a business professional.

593 Practicum in Physical Fitness and Wellness (1–2). Prerequisites, EXSS 220, 385, 408, 410L, and 412. Recommended preparation, EXSS 360–site dependent. Current CPR certification and student liability insurance is required. Introductory practical experience to enable student to apply knowledge and skills in a worksite under direct supervision of certified professionals.

693H Senior Honors Thesis (3). Prerequisite, EXSS 273. Required preparation, a cumulative grade point average of 3.2, and permission of the department. Directed independent research under the supervision of a faculty advisor who teaches in the exercise and sport science curriculum.

694H Senior Honors Thesis (3). Prerequisite, EXSS 273. Required preparation, a cumulative grade point average of 3.2, and permission of the department. Preparation of an honors thesis and an oral examination on the thesis.

Courses for Graduate and Advanced Undergraduate Students
RECR

420 Program Planning in Recreation Services (3). This experiential course covers the concepts and skills used in program planning. Students apply their program planning skills to real-life situations and implement a recreation program for a community agency.

430 Introduction to Leadership and Group Dynamics (3). An analysis of the techniques, methods, and motives of group and community leaders. Special attention is focused upon the roles of organizational structure, personnel policies, and in-service training programs.

440 Outdoor Recreation and Environmental Issues (3). A survey course taught from a psychosocial perspective addressing the roles of public and private agencies in meeting increased demand for outdoor recreation. Emphasizes the implications of environmental awareness on outdoor recreation.

470 Recreation and Leisure across the Lifespan (3). An analysis of aspects that affect recreation and leisure behavior from birth to death, with a focus on issues associated with race, class, gender, sexual identity, and disabling conditions.

475 Disability, Culture, and Therapeutic Recreation (3). An examination of disability from a cultural perspective with the application of theoretical and scientific knowledge to provide recreation interventions that facilitate participation in life by individuals with disabilities.

676 Clinical Skills in Therapeutic Recreation (3). Development of helping skills for the practice of therapeutic recreation emphasizing rationale, techniques, and role responsibilities of therapeutic recreation in the area of leisure education. A 20-hour practicum is required.

677 Disabling Conditions and the Practice of Therapeutic Recreation (3). Prerequisites, RECR 475 and 676. Instruction in the relationship between various disabling conditions and the practice of therapeutic recreation. A 24-hour practicum is required.

691H Honors in RECR (3). Special studies for undergraduates. Intensive study on a particular topic under the supervision of a qualified member of the staff. For RECR majors, with special permission of the faculty members involved and the director of undergraduate studies.

692H Honors in RECR (3). Honors project in recreation. The completion of a special project, approved by the department, by a student who has been designated a candidate for undergraduate honors. The second of a two-course honors sequence.

Courses for Graduate Students

EXSS

700 Applied Statistics and Research Methods in Exercise and Sport Science (3). Required preparation, undergraduate statistics course. Applied statistical analysis - interpretation of data from exercise and sport science. Emphasis: choosing method of analysis, using statistics software to run analyses. Major topics: experimental and nonexperimental research design, sampling, hypothesis testing, power calculation, t-tests, ANOVA, correlation, simple and multiple regression, and chi square.

705 Applied Statistics and Research Methods Laboratory (3). Required preparation, any undergraduate statistics course. Builds heavily upon material presented in EXSS 700. Planning, conducting, and reporting of research. Thesis writing and writing for publication. Problem-solving and practical experience in applied statistical analysis, interpretation, and presentation of data from the field of exercise and sport science.

730 Management of Athletic Injuries (3). Permission of the instructor for nonmajors. Designed to provide basic knowledge and skills that aid in the prevention and treatment of injuries common to athletics.

732 Human Anatomy for Athletic Trainers (4). Graduate standing in exercise and sport science or permission of the instructor. The study of gross human anatomy, with emphasis on the functional and clinical aspects of the neck, back, and extremities as related to athletic injuries.

733 Psychological Considerations for Injury and Rehabilitation (3). Athletic training graduate students only. Psychological impact of injury and rehabilitation on the injured athlete. Stress from injury, coping skills for the rigors of rehabilitation, and the improvement of communication skills in order to better the relationship between the athletic trainer, the injured athlete, and the injured athlete's coach.

735 Sports Medicine Analysis: Special Problems Related to Sports Medicine (3). Permission of the instructor for nonmajors. Problem and research oriented.

736 Clinical Methods in Athletic Training (3). Prerequisite, EXSS 730. Analysis of theories and techniques used in clinical sports medicine settings.

737 Advanced Muscular Assessment and Treatment (3). Prerequisites, EXSS 730, 732, and 736. Permission of the instructor. Discussion of mechanical properties and healing of musculoskeletal tissues throughout the life cycle, and laboratory/seminar units concerned with assessment and treatment of musculoskeletal pathology.

738 Laboratory Techniques in Sports Medicine (3). This course provides an introduction to measurement techniques used in sports medicine/athletic training research. Course meetings involve lecture and laboratory sessions which encompass data collection, analysis, and interpretation techniques.

739 Practicum in Athletic Training (3). Graduate standing in exercise and sport science or permission of the instructor. The implementation of theories and practices in a professional setting under the direction of a competent practitioner.

740 Administration of Sport (3). Permission of the instructor for nonmajors. Policies and problems of organization and administration of athletic programs in colleges.

742 Social Issues in Exercise and Sport (3). A comprehensive study of race and gender discrimination, adherence, value development, violence, and other socialization factors in youth, collegiate, and Olympic sport.

744 Collegiate Sport Marketing (3). Graduate standing required. This course is designed to develop a thorough understanding of sport marketing principles and their application to collegiate athletics.

746 Organizational and Financial Management of Sport (3). Graduate standing in exercise and sport science or permission of the instructor. The study of administrative structures and financial concerns of collegiate athletic programs. An intensive study of NCAA regulations is included.

747 College Sport Facility and Event Management (3). This course provides students with necessary knowledge and skills to manage college-sport facilities and plan a complete sport event. Students also evaluate facility functions related to risk and event management.

748 Legal Issues in Collegiate Sport (3). Provides an introduction to the United States legal system, legal principles, and legal issues related to intercollegiate athletics.

749 NCAA Governance and Compliance (3). Prerequisite, EXSS 740. The implementation of theories and practices in a professional setting under the direction of a competent practitioner.

750 Sport Administration Leadership Seminar I (1). Successful completion of first year in sport administration graduate program. An introduction of organizational leadership concepts in a practical applied context. Students will lead class discussion tying relevant current events with leadership theory.

751 Sport Administration Leadership Seminar II (1). Successful completion of first year in sport administration graduate program. An introduction of organizational leadership concepts in a practical applied context. Students will lead class discussion tying relevant current events with leadership theory.

770 Motor Learning (3). Prerequisite, EXSS 380. Permission of the instructor. A study of the physical and psychological factors that influence skill acquisition and performance in sport and exercise, including applications to teaching and coaching.

780 Physiology of Exercise (3). Prerequisite, EXSS 276 or 376. The study of the physical, biochemical, and environmental factors that influence human performance. Emphasis is placed on metabolic, cardiovascular, respiratory, muscular, and endocrine systems. Three hours of lecture and two hours of laboratory per week.

781 Clinical Exercise Prescription and Testing (2-3). Prerequisite, EXSS 376 or 410L. Permission of the instructor for students lacking the prerequisite. Students who take EXSS 410L must pass with B or equivalent. This course concentrates on the knowledge and skills necessary for providing exercise testing and prescription in the clinical setting, emphasizing cardiac rehabilitation.

782 Nutritional Aspects of Exercise (2-3). Graduate standing in physical education or permission of the instructor. Exploration of the role of macronutrients and micronutrients as they apply to exercise, physical conditioning, and competition. Students obtain experience in dietary analysis as it applies to athletic populations.

783 Assessment of Physiological Functions in Exercise (3). Prerequisite, EXSS 780. Permission of the instructor. Designed to develop laboratory techniques and experimental design skills as applied to the physiology of human performance.

784 Advanced Topics in Exercise Physiology (3). Required preparation, completion of a graduate level exercise physiology course. Graduate standing required. This course deals with current and rapidly developing aspects of the exercise physiology field. Specifically enhancing and adding to the content area of basic physiology acquired in EXSS 780.

785 Seminar in Exercise Physiology (3). Graduate standing in exercise and sport science or permission of the instructor. In-depth study of selected advanced topics in exercise physiology. Emphasis on metabolism, biochemical, and cardiorespiratory physiology, with student presentations on selected topics.

789 Practicum in Exercise Physiology (3). Prerequisite, EXSS 410L, 780, or 781. Permission of the instructor for students lacking the prerequisite. The implementation of theories and practices of fitness or cardiac rehabilitation in a professional setting under the direction of an experienced practitioner.

890 Special Topics in Exercise and Sport Science (1–3). Graduate standing or permission of the instructor. The study of special topics directed by an authority in the field.

990 Research in Exercise and Sport Science (1–3). Graduate standing in exercise and sport science or permission of the instructor. Individually designed research projects conducted by students under the direction of a graduate faculty member.

993 Master's Thesis (3–6).

Graduate Recreation Degree Course Work
RECR

710 Leisure and Organized Recreation in the United States (3). An analysis of the scope of leisure research, recreation services, the evolution of leisure and of individual recreation behavior.

770 Administration of Therapeutic Recreation Services (3). Emphasis on information specific to the administration of therapeutic recreation such as fiscal management, quality assurance, evaluation, marketing of therapeutic recreation, and other general administrative topics.

775 Principles and Procedures in Therapeutic Recreation (3). A study of the existing practices and principles of therapeutic recreation. An in-depth treatment of assessment/evaluation, goal setting and individualized planning, documentation, leisure counseling, and clinical skills.

790 Independent Field Study (3). Permission of the department. May be repeated for credit.

830 Managing Organizational Behavior in Recreation Services (3). This course addresses organizational behavior and theory to promote insight into micro and macro issues confronting professionals in organized recreation services.

865 Issues and Trends in Recreation Management (3). A seminar to involve graduate recreation students in in-depth analyses of selected topics, issues, and problems relevant to the recreation management in public and not-for-profit leisure service organizations.

876 Issues and Trends in Therapeutic Recreation (3). An analysis of selected issues, problems and concerns in the provision of therapeutic recreation and inclusive recreation services.

880 Internship in Recreation Administration (2). Participation in full-time, practical on-the-job experience in a recreational agency of the student's choice.

881 Internship in Recreation Administration (2). Completion of a professional project and in-depth paper reflecting the outcomes of the internship completed in RECR 880

890 Seminar in Leisure Studies (3). A survey of contemporary views of society and their structures and functions, as they relate to concepts of leisure and recreation behaviors.

950 Recreation Research Design and Methods I (3). An appraisal of current recreation and leisure research design using both quantitative and qualitative data. Students complete and deliver a formal research proposal.

951 Recreation Research Design and Methods II (3). Prerequisite, RECR 950. Required preparation, any statistics course. Students analyze quantitative and qualitative data and apply their work to theory and practice. Students complete the research proposed in RECR 950.

993 Master's Thesis (3–6).

Curriculum in Genetics and Molecular Biology

gmb.unc.edu
JEFF SEKELSKY, *Director*

Professors

Albert S. Baldwin, Regulation of Gene Expression, Control of Oncogenesis and Apoptosis
Victoria Bautch, Molecular Genetics of Blood Vessel Formation in Mouse Models
Kerry S. Bloom, Mechanisms of Chromosome Segregation in Yeast, Chromosome and Spindle Dynamics
Patrick Brennwald, Examination of Problems in Membrane Trafficking and Cell Polarity Using Genetics
Adrienne D. Cox, Ras Family Oncogenes and Signaling, Cellular Radiation Response, Lipid Modification and Drug Development

Stephen T. Crews, Neurogenomics and Developmental Neuroscience, Cell Migration and Fusion, Brain Development and Behavior
Blossom Damania, Viral Oncogenes, Signal Transduction, Transcription and Immune Evasion of KSHV/RRV
Jeffery L. Dangl, Plant Disease Resistance and Cell-Death Control, Plant Genomics, Bacterial Pathogenesis and Genomics, Type III Secretion Systems
Channing J. Der, Oncogenes, Ras Superfamily Protein, Signal Transduction
Dirk P. Dittmer, Anti-Lymphoma Therapies
Bob Duronio, Genetics of Cell-Cycle Control during Drosophila Development
Beverly J. Errede, Yeast Molecular Genetics, MAP-Kinease Activation Pathways, Regulation of Cell Differentiation
Eric T. Everett, Genetics of Acquired and Congenital Disorders of Craniofacial Development
Rosann A. Farber, Cancer Genetics, Human Molecular Genetics, Somatic-Cell Genetics, Microsatellite Instability
Bob Goldstein, Generation of Cell Diversity in Early Development of C. Elegans
Jack D. Griffith, HIV, Transcription, Electron Microscopy
Joseph Kieber, Molecular Genetic Analysis of Hormone Signaling in Arabidopsis
Nobuyo Maeda, Genetics Modeling of Atherosclerosis in Mice
Terry Magnuson, Mammalian Genetics, Epigenetics, Genomics
William F. Marzluff, Regulation of RNA Metabolism in Animal Cells
A. Gregory Matera, Biogenesis of Small Ribonucleoproteins in Health and Disease
Steven W. Matson, Biochemistry and Genetics of DNA Helicases from E. coli and Yeast
Deborah O'Brien, Molecular Regulation of Mammalian Spermatogenesis and Fertilization
Fernando Pardo-Manuel de Villena, Meiotic Drive, Chromosome Segregation, Non-Mendelian Genetics
Leslie V. Parise, Adhesion Receptors and Signaling in Platelets, Sickle Cells and Cancer
Charles Perou, Genomic and Molecular Classification of Human Tumors to Guide Therapy
Mark Peifer, Cell Adhesion, Signal Transduction and Cancer
Daniel Pomp, Genetic Architecture of Complex Trait Predisposition
Patricia J. Pukkila, Molecular Mechanisms of Chromosome Pairing and Meiosis
Dale Ramsden, V(D)J Recombination, DNA Double Strand Break Repair
R. Jude Samulski, Development of Virus-Based Delivery Systems for Use in Human Gene Therapy
Aziz Sancar, Structure and Function of DNA Repair Enzymes, Biological Clock
Jeff J. Sekelsky, Genetics of Genome Instability in Drosophila
Norman E. Sharpless, Tumor Suppressor Genes, Genetics of Cancer and Aging
Lishan Su, T Cells during Normal and Pathogenic Hematolymphopoiesis
Patrick Sullivan, Complex Traits in Humans, Psychiatric Genetics, Pharmacogenetics, Twin Studies, Schizophrenia, Major Depression, Nicotine Dependence
Ronald I. Swanstrom, Retroviruses, Molecular Biology of the AIDS Virus
Jenny P. Ting, Transcriptional Regulation of Eukaryotic Genes, Discovery of New Genes in Inflammation and Apoptosis, Functional Genomics and Application to Immunologic and Neurologic Diseases, Chemotherapy, Signal Transduction and Cell Death
Bernard E. Weissman, Tumor Suppressor Genes, Cancer Genetics
Ellen R. Weiss, Regulation of G-Protein-Coupled Receptor Signal Transduction Pathways
Kirk Wilhelmsen, Genetic Mapping, Neurodegenerative Diseases
Yue Xiong, Cancer Biology, Mammalian Cell Cycle, Tumor Suppressor Genes
Yanping Zhang, Genetics and Mechanisms of Cancer Cell Growth and Division
Yi Zhang, Chromatin Dynamics, Gene Expression, Cancer

Associate Professors

Shawn Ahmed, Telomere Replication and Germline Immortality in C. Elegans
Jay Brenman, Neuronal Dendrite Development Using Drosophila Genetics
Christina Burch, Experimental Evolution in Microorganisms
Kathleen Caron, Genetically Engineered Animal Models in the Study of Human Disease
Frank L. Conlon, Mesodermal Patterning and Heart Development, T-Box Genes
Jeanette Gowen Cook, Integrating DNA Replication Control with Checkpoint Signaling
Gregory P. Copenhaver, Regulation of Meiotic Recombination in Higher Eukaryotes
Sarah R. Grant, Plant-Pathogen Interactions with a Focus on Bacterial Virulence
Mark Heise, Genetics of Arbovirus Virulence and Immune Evasion
Corbin D. Jones, Population Genetics and Evolution in Drosophila
Tal Kafri, HIV-I Vectors for Gene Therapy and Functional Genomic Applications, and as a Means to Study Basic HIV-1 Biology
Beverly H. Koller, Generating Animal Models of Human Diseases
Ethan Lange, Complex Disease Models, Statistical Genetics
Leslie Lange, Genetics of Complex Diseases, Chronic Inflammation, Cardiovascular Disease and Asthma
Karen L. Mohlke, Human Genetics and Genomics, Diabetes, Complex Diseases
W. Kimryn Rathmell, Genetics of Renal Cell Carcinoma
Jason W. Reed, Plant Development, Auxin Signaling, Light Responses
Steve Rogers, Functional Genomics of Cytoskeletal Organization
Lillie L. Searles, RNA Processing Control in Drosophila, Developmental Genetics
Brian Strahl, Histone Modifications and Gene Regulation
Eleni Tzima, Mechanisms of Vascular Endothelial Cell Signaling and Angiogenesis in Response to Hemodynamic Stimuli
Cyrus Vaziri, Integration of DNA Replication and Repair
Todd Vision, Genome Evolution and the Architecture of Complex Traits
Jen Jen Yeh, Study of Therapeutic Targets for the Treatment of Pancreatic and Colorectal Cancer

Assistant Professors

Aravind Asokan, Synthetic Virology and Vector Development for Human Gene Therapy
Brian Bennett, Genetic modeling of atherosclerosis and nutrigenomics
Jonathan Berg, Clinical adult and cancer genetics
Scott Bultman, Mouse Models of Human Disease, Chromatin-modifying factors, Epigenetics
Ian Davis, Mechanisms of Transcription Factor Deregulation in Cancer Development
Mara Duncan, Membrane Trafficking Defects and their Effect on Cancer and the Immune System
Folami Ideraabdullah, Genetics, toxicants and nutrition: Role of gene-environment interactions in epigenetic gene regulation during development

Jonathan Juliano, Malaria Drug Resistance, Diversity and Population Evolution
Samir Kelada, Genetics and genomics of environmentally induced asthma
William Kim, Exploration of the Role of Hypoxia-Inducible Factor in Tumorigenesis
C. Ryan Miller, Preclinical Experimental Therapeutics and Biomarker Research in Gliomas
Kristy Richards, Cancer Biology, Genetics, Genomics, Molecular Biology, Translational Medicine
Praveen Sethupathy, Genomic Approaches to Investigating Gene Regulatory Mechanisms Underlying Human Metabolic Disorders
Kevin Slep, Regulators of Cytoskeletal Dynamics
Lisa Tarantino, Genetic mapping of complex behavioral traits
Zefeng Wang, Post-Transcriptional Gene Regulation, RNA Splicing, and Splicing-Related Diseases

The Curriculum in Genetics and Molecular Biology is an interdepartmental predoctoral training program leading to a Ph.D. degree in genetics and molecular biology. The goal of this program is to train students to be creative, sophisticated research scientists within the disciplines of genetics and molecular biology. To this end, we emphasize acquisition of a foundation of knowledge, accumulation of the laboratory skills required for implementing research objectives, and development of the ability to formulate experimental approaches to solving contemporary problems in the biological sciences. During their first year, students enroll in graduate-level courses and participate in laboratory rotations. Subsequently, students select a faculty research advisor and establish an advisory committee. Research work is done in the laboratory facilities of the individual faculty member and is supported primarily by faculty research grants.

The curriculum faculty have appointments in 13 departments in the School of Medicine, the School of Dentistry, and the College of Arts and Sciences. The faculty represent diverse research interests that use the tools of genetics, molecular biology, and biochemistry to address fundamental questions in the areas of cell cycle regulation, chromosome structure, development and disease models, DNA repair and recombination, genome stability, evolutionary genetics, genomics, human genetics, neurobiology, pathogens and immunity, signal transduction, transcription and gene regulation and virology. Students are able to choose from a variety of biological systems and questions for their thesis research.

Requirements for Admission for Graduate Work

Applications from students with good academic records and interest in research careers in genetics and molecular biology are favorably considered. Applicants preferably have majored or minored in one of the following disciplines: genetics, biology (zoology or botany), microbiology, chemistry, mathematics, physics or biophysics. They usually have taken calculus and organic and physical chemistry, although these are not essential. Applicants are accepted to begin their initial studies in the fall. They must apply to the program through a unified application program known as the Biological and Biomedical Sciences Program (BBSP). Students apply for graduate study in the biological or biomedical sciences at UNC–Chapel Hill. Students interested in any of the BBSP research areas apply to BBSP and those whose application portfolio places them highest on the admission list are asked to visit Chapel Hill for interviews. Students who are ultimately admitted to UNC make no formal commitment to a Ph.D. program. After completing their first year of study students leave BBSP and join a thesis lab and matriculate into one of 13 participating Ph.D. programs. During their first year BBSP students are part of small, interest-based groups led by several faculty members. These groups meet frequently and provide a research community for students until they join a degree granting program. The application consists of Graduate Record Examination (GRE) scores, transcripts of records, three letters of recommendation, and a statement of purpose, all submitted through the Web-based application system of The Graduate School. Students are encouraged to apply as early as possible, preferably before December 1. (Applicants seeking a master's degree are not considered for admission.)

Requirements for the Ph.D. Degree

In addition to the dissertation requirements of The Graduate School (four full semesters of credit including at least six hours of doctoral dissertation; a written preliminary examination, an oral examination, and a dissertation), students in the Curriculum in Genetics and Molecular Biology must meet the following requirements: complete four didactic courses (two of which are required: GNET 621, GNET 631 OR GNET 632, and one or two additional courses which can be selected from a wide variety of options, one seminar course in which at least one-third of the final grade is based upon class participation, act as a teaching assistant for one semester; participate in a student seminar series as an attendee until the oral exam requirement is completed and then as a presenter in the later years; participate in the curriculum's retreat and attend the weekly seminar series sponsored by the curriculum and the Carolina Center for Genome Sciences. Students are required to rotate through at least three laboratories before choosing a thesis advisor. It is strongly recommended that students attend national meetings in order to better understand how their research fits with progress in their field.

Financial Aid

Stipends for predoctoral students are available from an NIH predoctoral training grant and from the University. Tuition, student fees, and graduate student health insurance are also covered by the training grant and the University.

Courses for Graduate and Advanced Undergraduate Students

GNET

425 Human Genetics (BIOL 425) (3). See BIOL 425 for description.

621 Principles of Genetic Analysis I (BIOL 621) (3). See BIOL 621 for description.

622 Principles of Genetic Analysis II (BIOL 622) (4). Prerequisite, BIOL 621. Principles of genetic analysis in higher eukaryotes; genomics.

623 Developmental Genetics Seminar (1). Permission of the instructor. Presentations of current research or relevant papers from the literature on development by students will be followed by open forum discussion of relevant points, and critique of presentation skills. Two hours per week.

624 Developmental Genetics (BIOL 624) (3). See BIOL 624 for description.

625 Seminar in Genetics (BIOL 625) (2). See BIOL 625 for description.

631 Advanced Molecular Biology I (BIOC 631, BIOL 631, MCRO 631) (3). Required preparation for undergraduates, at least one undergraduate course in both biochemistry and genetics. DNA structure, function, and interactions in prokaryotic and eukaryotic systems, including chromosome structure, replication, recombination, repair, and genome fluidity. Three lecture hours a week.

632 Advanced Molecular Biology II (BIOC 632, BIOL 632, MCRO 632) (3). Required preparation for undergraduates, at least one undergraduate course in both biochemistry and genetics. The purpose of this course is to provide historical, basic, and current information about the flow and regulation of genetic information from DNA to RNA in a variety of biological systems. Three lecture hours a week.

635 Clinical and Counseling Aspects of Human Genetics (BIOL 529) (3). Prerequisite, BIOL 425 or GNET 634. Permission of the instructor. Topics in clinical genetics including pedigree analysis, counseling/ethical issues, genetic testing, screening, and issues in human research. Taught in a small group format. Active student participation is expected.

636 Elements of Probability and Statistical Inference I (BIOS 550) (4). See BIOS 550 for description.

641 Bioinformatics: A Practical Introduction (4). This course provides an introduction to basic genome informatics, including genome databases, sequence analysis, gene expression analysis, protein structural analysis, and managing the scientific literature.

645 Quantitative Genetics of Complex Traits (1). Prerequisite, GNET 621. Students will learn about various topics that form the basis for understanding quantitative genetics of complex traits with biomedical and agricultural relevance. The ultimate goal of quantitative genetics in this postgenomic era is prediction of phenotype from genotype, namely deducing the molecular basis for genetic trait variation.

646 Principles and Experimental Approaches of Mammalian Genetics (1). This course will focus on the laboratory mouse as a model organism to learn fundamental genetic concepts and understand how state-of-the-art experimental approaches are being used to elucidate gene function and the genetic architecture of biological traits.

647 Human Genetics and Genomics (1). The course covers principles and modern approaches of human genetics and genomics, including human genetic variation, linkage, genome-wide association analysis, sequencing for variant discovery in monogenic and complex diseases, regulatory variation, the molecular basis of human disease, and functional validation of disease variants.

655 Issues in Human Genetics (1). This course will provide an overview of methods in human genetics during the critical reading of selected literature and work of speakers that will present in the Friday Seminar Series.

675 Computational Genetics (1). A course on systems genetics focused on student participation and the development of targeted multidisciplinary responses to genetic questions.

680 Modeling Human Diseases in Mice (1). Permission of the instructor. This course will provide an overview of the use of the mouse as an experimental model for determining factors, both genetic and environmental, that contribute to human diseases. One seminar hour a week.

Courses for Graduate Students

GNET

701 Genetic Lecture Series (1). Open to genetics students only. Diverse but current topics in all aspects of genetics. Relates new techniques and current research of notables in the field of genetics.

702 Student Seminars (1). Required of all candidates for the degree in genetics. A course to provide public lecture experience to advanced genetics students. Students present personal research seminars based on their individual dissertation projects. Lectures are privately critiqued by fellow students and genetics faculty.

703 Student Seminars (1). Required of all candidates for the degree in genetics. A course to provide public lecture experience to advanced genetics students. Students present personal research seminars based on their individual dissertation projects. Lectures are privately critiqued by fellow students and genetics faculty.

742 Introduction to UNIX and Perl Programming for Biomedical Data Analysis (1). This module will introduce UNIX and Perl programming. It is mainly targeted towards biomedical scientists who would be able to use Perl to analyze, transform, and manage large datasets.

743 Introductory Statistical Analysis in R for Biomedical Scientists (1). This module will introduce the data analysis environment R and use it to illustrate basic concepts in data manipulation, plotting of complex data, and basic statistical modeling. Class examples will be general and will aim to build familiarity and confidence with R and data analysis.

744 Biological Sequence Analysis, Protein-Structure, and Genome-Wide Data (1). This module provides an introduction to basic protein structure/function analyses combining sequence informatics and macromolecular structure. In the second half the focus will switch to analysis of genome-wide datasets and methods used for the analysis of such "big data."

750 Genomics of Complex Human Disease (2). Human complex diseases are major focus in human genomics. They have important genetic components, but inheritance is probabilistic and not deterministic. This graduate seminar will cover the main approaches (genome-wide association, next-generation sequencing, and structural variation in case-control and pedigree studies) and current knowledge in the main disease areas.

850 Training in Genetic Teaching (3). Required preparation, two courses in genetics. Permission of the instructor. Principles of genetic pedagogy. Students are responsible for assistance in teaching genetics and work under the supervision of the faculty, with whom they have regular discussion of methods, content, and evaluation of performance.

905 Research in Genetics (BIOL 921) (1–21). May be repeated for credit.

993 Master's Thesis (3–21). Permission of the department. Students are not accepted directly into the M.S. program.

994 Doctoral Dissertation (3–21).

Department of Geography

www.unc.edu/depts/geog
MICHAEL EMCH, *Chair*

Professors

Lawrence E. Band (21) Voit Gilmore Distinguished Professor. Geographic Information Systems (GIS), Hydroecology, Geomorphology

Stephen S. Birdsall (5) Cultural Landscapes, North America

Michael Emch (29) Medical Geography, Spatial Epidemiology, Health and Environment, Geographic Information Systems (GIS), Remote Sensing

John Pickles (26) Earl N. Phillips Distinguished Chair of International Studies. International Studies, Regional Development, Geographic Thought, Political Economy

Stephen J. Walsh (12) Lyle V. Jones Distinguished Professor. Remote Sensing, Geographic Information Systems (GIS), Physical

Associate Professors

Altha J. Cravey (17) Latin America, Social
Banu Gökariksel (28) Urban, Cultural, and Feminist Geography; Social Theory; Globalization and Modernity; the Middle East and Southeast Asia
Charles E. Konrad (16) Synoptic Climatology and Meteorology
Scott L. Kirsch (23) Historical and Political Geography; Science, Technology and Environment
Aaron Moody (18) Geographic Information Systems (GIS), Biogeography
Elizabeth Olson (41) Development and Inequality, Religion, Global Studies, Moral Geographies
Conghe Song (24) GIS, Remote Sensing, Earth Systems Science

Assistant Professors

Xiaodong Chen (38) Human-environment Interactions, Systems Modeling and Simulation, Environmental Policy, GIS, China
Clark Gray (35) Population, Environment and Development; Survey and Statistical Methods
Elizabeth Havice (36) Political Economy and Ecology, International Development, Commodity Studies, Environmental Politics, Trade Politics, Fisheries Systems
Christian Lentz (39) Development, State Formation, Nationalism, Nature-Society Relations, Agrarian Studies, Southeast Asia
Nina Martin (31) Urban, Economic and Migration Geography, Globalization and Urban Change, Urban Planning and Policy, Civil Society
Lauren Persha (40) Conservation and Development, Social-Ecological Systems, Institutional Analysis, Environmental Governance, Forest Ecology, Political Ecology, East Africa
Alvaro Reyes (37) Urban and Political Geography, Regimes of Racialization and Socio-Territorial Movements in the Americas, and Critical Theory
Sara Smith (33) Political and Social Geography, Nationalism, Health, South Asia
Erika Wise (34) Dendrochronology, Climatology, Water Resources
Gabriela Valdivia (32) Political Ecology, Indigenous Communities, Latin America

Adjunct Faculty

Richard Bilsborrow (Biostatistics), Demography, Development and the Environment, Environment and Society, Research Methods
Barbara Entwistle (Sociology), Social Demography, Methods of Social Research, Population and Environment
Arturo Escobar (Anthropology), Ecological Anthropology, Social Movements, Political Ecology, Latin America, Complexity
Lawrence Grossberg (Communications Studies), Cultural Studies, Modern and Contemporary Philosophy, Popular Music (Rock Culture) and Popular Culture, Contemporary Political Culture of the United States
Carlos Mena (Universidad San Francisco de Quito, Ecuador) GIS, Latin America, Population Environment, Remote Sensing, Dynamic Modeling
Diego Quiroga (Universidad San Francisco de Quito, Ecuador) Environmental Life and SciencesMichael WelshZambia Country Director, Family Health International), delivery of comprehensive HIV/AIDS services.

Professors Emeriti

David G. Basile
Clyde E. Browning
John D. Eyre
John W. Florin
Wilbert M. Gesler
Richard J. Kopec
Melinda Meade
Peter J. Robinson
Thomas M. Whitmore

The Department of Geography offers advanced work leading to the master of arts and doctor of philosophy degrees. Both the M.A. and Ph.D. degrees are offered, but the major emphasis of the program is on the Ph.D., even for those not yet possessing an M.A. Incoming students are roughly evenly mixed between those with and without a master's degree.

The Department of Geography has faculty strength in five overlapping areas of concentration. These represent areas of active faculty research and coherent foci—not mutually exclusive territories. Indeed, many students and faculty work on projects that span more than one area. So, while intensive training is offered in a number of diverse areas, the program is noted for its integrative and cross-cutting approach. The department's diverse graduate students are pursuing a wide variety of research at UNC–Chapel Hill.

Departmental research specializations include:

Biophysical Geography and Earth Systems Science. Here the biophysical environment is examined as an integrated system emphasizing the linkages and feedbacks between terrestrial and atmospheric form and function. The focus is on the interactions between the structure and composition of the earth's surface, its soils and vegetation, and the atmosphere with those processes that actively cycle energy and material through them.

Geographic Information and Analysis. Here geographic information sciences are applied as an integrated set of spatial digital technologies including tools, techniques, concepts, and data sets associated with geographic information systems, remote sensing, data visualization, global positioning systems, spatial analysis, and quantitative methods.

Nature-Society Studies and Human-Environment Interactions. Drawing on analytical and theoretical perspectives from ecology, sociocultural processes and values, political ecology, science studies, and cultural ecology, UNC–Chapel Hill geographers focus on geographies of environmental change, the political-economic and social contexts of environmental change, human uses of the environment, and the consequences of such uses.

Social Spaces. Here UNC–Chapel Hill geographers examine cultural geographies of people, places, regions, landscape and resources, space, identity, and representation; social geographies of race, space, gender, urban and community dynamics, rural landscapes and regional change, health, migration, inequality, and social movements; economic geographies of agrarian and industrial change, science, technology and regional change, post-socialism, political economy, and globalization and international development; and political geography, geopolitics, and political ecology.

Globalization and International Development. Here UNC–Chapel Hill geographers study the consequences of the processes of globalization (and the anti-globalization and global justice movements they have stimulated) that are reshaping the geographies of international and local capital, labor, technology, information, goods and services, and the post-war Fordist geographies of economic, social, and political life in the United States and globally.

Graduate students in the department participate in most departmental governance activities and maintain their own organization, the Graduate Association of Geography Students (GAGS). UNC–Chapel Hill professional and graduate students also have an active campus-wide organization. Graduate students have access to extensive research and

computing facilities within the department and across campus, and many of our students are involved in specialized departmental research groups. Students and faculty have strong ties to other departments and research centers at UNC–Chapel Hill, including the Carolina Population Center, the Odum Institute for Research in Social Science, the Institute of Latin American Studies (UNC–Chapel Hill and Duke University), the Sheps Center for Health Services Research, the Curriculum in Ecology, the Center for Urban and Regional Studies, the Carolina Environmental Program and UNC–Chapel Hill's schools of public health and medicine. There are also opportunities for course work and research associated with nearby Duke University and North Carolina State University. Many students also take advantage of the government and private research facilities in Research Triangle Park.

Incoming graduate students are required to complete three core courses (GEOG 702, 703, and 704) presenting the foundations of geographical theory, communication, and research. Thereafter the program of study is flexible and tailored to the needs of the individual student. Students select the appropriate course work and dissertation topic in consultation with their advisor and research committee.

A large proportion of graduate students receive financial assistance. Sources of aid include teaching assistantships and work on sponsored research projects within the department, University-wide competitive assistantships, nonservice fellowships and merit scholarships, and externally awarded fellowships.

The department occupies the top two floors of newly renovated Saunders Hall and has access to extensive computational laboratories needed to fulfill its research and teaching mission, with specialized facilities dedicated to spatial analysis and the use of geographic information systems. A wide range of geographic data sets are readily available. An extensive collection of geographic books and periodicals, including an exceptionally strong collection of foreign periodicals, is held in the nearby Davis Library, while Wilson Library houses a large map library.

Courses for Graduate and Advanced Undergraduate Students

GEOG

404 Atmospheric Processes II (ENST 406) (4). See ENST 406 for description.

410 Modeling of Environmental Systems (3). Uses systems theory and computer models to understand ecosystem energy and matter flows, such as energy flow in food webs, terrestrial ecosystem evapotranspiration and productivity, related to climate, vegetation, soils, and hydrology across a range of spatial and temporal scales.

412 Synoptic Meteorology (3). Prerequisite, GEOG 110 or 111. An analysis of synoptic weather patterns and the processes responsible for them. Climatological aspects of these weather patterns are emphasized. (EES)

414 Climate Change (3). An investigation of the physical processes that produce and change climates across space and time. Emphasis is placed on recent and predicted patterns of climate change.

416 Applied Climatology: The Impacts of Climate and Weather on Environmental and Social Systems (3). Applied climatology involves the interdisciplinary application of climate data and techniques to solve a wide range of societal and environmental problems. This projects-based course investigates how climate impacts a range of sectors, including water resources, urban environments, ecosystems, and human health.

419 Field Methods in Physical Geography (3). Involves evaluation of landscapes by examining nature and biophysical elements influencing landscape form and function. Course emphasizes data collection, analysis, and interpretation using GIS and field methods. (EES)

420 Fundamental Concepts of Human Geography (3). A systematic study of the approaches, key concepts, and methods of human geography. Emphasizes the cultural landscape and location analysis within a thematic rather than a regional framework. (Core)

423 Social Geography (3). A study of the spatial components of current social problems, such as poverty, race relations, environmental deterioration and pollution, and crime. (GHA)

424 Geographies of Religion (3). This course considers the theoretical and empirical dimensions of religion from a geographical perspective. The course introduces the key theories linking space, place, and religion and helps students apply these new theoretical tools to examine some of the pressing issues in the contemporary study of religion.

428 Urban Social Geography (3). Studies the changing landscapes of contemporary urbanism. Emphasis on patterns of economic development, housing, and infrastructure in cities in a global context. (GHA)

430 Global Migrations, Local Impacts: Urbanization and Migration in the United States (3). This course explores the relationship between patterns of urban development in the United States and migration, in both historical and contemporary contexts.

434 Cultural Ecology of Agriculture, Urbanization, and Disease (3). Examines the role of the interactions of cultures, environments, and human diseases in the quest for sustainable agriculture by examining the cultural ecology of agriculture systems and their human diseases. (GHA)

435 Environmental Politics (3). This course brings geographical perspectives on place, space, scale, and environmental change to the study of environmental politics. In lectures, texts, and student research, students examine topics including environmental health risks, globalization and urban environments, and the role of science in environmental politics. (GHA)

436 Governance, Institutions, and Global Environmental Change (3). Prerequisite, GEOG 112. Permission of the instructor for students lacking the prerequisite. Interdisciplinary course for advanced undergraduates and graduate students. Focuses on multiscale environmental issues and related social, institutional, governance, and policy challenges. Examines key concepts and theories involving global environmental change and problem-solving efforts.

440 Earth Surface Processes (GEOL 502) (3). Prerequisite, GEOG 110. This course will focus on the processes of soil formation, erosion, and landform evolution with an emphasis on the interaction of geomorphic processes with surface hydrology and ecosystems. (EES)

441 Introduction to Watershed Systems (3). Prerequisite, GEOG 110. Introduction to the hydrologic and geomorphic processes and forms in watersheds as applied to problems in flood analysis, water quality, and interactions with ecosystem processes. Course will cover the structure of drainage networks, nested catchments, and distribution and controls of precipitation, evaporation, runoff, soil, and groundwater flow. (EES)

442 River Processes (3). Introduction to landforms and processes associated with flowing water at the earth's surface. Hydrology, sedimentology, and theories of channel formation and drainage basin evolution. (ESS)

444 Landscape Biogeography (3). This course is concerned with the application of biogeographical principles and techniques to the study of natural and human-modified landscapes. It includes local and extraregional case studies. (EES)

445 Medical Geography (3). The human ecology of health is studied by analyzing the cultural/environmental interactions that lie behind world patterns of disease distribution, diffusion, and treatment, and the ways these are being altered by development. (GHA)

446 Geography of Health Care Delivery (3). This course covers basics, including personnel and facility distributions, accessibility, regionalization, and location/allocation modeling; spatial analysis and GIS; and the cultural geography of health care, including humanist and political-economic perspectives. (GHA)

447 Gender in the Middle East (ASIA 447) (3). Examines gender, space, and place relationships in the modern Middle East. Investigates shifting gender geographies of colonialism, nationalism, modernization, and globalization in this region. (GHA)

448 Transnational Geographies of Muslim Societies (3). Examines modern Muslim geographies that are created by transnational flows, connections, and imaginaries that cross national and regional boundaries across the Middle East, Southeast Asia, and beyond.

450 Population, Development, and the Environment (3). Introduction to contemporary and historical changes in human population, international development, and the global environment and how these processes interact, drawing on population geography as an organizing framework.

452 Mobile Geographies: The Political Economy of Migration (3). This course explores the contemporary experience of migrants. Various theoretical approaches are introduced, with the emphasis on a political-economic approach. (GHA)

453 Political Geography (PWAD 453) (3). The geography of politics is explored at the global, the nation–state, and the local scale in separate course units, but the interconnections between these geographical scales are emphasized throughout. (GHA)

454 Historical Geography of the United States (FOLK 454) (3). A study of selected past geographies of the United States with emphasis on the significant geographic changes in population, cultural, and economic conditions through time. (GHA)

457 Rural Latin America: Agriculture, Environment, and Natural Resources (3). Prerequisite, GEOG 259. Permission of the instructor for students lacking the prerequisite. This course explores a systems and cultural-ecological view of agriculture, environment, natural resource, and rural development issues in Latin America. It serves as a complement to GEOG 458 Urban Latin America. (Regional)

458 Urban Latin America: Politics, Economy, and Society (3). Prerequisite, GEOG 259. Permission of the instructor for students lacking the prerequisite. This course examines urban social issues in contemporary Latin America. Cities and their residents will be considered in relation to each other and to North American examples. (Regional)

460 Geographies of Economic Change (3). This course is designed to explore changing geographies of production and consumption in theory and in practice.

464 Europe Today: Transnationalism, Globalisms, and the Geographies of Pan-Europe (3). A survey by topic and country of Europe west of Russia. Those features that make Europe a distinct and important region today are emphasized. (Regional)

470 Political Ecology: Geographical Perspectives (3). Examines foundational concepts and methods and their relevance for understanding nature–society relationships. Discussions on environmental change and conflict and how nature is bound up with relations of power and constructions of identity.

477 Introduction to Remote Sensing of the Environment (3). Prerequisite, GEOG 370. Covers fundamental theory and mechanics of remote sensing, related theoretical aspects of radiation and the environment, and remote-sensing applications relating to terrestrial, atmospheric, and marine environments. Hands-on experience for application and information extraction from satellite-based imagery through biweekly laboratory assignments. Prepares students for GEOG 577. (GISci)

480 Liberation Geographies: The Place, Politics, and Practice of Resistance (3). An examination of the theory and history of resistance in the modern world, including instances of contestation from "foot dragging" to the formation of social movements, and exploring the relationship between place and protest.

481 Ethnographies of Globalization: An Upper-Level Research Design Class (3). Examines critical perspectives on globalization through research interviews conducted by social scientists working on topics ranging from land reform in Brazil to international banking.

491 Introduction to GIS (PLAN 491) (3). Prerequisite, GEOG 370. Permission of the instructor for students lacking the prerequisite. Stresses the spatial analysis and modeling capabilities of organizing data within a geographic information system. (GISci)

541 GIS in Public Health (3). Explores theory and application of geographic information systems (GIS) for public health. The course includes an overview of the principles of GIS in public health and practical experience in its use. (GISci)

542 Neighborhoods and Health (3). This course explores how neighborhood context influences the health of the populations living in them. It includes a survey of neighborhoods and health theory and empirical examples. (GHA)

577 Advanced Remote Sensing (3). Prerequisite, GEOG 370 or 477. Acquisition, processing, and analysis of satellite digital data for the mapping and characterization of land cover types. (GISci)

591 Applied Issues in Geographic Information Systems (PLAN 591) (3). See PLAN 591 for description.

592 Geographic Information Science Programming (3). Prerequisite, GEOG 370 or 491. This course will teach students the elements of GISci software development using major GIS platforms. Students will modularly build a series of applications through the term, culminating in an integrated GIS applications program.

594 Global Positioning Systems and Applications (3). Prerequisite, GEOG 370. Global Positioning Systems (GPS) fundamental theory, application design, post processing, integration of GPS data into GIS and GPS application examples (such as public health, business, etc.) will be introduced.

597 Ecological Modeling (3). Prerequisite, BIOL 561 or STOR 355. Permission of the instructor for students lacking the prerequisite. This course focuses on modeling the terrestrial forest ecosystems processes, including population dynamics, energy, water, nutrients, and carbon flow through the ecosystem. (GISci)

650 Technology and Democracy Workshop (3). Are technological choices open to democratic participation? Through a novel research workshop format, this graduate and undergraduate course explores political and geographical dimensions of technological change around key environmental issues—energy, water, and waste.

691H Honors (3). Permission of the department. Required of all students aspiring to honors in geography. Directed readings, research, and writing.

692H Honors (3). Prerequisite, GEOG 691H. Required of all students aspiring to honors in geography. Preparation of a senior thesis.

Courses for Graduate Students
GEOG

702 Contemporary Geographic Thought (3). History and philosophy of the geographic discipline, with particular emphasis on developments in recent decades.

703 Geographic Research Design (3). Introduction to the theory and practice of geographic research. The range of methods available for problem identification and solution are considered through development of specific research proposals.

704 Communicating Geography (3). Seminar introduces new students to current geographic sub-disciplines, faculty research interests and areas of expertise within the Department, and university resources. In this required core course in Geography's graduate curriculum, students also engage with issues of communication, professionalization, and career development in Geography and related fields.

705 Advanced Quantitative Methods in Geography (3). Application of selected multivariate statistical techniques to the analysis of geographic phenomena and problems.

710 Advanced Physical Geography—Biogeoscience (3). Examination of the major processes controlling environmental cycling of material and energy at the landscape level, and development of a quantitative understanding of the physical and ecosystem processes responsible for landscape pattern and evolution.

711 Advanced Physical Geography—Hydroclimatology and Bioclimatology (3). Examination of topics focused on the atmospheric and the vegetation and land surface parts of the hydrologic cycle at the micro to global spatial scale and short-term to millennial temporal scale.

715 Land Use/Land Cover Dynamics and Human-Environment Interaction (3). Examination of topics that integrate social, natural, and spatial sciences within the context of human-environment interactions, with an emphasis on landuse/landcover dynamics and spatial digital technologies for linking landscape form and function.

720 Cultural and Political Ecology (3). This course examines the foundations and current literature on cultural and political ecology. Focus is given to the appropriation of "Nature," degradation and deforestation, conservation, famine, postcolonial peasants, resistance, Indigeneit, and property, land distribution, and governmentality.

760 Geographies of Economic Change (3). This course is designed to explore changing geographies of production and consumption in theory and practice.

790 Spatial Analysis and Computer Modeling (3). This course introduces students to spatial analysis techniques involving points, lines, areas, surfaces, and nonmetric spaces, as well as programming basic geographic models on microcomputers.

801 Research Seminar in Earth System Science and Biophysical Geography (3). An in-depth seminar devoted to contemporary faculty research topics in earth system science and biophysical geography. Topics and instructors vary.

802 Research Seminar in Geographic Information Sciences (3). An in-depth seminar devoted to contemporary faculty research topics in geographic information sciences. Topics and instructors vary.

803 Research Seminar in Nature-Society Studies and Human-Environment Interactions (3). An in-depth seminar devoted to contemporary faculty research topics in nature-society studies and human-environment interactions. Topics and instructors vary.

804 Research Seminar in Social Geography (3). An in-depth seminar devoted to contemporary faculty research topics in social geography. Topics and instructors vary.

805 Research Seminar in International Area Studies, Development, and Globalization (3). An in-depth seminar devoted to contemporary faculty research topics in international area studies, development, and globalization. Topics and instructors vary.

811 Seminar/Readings in Earth System Science and Biophysical Geography (3). An in-depth seminar devoted to contemporary readings in earth system science and biophysical geography. Topics and instructors vary.

812 Seminar/Readings in Geographic Information Sciences (3). An in-depth seminar devoted to contemporary readings in geographic information sciences. Topics and instructors vary.

813 Seminar/Readings in Nature-Society Studies and Human-Environment Interactions (3). An in-depth seminar devoted to contemporary readings in nature-society studies and human-environment interactions. Topics and instructors vary.

814 Seminar/Readings in Social Geography (3). An in-depth seminar devoted to contemporary readings in social geography. Topics and instructors vary.

815 Seminar/Readings in International Area Studies, Development, and Globalization (3). An in-depth seminar devoted to contemporary readings in international area studies, development, and globalization. Topics and instructors vary.

900 Special Work in Geography (1–21). Required preparation, two courses in the one hundred bracket or permission of the instructor.

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Department of Geological Sciences

www.geosci.unc.edu
Jonathan Lees, *Chair*

Professors
Larry K. Benninger, Low-Temperature Geochemistry
Joseph G. Carter, Paleoecology, Invertebrate Paleontology
Allen F. Glazner, Igneous Petrology, Tectonics
Jonathan M. Lees, Seismology, Geophysical Inverse Theory
Jose A. Rial, Geophysics, Seismology

Associate Professors
Louis R. Bartek, Sedimentology, Stratigraphy, Marine Geology
Drew S. Coleman, Isotope Geochemistry, Geochronology
Kevin G. Stewart, Structural Geology
Donna M. Surge, Paleoclimate, Paleoecology, Low-Temperature Geochemistry

Assistant Professors
Tamlin M. Pavelsky, Global Hydrology
Laura J. Moore, Coastal Geology
Lara S. Wagner, Seismology, Tectonics
Benjamin B. Mirus, Hydrology

Associated Faculty
John M. Bane Jr., Physical Oceanography
Christopher S. Martens, Chemical Oceanography

Adjunct Appointments
Alan E. Boudreau, Petrology, Geochemistry
Antonio Rodriguez, Coastal Geology, Sedimentology

Professors Emeriti
John M. Dennison
A. Conrad Neumann
John J. W. Rogers
Joseph St. Jean Jr.
Daniel A. Textoris

The Department of Geological Sciences offers programs leading to the M.S. and Ph.D. degrees in geological sciences. A broad background is offered in most major areas of geoscience, with particular emphasis on isotope geochemistry, geochronology, seismology, volcanology, igneous petrology, marine geology, low-temperature geochemistry, paleoclimatology, paleoceanography, paleontology, paleoecology, sequence stratigraphy, structural geology, and tectonics.

Admission and General Degree Requirements
Students admitted to pursue a graduate degree in the Department of Geological Sciences normally are expected to have an undergraduate degree in traditional geology, geochemistry, geophysics, biology, chemistry, mathematics, physics, or other related interdisciplinary fields. All applicants must take the Graduate Record Examination (GRE). All foreign students whose native language is not English also must take the Test of English as a Foreign Language (TOEFL) examination.

Course requirements for incoming students will be determined by individual graduate committees, often in consultation with the director of graduate studies. Specific requirements are varied to meet the needs and career objectives of the individual.

Master of Science
Requirements for the Master of Science degree are 30 semester hours (including a minimum of three hours, but no more than six hours of GEOL 993), a thesis, and a final oral examination in defense of the thesis.

Doctor of Philosophy
Normally a student must have completed a master's degree before being admitted to the doctoral program. A student may be permitted to bypass the master's degree after one year of residence upon demonstration of superior scholastic performance and research potential, recommendation of his or her graduate committee, and approval by the geological sciences faculty.

Admission to the Ph.D. program after completing the M.S. degree in the Department of Geological Sciences requires faculty approval.

Requirements for the Ph.D. degree are a minimum of 48 semester hours of graduate credit (which may include 30 hours from the M.S. degree) plus a minimum of six hours and preferably no more than 12 hours of GEOL 994, a written comprehensive examination and an oral comprehensive examination, a dissertation, and a final oral examination in defense of the dissertation.

Facilities and Research Interests
The Department of Geological Sciences occupies the 50,000 square feet of floor space in Elisha Mitchell Hall. Research equipment and facilities include a thermal ionization mass spectrometer; two Class 100 clean labs; X-ray fluorescence spectrometer; X-ray diffractometer; electron microprobe (at Fayetteville State University; remotely operable); scanning electron microscope with X-ray analysis and cathodoluminescence; counting laboratory (alpha-, beta-, and gamma-emitting radionuclides); gas chromatograph- isotope ratio mass spectrometer (in Marine Sciences); carbon analyzer (carbon dioxide coulometer, acidification module, horizontal furnace); ICP mass spectrometer and electron microprobe (at Duke University); chirp sonar and side-scan sonar imaging systems; seismic reflection system; grain-size analysis equipment; microsampling system with epifluorescence capabilities. The department utilizes a variety of computing resources, including networked Windows, Macintosh, LINUX, and UNIX workstations. Campus-wide supercomputer clusters are available through the North Carolina Supercomputing Center.

Financial Aid
Approximately 11 teaching assistantships with stipends of $14,700–$15,700 per academic year (2013–2014 stipends) are available to graduate students. In addition, all graduate students in good standing receive a summer research fellowship ($6,250–$7,000 in 2013–2014) from a departmental endowment.

The department nominates one or two students to be considered by The Graduate School for nonservice fellowships; no additional application is necessary. Faculty research grants support some research assistantships. Out-of-state students are recommended for remission of out-of-state tuition costs; all students are recommended for an in-state tuition award. Most students are eligible for both, and therefore are responsible only for the payment of student fees.

Courses for Graduate and Advanced Undergraduate Students
GEOL

401 Structural Geology (4). Prerequisite, GEOL 101, 105, 109, or 110. Introduction to the mechanical behavior and dynamic evolution of the earth's crust through the study of deformed rocks. Includes weekend field trip to western North Carolina.

402 Sedimentology and Stratigraphy (4). Prerequisites, GEOL 101 or 110, and GEOL 301. Introduction of principles involved in description and classification of sedimentary rocks and stratigraphic units as well as stratigraphic correlation. Students will be introduced to relationships of processes, depositional environments, and sedimentary facies.

403 Oceanography (BIOL 350, ENVR 417, MASC 401) (3). See MASC 401 for description.

404 Petrology and Plate Tectonics (4). Prerequisite, GEOL 301. Permission of the instructor for students lacking the prerequisite. Studies of the origin and evolution of igneous and metamorphic rocks, including microscopic, X-ray, and field methods; volcanology; plate-tectonic interpretation of rock sequences. Three lecture and three laboratory hours a week.

410 Earth Processes in Environmental Systems (ENST 410, MASC 410) (4). See ENST 410 for description.

411 Oceanic Processes in Environmental Systems (ENST 411, MASC 411) (4). See ENST 411 for description.

412 Principles and Methods of Teaching Earth Science (4). Prerequisites, GEOL 101/101L, 103, 105/101L, 109/101L, or 110; and at least two of the four geology core courses: GEOL 301, 401, 402, and 404. This course develops the knowledge and skills teachers need to implement inquiry-based earth science instruction: conceptual knowledge of earth sciences and mastery of inquiry instructional methods. Students study inquiry in cognitive science and learning theory. This course is a requirement for the UNC–BEST program in geological sciences.

413 Field Paleontology (4). Prerequisites, GEOL 101, 109, 110, or 159; and 402 or 478. Permission of the instructor for students lacking the prerequisites. Field-oriented course on larger Ordovician through Pliocene fossil invertebrates in the central and eastern United States. Students develop a reference collection of over 250 genera and species, with data of stratigraphy and biostratigraphy. Three lecture and two laboratory hours a week.

415 Environmental Systems Modeling (ENST 415, ENVR 461, MASC 415) (3). See ENST 415 for description.

417 Geomorphology (ENST 417) (3). Prerequisites, GEOL 101 or 110, and MATH 231. Permission of the instructor for students lacking the prerequisites. Introduction to process geomorphology with emphasis on quantitative interpretation of weathering, hill slope, fluvial, glacial, and eolian processes from topography and landscapes.

417L Geomorphology Laboratory (1). Pre- or corequisite, GEOL 417. Two laboratory hours per week.

421 Archaeological Geology (ANTH 421) (3). Permission of the instructor. The application of geological principles and techniques to the solution of archaeological problems. Studies geological processes and deposits pertinent to archaeological sites, geologic framework of archaeology in the southeastern United States, and techniques of archaeological geology. Field trips to three or more sites; written reports required.

422 Physics of the Earth's Interior (PHYS 422) (3). See PHYS 422 for description.

430 Coastal Sedimentary Environments (MASC 430) (3). Prerequisite, GEOL 402. Introduction to modern shallow-water clastic environments and their sediments, emphasizing barrier islands, deltas, estuaries, wetlands, and tidal flats. Includes local field trips and discussion/application of data-collecting techniques.

431 Micropaleontology (MASC 431) (4). Prerequisite, GEOL 478 or MASC 440. Permission of the instructor for students lacking the prerequisite. An in-depth study of the biostratigraphy, paleoecology, and taxonomy of various microfossil groups (i.e., foraminifera, ostracodes, conodonts, coccoliths, radiolaria, diatoms, acritarchs, dinoflagellates, etc.) dependent upon individual student objectives. Three lecture and three laboratory hours a week.

432 Paleoclimatology (3). Prerequisite, GEOL 402. Permission of the instructor for students lacking the prerequisite. Introduction to mechanisms that drive climate. Examination of past climate reconstructions using ecological and geochemical proxies. Utility of computer models to reconstruct past climates and predict future climate change. Emphasis placed on late Quaternary.

433 Paleoceanography (3). Prerequisite, GEOL 402 or 503. Permission of the instructor for students lacking the prerequisite. Origin and distribution of pelagic sediments. Review of the major Mesozoic and Cenozoic events in the world oceans. Glacial/interglacial changes in the ocean/atmosphere system.

434 Marine Carbonate Environments (2). Permission of the instructor. Chemical and biological origins of calcium carbonate, skeletal structure, and chemo-mineralogy, preservation, sedimentation, and early diagenesis are studied in deep and shallow environmental settings to understand skeletal genesis, limestone origin, and carbonate facies variability. Field trip to Florida, Bahamas, or Bermuda. Laboratory exercises; research report.

440 Principles of Seismology (3). Prerequisites, GEOL 101, 213, 401; MATH 231. Permission of the instructor for students lacking the prerequisites. Descriptive account of global seismology, earthquake distribution, and focal mechanics. Principles of geometrical optics and applications to imaging the earth's interior. Principles of seismic prospecting of hydrocarbon and geothermal reservoirs.

450 Biogeochemical Processes (ENST 450, ENVR 415, MASC 450) (4). See ENST 450 for description.

460 Fluid Dynamics of the Environment (3). Prerequisite, MATH 232. Permission of the instructor for students lacking the prerequisite. Principles and applications of fluid dynamics to flows of air and water in the natural environment. Conservation of momentum, mass, and energy applied to lakes, rivers, estuaries, and the coastal ocean. Dimensional analysis and scaling emphasized to promote problem-solving skills.

478 Invertebrate Paleontology (BIOL 478) (4). Prerequisite, GEOL 159 or BIOL 101. Permission of the instructor for students lacking the prerequisites. Introduction to the principles, methods of analysis, and major controversies within paleontology. Examination of the fossil record and its application to problems in evolutionary biology, paleoecology, paleoclimatology, and general earth history.

480 Modeling of Marine and Earth Systems (ENVR 480, MASC 480) (1–3). Prerequisite, MATH 232. Permission of the instructor for students lacking the prerequisite. Mathematical modeling of the dynamic system, linear and nonlinear. The fundamental budget equation. Case studies in modeling convective transport, biogeochemical process, population dynamics. Analytical and numerical techniques, chaos theory, fractal geometry.

483 Geologic and Oceanographic Applications of Geographical Information Systems (MASC 483) (4). Required preparation, four GEOL courses or permission of the instructor. Focus is on applying GIS concepts and techniques to mining and petroleum geology, resource assessment, hydrogeology, coastal and marine geology, physical oceanography, engineering geology, and a geologic perspective on land use. Three lecture and two laboratory hours a week.

490 Topics in Earth and Environmental Sciences (3). Key topics and resources for high school teachers preparing to teach earth and environmental sciences. Includes lithosphere, tectonic processes, hydrosphere, atmosphere, origin of solar system and life, and environmental stewardship.

501 Geological Research Techniques (2). Permission of the instructor. An introduction to methods of obtaining, analyzing, and presenting geologic and paleontologic data.

502 Earth Surface Processes (GEOG 440) (3). See GEOG 440 for description.

503 Geological Oceanography (MASC 503) (4). See MASC 503 for description.

505 Chemical Oceanography (ENVR 505, MASC 505) (4). See MASC 505 for description.

506 Physical Oceanography (MASC 506) (4). See MASC 506 for description.

507 Rhythms in Global Climate and the Stratigraphic Record (3). Prerequisite, GEOL 402. An overview of the mechanisms of cyclic climate forcing and a review of the geologic evidence for these climate rhythms, with a particular emphasis on the Milankovitch orbital cycles.

508 Applied Hydrology (3). Prerequisites, GEOL 101 or 110, MATH 231, PHYS 105. Permission of the instructor for students lacking the prerequisites. An introduction to methodologies and instrumentation for quantifying the movement of water in the earth system focusing on components of the hydrologic cycle. Emphasis is divided between analytical aspects and field procedures.

509 Groundwater (3). Prerequisites, CHEM 102; GEOL 101, 105, 109, or 110; MATH 231; PHYS 104, 116. Permission of the instructor for students lacking the prerequisites. Introduction to physics, chemistry, and geology of groundwater.

510 Geochemistry of Natural Waters (3). Prerequisites, CHEM 102; GEOL 101, 105, 109, or 110; MATH 231. Permission of the instructor for students lacking the prerequisites. Survey of processes affecting the compositions of streams, lakes, the ocean, and shallow ground waters.

511 Stable Isotopes in the Environment (ENST 511) (3). Prerequisite, CHEM 102. Introduction to the theory, methods, and applications of stable isotopes to environmental problems. Primary focus will be on the origin, natural abundance, and fractionation of carbon, hydrogen, oxygen, and nitrogen isotopes.

512 Geochemistry (MASC 553) (3). Prerequisites, CHEM 102; GEOL 101, 105, or 110; and MATH 231. Permission of the instructor for students lacking the prerequisites. Introduction to the application of chemical principles to geological problems. Topics include thermodynamics, kinetics, and isotope geochemistry.

514 River Systems of East Coast North America (3). Prerequisites, GEOL 101 or 110, and 211 or 417. Junior or senior status. Analysis of 23 rivers from St. Lawrence to the Everglades, from headwaters to oceanic terminus of turbidite fan. Focus on stream processes, geologic development, hydrology, utilization history, ecology, and planning.

515 Introduction to Geophysics (3). Prerequisites, PHYS 116 and 117. Introduction to the fundamentals of global geophysics: gravity, seismology, magnetism, heat, and plate tectonics. Both shallow and deep processes are considered. Emphasis is aimed at problem solving by applying concepts.

517 Sequence and Seismic Stratigraphy (3). Prerequisite, GEOL 402. Examination of lithostratigraphic principles and the sequence stratigraphic paradigm. Students will study use of variation of well log signature reflection attributes and reflection termination patterns to identify and correlate sequences and systems and to interpret the lithology and depositional history of subsurface stratigraphic units.

518 Geodynamics (3). Prerequisites, CHEM 102; GEOL 101 or 110; MATH 232; and PHYS 104 and 105. Interior of the earth deduced from seismology, gravity, heat flow, magnetism; geophysics of continents and ocean basins; age of earth.

520 Data Analysis in the Earth Sciences (3). Prerequisites, MATH 231 and 232. Required preparation, an introductory geology course numbered below 202, except first-year seminar, or permission of the instructor. Introduction to quantitative analysis in earth sciences: solid earth, atmospheres, oceans, geochemistry, and paleontology. Topics covered: univariate and multivariate statistics, testing, nonparametric methods, time series, spatial and cluster analysis, shapes.

521 Clastic Depositional Systems: Processes and Products (3). Prerequisite, GEOL 402. Examination of the use of lateral and vertical changes in sedimentary facies to identify depositional processes and environments of deposition within the terrestrial, marginal marine, shelf, and deep sea clastic depositional systems. These systems will be examined in a sequence stratigraphic framework.

522 Physical Volcanology (3). Required preparation, introductory courses in geology and physics. Course is aimed at understanding the physical properties and processes controlling volcanism and magma transport. Topics covered include volcanic processes from the formation of magma in the upper mantle to violent eruption at the surface. Emphasizes dynamic processes and underlying mechanisms.

523 Petroleum Geoscience (4). Prerequisites, GEOL 101, 301, 401, and 402. Permission of the instructor for students lacking the prerequisites. Students study the origin, migration, and entrapment of hydrocarbons in sedimentary basins and learn how several areas of the geosciences are integrated to locate and produce hydrocarbons. Students learn about these topics while analyzing a real subsurface data set.

550 Biogeochemical Cycling (MASC 550) (3). See MASC 550 for description.

552 Organic Geochemistry (ENVR 552, MASC 552) (3). See MASC 552 for description.

555 Paleobotany (BIOL 555) (4). See BIOL 555 for description.

560 Fluid Dynamics (ENVR 452, MASC 560, PHYS 660) (3). See MASC 560 for description.

563 Descriptive Physical Oceanography (MASC 563) (3). See MASC 563 for description.

590 Special Topics in Earth Sciences (1–4). Discussion or lab-based consideration of topical issues in earth sciences.

601 Summer Field Course in Geology (3). Prerequisites, GEOL 301, 401, 402, and 404. Permission of the instructor for students lacking the prerequisites. Three-week field camp conducted in the western United States (Arizona, California, Colorado, Nevada, New Mexico, and/or Utah). Learn proper use of geology field tools and how to make a geologic map. Field interpretation of rocks and their deformation.

602 Summer Field Course in Geology (3). Prerequisites, GEOL 301, 401, 402, and 404. Permission of the instructor for students lacking the prerequisites. Three-week field camp conducted in the western United States (Arizona, California, Colorado, Nevada, New Mexico, and/or Utah). Learn advanced mapping skills necessary to interpret geologic history of complexly deformed rocks.

608 Continuum Mechanics in the Earth Sciences (ENST 608) (3). Prerequisites, MATH 231; PHYS 104 or 116. Required preparation, introductory geology course numbered below GEOL 202, except first-year seminar, or permission of the instructor. Applications of continuum mechanics in the earth sciences, including stress, strain, elasticity, and viscous flow. Numerical solutions to problems in heterogeneous finite strain including finite element analysis.

655 Physical Geochemistry (3). Prerequisites, CHEM 102 and MATH 232. Permission of the instructor for students lacking the prerequisites. An introduction to physical geochemistry and chemical thermodynamics with special emphasis on geological applications. Three lecture hours a week.

690 Topics in Petrology (4). Prerequisite, GEOL 404. Origin of magmas and evolution of igneous and metamorphic rocks, combined with petrographic study of selected sites and individual examples. Two lecture and six laboratory hours a week.

695 Advanced Field Seminar in Geology (1–4). Prerequisites, GEOL 601 and 602. A field course that emphasizes advanced field methods. Emphasis is placed on large-scale, detailed field work in complex structural terrains and on independent mapping that will lead to thesis/dissertation and/or publication.

691H Honors (3). Permission of the department. For details, see geology degree requirements.

692H Honors (3). Prerequisite, GEOL 691H. For details, see geology degree requirements.

Courses for Graduate Students
GEOL

700 Research Seminar (1). Required of all entering graduate students or permission of the department. A topical seminar in current research topics in the earth sciences. Presentations by selected faculty with an emphasis on in-depth, critical analysis of current research literature. Two hours a week.

701 Graduate Seminar (0.5–21).

703 Sedimentary Geology I (3). Prerequisite, GEOL 402. Stratigraphic, sedimentologic, geochemical, petrologic, and paleontologic principles will be summarized. Emphasis is placed on both the techniques used in sedimentary geology and on the characteristics and processes that distinguish sedimentary environments.

704 Sedimentary Geology II (3). Prerequisite, GEOL 703. Continuation of GEOL 703.

705 Advanced Petrology I (3). Prerequisites, CHEM 102, GEOL 404, MATH 233, and PHYS 105. Application of thermodynamics, phase equilibria, thermobarometry, radiogenic and stable isotope geology, and geochemical modeling to the study of igneous and metamorphic rocks and crustal evolution.

706 Advanced Petrology II (3). Prerequisite, GEOL 705. Continuation of GEOL 705.

707 Stratigraphic Micropaleontology: Mesozoic Calcareous Nannofossils (4).

708 Stratigraphic Paleontology: Cenozoic Calcareous Nannofossils (4).

710 Advanced Coastal Environmental Change (3). Prerequisites, GEOL 417, 430, 502, 503. Permission of the instructor for students lacking the prerequisites. Focuses on biological-physical couplings that shape coastal environments (i.e. coastal 'ecomorphodynamics') and determine how these environments change with climate and land use. Environments include: barrier islands, open ocean coastlines, and tidal wetlands. Grading based on presentations, participation, and a research proposal.

711 Advanced Mineralogy (3).

712 Isotope Geochemistry (3). Prerequisites, CHEM 102, GEOL 301, 402, and 404. Survey of isotopic studies in geology; geochronology, crustal evolution, heat flow, paleotemperatures, origin of ore deposits.

804 Advanced Igneous Petrology (4).

805 Igneous Geochemistry (4).

806 Metamorphic Petrology (4).

807 Physics of Earthquakes (3). Prerequisites, MATH 524 and PHYS 211. Permission of the instructor for students lacking the prerequisites. The earthquake source. Description. Moment tensor. Developments in the mathematical theory of seismic sources. Radiation patterns. Earthquake mechanisms and plate tectonics. Synthetic seismograms. Seismicity and self-organized criticality.

809 Tectonophysics (3). Prerequisites, MATH 83, PHYS 201, and 211. Permission of the instructor for students lacking the prerequisites. Fundamental physical processes necessary for an understanding of plate tectonics; stress and strain in solids; elasticity and flexure; heat transfer; gravity; mantle rheology and convection.

816 Principles of Climate Modeling: Applications to the Study of Climate Change (3). Required preparation, one year calculus and physics, familiarity with differential equations, and experience with Matlab and/or Mathematical/Maple. Develop explanatory and predictive models of earth's climate. Introductory course focused on modeling past climate with the hope of understanding its future. Discusses current global warming/climate change issues, including science, history, and controversy.

851 Seminar in Stratigraphy (0.5–21).

852 Seminar in Paleoclimatology (0.5–21).

853 Seminar in Paleontology (0.5–21).

854 Seminar in Continental Margins (0.5–21).

855 Seminar in Sedimentology (0.5–21).

856 Seminar in Isotope Geology (0.5–21).

857 Seminar in Geochemistry (0.5–21).

858 Seminar in Petrology (1–21).

859 Seminar in Economic Geology (0.5–21).

860 Seminar in Volcanology (3). All aspects of volcanism will be covered including seismology, geochemistry, deep structure, volcanic products, and hazards. Readings of original papers will be stressed.

861 Seminar in Geophysics (0.5–21).

862 Seminar in Seismology (1–21).

863 Seminar in Structural Geology (0.5–21).

864 Seminar in Tectonics (1–21).

900 Research in Geology (1–9).

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Department of Germanic and Slavic Languages and Literatures

www.unc.edu/depts/gsll

CLAYTON KOELB, *Chair*

Carolina-Duke Graduate Program in German Studies
www.german.trinity.duke.edu/carolina-duke-grad

ERIC DOWNING (UNC) and THOMAS PFAU (Duke), *Directors of Graduate Study*

Professors

William Donahue (20) (Duke) 19th- and 20th-Century German Literature and Culture, Holocaust Studies, Politics and Literature, Contemporary German Literature and Culture

Eric Downing (2) (UNC) 18th-to-20th-Century Narrative Fiction, Literary Theory, Realism and Aestheticism

Jonathan Hess (3) (UNC) 18th-Century Studies, German-Jewish Cultural History, Aesthetics and Literary Theory, Philosophy and Literature

Clayton Koelb (4) (UNC) Modern Literature (Thomas Mann, Franz Kafka), Literary Theory, Philosophy and Aesthetics, Comparative Literature

Thomas Pfau (24) (Duke) Romanticism, 19th-Century Literature, Critical Theory, Literary History and Criticism, English Literature

David Pike (8) (UNC) 20th-Century Literature, East German and Soviet Culture and Politics

Ann Marie Rasmussen (25) (Duke) Medieval Literature and Culture, Gender Studies, Manuscript Studies, Poetics

Paul T. Roberge (9) (UNC) Historical Linguistics, Older Germanic Dialects, Comparative Germanic Grammar, Pidgins and Creoles, Afrikaans, Language, Ethnicity, and Politics

Associate Professors

Richard Langston (6) (UNC) Postwar and Contemporary Literature, Avant-Garde Studies, Popular Culture and Literature, Literary and Cultural Theory

Michael Morton (22) (Duke) 18th- and Early 19th-Century Literature (Enlightenment, Goethezeit), Philosophy and Intellectual History, Critical Theory, Literary History and Criticism

Associate Professor of the Practice

Ingeborg Walther (26) (Duke) Applied Linguistics, Second Language Acquisition, Pedagogy, 20th-Century Literature

Assistant Professors

Ruth von Bernuth (12) (UNC) Early Modern German Literature and Culture, Yiddish Studies, Disability Studies

Kata Gellen (30) (Duke) German Modernism; Film; Fin-de-Siècle and Postwar Austrian Literature, German-Jewish Studies

Priscilla Layne (UNC) 20th- and 21st-Century Literature, Film and Music, (Post)Subculture Studies, Multiculturalism, Afro-German History and Culture, and Gender Studies

Jakob Norberg (23) (Duke) Postwar Literature and Society, 20th-Century Austrian Literature, Political Theory, the Public Sphere

Inga Pollmann (UNC) Film and Media Theory and History, Early Cinema, German Cinema, Film and Science, Aesthetic and Critical Theory

Gabriel Trop (11) (UNC) 18th-Century Studies, Poetry and Poetics, Romanticism, Philosophy and Aesthetics

Assistant Professor of the Practice

Corinna Kahnke (21) (Duke) Pedagogy; 20th-/21st-Century Literature, Popular Culture, Literature and Film, Women, Gender and Queer Studies

Senior Lecturer

Christina Wegel (13) (UNC) Pedagogy, Theater Productions and Music in the Foreign Language Classroom, Drama and Theater, Performance Studies

Lecturer (Part Time)

Sandra Summers (18) (UNC) Business German

Adjunct Professor

Jochen Vogt (33) (Duke) Early Modern German Literature, "Goethezeit," 20th-Century Culture and Literature; Hermeneutics and Narratology, Literature, Journalism, and the Media, International Crime Literature, Pedagogy

Adjunct Associate Professors

Helga Bister (15) (UNC) Germanic Linguistics, Dialectology, Contact and Sociolinguistics, Applied Linguistics

Norman Keul (31) (Duke) Medieval and Early Modern Studies, Linguistics, Literary History and Criticism

Adjunct Assistant Professors

Tanya Kinsella (16) (UNC) Languages Across the Curriculum, Language Pedagogy, Early German Cinema, 19th- and 20th-Century Narrative, Aesthetics

Heidi Madden (32) (Duke) 19th Century, Comparative Literature and Theory

Dan Thornton (19) (UNC) Postwar German and Austrian Literature, Expressionism, Neue Sachlichkeit, Golden Age and 20th-Century Dutch Literature, Holocaust Studies, Jewish Literature in the Diaspora

Professors Emeriti

Richard H. Lawson (UNC)
Siegfried Mews (UNC)
James Rolleston (Duke)
Christoph E. Schweitzer (UNC)
Sidney R. Smith (UNC)
Petrus W. Tax (UNC)

Associate Professor Emeritus

Walter K. Francke (UNC)
Assistant Professor Emeritus
Helga Bessent (Duke)

M.A. Program in Slavic Languages and Literatures

CHRISTOPHER R. PUTNEY, *Director*

Professor

Peter Sherwood (15) Hungarian Language and Culture

Associate Professors

Radislav Lapushin (14) Russian Literature
Hana Pichova (18) Czech Literature
Christopher R. Putney (12) Russian Literature, Medieval Slavic Culture

Assistant Professors

Ewa Wampuszyc (21) Polish Literature

Senior Lecturer

Eleonora Magomedova (20) Russian Language

Professors Emeriti

Madeline G. Levine
Vasa D. Mihailovich

Associate Professors Emeriti

Lawrence Feinberg
Ivana Vuletic

The Department of Germanic and Slavic Languages and Literatures offers a Ph.D. in German studies in conjunction with Duke University, as well as an M.A. in Slavic languages and literatures. Within the Slavic M.A. degree, students may concentrate either in comparative Slavic and East European literatures and cultures, or in Russian literature and culture. Each program is described in detail below.

The Carolina-Duke graduate program in German studies is a fully merged graduate program that draws on one of the largest German studies faculties in the country, as well as on the considerable library holdings of each institution. Students apply to a single program and graduate with a diploma bearing the names of both Duke University and the University of North Carolina at Chapel Hill.

The program features a combination of disciplinary rigor and interdisciplinary flexibility that recognizes the fundamental interrelation of all the cultural expressions of societies where the German language is spoken. Taking full advantage of the intellectual, educational, and cultural resources of two great universities, the program offers an attractive combination of individual attention in small classes and a close connection to the broader communities of literature, cultural studies, and German studies at Duke University and at the University of North Carolina at Chapel Hill.

The core German studies faculty represent all branches of research in the field, including medieval studies, gender and sexuality studies, literary theory and poetics, European intellectual history, modernism, realism, German-Jewish studies, Holocaust studies, politics and culture in the 20th century, film and media studies, and contemporary society. Faculty engage in innovative, interdisciplinary teaching and research projects

involving other departments and programs and support close intellectual ties with major German universities.

Students take courses full time in their first year of study; in subsequent years they acquire pedagogical training and teaching experience at both a private (Duke University) and a public (University of North Carolina at Chapel Hill) university. Multiple program options are available to students, from the study of historical periods and genres (medieval to contemporary) to literary criticism and theory. Interdisciplinary work is strongly encouraged.

Admission is competitive and limited to no more than seven students a year. Duke University and the University of North Carolina at Chapel Hill are committed to offering five years of full funding, including tuition, to students in good academic standing.

Note: The previous Ph.D. programs in German studies at Duke University and in Germanic languages at the University of North Carolina at Chapel Hill no longer admit new students.

Admissions Requirements

We seek applicants who demonstrate academic excellence, and we welcome applicants from diverse academic and cultural backgrounds. A bachelor's degree or the equivalent is required, generally in German studies or a related field. All applications are routed through the UNC Graduate School. Please read UNC's admissions instructions at gradschool.unc.edu/admissions for detailed information about the application process and requirements. Questions regarding translation issues and foreign degrees and transcripts should be directed to gsll@unc.edu.

Application Deadline

Applicants are strongly encouraged to complete their applications by December 8 and must meet all posted deadlines at gradschool.unc.edu/admissions.

Course of Study

1. Five core courses: Foreign Language Pedagogy, Theories, and Practices; Cultural Foundations in German Studies, to 1800; Cultural Foundations in German Studies, 1800 to the Present; Middle High German; and German Linguistics. Incoming students who have satisfactorily completed equivalent graduate courses may be exempted by the director of graduate studies and graduate advising (DGS) from one or more of the required courses.
2. Students are required to take two courses outside the German studies program that complement the students' areas of interest in an interdisciplinary fashion. In their first semester students take all their course work in the program. In subsequent semesters, students may take one course per semester outside the program. All courses taken outside the program must be approved by the directors of graduate study.
3. A total of 16 courses (including those enumerated above), two of which may be credit for work on the dissertation.
4. A Ph.D. preliminary exam, normally by the end of the third year.
5. An oral dissertation defense, normally by the end of the fifth year.

In addition, students are strongly encouraged to attend the program's monthly "works-in-progress" seminar, at which faculty, advanced graduate students, and guests present their current research.

Qualifying Requirements

1. Satisfactory performance in all course work.
2. Satisfactory performance in the teaching program.
3. Demonstration of superior level on the ACTFL scale for proficiency in German, including all four competencies (reading, writing, speaking, and listening), usually by the time the student enters the program or by the end of the first year of study.
4. Demonstration of reading knowledge in a second foreign language relevant to the student's research, as approved by the DGS.
5. All students will submit an annual plan of study form each year prior to completion of their preliminary exam. Doing so encourages students to reflect in broad terms on their current intellectual interests and possible future trajectories for these interests. Students can access this form on the program's Web site (www.german.trinity.duke.edu/carolina-duke-grad/) under the "Program of Study" tab just below the heading "Qualifying Requirements." The document is titled "Annual Plan of Study Report."
6. Successful completion of the writing proficiency review, normally by the end of the second year of study. Normally, students will submit a revised paper originally written for one of their courses.
7. Completion of the preliminary examination with a grade of "pass." The exam is normally taken in the third year of study.
8. Successful completion of a dissertation chapter review, usually by the end of the fourth year of study.

Course Work

Checklist of 16 Courses

1. Foreign Language Pedagogy
2. Foundations, to 1800
3. Foundations, 1800 to present
4. Middle High German
5. German Linguistics

6–7. Electives: Course from outside the program

8–14. Electives

15–16. Dissertation research

Courses outside German Studies: Students will normally take at least two courses outside of the German studies program. They are encouraged to take more as relevant to their interests and research.

Transfer Credit: Students coming in with an M.A. in German may, at the discretion of the directors of graduate studies, receive credit for coursework completed at their previous institution. A maximum of four courses can be remitted, and decisions about credit for prior course work will be made at the end of the students' first year in the Carolina–Duke graduate program.

Teaching

Teacher training is a central component of the Carolina–Duke graduate program in German studies. Both departments provide rigorous training in foreign language teaching, which includes an introduction to the interdisciplinary fields of applied linguistics and second language acquisition.

Teaching assistantships are normally available to students in their second through fifth years of study who continue to make satisfactory progress towards the completion of their degree.

It is crucial that teaching assistants (TAs) have highly advanced German language skills. During their first year, students' language proficiency in German will be evaluated. Only students who achieve a level of "superior" (see ACTFL guidelines) will be asked to teach in the German language program. Students who do not possess the required proficiency in German will be expected to obtain this proficiency as soon as possible.

Beginning TAs generally teach first-year German and take the foreign language pedagogy course concurrently with their first semester of teaching. In later semesters, graduate students often teach second-year German, and occasionally more advanced undergraduate courses as well (German culture and society, advanced composition, introduction to German literature). In addition, students may serve as discussion leaders in larger lecture courses or serve as research assistants.

Reviews, Examinations, Dissertation

The Annual Plan of Study Report. All students will have to prepare and submit to the DGS an updated plan of study form by January 31 of years 1–3. Once the preliminary exam has been taken, this form is no longer required.

The Writing Proficiency Review. For the writing proficiency review—an hour-long oral review that takes place in the second year of study—students submit a scholarly paper, normally written in English and about 30 pages in length, which expands and reworks a paper written for one of their courses. The DGS sets up a committee of three faculty members, including the student's primary advisor, in consultation with the student.

Ph.D. Committee. For the purpose of the preliminary examination, the Ph.D. committee consists of four faculty members, including the faculty advisor, selected by the student in consultation with the faculty advisor and the DGS. A fifth faculty member will be added to the committee for the dissertation chapter review and the dissertation defense. Typically, faculty from the preliminary exam will also serve on the dissertation review and dissertation defense committees.

The Preliminary Examination. The purpose of the preliminary exam is to ensure competency in a teaching field and to establish a comprehensive intellectual framework for the dissertation project. The exam should be designed so that students approach their teaching interests and dissertation research in such a way as to engage a set of broad questions that will speak to scholars both within and outside the field of German studies. The exam centers on two equally weighted lists, one of which generally concerns itself with a broadly defined literary field, such as a recognized period, movement, or genre across several periods. The other list focuses on a more specific topic such as represents the student's projected area of doctoral research, it being understood that by "area" of doctoral research something broader is envisioned than a list of texts immediately pertinent to the "topic" of the dissertation. In keeping with the prevalent conception of German studies, at least one of the exam lists ought to have a substantive interdisciplinary component; this might include integrating a particular historical span of literary production with an adjacent and related area, such as visual culture, music, religion, cultural anthropology, literary or critical theory, media studies, philosophy, linguistics, or political theory.

The preliminary examination has both a written and an oral component. In consultation with their advisor and the DGS, students may choose either of the following formats for the written portion of the exam.

(1) An in-house, closed book exam. Students are given eight hours to respond to three out of a set of six exam questions assembled by the student's faculty advisor in consultation with committee members. The program will provide a computer for the exam and a quiet room; legible handwritten exams are also acceptable.

(2) A take-home, open-book exam, consisting of two substantial questions, one on each field, given every other day. Students are given 24 hours per question and are expected to submit an essay of roughly 15 pages on the assigned topic. Students are encouraged to make use of all available technology and of any materials, resources, databases, etc., they would normally consult while doing research.

The oral portion of the exam, with questions from all examiners, lasts about 90 minutes and generally takes place within two weeks of the written exam.

Dissertation Overview. A successful German studies Ph.D. dissertation must constitute a significant contribution to the field of German studies.

Following the preliminary exam in their third year of study, students are generally expected to complete their dissertation chapter review during their fourth year of study, and to defend their dissertation by the end of the fifth year.

Dissertation Chapter Review. In consultation with their advisor, students develop a dissertation project. Students submit to the dissertation review committee a chapter of 30–45 pages, a two-to-three-page overview of the dissertation, and a comprehensive bibliography. The oral review lasts approximately 1–2 hours.

Dissertation Defense. When the student and the primary advisor are satisfied that a defensible draft is complete, they will offer it to the members of the committee for final approval and set a date for the final examination (also known as the dissertation defense). The defense will usually be held as soon after submission of the final draft as is practical and in keeping with University and Graduate School requirements.

Study and Research Abroad

Students are strongly encouraged to study and conduct research abroad as an integral part of their graduate work. Both Duke University and the University of North Carolina at Chapel Hill have strong, long-standing partnerships with German universities.

Duke offers student exchanges with the Free University of Berlin and the University of Potsdam, programs in which graduate students in German studies regularly participate. Additionally, Duke University's Department of Germanic Languages and Literatures has initiated a graduate student exchange with the University of Duisburg-Essen, which typically takes the American graduate students to Essen for four weeks of intensive study in May or June, with a corresponding visit of German students to Durham in September. Finally, select graduate students will be invited to serve as mentors, instructors, and/or program assistants in the undergraduate Duke study abroad summer program in Berlin.

The University of North Carolina at Chapel Hill has partnerships with German universities, including exchanges with Göttingen, Tübingen, and the state of Baden-Württemberg. Its German department has a TA exchange with the University of Tübingen, annually sending one graduate student to Tübingen to teach English and pursue further graduate studies.

Further, graduate students in German at Duke University and the University of North Carolina at Chapel Hill have a strong track record for successful DAAD and Fulbright fellowships for study abroad.

The M.A. in Slavic languages and literatures meets general requirements of The Graduate School plus certain departmental requirements. A student may emphasize Russian literature and culture or comparative Slavic and East European literatures and cultures.

All students are required to register for three credits of SLAV 993 (master's thesis credits), write and defend a master's thesis, and pass an M.A. oral exam to demonstrate mastery of a reading list in the student's

major language concentration(s). This M.A. oral exam generally takes place during the thesis defense. In addition, students must satisfy a language requirement (reading knowledge only) in one modern foreign language other than a Slavic language.

The master's candidate in Russian literature and culture requires a total of 31 credit hours (including 3 credits for SLAV 993). Each student is required to

a) Take a 1-credit Slavic Seminar (SLAV 700).

b) Take one course (3 credits) in 18th-century Russian literature and culture.

c) Take seven courses (total of 21 credits) to be distributed, with graduate advisor supervision, in 19th- and 20th-century Russian literature and culture.

d) Pass or place out of Fourth-Year Russian Conversation and Reading (RUSS 412) (3 credits).

The master's candidate in comparative Slavic and East European literatures and cultures is required to

a) Take a 1-credit Slavic Seminar (SLAV 700).

b) Take four courses (12 credits) in Russian literature and culture.

c) Take three comparative Russian and Slavic/East European literature and culture courses, or three exclusively non-Russian Slavic/East European literature and culture courses (9 credits), in consultation with the graduate advisor.

d) Pass or place out of two courses (one year) in a modern Slavic/East European language other than Russian.

In addition, students who wish to teach in the Russian program are expected to complete the 1-credit Russian Pedagogy course (RUSS 790) in the year preceding their first year of teaching.

Please note that some language courses below are offered only when space and funding are available. Please check with the department (gsll@unc.edu) for specific course offerings.

Germanic and Slavic Languages and Literatures

Courses for Graduates and Advanced Undergraduates
GSLL

490 Topics in Germanic and Slavic Languages and Literatures (3). Examines selected themes in the history, culture, society, art, and/or literature of Germanic and Slavic/East European countries.

496 Independent Readings in Germanic and Slavic/East European Studies (1–3). Special readings and research in a selected field or topic related to Germanic and Slavic/East European Studies, under the direction of a faculty member.

691H Honors Course (3). Permission of the director of undergraduate studies. For majors only. Reading and special studies under the direction of a faculty member.

692H Honors Course (3). Permission of the director of undergraduate studies. For majors only. Reading and preparation of an essay under the director of a faculty member, designed to lead to the completion of the honors thesis.

693H Honors Seminar (3). Permission of the director of undergraduate studies. For majors only. Introduction to research techniques and preparation of an essay, designed to lead to the completion of the honors thesis.

German

Courses for Graduates and Advanced Undergraduates
GERM

400 Advanced German Grammar (3). Prerequisites, GERM 302 and 303. Permission of the instructor for students lacking the prerequisites. A study of current German structure and usage. Course strengthens the writing of graduate students and helps them confront the problems most frequently faced in speaking and teaching.

500 History of the German Language (3). Prerequisites, GERM 302 and 303. Permission of the instructor for students lacking the prerequisites. Development of phonology and morphosyntax from ancient times to present. Political, social, and literary forces influencing the language.

501 German Linguistics (3). Prerequisites, GERM 302 and 303. Permission of the instructor for students lacking the prerequisites. LING 101 recommended for undergraduates. Introduction to formal analysis of German grammar (phonology, morphophonemics, prosodics, morphology, syntax) within the framework of generative grammar.

502 Middle High German (3). Prerequisites, GERM 302 and 303. Permission of the instructor for students lacking the prerequisites. Introduction to medieval German language and literature. Readings in medieval German; lectures in English.

505 Early New High German (3). Permission of the instructor for undergraduates. Reading and linguistic analysis of Early New High German texts, with study of phonology, morphology, and syntax. On demand.

508 Old High German (3). Permission of the instructor for undergraduates. Reading and linguistic analysis of Old High German texts, with study of phonology, morphology, and syntax; comparison of the various dialects with other older dialects of Germanic. On demand.

511 Old Saxon (3). Permission of the instructor for undergraduates. Reading and linguistic study of biblical texts (*Heliand, Genesis*) in Old Saxon, with study of phonology, morphology, and syntax; comparison with Old English, Old High German, and other Germanic dialects. On demand.

514 Old Norse I (Old Icelandic) (3). Permission of the instructor for undergraduates. Reading and linguistic analysis of Old Norse (Old Icelandic) texts, with study of phonology, morphology, and syntax; comparison with other older dialects of Germanic. On demand.

515 Old Norse II (Old Icelandic) (3). Permission of the instructor for undergraduates. Continuation of GERM 514. On demand.

517 Gothic (3). Permission of the instructor for undergraduates. Reading and linguistic analysis of Gothic biblical texts, with study of phonology, morphology, and syntax; comparison with other older dialects of Germanic. On demand.

520 Stylistics: Theory and Practice (3). Prerequisites, GERM 302 and 303. Permission of the instructor for students lacking the prerequisites. LING 101 recommended for undergraduates. Study of stylistic theories and practices in literature and linguistics, analysis of a large variety of texts, written exercises, training in the use of stylistic devices.

521 Variation in German (3). Prerequisites, GERM 302 and 303. Permission of the instructor for students lacking the prerequisites. LING 101 recommended for undergraduates. Major topics in sociolinguistics: development of the German language, traditional dialects, variation in contemporary speech, German as a minority language (Alsace, Belgium), German outside of Germany (Austria, Switzerland, Luxemburg, Liechtenstein).

545 Problems in Germanic Linguistics (3). Prerequisites, GERM 302 and 303. Permission of the instructor for students lacking the prerequisites. LING 101 recommended for undergraduates. Special problems will be selected for intensive investigation. Subject matter of the course will be adapted to the particular interests of the students and instructor.

590 Topics in Germanic Linguistics (3). Prerequisites, GERM 302 and 303. Permission of the instructor for students lacking the prerequisites. LING 101 recommended for undergraduates.

601 Elementary German for Graduate Students (3). Permission of the instructor for undergraduates. With GERM 602, a two-semester sequence designed as preparation for the reading knowledge examination for higher degrees in the humanities, social sciences, physical sciences, etc.

602 Elementary German for Graduate Students, Continued (3). Permission of the instructor for undergraduates. Continuation of GERM 601.

605 Comparative Germanic Grammar (3). Permission of the instructor for undergraduates. LING 101 recommended for undergraduates. Analysis of phonological, morphological, and syntactic development from Indo-European to the older stages of Germanic dialects.

615 Cultural Foundations in German Studies, to 1800 (3). Permission of the instructor for undergraduates. First part of a two-semester sequence offering students a comprehensive, text-based survey of German literary history from the High Middle Ages to the present.

616 Cultural Foundations in German Studies, 1800 to Present (3). Permission of the instructor for undergraduates. Second part of a two-semester sequence offering students a comprehensive, text-based survey of German literary history from the High Middle Ages to the present.

625 Early Modern Literature (3). Permission of the instructor for undergraduates. German literature of the 15th, 16th, and 17th centuries. Close readings, lectures, and discussions of representative texts.

630 18th-Century Literature (3). Permission of the instructor for undergraduates. Literature in the Age of Enlightenment. Close readings, lectures, and discussions of representative texts.

640 Early 19th-Century Literature (3). Permission of the instructor for undergraduates. Literature of the Romantic period. Close readings, lectures, and discussions of representative texts.

645 Later 19th-Century Literature (3). Permission of the instructor for undergraduates. Literature of Realism, Naturalism, and related movements. Close readings, lectures, and discussions of representative texts.

650 Early 20th-Century Literature (3). Permission of the instructor for undergraduates. Major figures of the period from the turn of the century to World War II. Close readings, lectures, and discussions of representative texts.

655 Later 20th-Century Literature (3). Permission of the instructor for undergraduates. Literature since World War II in both the Federal Republic and the former GDR. Close readings, lectures, and discussions of representative texts.

683 Moving-Image Avante-Gardes and Experimentalism (3). Prerequisite, ARTH 159, COMM 140, or ENGL 142. Permission of the instructor for students lacking the prerequisite. History and theory of international avant-garde and experimentalist movements in film, video, intermedia, multimedia, and digital formats. Content and focus may vary from semester to semester.

685 Early 21st-Century German Literature (3). Permission of the instructor for undergraduates. Literature since German unification in 1989. Close readings, lectures, and discussions of representative texts.

691H Honors Course (3). Permission of the director of undergraduate studies. Majors only. Reading and special studies under the direction of a faculty member.

692H Honors Course (3). Permission of the director of undergraduate studies. Majors only. Reading and preparation of an essay under the direction of a faculty member, designed to lead to the completion of the honors thesis.

693H Honors Seminar (3). Permission of the director of undergraduate studies. Majors only. Introduction to research techniques and preparation of an essay, designed to lead to the completion of the honors thesis.

Courses for Graduate Students

GERM

700 Foreign Language Pedagogy: Theories and Practice (3). For prospective teachers of German. Required of all teaching assistants.

703 Advanced Topics in Foreign Language Pedagogy (3). Prerequisite, GERM 700. This seminar provides experienced teaching assistants the opportunity to revisit the fundamentals in foreign language pedagogy while exploring in greater depth advanced issues like content-based instruction, technology, and supervising.

705 Essay Course (1). Must be taken with a German Department course numbered 620–689. Courses numbered 620–689 may be taken in conjunction with GERM 705 for one additional credit hour. German Department graduate students only. Requires a term paper.

706 Topics in Literary Theory (3). Literary and cultural theory with a German accent. Topics may include hermeneutics, Frankfurt School, reception theory, psychoanalysis, new historicism, and other strains of contemporary theory relevant to German studies.

820 Topics in Medieval Literature (3).

825 Topics in Modern Literature (3).

830 Topics in 18th-Century Literature (3).

840 Topics in Early 19th-Century Literature (3).

845 Topics in Later 19th-Century Literature (3).

850 Topics in Early 20th-Century Literature (3).

855 Topics in Later 20th-Century Literature (3).

860 Topics in Aesthetics and Criticism (3).

861 Topics in Literary Genres (3). Explores issues associated with various literary genres across various literary periods.

865 Topics in German Cultural Studies (3).

870 Topics in Gender Studies (3).

875 Topics in German Jewish Studies (3).

880 Topics in German Cinema (3).

896 Independent Readings (1–12). Permission of the instructor and the director of graduate studies. Special readings and research in a selected field or topic outside the scope of current course offerings.

980 Seminar in German Literature (3).

985 Seminar in German Linguistics (3).

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Duke German Studies Courses

(Please also check the Duke University course catalog at registrar.duke.edu/courses-classroom/course-catalog)

499S Seminar in German Studies (3). Review of current debates and historical perspectives in the German cultural field, structured through contributing disciplines: social and economic history, political theory and history, literature, fine arts, music, philosophy, and religion. Team-taught, involving a wide range of faculty in the German Studies Program. Taught in English.

532S Fin-De-Siècle and Interwar Vienna: Politics, Society, and Culture (HISTORY 532S) (3). Advanced undergraduate and graduate colloquium and research seminar focusing on the cultural milieu of fin-de-siècle and interwar Vienna. Readings in the Austro-Marxists, the Austrian School of Economics, Freud, Kraus, the Logical Positivists, Musil, Popper, and Wittgenstein. Monographs on the Habsburg Empire, fin-de-siècle culture and technology, Viennese feminism, Austrian socialism, philosophy of science, literature and ethics, and the culture of the Central European émigrés.

560 History of the German Language (LINGUIST 560, MEDREN 607) (3). Phonology, morphology, and syntax of German from the beginnings to the present.

561S Second Language Acquisition Theory and Practice (LINGUIST 561S) (3). Overview of current research in the fields of second language acquisition and foreign language pedagogy, and its implications for the teaching of the German language, literature, and culture at all levels. Readings and discussions on competing theories of language acquisition and learning, issues of cultural identity and difference, learner styles, and the teaching of language as culture; training in contemporary teaching techniques and approaches.

575S Hegel's Political Philosophy (PHIL 536S, POLSCI 676S) (3). Within context of Hegel's total philosophy, an examination of his understanding of phenomenology and the phenomenological basis of political institutions and his understanding of Greek and Christian political life. Selections from Phenomenology, Philosophy of History, and Philosophy of Right. Research paper required.

576S Nietzsche's Political Philosophy (PHIL 537S, POLSCI 577S) (3). Study of the thinker who has, in different incarnations, been characterized as the prophet of nihilism, the destroyer of values, the father of fascism, and the spiritual source of postmodernism. An examination of his philosophy as a whole in order to come to terms with its significance for his thinking about politics.

580S Music in Literature and Philosophy (English 580S) (3).

586S Literary Guide to Italy (AMI 640S, ITALIAN 586S, LIT 542S) (3). A journey of Italy through literary, cinematic, and musical texts through Italy's sights and customs, as well as the place of Italy, both the real and imagined, in the aesthetics of the Grand Tour. Taught in English.

590S Special Topics (3). Special topics in German literature and cultural studies. Taught in English.

610S Introduction to Medieval German: The Language of the German Middle Ages and Its Literature (MEDREN 610S) (3). Basic reading skills in the medieval German language (Middle High German) developed by working with literary texts in their original idiom. Canonical texts such as courtly love poetry (Walther von der Vogelweide), Arthurian romance (Hartmann von Aue, Wolfram), and heroic epic (Nibelungenlied). Understanding manuscript culture, philological inquiry, medieval intellectual practices, relationship between learned Latin culture and educated vernacular cultures. Research paper required. Readings and discussion in German.

690 Special Topics in German Literature and Culture (3). Topics vary by semester.

690S Special Topics in German Literature and Cultural Studies (3).

700S German Pedagogy (3). Overview of current research in the fields of second language acquisition and foreign language pedagogy, and its implications for the teaching of the German language, literature, and culture at all levels. Readings and discussions on competing theories of language acquisition and learning, issues of cultural identity and difference, learner styles, and the teaching of language as culture; training in contemporary teaching techniques and approaches.

701 German Studies: Theory and Practice (3). German studies at the intersection of various discourses (such as feminism, psychoanalysis, new historicism), questioning traditional concepts such as national identity, history, and language. Interdisciplinary issues may include: the relationship of literature, the unconscious and technology; the cinematic representation of Nazi history; architecture, monuments, and "German" space. Texts might include works by Kafka, Freud, Marx, Spengler, and Schinkel as well as texts by individuals whose work has been excluded from more traditional "Germanistik" courses.

721S Sex, Gender, and Love in Medieval German Literature (3). Historical contexts for emergence of courtly love and the role of desire and interpretation in Gottfried von Strassburg's Tristan und Isolde, courtly love lyric, 'maere.'

740S Introduction to Goethe (3). Major works of lyric, narrative, drama, and theory, throughout Goethe's career. Readings and discussions in German.

745S Goethe's Faust (3). Goethe's masterpiece and life's work, conceived as a summation of Western literature and mythology for the modern age. Readings and discussions in German.

790-1 Topics in Literary Theory (3). Literary theories and methods in their history and philosophical contexts. Issues include canonicity, German identity debates, and the claims of aesthetic language.

790-2 Topics in Literary History (3). Relations between an established German literature and its competing cultural centers; classical and popular cultures, literary conventions, and nonliterary discourses (religious, national, scientific), the construction of Austrian and Swiss traditions.

790-3 Topics in Genre Theory (3). The construction of German literature through generic frameworks: Minnesang, epic, baroque lyric and drama, classical ballad, folksong, Bildungsroman, expressionist film, others.

801S The Discipline of Germanistik: A Historical Survey (3). A study of trends in scholarly criticism within the context of German culture and politics beginning in the 1810s with the origins of Germanistik as a university discipline. Topics may include: the invention of philology and the romantic enterprise; positivism and Geistesgeschichte; the politics of Germanistik, 1933–45; Germanistik in Europe and the United States after 1945.

810S Germanic Seminar (3).

995S Graduate Dissertation Colloquium (3). The course will probe the complexities of advanced research from several perspectives: the opening up or extension of a specific scholarly field; the articulation of results in a broad professional context, including publication; the translation of personal explorations into pedagogical assets. German studies students

will present dissertation chapters; German studies faculty will give guest talks surveying their own work, its interdisciplinary implications and the goal of synthesizing research and teaching.

Dutch

Courses for Graduates and Advanced Undergraduates
DTCH

402 Elementary Dutch (3). Rapid introduction to modern Dutch with emphasis on all fundamental components of communication.

403 Intermediate Dutch (3). Focuses on increased skills in speaking, listening, reading, global comprehension, and communication. Emphasis on reading and discussion of longer texts.

404 Advanced Intermediate Dutch (3). Aims to increase proficiency in language skills (reading, speaking, writing) and is constructed around a series of themes meant to introduce students to Dutch society, culture, and history.

405 Topics in Dutch Culture: A Literary Survey (3). Prerequisite, DTCH 404. Permission of the instructor for students lacking the prerequisite. Ability to read and speak Dutch at intermediate to advanced level recommended. Introduction to Dutch literature from Middle Ages to the present. Survey of topics in Dutch culture.

Slavic

Courses for Graduates and Advanced Undergraduates
SLAV

405 Introduction to Slavic Linguistics (3). The phonological and morphological history of Slavic languages from the late Indo-European to the split of the common Slavic linguistic unity.

463 Medieval Slavic Culture (RELI 463) (3). Survey of medieval Slavic culture, beginning with Christianization in the ninth and 10th centuries. Themes include Byzantine missions, the replacement of paganism with Christianity, the oral traditions, and Slavic literary relations. Readings in English for non-Slavic concentrators.

464 Imagined Jews: Jewish Themes in Polish and Russian Literature (JWST 464) (3). Explores the fictional representation of Jewish life in Russia and Poland by Russian, Polish, and Jewish authors from the 19th century to the present. Readings in English for non-Slavic concentrators.

465 Literature of Atrocity: The Gulag and the Holocaust in Russia and Eastern Europe (JWST 465, PWAD 465) (3). Literary representation in fiction, poetry, memoirs, and other genres of the mass annihilation and terror in Eastern Europe and the former Soviet Union under the Nazi and Communist regimes. Readings in English for non-Slavic concentrators.

467 Language and Political Identity (PWAD 467) (3). This course examines the roles of language policy and linguistic controversies in determining national identity and fueling political polarization. It focuses primarily on western and eastern Europe and Central Asia.

469 Coming to America: The Slavic Immigrant Experience in Literature (JWST 469) (3). Fictional and autobiographical expressions of the Slavic and East European immigrant experience in the 20th century. Readings include Russian, Polish, Jewish, and Czech authors from early 1900s to present. Readings in English for non-Slavic concentrators.

470 20th-Century Russian and Polish Theater (3). A comparative survey of the major trends in 20th-century Russian and Polish dramaturgy and theatrical production, with attention to aesthetic, professional, and political connections between the two. Readings in English for non-Slavic concentrators.

490 Topics in Slavic Culture (3). Comparative study of topics in non-Russian Slavic literatures and culture not covered in any other course. Specific topics will vary and will be announced in advance. Taught in English. Some readings in the target language(s) for qualified students.

500 Old Church Slavonic (3). An introduction to the language of the oldest Slavic texts. Translation, grammatical analysis, comparison of texts.

560 Reading Other Cultures: Issues in Literary Translation (CMPL 560) (3). Permission of the instructor. Reading knowledge of a language other than English recommended. Starting from the proposition that cultural literacy would be impossible without reliance on translations, this course addresses fundamental issues in the practice, art, and politics of literary translation.

580 East European Literary Criticism (3). Survey of 20th-century Slavic literary criticism. Russian formalists, Bakhtin and his circle, Czech structuralists, Soviet semiotics. Emphasis on influence of Slavic criticism on development of Western literary criticism.

691H Honors Reading Course (3). Slavic and East European languages and cultures majors only. Research and writing of an honors thesis on an agreed-upon topic not covered by scheduled courses, under the direction of departmental advisors.

692H Honors Reading Course (3). Slavic and East European languages and cultures majors only. Research and writing of an honors thesis on an agreed-upon topic not covered by scheduled courses, under the direction of departmental advisors.

Courses for Graduate Students
SLAV

700 Proseminar in Slavic Literature (1). Graduate students only. A seminar that acquaints graduate students with the basic resources for conducting research in their field and trains them in various critical approaches to the analysis of Slavic literatures.

740 Reading Course (1–21).

751 East Slavic Linguistics (3). Prerequisite, SLAV 405. Required preparation, four years of study of any East Slavic language. An examination of the linguistic history and contemporary dialectology of the East Slavic languages (Russian, Ukrainian, Belarusian) with emphasis on Russian.

752 West Slavic Linguistics (3). Prerequisites, SLAV 405 and/or 500. Required preparation, one year of any West Slavic language. An examination of the linguistic history and contemporary dialectology of the West Slavic languages (Polish, Czech, Slovak, Upper and Lower Sorbian, Kashubian, Slovincian, Pomeranian).

753 South Slavic Linguistics (3). Prerequisite, SLAV 405. Required preparation, one year of study of any South Slavic language. An examination of the linguistic history and contemporary dialectology of the living South Slavic languages (Slovenian, Serbo-Croatian, Macedonian, Bulgarian).

760 Topics in Slavic Sociolinguistics (3). A seminar that acquaints graduate students with the variety of approaches to sociolinguistics research, with particular emphasis on the extant literature in Slavic sociolinguistics, language and identity, language and the nation.

905 Seminar in Slavic Linguistics (3). Selected issues in Slavic synchronic and diachronic linguistics.

960 Pre-Dissertation Research (3).

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Russian

Courses for Graduates and Advanced Undergraduates
RUSS

400 The Evolution of Russian (3). This course traces the development of Russian from late common Slavic to contemporary Russian. Consideration is given to linguistic developments as well as cultural, social, and historical circumstances shaping contemporary Russian.

405 The Structure of Modern Russian (3). Prerequisite, RUSS 400. Permission of the instructor for students lacking the prerequisite. For students who want a systematic understanding of the language. Synchronic analysis of contemporary standard Russian phonology, morphology, morphophonemics, semantics, and syntax.

406 Advanced Russian Grammar (3). Prerequisite, RUSS 204. Permission of the instructor for students lacking the prerequisite. A comprehensive review of Russian grammar on an advanced level, emphasizing reading and writing skills.

407 Advanced Russian Grammar (3). Prerequisite, RUSS 406. Permission of the instructor for students lacking the prerequisite. A comprehensive review of Russian grammar on an advanced level, emphasizing reading and writing skills.

411 Advanced Russian Conversation and Composition (3). Prerequisite, RUSS 322 or 407. Permission of the instructor for students lacking the prerequisite. Designed to develop conversational and writing skills in a variety of situations and subjects.

412 Advanced Russian Conversation and Composition (3). Prerequisite, RUSS 411. Permission of the instructor for students lacking the prerequisite. Designed to develop conversational and writing skills in a variety of situations and subjects.

413 Russian Stylistics (3). Prerequisite, RUSS 412. Permission of the instructor for students lacking the prerequisite. Advanced Russian conversation and composition, with appropriate grammatical and stylistic explanations. Can be taken repeatedly for credit, but only counts once toward degree requirements.

414 Russian Stylistics (3). Prerequisite, RUSS 413. Permission of the instructor for students lacking the prerequisite. Continuation of Russian Stylistics at a more advanced level.

431 Dandies and Dead Souls: Russian Literature and Culture, 1800–1850 (3). A survey of major works of Russian literature and culture in the first half of the 19th century. Readings in English translation. Some readings in Russian for qualified students.

432 Great Novels and Cursed Questions: Russian Literature and Culture, 1850–1881 (3). A survey of major works of Russian literature and culture in the Golden Age, an era of sociopolitical reform. Readings in English translation. Some readings in Russian for qualified students.

435 Literature and Music in Russia (3). Exploring the uses Russian composers have made of literary works and motifs, as well as the response of Russian writers to musical compositions and composers, and to music as an art form. Readings in English translation. Some readings in Russian for qualified students.

441 From Decadence to Revolution: Russian Literature and Culture, 1881–1945 (3). A survey of major works of fin-de-siècle Russian and early Soviet literature and culture. Readings in English translation. Some readings in Russian for qualified students.

442 From Cold War to Capitalism: Russian Literature and Culture, 1945–Present (3). A survey of major works of Russian literature and culture from 1945 to the present. Readings in English translation. Some readings in Russian for qualified students.

460 Russian Short Story (3). An introduction to the Russian short story. The readings, in English for nonmajors and in Russian for majors, include works from the 17th century to the present. Readings in Russian for majors, in English for nonmajors.

462 Russian Poetry of the 19th Century (3). Readings and lecture on 19th-century Russian poetry. Readings in Russian.

463 Russian Drama: From Classicism to Modernism (3). Survey of Russian drama as a literary and theatrical phenomenon from the end of the 18th to the beginning of the 20th century. Readings in English translation. Some readings in Russian for qualified students.

464 Dostoevsky (3). Study of major works of Dostoevsky and a survey of contemporary authors and literary trends relevant to his creative career. Readings in Russian for majors, in English for nonmajors.

465 Chekhov (3). Study of major works of Chekhov and survey of contemporary authors and literary trends relevant to his creative career. Readings in Russian for majors, in English for nonmajors.

469 Bulgakov (3). Study of major works of Mikhail Bulgakov, including *The Master and Margarita*, and a survey of contemporary Russian history and culture relevant to his creative career. Readings in English, in Russian for majors.

471 Gogol (3). Study of major works of N. V. Gogol and a survey of contemporary authors and literary trends relevant to his creative career. Lectures and seminar discussions. Readings in Russian for majors, in English for nonmajors.

473 Vladimir Nabokov (3). Exploration of Vladimir Nabokov's prose fiction written in Germany and America. Emphasis placed on the primary texts, but some secondary readings included. Movies based on Nabokov's novels will be viewed as well. Readings in Russian for majors, in English for nonmajors.

475 Literature of Russian Terrorism: Arson, Bombs, Mayhem (PWAD 475) (3). Literary representations of Russian revolutionaries and terrorists in the 19th and early 20th centuries. Readings by Dostoevsky, Chernyshevsky, Bely, Joseph Conrad, and by some of the terrorists themselves. Readings in English translation. Some readings in Russian for qualified students.

479 Tolstoy (3). Study of the major works of Tolstoy and a survey of contemporary authors and literary trends relevant to his creative career. Readings in Russian for majors, in English for nonmajors.

486 Contemporary Russian Women's Writing (WMST 486) (3). A study of Russian women's writing after World War II, including both fictional and propagandistic works analyzed in their sociopolitical context. Serves as an introduction to Russian women's studies. Readings in Russian for majors, in English for nonmajors.

490 Topics in Russian Culture (3). Study of topics in Russian literature and culture not currently covered in any other course. The specific topic will be announced in advance. Taught in English. Some readings in Russian for qualified students.

511 Russian Mass Media I (3). Prerequisites, RUSS 411 and 412. Permission of the instructor for students lacking the prerequisites. Module 1. Fifth-year Russian, intended to expand and master the knowledge of the language necessary for understanding deep ongoing changes in different spheres of Russian society.

512 Russian Mass Media II (3). Prerequisites, RUSS 411 and 412. Permission of the instructor for students lacking the prerequisites. Module 2. Fifth-year Russian, intended to expand and master the knowledge of the language necessary for understanding deep ongoing changes in different spheres of Russian society.

513 Russian Culture in Transition I (3). Prerequisite, RUSS 411. Permission of the instructor for students lacking the prerequisite. Fifth-year Russian, to expand knowledge of the language necessary for understanding social changes that are taking place in Russian society, in literature, art, culture, and everyday human mentality.

514 Russian Culture in Transition II (3). Prerequisite, RUSS 412. Permission of the instructor for students lacking the prerequisite. RUSS 513 is not a prerequisite. Fifth-year Russian, continuing with the theme of RUSS 513 offered in the fall semester.

560 Russian Sentimentalism and Romanticism (3). Prerequisite, RUSS 407. Permission of the instructor for students lacking the prerequisite. Survey of Russian sentimentalism and romanticism, with special attention to the intellectual currents of the period (ca. 1770 to 1850). Consideration of Western precursors (Rousseau, Sterne, Byron, et al.). Readings in Russian.

691H Honors Reading Course (3). Russian language and culture majors only. Researching and writing of an honors thesis on an agreed-upon topic not covered by scheduled courses, under the direction of departmental advisors.

692H Honors Reading Course (3). Russian language and culture majors only. Researching and writing of an honors thesis on an agreed-upon topic not covered by scheduled courses, under the direction of departmental advisors.

Courses for Graduate Students
RUSS

790 Teaching Methods and Materials (1). For prospective teachers of Russian. Required of all teaching assistants.

851 Pushkin (3). Study of major works of Pushkin.

859 Medieval and Baroque Russian Literature (3). Literature from the advent of literacy to the late 17th century. Lectures on and interpretations of literature of Kievan Rus' down to Grand Muscovy. Readings in English for non-Slavic concentrators.

860 Russian Literature of the 18th Century (3). A survey of major movements and genres from Prokopovich to Karamzin. Emphasis on Russian formulations of European models of neoclassicism, sentimentalism, and pre-Romanticism.

866 Russian Symbolism (3). Required preparation, reading knowledge of Russian or permission of the instructor. Introduction to the leading writers and works of the Symbolist movement in Russia.

867 Post-Symbolist Poetry (3). Required preparation, reading knowledge of Russian or permission of the instructor. A study of the major poetic works of Gumilev, Akhmatova, Mandelstam, Mayakovsky, Khlebnikov, Pasternak, Tsvetaeva.

892 Russian Versification (3). A study of technical problems and thematic aspects in the development of Russian poetry.

950 Seminar in Russian Literature (3). Permission of the instructor. Seminar on selected topics in Russian literature.

Czech

Courses for Graduates and Advanced Undergraduates
CZCH

401 Elementary Czech (3). Pronunciation, structure of language, and reading in modern Czech.

402 Elementary Czech (3). Pronunciation, structure of language, and reading in modern Czech, continued.

403 Intermediate Czech (3). Continuation of proficiency-based instruction begun in Elementary Czech.

404 Intermediate Czech (3). Continuation of proficiency-based instruction begun in Elementary Czech, continued.

405 Advanced Czech (3). Advanced readings and discussion in Czech in humanities and social science topics.

406 Advanced Czech (3). Advanced readings and discussion in Czech in humanities and social science topics, continued.

411 Introduction to Czech Literature (3). Introduction to Czech literature with an emphasis on 19th- and 20th-century prose. Taught in English. Some readings in Czech for qualified students.

470 Milan Kundera and World Literature (3). This course traces Milan Kundera's literary path from his communist poetic youth to his present postmodern Francophilia. His work will be compared with those authors he considers his predecessors and influences in European literature. Taught in English. Some readings in Czech for qualified students.

490 Topics in Czech Culture (3). Study of topics in Czech and/or Slovak literature and culture not currently covered in any other course. The specific topic will be announced in advance. Taught in English. Some readings in Czech for qualified students.

Hungarian

Courses for Graduates and Advanced Undergraduates
HUNG

401 Elementary Hungarian (3). Pronunciation, structure of language, and reading in modern Hungarian.

402 Elementary Hungarian (3). Pronunciation, structure of language, and reading in modern Hungarian, continued.

403 Intermediate Hungarian Language (3). Continuation of the proficiency-based instruction begun in Elementary Hungarian.

404 Intermediate Hungarian Language (3). Continuation of the proficiency-based instruction begun in Elementary Hungarian, continued.

405 Advanced Hungarian (3). Prerequisite, HUNG 404. Permission of the instructor for students lacking the prerequisite. Advanced readings and discussion in Hungarian in humanities and social science topics.

406 Advanced Hungarian (3). Advanced readings and discussion in Hungarian in humanities and social science topics, continued.

407 The Structure of Modern Hungarian (3). Prerequisite, HUNG 401 or LING 101. Introduction to the phonology, morphology, and syntax of modern standard Hungarian, with emphasis on some of its distinctive typological features.

411 Introduction to Hungarian Literature (3). An introduction to Hungarian literature of the last five centuries through a selection of works in English translation, with supporting background materials including films (with English subtitles). Taught in English; some readings in Hungarian for qualified students.

490 Topics in Hungarian Culture (3). Study of topics in Hungarian literature and culture not currently covered in any other course. The specific topic will be announced in advance. Taught in English; some readings in Hungarian for qualified students.

Macedonian

Courses for Graduates and Advanced Undergraduates
MACD

401 Elementary Macedonian (3). Pronunciation, structure of language, and reading in modern Macedonian.

402 Elementary Macedonian (3). Pronunciation, structure of language, and reading in modern Macedonian, continued.

403 Intermediate Macedonian (3). Continuation of the proficiency-based instruction begun in Elementary Macedonian.

404 Intermediate Macedonian (3). Continuation of the proficiency-based instruction begun in Elementary Macedonian, continued.

405 Advanced Macedonian (3). Advanced reading and discussion in Macedonian in humanities and social science topics.

406 Advanced Macedonian (3). Advanced reading and discussion in Macedonian in humanities and social science topics, continued.

Polish

Courses for Graduates and Advanced Undergraduates
PLSH

401 Elementary Polish (3). Pronunciation, structure of language, and reading in modern Polish.

402 Elementary Polish (3). Pronunciation, structure of language, and reading in modern Polish, continued.

403 Intermediate Polish (3). Continuation of the proficiency-based instruction begun in Elementary Polish.

404 Intermediate Polish (3). Continuation of the proficiency-based instruction begun in Elementary Polish, continued.

405 Advanced Polish (3). Advanced readings and discussion in Polish on humanities and social science topics.

406 Advanced Polish (3). Advanced readings and discussion in Polish on humanities and social science topics, continued.

411 19th-Century Polish Literature and Culture (3). A survey of the major works of 19th-century Polish literature and culture in English translation. Some readings in Polish for qualified students.

412 20th-Century Polish Literature and Culture (JWST 412) (3). A survey of the major works of 20th-century Polish literature and culture in English translation. Some readings in Polish for qualified students.

490 Topics in Polish Culture (3). Study of topics in Polish literature and culture not currently covered in any other course. The specific topic will be announced in advance. Taught in English. Some readings in Polish for qualified students.Serbian and Croatian

Serbian and Croatian

Courses for Graduates and Advanced Undergraduates
SECR

401 Elementary Serbian and Croatian Language (3). Pronunciation, structure of the language, and readings in modern Serbian and Croatian language.

402 Elementary Serbian and Croatian Language (3). Pronunciation, structure of the language, and readings in modern Serbian and Croatian language, continued.

403 Intermediate Serbian and Croatian Language (3). Continuation of the proficiency-based instruction begun in Elementary Serbian and Croatian language.

404 Intermediate Serbian and Croatian Language (3). Continuation of the proficiency-based instruction begun in Elementary Serbian and Croatian language, continued.

405 Advanced Serbian and Croatian Language (3). Advanced readings and discussion in Serbian and Croatian language on humanities and social science topics.

406 Advanced Serbian and Croatian Language (3). Advanced readings and discussion in Serbian and Croatian language on humanities and social science topics, continued.

411 Introduction to Serbian and Croatian Literature (3). Introduction to Serbian and Croatian literature with an emphasis on 19th- and 20th-century prose. Taught in English. Some readings in Serbian and Croatian for qualified students.

490 Topics in South Slavic Culture (3). Study of topics in Serbian, Croatian, and other South Slavic literatures and cultures not currently covered in any other course. The specific topic will be announced in advance. Taught in English. Some readings in the target language for qualified students.

School of Government

www.sog.unc.edu
MICHAEL R. SMITH, *Dean*

Professors

David N. Ammons, Albert Coates Distinguished Professor of Public Law and Government. Public Administration
A. Fleming Bell II, Local Government Law
Maureen M. Berner, Public Administration
Frayda S. Bluestein, Local Government Law, Associate Dean for Faculty Development
John Michael Crowell, Public Law and Government
James C. Drennan, Courts Law and Judicial Administration
Robert L. Farb, Criminal Law and Procedure (Retired)
Joseph S. Ferrell, Property Tax Law, Secretary of the Faculty (Retired)
Cheryl D. Howell, Albert Coates Distinguished Professor of Public Law and Government. Judicial Education and Administration
Robert P. Joyce, Charles Edwin Hinsdale Distinguished Professor of Public Law and Government. Education Law
Diane M. Juffras, Employment Law
Laurie L. Mesibov, Education Law
David W. Owens, Gladys Hall Coates Distinguished Professor of Public Law and Government. Environmental and Land Use Law
William C. Rivenbark, Public Administration
John Rubin, Albert Coates Distinguished Professor of Law and Government. Criminal Law and Procedure
Jessica Smith, Criminal Law and Procedure
Michael R. Smith, Dean
Carl W. Stenberg III, Public Administration
Charles Szypszak, Real Estate Law
Thomas H. Thornburg, Criminal Law, Senior Associate Dean
Richard B. Whisnant, Gladys Hall Coates Distinguished Professor of Law and Government. Environmental Law

Associate Professors
Mark F. Botts, Mental Health Law
Leisha Dehart-Davis, Public Management and Organization Development
Shea R. Denning, Property Tax Law
Richard D. Ducker, Land Use Law
Willow S. Jacobson, Human Resource Management and Organizational Theory
Kara Millonzi, Local Government and Finance
Jill D. Moore, Public Health Law
Jonathan Q. Morgan, Economic Development
Ricardo S. Morse, Public Administration
Kim L. Nelson, Local Government Management
John B. Stephens, Inter-Agency and Public Policy Dispute Resolution
Aimee N. Wall, Albert and Gladys Hall Coates Distinguished Term Associate Professor. Legislative Education and Social Services Law

Assistant Professors
Whitney Afonso, Local Government Budgeting and Finance
Trey Allen, Local Government Law
Ann Anderson, Courts and Estate Law
Sara DePasquale, Juvenile Law
Adam S. Lovelady, Land Use Law and Planning
James Markham, Criminal Law
Christopher B. McLaughlin, Albert and Gladys Hall Coates Distinguished Term Assistant Professor. Tax Law
Christopher Tyler Mulligan, Community and Economic Development
LaToya Powell, Juvenile Law
Meredith Smith, Clerks of Court
Shannon Tufts, Albert and Gladys Hall Coates Distinguished Term Assistant Professor and Director, Center of Public Technology
Jeff Welty, Albert and Gladys Hall Coates Distinguished Term Assistant Professor. Criminal Law

Senior Lecturer
Gregory S. Allison, Governmental Accounting and Financial Reporting

Lecturers
Alyson A. Grine, Albert and Gladys Hall Coates Distinguished Term Lecturer. Social Services Law
Norma Houston, Public Law and Government
Jeffrey A. Hughes, Albert and Gladys Hall Coates Distinguished Term Lecturer. Environmental Services and Programs
Kenneth L. Joyner, Property Tax Administration
Dona Lewandowski, Public Law and Government
Dale Roenigk, Performance Measurement and Public Administration
Vaughn Upshaw, Public Governance

Adjunct Faculty
Vickie Bass, Adjunct Instructor
Douglas Bean, Adjunct Instructor
Julie M. Brenman, Adjunct Instructor
Joanna Carey Cleveland, Adjunct Instructor
Marguerite Creel, Adjunct Instructor
Mary Dillon, Adjunct Instructor
Robert Farb, Adjunct Professor
Andrew George, Adjunct Instructor
Margaret Henderson, Nonprofit Management
David M. Lawrence, Adjunct Professor (Retired)
John T. Lundy, Adjunct Instructor
Janet Mason, Adjunct Professor (Retired)
Kelley O'Brien, Adjunct Instructor
Amy Strecker, Adjunct Instructor
Alan Woodlief, Adjunct Instructor

The School of Government (www.sog.unc.edu) was established at UNC–Chapel Hill in 1931 as the Institute of Government . The SOG has long focused on state and local government in the broader study of government, public law, public finance, and public administration. Today, it is the nation's leading university-based provider of instructional and advisory services to state and local government practitioners. Through instructional programs, advising, research, and publishing, the SOG advances general understanding about government and shares that information with practitioners and other scholars. The SOG offers a program of courses leading to the master of public administration (M.P.A.) degree.

Master of Public Administration (M.P.A.) Degree Program
William C. Rivenbark, *Director*

M.P.A. Program Teaching Faculty
Afonso; Allison; Ammons; Berner; Bluestein; Brenman; Creel; Dehart-Davis; Henderson; Hoyman—Department of Political Science; Hughes; Jacobson; Millonzi; Morgan; Morse; O'Brien; Rivenbark; Roenigk; Stenberg; Stephens; Szypszak; and Tufts.

Program Overview
The SOG offers the M.P.A. degree. Rated among the among the nation's best, the mission of the M.P.A. program is to prepare public service leaders. In pursing this mission, the program offers a curriculum that helps students reach their potential for leadership through rigorous academic study and practical experience.

Accredited by the Network Association of Schools of Public Affairs and Administration, the M.P.A. program has produced graduates serving in governmental and nonprofit organizations. In local government, alumni serve as city and county managers, budget and finance directors, personnel directors, and in other administrative positions. In state government, alumni serve in management and staff positions in policy planning, finance and management, personnel, water resources, health services, education, and other areas. Alumni serve as administrators and analysts in a variety of agencies at the federal level, including the Office of Management and Budget, the Environmental Protection Agency, the Department of Health and Human Services, the Department of Labor, the Government Accountability Office, and on Senate and House committee staffs. In the nonprofit sector, M.P.A. alumni administer programs in the arts, education, economic development, and human services.

More information is available on the Web at www.mpa.unc.edu.

Admission Requirements
The M.P.A. program welcomes applicants from diverse backgrounds. For example, while many of our applicants are from the social sciences, other applicants have undergraduate majors in architecture, business administration, engineering, English, history, industrial relations, and many other fields.

The requirements for admissions are
- Bachelor's degree
- A grade point average (GPA) of 3.0 or higher
- Minimum of three semester hours of credit in American government and politics
- Satisfactory verbal and quantitative scores on the Graduate Record Examination (GRE)
- A purpose statement
- Three letters of recommendation
- Oral interview with the M.P.A. admissions committee

All admissions decisions are made during the spring for fall semester matriculation. Applications must meet the deadlines of The Graduate School.

Financial Aid

The M.P.A. program provides financial assistance to many of its students. Research assistantships and scholarships are available to top candidates. Students also become involved in School of Government projects or work in governmental or nonprofit organizations as graduate assistants.

Course Work and Degree Requirements

A minimum of 44 semester hours of credit, an internship, a portfolio, and a final oral examination are required for the M.P.A. These requirements are designed to ensure that each graduate possesses the core set of competences that supports the M.P.A. program's mission of preparing public service leaders.

Core course requirements are:

- Public Administration Institutions and Values (3)
- Organization Theory (3)
- Public Service Leadership (3)
- Public Administration Evaluation and Analysis I (3)
- Public Administration Evaluation and Analysis II (3)
- Professional Communications (3)
- Human Resource Management (3)
- Public Financial Management (3)
- Law for Public Administration (3)
- Professional Work Experience (1)
- M.P.A. Portfolio (1)

In addition to the core course requirements, each student completes 15 semester hours of elective courses.

Courses for Graduate and Advanced Undergraduate Students
GOVT

660 Municipal Administration (4). This course covers municipal government organization and management, finance, personnel, planning and economic development, and the administration of specific municipal functions.

661 County Administration (4). This course covers county government organization and management, finance, personnel, planning, and economic development, and the administration of specific municipal functions.

662 Information Technology Project Management and Leadership (3). Examines the public sector environment as it relates to information technology development. Special attention focused on the complex environment and its influence on information technology-based solutions.

663 Public Executive Leadership Academy (6). The Public Executive Leadership Academy is designed for North Carolina city and county managers to understand themselves as leaders and to prepare the organization to work with others in improving the quality of life within the community.

664 Chief Information Office Certification Program (5). The CIO Certification Program is designed for chief information officers of local governments in North Carolina. The course lays the foundation for addressing the most critical issues facing IT leadership in local government and equips leaders with tools to manage and improve their organizational assets.

Courses for Graduate and Advanced Undergraduate Students
PUBA

401 State and Local Governance (3). Introduction to local/state public service, including governmental institutions, ethics and public values, and core functions of administrative governance. Discussions led by M.P.A. faculty with practicing public and nonprofit administrators.

Courses for Graduate Students
PUBA

709 Public Administration Institutions and Values (3). This foundation course introduces students to the historical and contemporary social, economic, political, and ethical context of public administration and governance in the United States. Students gain an understanding of public institutions and values and develop skills for interpreting and critically evaluating American public service issues.

710 Organization Theory (3). Provides a conceptual and experiential grounding in theories of management and organizational operation. Students learn how to analyze organizations and their environments from multiple perspectives. Students systematically examine important dimensions of organizational life: what motivates people, how decisions are made, challenges of diversity, conflict, and power dynamics.

711 Public Service Leadership (3). Students learn about their leadership style and values, as well as strengths and weaknesses, with regard to public leadership at the personal, interpersonal, organizational, and community levels. Readings, assignments, and class activities focus on developing knowledge and skills necessary to lead successfully in public service settings.

719 Public Administration Analysis and Evaluation I (3). Corequisite, PUBA 720. First course in a two-course sequence introducing students to applied research design, data collection, data management, data analysis, and analytical reporting to allow them to conduct original research, be informed consumers of other research, and ultimately improve public program planning and evaluation decisions.

720 Public Administration Analysis and Evaluation II (POLI 725) (3). See POLI 725 for description.

721 Professional Communications (3). Prepares students to communicate clearly and effectively as public service leaders, which includes reading, listening, and thinking critically; writing and speaking clearly, concisely, and unambiguously; giving organized and convincing oral presentations; and using appropriate tools and tone in preparing oral and written communications for diverse audiences.

722 Politics of the Administrative Process (POLI 722) (3). The motivations of public agency officials, interactions between bureaucracies and other political actors, and alternative strategies to control bureaucratic power and discretion in making, implementing, and evaluating public policies.

723 Human Resource Management (3). Students gain skills in traditional HRM functions such as hiring, compensation, and discipline, as well as contemporary managerial responsibilities, such as motivating a diverse workforce. This course provides students with an overview of traditional and contemporary issues and trends in HRM and introduces core legal constraints on personnel systems.

725 Collaborative Governance (3). Required preparation, minimum of three undergraduate credit hours of American government. Explores contemporary thought on networks and governance and its place in public administration theory and practice. Examines processes and structures, and develops skills relevant to collaborative public management.

730 Governmental and Not-for-Profit Accounting and Reporting (2). Teaches the principles of accounting and financial reporting in governmental and not-for-profit environment. Provides skills for analyzing the financial condition of governments and the efficiency and effectiveness of governmental programs.

731 Public Financial Management (3). Introduces students to the basic principles of public finance and covers the fundamental areas of public financial management, including the operating and capital budgeting processes used to obtain and allocate public resources, the role of public debt, and the issuance of annual financial statements.

732 Economics for Public Administrators (1.5). Develop an understanding of the relationship between government administration and microeconomic outcomes, as well as the effect of macroeconomic events on government budgets and service demands.

733 Strategic Information Technology Management (1.5). This course provides public managers with the basic knowledge to successfully invest in and manage strategic information technology projects.

740 Decision Analysis (3). Course will provide introduction to a process for systematically thinking about decisions and valuable techniques for analyzing decisions. Students will learn how to construct models for decision making and how to use these models to analyze decisions.

745 Professional Work Experience (1). The M.P.A. professional work experience consists of 10 weeks of full-time employment in a public agency or nonprofit organization. This course requires students to demonstrate and extend this learning experience within the context of public service leadership and management.

746 M.P.A. Portfolio (1). The purpose of the portfolio is for students to demonstrate and further develop their public service leadership potential through a collection of academic and professional products. Students take this course during their final semester, allowing them to integrate and build upon the core competencies of the program.

749 Ethical and Effective Public Administration (1.5). Prerequisites, POLI 210, 211, 212, 214, and 226. The role(s), function(s), and strategy of public administrators in the formulation, adoption, and implementation of public policies. Policy from the perspective of the policy maker; cases exploring the relationship of theories to actual policy processes.

751 City and County Management (3). Nature of city or county manager's job: expectations of elected body, staff, public and professional peers. Examines contemporary issues in departmental operations that have significant effect on how manager's performance is perceived.

752 Productivity Improvement in Local Government (3). This course will acquaint students with the concept of productivity, its importance in the public sector, principal techniques used to improve productivity in local government, and barriers to productivity improvement initiatives.

756 Nonprofit Management (3). Examination of the managerial challenges posed by nonprofit organizations and of techniques and practices used by managers of nonprofit organizations.

757 Financial Management of Nonprofit Organizations (SOWO 885) (3). See SOWO 885 for description.

758 Navigating Nonprofit Local Government (3). This course is designed for graduate students who are seeking professional positions in local government or nonprofits. The overall objectives are to exchange information about issues of mutual concern to both nonprofits and governments.

760 Law for Public Administration (3). Introduction to basic law subjects likely to be encountered in public administration. Topics include constitutional foundations, due process and equal protection, and First Amendment rights; property, contracts, employment, torts, criminal law, administrative law, and public ethics laws; and basic legal research, managing litigation, and working with lawyers.

761 Local Government Law (1.5). Overview of key legal concepts affecting local government operations. Topics include relation to federal/state governments, legal structures, finance and regulatory powers, plus introduction to the legal system and analysis.

762 Administrative Law Development and Applications (3). Addresses legal issues in the exercise of governmental power by federal, state, and local agencies in the United States. Topics include legislative and executive oversight, rule making, adjudication, and judicial review.

765 Capital Budgeting and Finance (1.5). Prerequisite, PUBA 214. Analysis of alternative approaches to planning and administering the budgets and financial operations of public agencies. Extensive use of case materials.

768 Mediation Skills for Public Organizations (1.5). Workshop-style course focuses on workplace and service provision conflicts to develop mediation skills; is comprised of short lectures, demonstration, and student practice of a mediation model/specific skill sets.

769 Facilitation Skills for Public Sector Managers (1.5). Workshop-style course focuses on inter-organization and community settings to develop facilitation skills and is comprised of short lectures, demonstration, and student practice of facilitation strategies.

770 Community Economic Development: Strategies and Choices (POLI 770) (3). See POLI 770 for description.

771 Managing Economic Development (3). Emphasizes the practical application and implementation of various approaches to economic development. Students will apply tools/strategies by doing case studies and small group projects based on real-world scenarios faced by local practitioners.

778 Intergovernmental Relations (POLI 726) (3). See POLI 726 for description.

780 Special Topics in Public Administration (1–3). Permission of the instructor. Seminar in selected areas of public administration. Topics will vary from year to year. May be repeated for credit.

781 Directed Readings in Public Administration (1–3). Directed readings in a special field under the direction of a member of the graduate faculty.

900 Research in Public Administration (1–21).

Department of History

www.unc.edu/depts/history
W. FITZHUGH BRUNDAGE, *Chair*

Professors

William L. Barney (92) Political History of 19th-Century America
Christopher R. Browning (30) 20th-Century Germany, the Holocaust
W. Fitzhugh Brundage (96) U.S. South since the Civil War, New South
Marcus G. Bull (20) Medieval History
Melissa M. Bullard (38) Renaissance, Mediterranean, and Early Modern Europe
Kathryn Burns (47) Colonial Latin American Gender/Women's History
John C. Chasteen (45) 19th-Century Latin America (Especially Brazil), Popular and Political Culture

Peter A. Coclanis (85) U.S. Economic and Business History, Colonial History
William Ferris (65) U.S. South (with Emphasis on Literature), Documentary Studies
W. Miles Fletcher (52) Japanese History
Joseph T. Glatthaar (69) Civil War Era, U.S. History
Karen Hagemann (40) Modern Europe, Gender and Social
Jacquelyn D. Hall (90) U.S. Women's History, Oral History, U.S. South
Konrad H. Jarausch (32) 19th- and 20th-Century Europe
John F. Kasson (88) American Intellectual and Cultural History, Technology and Society, Art and Literature
Lloyd S. Kramer (39) European Intellectual History
Wayne E. Lee (71) Military History, Colonial American History
James L. Leloudis (91) North Carolina History, U.S. South, Education History
Roger W. Lotchin (81) Urban Political History, 1800 to the Present
Genna Rae McNeil (86) African American History
L. Louise McReynolds (42) 19th-Century Russia
Susan D. Pennybacker (44) British History
Louis A. Pérez Jr. (46) Latin America, Caribbean, Cuba
Cynthia Radding (48) Colonial Latin America, Environmental History, Ethnohistory
Donald J. Raleigh (64) 20th-Century Russian/Soviet History
Donald M. Reid (36) Modern French History
Sarah D. Shields (55) Islamic Civilization
Jay M. Smith (34) France 1550–1815
Richard J. A. Talbert (18) Ancient Rome, Classics
Zaragosa Vargas (72) History of Latinos in the United States
Harry L. Watson (93) North Carolina History
Heather A. Williams (94) 19th-Century American History, African-American History

Associate Professors

Chad Bryant (66) 20th-Century Eastern European History
Kathleen A. DuVal (67) Early America, Early American Women
Jerma A. Jackson (96) African American History
Lisa A. Lindsay (80) West Africa; African Diaspora
Malinda Maynor Lowery (79) Native American History
Terence V. McIntosh (33) Early Modern European History, Economic and Social
Fred Naiden (41) Ancient Greece
John W. Sweet (68) Early American History
Michael Tsin (54) Modern Chinese History
Brett E. Whalen (41) Medieval History

Assistant Professors

Flora Cassen (35) Jewish History
Emma Flatt (56) Medieval South Asian History
Michelle King (59) Modern Chinese History
Miguel LaSerna (49) Latin American History
Michael C. Morgan (31) Modern International History
Iqbal Sevea (51) Modern South Asian History
Benjamin Waterhouse (99) 20th-Century American Political and Business History
Molly Worthen (87) U. S. Religious and Intellectual History

Joint Appointments

Robert C. Allen (73) American Studies
Reginald F. Hildebrand (75) African and African American Studies

Adjunct Professor

Kenneth R. Janken, African and Afro-american Studies
Daniel J. Sherman, French Cultural History, Modern Art

Adjunct Associate Professor

Daniel M. Cobb, American Studies, 20th-century American Indian
Morgan Pitelka, East Asian Studies

Adjunct Assistant Professors

Eve Duffy, Humanities and Human Values
Raúl Necochea, Modern Medicine Global
Jacqueline Olich, Slavic, Eurasian, and Eastern European Studies, Russian
Anne M. Whisnant, American History, Public History

Faculty in Phased Retirement

Professors Emeriti

Josef Anderle
Samuel H. Baron
Stephen B. Baxter
Frederick O. Behrends
Judith M. Bennett
Herbert L. Bodman Jr.
Henry C. Boren
E. Willis Brooks
Stanley J. Chojnacki
Peter G. Filene
Michael D. Green
David M. Griffiths
Barbara J. Harris
John M. Headley
Michael H. Hunt
Lawrence D. Kessler
Frank W. Klingberg
Richard H. Kohn
William E. Leuchtenburg
Donald G. Mathews
W. James McCoy
Michael R. McVaugh
John K. Nelson
Theda Perdue
Richard W. Pfaff
William S. Powell
John E. Semonche
Peter F. Walker
Gerhard L. Weinberg
Joel R. Williamson

The graduate history program at UNC-Chapel Hill is committed to training professional historians to be both scholars and teachers. Our program allows ample choice to students in designing academic programs to fit particular interests and needs while providing them with rigorous training in ancient history, Asian history, European history, global history, Latin american history, military history, Russian and East European history, U.S. history, and the history of women and gender. Degree requirements and departmental culture encourage comparative and interdisciplinary study. The program promotes close mentoring relationships with faculty and sustains a lively intellectual community among the graduate students.

Extensive information about the graduate program in history is available at https://history.unc.edu/graduate-program. Please use this to supplement the brief summary below.

Admission

The department considers applications from those holding undergraduate degrees and those who have obtained M.A. degrees elsewhere. Students admitted to the department with an M.A. from

another university will be reviewed by the faculty at the time of entry into the program to determine whether they should take second M.A. degrees here or proceed directly to the Ph.D. training. Preference in admission is given to students who intend to proceed to doctoral work, either directly or after completion of the M.A. degree.

The M.A. Program

The courses required for the M.A. degree usually include an introduction to research (HIST 700) and an introductory seminar (HIST 900), to be taken in the first year of study, a two-semester reading colloquium or its equivalent in the student's major field, one additional seminar (900-level course), three hours of thesis credit (HIST 993), and four other courses, of which as many as three may be taken in fields other than that in which the student is concentrating or even in other disciplines. M.A. candidates must also pass a reading-knowledge examination in an appropriate foreign language, prepare a thesis based on original research, and pass an oral examination on the thesis. Students entering in fall 2010 and afterwards are expected to complete the M.A. after three semesters in residence.

The Ph.D. Program

Satisfactory completion of the M.A. does not automatically entitle a student to continue at the doctoral level. After the M.A. oral examination, the student's committee reaches a formal written decision about whether he or she should continue toward the Ph.D.

All courses taken at UNC–Chapel Hill for the M.A. (except HIST 993) may be credited toward the doctoral program. If The Graduate School approves for transfer credit up to six hours of graduate courses taken elsewhere, these may be credited as well. Candidates for the Ph.D. complete the following minimum course program (in addition to the requirements for the M.A.): a research seminar, two courses in a second field of study, research design (HIST 905), and dissertation credit (HIST 994). A reading knowledge of two foreign languages or advanced proficiency in one is required for the Ph.D. degree.

Each doctoral student must pass written comprehensive examinations in the major field, as well as an oral examination that focuses on the dissertation. The final requirements for the Ph.D. are a dissertation and an oral examination on it.

The department expects doctoral students to proceed efficiently with their work. For those who enter the program in fall 2010 and afterwards and who are pursuing both the M.A. and the Ph.D., all coursework and the comprehensive written and oral examinations must be completed by the end of the sixth semester. For those who enter the program with an acceptable M.A. from another institution, A.B.D. status must be achieved within four semesters. The entire degree program must be completed within a period of eight years.

Fellowships and Assistantships

The department funds most of its students through teaching assistantships or fellowships, and also offers research grants and dissertation fellowships. In addition, The Graduate School awards fellowships to both entering students and students in the later phases of their doctoral training.

Libraries and Research Opportunities

The Davis and Wilson libraries have many collections of great value, and the University itself is conveniently situated close to a number of other research centers, particularly the Duke University Library and the North Carolina State Department of Archives and History (www.ah.dcr.state.nc.us). The library houses many outstanding special collections, including the William Henry Hoyt Collection on revolutionary France and the Peabody Collection on international law and diplomacy. Especially notable are the Southern Historical Collection (one of the most important manuscript collections on the subject), and the North Carolina Collection (a repository of books, magazines, pamphlets, and newspapers published in or about North Carolina). The Southern Oral History Program and the Center for the Study of the American South further enhance research and training in the history of our region.

The University Center for International Studies, the Center for European Studies, and the Triangle Institute for Security Studies (TISS) sponsor fellowships, seminars, speakers, and other opportunities in their respective areas. The History Department participates in the new, interdisciplinary Medieval and Early Modern Studies Program (MEMs) which offers fellowships and research grants. MEMs places special emphasis upon viewing the premodern world from a global perspective. The Ancient World Mapping Center forms part of the Department of History, and there is no other unit worldwide that matches its mission of promoting cartography and geographic information science within ancient studies. For research and other initiatives at the center, visit www.unc.edu/awmc. The department also sponsors the Project for Historical Education, an outreach program for teachers in secondary schools. In addition, a wide variety of workshops regularly bring together faculty and graduate students who share interest in particular historical topics or approaches.

Courses for Graduate and Advanced Undergraduate Students

HIST

420 Politics and Religion in Ancient Greece (3). This course deals with ancient Greek religious practices and seeks to place them in their legal, political, and cultural contexts, and thus integrate them into the study of Greek history.

421 Alexander (PWAD 421) (3). The rise of Macedonia; the careers of Philip II and Alexander (with emphasis on the latter's campaigns); the emerging Hellenistic Age. The course integrates computer (including Web site) and audiovisual materials throughout.

422 Ancient Greek Warfare (PWAD 422) (3). War and the warrior in the archaic and classical Greek world, seventh to the fourth centuries BCE.

423 Archaic Greece, 800–480 BCE (3). HIST 225 strongly recommended. Topical approach to the social and cultural history of the ancient Greek city states, ca. 800–336 BCE.

424 Classical Greece (Sixth–Fourth Centuries BCE) (3). HIST 225 strongly recommended. The life and times of the ancient Athenians from the sixth to fourth centuries BCE.

425 Roman History, 154 BCE–14 CE (3). Explores the transformation from Republic to Principate. Conducted in considerable part by student reports and classroom discussions.

427 The Early Roman Empire, 14 CE–193 CE (3). Focuses upon administrative, social, and economic themes. Conducted in considerable part by student reports and classroom discussions.

428 The Later Roman Empire, 193 CE–378 CE (3). Focuses upon administrative, social, and economic themes. Conducted in considerable part by student reports and classroom discussions.

431 The Medieval Church (3). The nature and workings of the Western church between roughly 600 and 1300. Emphasis on the church "from within," organization, missionary strategies, liturgy, monasticism, popular religion.

432 The Crusades (3). Students in this course will examine Christian attitudes toward holy war, crusading, and other forms of coercive violence from the 11th until the 15th centuries, with a focus on the major crusades to the Holy Land.

433 English Society, 1200–1700 (3). Examines critical issues in the development of English society and economy in the centuries before industrialization.

434 Medieval England (3). A consideration of England's origins, unification, and development as a national monarchy. Primary emphasis is on political, ecclesiastical, and cultural aspects.

435 The Medieval University (3). The origins and development of the university during the period 1100 to 1400; types of organization, curricula and degrees, intellectual life, town-gown and student-master relationships.

436 Medieval Theology, Gender, and the Body (3). This course will explore notions of male and female sanctity from Late Antiquity to the High Middle Ages. Topics will include martyrdom, the cult of relics, and bodily resurrection.

437 Aristocratic Culture in the Central Middle Ages (3). This course has as its theme the lives of aristocratic men and women in western Europe between about 850 and 1200 CE. Discusses the nature of aristocratic identity, the trends that shaped the lives of aristocratic men and women, and the different roles of men and women within aristocratic culture.

438 Medieval Masculinities, 500–1200 (3). This course examines the multifaceted constructions of masculinity found in narrative texts produced in medieval western Europe. Focuses on topics such as gender relations, male self-fashioning, homosocial bonding, family structures. Sources studied range from epic and romance to chronicles and visual records.

452 The Renaissance: Italy, Birthplace of the Renaissance, 1300–1550. (3). A study of the people, culture, and intellectual achievements of the Italian Renaissance with emphasis on the interaction between culture and society.

453 Mediterranean Societies and Economics in the Renaissance World (3). A picture of Mediterranean social and economic life 1300 to 1600, with special focus on rural and urban society, family structure, patronage, work and wages, public and private finance.

454 The Reformation (RELI 454) (3). Examines a movement of religious reform that shattered Latin Christendom and contributed many of the conditions of early modern Europe. Emphases: religious, political, social.

455 Europe in the 17th Century (3). The century marks the watershed in European development. Emphases: statecraft, the emerging state-system, the new scientific world view, the evolution of European society.

458 Europe and the World Wars, 1914–1945 (3). Europe and the experience of total war, with special focus on national conflicts; ideological conflicts among fascism, communism, and liberalism; and the dictatorships of Hitler and Stalin.

460 Late Medieval and Reformation Germany (3). Examines the major late medieval religious, social, and political developments plus the Reformation and Counter-Reformation. Topics include Luther's theology, the German Peasant's War, Jewish-Christian relations, witch-hunting, and family life.

461 Early Modern Germany, 1600–1815 (3). Examines major political, social, and cultural developments. Topics include the growth of absolutist government, Prussia's militarism and rivalry with Austria, German Jewry, Baroque music, the Enlightenment, and the Napoleonic wars.

462 Germany, 1815–1918 (3). The nature of Prussian society, the rivalry between Prussia and Austria for the command of German affairs, and the quality of Prussian leadership in the German Empire of 1871.

463 History of Germany since 1918 (3). Politics and culture in the Weimar Republic, Nazi totalitarianism, and the reshaping of East and West Germany since World War II.

464 History of Spain (3). A survey of Spanish history from the Islamic invasion to Napoleon. Particular attention will be given to the period of the Hapsburgs, 1516 to 1700.

465 Intellectual History of Europe, Early Period (3). The course examines the gradual erosion of and criticism within the classical Christian tradition that led to the emergence of a new mentality by the end of the 17th century. Two lectures, one discussion per week.

466 Modern European Intellectual History (3). The main developments in European thought from the Enlightenment to the 20th century, with some attention to social context. Readings include Voltaire, Rousseau, Hegel, Marx, Tocqueville, Sand, Flaubert, Nietzsche, Freud.

467 Society and Family in Early Modern Europe (3). A survey of changes in social organization, family life, courtship practices, sexual behavior, and the relations between the economy and population that occurred in preindustrial Europe, 1500–1815.

469 European Social History, 1815–1970 (3). The social transformation of Europe from agrarian through postindustrial society, discussing population growth, family history, spread of education, class structure, social conflict, group ideologies, and mass politics, as well as everyday lives and popular lifestyles.

470 The Scientific Revolution (3). Traces the creation of scientific thought 1500 to 1700, from Leonardo to Newton, examining the various strands—Greek science, art, engineering, experimentation, occultism, etc.—woven into it.

471 History of Science from Newton to Einstein (3). A survey of the development since 1700 of the various branches of physical and biological science, culminating in the 20th-century revolution in physics.

472 Medicine and Health in Early Modern Europe (3). Shows how the age of Shakespeare and Newton (16th- to 17th-century England) fused old and new ideas about medicine and health, anticipating some of our own beliefs and practices.

473 Tudor and Stuart England, 1485–1660 (3). A lecture course, open to juniors, seniors, and graduate students.

477 Revolution in Russia, 1900–1930 (3). A close study of Russia's age of revolution from the reign of the last tsar to the turbulent Stalin Revolution of 1929, with emphasis on the revolutions of 1917.

478 Stalin and After: The USSR, 1929–Present (3). An in-depth examination of Soviet and post-Soviet history from 1929 to the present.

479 History of Female Sexualities in the West (WMST 479) (3). Spanning the ancient, medieval, and modern West, this course explores normative and non-normative female sexualities, ideas about female bodies, and the regulation of female sexuality by families, religions, and states.

480 Russia, 1796–1917 (3). The diplomatic, military, and ideological confrontations with the West; the decline and fall of the Russian autocracy; the evolution of reform thought; and revolutionary opposition.

481 Eastern Europe since World War II (3). An examination of the countries of Eastern Europe, their origins and development since World War II, their cohesion and conflict.

482 Russia, Eurasian Empire (3). This course examines the development of the Russian Empire, from the Mongol conquest in the 13th century to the transformation of Imperial Russia in the Soviet Union after 1917.

490 Special Topics in History (3). Subject matter will vary with instructor but will focus on some particular topic or historical approach. Course description available from the departmental office.

493 Internship in History (1–3). Permission of the director of undergraduate studies. A supervised internship at an organization or institution engaged in the promotion of historical studies or the collection and preservation of historical documents and artifacts.

496 Independent Studies in History (1–3). Permission of the director of undergraduate studies. Special reading and research, supervised by a member of the department, in a selected field of history. Prior coursework in the selected field is recommended.

500 Gender and Nation in Europe and Beyond: From the 18th to the 20th Century (WMST 500). The course explores the growing body of research on gender and nation/nationalism by focusing on problems of national belongings, citizenship, state and nation formation, and national iconography.

501 Gender of Welfare (WMST 501) (3). An interdisciplinary examination of issues pertaining to gender and welfare, such as the sexual division of labor and social policy, the work-family balance, and social citizenship in a transnational perspective.

513 Imperialism and the Third World (3). This course explores the processes by which 19th-century imperialism set the contours of the modern world, establishing relations among societies and reconfiguring both colonial cultures and European cultures.

514 Monuments and Memory (3). Museums and monuments have played a key role in the formation of cultural memory and identity, both nationally and globally. This course explores the relation between museums and monuments historically and theoretically, and relates them to national and international developments in the 19th and 20th centuries.

516 Historical Time (3). This course explores the ways in which Western historians and other students of the past from Adam Ferguson to Stephen Jay Gould have conceptualized and packaged historical time.

517 Military, War, and Gender in Comparative Perspective, 18th to the 20th Century (3). This course introduces students to the gender history of the military and war in a comparative perspective with a focus on Germany and the United States from the 18th to the 20th century.

526 History of the Andes (3). This course offers a survey of the history of the Andean region. The primary focus will be either the pre-Inca, Inca, and colonial periods or the 19th and 20th centuries, depending on the instructor.

527 Latin American Indigenous Peoples (3). This course surveys the history of Latin American indigenous peoples from the conquest to the present. Focus is on indigenous struggles and survival strategies.

528 Guerrillas and Revolution in 20th-Century Latin America (3). This course examines the leftist guerrilla movements that swept Latin America and the Caribbean during the latter half of the 20th century. Students will analyze the origins, trajectories, and legacies of these insurgencies, paying particular attention to the roles of race, class, and gender.

529 Mexico, 1750–1870: War, Independence, and Reforms: Citizenship and Conflict in a New Nation. This upper-division course focuses on the major issues, debates, and conflicts that arose over citizenship in a multiethnic society, tensions between church and state, and the definition of national territory in Mexico as a new and modernizing nation.

531 History of the Caribbean (3). Thematic approach to the history of the West Indies, with emphasis on the period from European conquest through the 20th century. Topics include colonialism, slavery, monoculture, United States–Caribbean relations, and decolonization.

532 History of Cuba (3). Thematic approach to Cuban history, from conquest to the revolution. Attention is given to socioeconomic developments, slavery and race relations, the 19th-century independence process, and the 20th-century republic.

533 History of Brazil (3). This course is concerned primarily with the creation of a new society through race mixture and culture change, and with the political and economic development of Brazil.

534 The African Diaspora (3). A comparative examination of the movements, experiences, and contributions of Africans and people of African descent from the period of the Atlantic slave trade to the present.

535 Women and Gender in African History (3). Analysis of historical transformations in Africa and their effects on women's lives and gender relations. Particular themes include precolonial societies, colonialism, religious change, urban labor, nationalism, and sexuality.

536 Revolution in the Modern Middle East (ASIA 536) (3). This course will focus on revolutionary change in the Middle East during the last century, emphasizing internal social, economic, and political conditions as well as international contexts.

537 Women in the Middle East (ASIA 537, WMST 537) (3). Explores the lives of women in the Middle East and how they have changed over time. Focus will change each year.

538 The Middle East and the West (ASIA 538) (3). This course explores changing interactions between the Middle East and the West, including trade, warfare, scientific exchange, and imperialism, and ends with an analysis of contemporary relations in light of the legacy of the past.

539 The Economic History of Southeast Asia (ASIA 539) (3). This course is intended as a broad overview of Southeast Asian economic history from premodern times to the present day.

540 African Intellectual History: Discourse, Knowledge, Politics (3). This course traces Africa's modern intellectual history, exploring such topics as Africa's place in history, African nationalism, pan-Africanism, the problem of colonialism, and the meaning of progress.

541 African Environmental History: Ecology, Economy, Politics (3). This course addresses the major themes of the environmental history of Africa with an emphasis on issues of local ecology, land use, and labor and the struggles over these issues.

542 Development in Africa and Its Discontents (3). This course examines the changing meanings of the idea of development in Africa and the role that Africans have played in shaping these meanings from the late 19th century.

543 Histories of Health and Healing in Africa (3). This course focuses on the historical, social, medical, cultural, policy, and economic aspects of health and health crises in Africa.

550 Gender in Chinese History (3). This course is designed to introduce undergraduates to recent historical scholarship in the field of Chinese gender studies. Topics include family and kinship, the body and bodily practices, social space, writing, sexuality, work, and law, covering both the premodern and modern periods. No prior coursework required.

561 The American Colonial Experience (3). Major topics: European reconnaissance; founding of new societies; character and structure of institutions; thought and feeling from Cotton to Franklin; privilege and cost of empire.

562 Oral History and Performance (COMM 562, FOLK 562, WMST 562) (3). See COMM 562 for description.

563 Jacksonian America, 1815–1848 (3). The society and politics of the United States during the period dominated by President Andrew Jackson. Topics include economic development, the expansion of slavery, religion and reform, the changing roles of women, and the political movements associated with "Jacksonian democracy."

564 Revolution and Nation Making in America, 1763–1815 (PWAD 564) (3). Major topics: constitutional conflict in the British empire; independence and war; Confederation and Constitution; growth of political parties and nationality in a period of domestic change and international conflict.

565 Civil War and Reconstruction, 1848–1900 (PWAD 565) (3). Focus is on causes, nature, and consequences of the Civil War.

566 The History of Sexuality in America (3). A history of the sexual practices, desires, and understandings of Americans, from earliest colonial encounters to the late 20th century.

568 Women in the South (WMST 568) (3). An exploration of the distinctive themes in Southern women's lives, using the evidence of history and literature.

569 African American Women's History (WMST 569) (3). The course covers the history of black women in the United States from the 18th century to the present. It deals with such themes as work, family, community, sexuality, politics, religion, and culture.

570 The Vietnam War (ASIA 570, PWAD 570) (3). A wide-ranging exploration of America's longest war, from 19th-century origins to 1990s legacies, from village battlegrounds to the Cold War context, from national leadership to popular participation and impact.

571 Southern Music (FOLK 571) (3). Explores the history of music in the American South from its roots to 20th-century musical forms, revealing how music serves as a window on the region's history and culture.

574 Spanish Borderlands in North America (3). The history of the Spanish colonial experience north of Mexico, to 1820.

576 The Ethnohistory of Native American Women (WMST 576) (3). Introduces students to the study of Native American women through the perspectives of anthropology, history, and autobiography.

577 United States Foreign Relations in the 20th Century (PWAD 577) (3). How the United States came to occupy a leading role in world affairs as a diplomatic, military, economic, and cultural power and what that role has meant to Americans and to other peoples, especially during the Cold War.

581 American Constitutional History to 1876 (3). In a classroom environment characterized by discussion, simulation, and interaction, the antecedents, formation, and interpretation of the Constitution are confronted in a broad historical matrix.

582 American Constitutional History since 1876 (3). Using a classroom environment similar to HIST 581, constitutional adjustments and change are related to psychological, political, social, and economic factors, and to Supreme Court members.

584 The Promise of Urbanization: American Cities in the 19th and 20th Centuries (3). A survey of the development of American cities since 1815 and their influence upon American history.

586 The Old South (3). Economic, cultural, and social history of the antebellum South. The region's political history will serve as a supporting part of the study.

587 The New South (3). This course explores the transformation of the South from the time of the Civil War and emancipation to the contemporary rise of the Sunbelt.

589 Race, Racism, and America: (United States) Law in Historical Perspective (3). This course will historically and critically examine the changing legal status of people of color in the United States. Within a broad historical matrix from the colonial era to the present, it will focus on African Americans, Native Americans, Asian Americans, Latina/os, and United States law.

622 Medicine and Society in America (3). A survey of major developments in the history of American medicine. Emphasis will be placed upon setting the practice of medicine as well as the experience of health and disease into broad social, cultural, and political contexts.

624 Intellectual History of African Americans (3). Examines African American intellectuals in North America with some attention to black writers in the Caribbean. Emphasizes American Negro Academy, black scholars, scholar-activists, writers, and public intellectuals.

625 Technology and American Culture (3). Technology's impact on American thought and society and the response it has engendered. Topics will include the factory town, search for utopia, impact of Henry Ford, war, and depersonalization.

670 Introduction to Oral History (FOLK 670) (3). Introduces students to the uses of interviews in historical research. Questions of ethics, interpretation, and the construction of memory will be explored, and interviewing skills will be developed through field work.

671 Introduction to Public History (3). Introduces the theory, politics, and practice of historical work conducted in public venues (museums, historic sites, national parks, government agencies, archives), directed at public audiences, or addressed to public issues.

674 Field Methods in Archaeology and History (3). This course will introduce many techniques employed by archaeologists and historians in locating and excavating sites of past human activity. It will involve field work at an active archeological site.

691H Honors in History (3). Permission of the instructor. Introduction to the methods of historical research; designed to lead to the completion of an honors essay.

692H Honors in History (3). Permission of the instructor. Introduction to the methods of historical research; designed to lead to the completion of an honors essay.

697 Myth and History (3). Myths and legends are the stuff of history. An interdisciplinary capstone course treating topics such as Alexander the Great and George Washington as mytho-historical heroes, the Holy Grail, and uses of myth in the modern world.

Courses for Graduate Students

HIST

700 Thinking Historically (3). Introduces students to the intellectual currents and schools of thought that have characterized the historical profession over time. By examining such diverse conceptual frameworks, students will prepare themselves to tackle more confidently the research projects they will design and execute in HIST 900 and 901.

701 Introduction to Medieval Studies (3). This is an interdisciplinary course to introduce graduate students to the sources, methods, and approaches of medieval studies.

702 Introduction to Historical Education (3). Provides an introduction to teaching history. Topics include the history of historical education, planning a course, the role of the teacher, goals and methods, using new technologies and evaluating students.

711 Introductory Colloquium on Early Modern Europe (3). Directed readings on early European history, from Britain through European Russia.

712 Introductory Colloquium on Modern Europe (3). Directed readings on modern European history, from Britain through European Russia.

713 Introductory Colloquium in Latin American History before 1810 (3). Directed readings on Latin American history from preconquest to 1810; required for students entering the field.

714 Introductory Colloquium in the History of Latin America since 1810. Directed readings on Latin American history in the National Period; required for students entering the field.

715 Introductory Colloquium in United States History to 1865 (3). Directed readings on American history through the Civil War; required for students entering the field.

716 Introductory Colloquium in United States History since 1865 (3). Directed readings on American history from the Civil War to the present; required for students entering the field.

717 Introduction to Military History (3). An introduction to the methods, issues, and literature of military history, including classic works and scholarship representative of a variety of approaches from history and other disciplines.

718 Colloquium in World Military History (3). Reading colloquium in world military history, emphasizing Europe, focusing on the most significant issues, methods, and approaches in the field today.

720 Introduction to Asian History (3). An introduction to major works and themes in the history of Asia with an emphasis on the history of China, Japan, and South Asia.

721 Readings in European Expansion and Global Interaction, 1400–1800 (3). Examines the dynamics of cross-cultural contacts and exchange between Europe and other civilizations in the context of a growing global interconnectedness.

722 Readings in Contemporary Global History (3). Focus on the 19th and 20th centuries. Mixing theory, case studies, and comparisons, the readings reflect disciplinary diversity.

725 Selected Readings in the Comparative or Global History of Women and Gender (WMST 725) (3). Readings in the history of women and gender in a comparative, global, or transnational perspective.

730 Feminist and Gender Theory for Historians (WMST 730) (3). Readings in contemporary feminist and gender theory, focused especially on theories that address the construction, writing, and general practice of history.

735 Readings in the History of Sexuality and Gender (WMST 735) (3). Readings on the historical study of gender and sexuality and on definitions of femininity and masculinity in different historical contexts.

741 Readings in the History of Science and Medicine (3). Examines the principal historiographical problems in the history of science and medicine, focusing on a different topic each year.

746 History and the Social Sciences (3). The relationship of the social sciences to history, logic of inquiry, use of quantitative methods, and introduction to the computer.

751 Problems in Greek History, 600–323 BCE (3). Permission of the instructor. This course introduces graduate students to problems in the use of literary, epigraphic, and archaeological sources for a range of issues, including religion, law, and warfare.

752 History of Rome, 27 BCE–180 CE (3). Readings, reports, and discussions on selected topics of current importance for the field. Topics to be announced n advance.

755 Readings in Medieval and Early Modern Women's History (WMST 755) (3). A readings course on the history of women, gender, and sexuality in Medieval Europe.

757 Late Medieval England (3). Prerequisite, HIST 433 or 434. Readings in English history, ca. 1300–1500, with a focus on social, economic, political, and legal topics.

760 Europe in the 16th Century (3). A survey of the best historical literature emphasizing churches, varieties of secular power, and religious practice.

761 Readings in Early Modern European History (3). Selected readings and discussion of topics and relevant historiography in early modern Europe.

763 Early Modern Germany (3). A topical survey of the political, social, and economic history of early modern Germany.

765 Problems in the History of the French Revolution (3). Readings, reports, and discussion on aspects of the French Revolutionary upheaval in Europe.

770 Readings in Modern European Women's and Gender History (WMST 220) (3). A readings course in the history of women in Europe since 1500.

771 Topics in Modern European History (3). This course examines particular themes, events, and historiographical debates of Modern European History in a seminar setting.

772 Readings in the Intellectual History of Europe (3). A readings course on specific themes and debates in modern European intellectual life.

773 Readings in European Social History (3). This graduate readings course discusses classic works as well as recent landmark books about the development of European society in the 19th and 20th centuries.

774 Readings in Modern European History, 1918–1945 (3). Directed readings, varying from year to year, selected from historiographical classics as well as the most recent scholarly publications.

775 Studies in Modern English History (3). Directed readings in 19th- and 20th-century English history. Topics vary from year to year.

776 Topics in French History (3). Open to graduate students from all departments. This course examines one period or one set of problems within French history since the Renaissance. Topics determined by instructor.

781 Readings in Russian History, 1796–1917 (3). Selected readings and discussion of various topics in the history of Russia from the late 18th century to the Russian Revolution.

782 Readings in Soviet History (3). A historiographical reading colloquium covering Soviet and post-Soviet Russian history, 1917-present. The course familiarizes students with Western, Soviet, and post-Soviet literature on the most important issues in Soviet history.

783 Special Topics in Russian and East European History (3). This interdisciplinary seminar provides an in-depth look at some of the major topics in modern Russian, East European, and Central Asian history.

784 Readings in East European History (3). Directed readings on modern East European history.

816 Topics in Asian History (3). Instructors use this course to focus on particular topics or historical approaches related to Asian history.

820 Problems in Latin American History (3). Instructors use this course to focus on particular topics or approaches in Latin American history. Topics to be announced in advance.

831 Readings in Early American History (3). Selected readings and research in United States history and its multicultural dimensions up to the American Revolution.

832 The American Revolutionary Era, 1763-1789 (3).

833 The United States in the Federal Period, 1789–1820 (3). Readings, discussion, and book lists designed to give familiarity with the historiographical problems, research opportunities, and bibliography of the period.

834 The United States in the Middle Period, 1815–1860 (3). An analysis of the material and ideological transformations within the antebellum republic, which climaxed in the sectional crisis of the 1850s.

835 Readings in the Antebellum South (3). A review of traditional and modern literature on the pre-Civil War South, focusing on the interrelationships of its economy, society, culture, and politics.

840 Civil War and Reconstruction, 1860–1876 (3). An intensive readings course on key works comprising the core historiography for Civil War-Reconstruction America. Discussions, short papers, and a 20-page historiographical paper comprise the bulk of the assignments.

841 Readings in the South since Reconstruction (3). Readings, reports, and discussions on selected topics with a view to gaining familiarity with the literature of the field.

842 Political and Social History of Modern America (3). A course of readings for advanced students that relate social history to the history of the state in America in the period from the Great Depression and the New Deal to the present.

845 Readings in United States Labor History (3). A graduate reading seminar on the history of America's workers from the 20th century to the present. The struggle of American workers to achieve a measure of dignity and security is examined from social, economic, and political perspectives. The course critically evaluates recent scholarship in the field of labor history.

860 Colloquium in United States Military History (3). Reading colloquium in United States military history focusing on the most significant issues, methods, and approaches in the field today.

861 History of United States Foreign Relations (3). Readings and research exploring various topics in modern American foreign relations and diplomacy.

863 Readings in Urban History (3). A readings course to introduce students to the main topics in urban history.

864 19th and 20th Century American Labor History (3). Graduate reading seminar in American labor history intended for students doing research as well as those writing M.A. and doctoral theses. Graduate students from fields other than United States history welcome. Students will read texts and articles by scholars in a wide variety of fields of American labor history.

865 Readings in United States Women's and Gender History (WMST 865) (3). A readings course on the history of women and gender in the United States.

870 Readings in African American History (3). Graduate students compile bibliographies and read important contributions to various aspects of African American history, stressing shifts in African American historiography and including very recent works.

875 Topics in American Cultural History (3). Research seminar exploring various topics in United States cultural history to be announced in advance.

878 Readings in Native American History (AMST 878) (3). Readings in and discussions of the major works in Native American history.

890 Topics in History for Graduates (3). Instructors use this course to focus on particular topics or historical approaches. Specific course descriptions are available each semester on the departmental Web site (www.unc.edu/depts/history).

899 Independent Study for Graduate Students (3). Permission of the instructor. Independent reading programs for graduate students whose needs are covered by no course immediately available. For students resident in Chapel Hill or vicinity.

900 Crafting a Historical Project (3). Intended to help students develop a plan of research and writing, select a bibliography, develop an understanding of the literature available for their topic, and articulate a problem or facet of the topic to which they can contribute original research in their M.A. thesis.

901 M.A. Research Seminar (3). A seminar for those preparing the M.A. thesis. Pursuing original research in primary sources, students prepare full drafts of their theses.

902 Writing for Historians: A Seminar on the Craft of Historical Writing (3). Doctoral students focus intensively on the writing process to produce an article-length piece of work suitable for publication. Topics include quotation, translation, narrative technique, structuring argument, and addressing a wide audience.

905 Dissertation Practicum (3). Required of all doctoral candidates in the last semester of coursework, this practicum helps students refine a dissertation topic and produce a prospectus.

906 Dissertation Seminar (3). A seminar for A.B.D. students, offered as demand and resources permit.

910 Ancient History (3). Research seminar on selected topics of current importance for the field. Topics to be announced in advance.

911 Medieval Dissertation Design (3). This course complements HIST 905, focusing on specific skills, sources, and methods for designing a dissertation prospectus in the field of medieval European history.

924 Seminar in Modern European History (3). This writing seminar explores the process of working with primary sources, creating a narrative, and shaping an interpretation based on examples from the last two centuries of European history.

925 Seminar in Russian and East European History (3). A multi-purpose writing seminar on Russian and Soviet history in which students may write a seminar paper, M.A. thesis, dissertation prospectus, or dissertation chapter.

930 American Revolution, 1763–1789 (3). Research seminar exploring various topics related to United States history in the late 18th century around the time of the American Revolution.

948 Research in Native American History (AMST 948) (3). This course introduces graduate students to research methods in Native American history, including the methodology of ethnohistory and the techniques of compiling a source base, taking notes, and outlining.

951 Introductory Seminar in Military History (3). Introduction to research that should result in a major research product. Students will alternate reading classic texts in military history with discussions of project conceptualization and research strategies.

952 Advanced Seminar in Military History (3). A research seminar designed to bring major projects (usually an M.A. thesis) to completion.

971 Seminar in Latin American History (3). All students will be required to complete an original research paper based on use of primary sources on a Latin American topic corresponding to the theme of the seminar to be announced in advance.

975 Seminar in Women's and Gender History (WMST 975) (3). Writing seminar for graduate students on all levels who work on the history of women and gender.

990 Seminar in History (3). Given on demand and as resources permit, this seminar allows faculty to respond to student interest in particular topics.

993 Master's Thesis (3). Individual work on the M.A. thesis, pursued under the supervision of the M.A. advisor.

994 Doctoral Dissertation (3). Individual work on the doctoral dissertation, pursued under the supervision of the Ph.D. advisor.

Human Movement Science

www.hmsc.unc.edu
JOSEPH B. MYERS, *Curriculum Director*

Professors

Carol A. Giuliani, Neural Basis of Motor Control, Disability in Aging, Stroke Recovery, Movement Analysis
Edward Grant, Robotics, Biomedical Systems, Neural Networks, Biomedical Sensors, and Medical Devices
Michael T. Gross, Biomechanics, Sports Medicine, Orthopedics, Orthotics
Kevin M. Guskiewicz, Athletic Training, Sports Medicine, Mild Head Injury
Anthony C. Hackney, Exercise Physiology, Metabolism, Endocrinology
Henry S. Hsiao, Medical Instrumentation, Interfacing Microprocessors to Physiological Transducers, Telemedicine
Michael Y. Lee, Neurological Rehabilitation, Clinical Neurophysiology, Acupuncture
Karen McCulloch, Balance Control in Neurologic Populations, Intervention in Stroke and Brain Injury, Cognitive Processes
Frederick O. Mueller, Epidemiology of Athletic Injuries, Administration, Sports Medicine
Darin Padua, Biomechanics and Sports Medicine, Knee Injury Prevention
William E. Prentice, Athletic Training, Sports Medicine
Richard Segal, Role of Spinal Circuits and Supraspinal Systems during Upper Limb Movement and Walking, Neuro Plasticity of Spinal Circuits
Bing Yu, Biomechanics, Rehabilitation, Movement Analysis, Biomechanical Modeling

Associate Professors

Claudio Battaglini, Management of Cancer Treatment-Related Symptoms, Prescriptive Exercise Intervention
J. Troy Blackburn, Neuromuscular Function and Motor Control, Knee Injury Prevention
Diane Groff, Recreational Therapy, Management of Cancer Treatment-Related Symptoms
Bonita Marks, Exercise Physiology, Aging, Physical Activity and Health
Steve Marshall, Injury Epidemiology, Occupational Epidemiology, Methodology
Vicki S. Mercer, Motor Control, Motor Learning, Posture and Balance across the Lifespan, Stroke Recovery
Miriam Morey, Exercise Physiology, Epidemiology, Aging and Exercise, Physical Activity and Health
Joseph Myers, Sports Medicine, Upper Extremity Orthopedics
Debbie E. Thorpe, Pediatrics, Motor Learning, Developmental Disabilities across the Lifespan, Aquatics
Paul S. Weinhold, Biomechanics of Repetitive Motion Injury, Tissue Engineering

Assistant Professors

Janet K. Freburger, Health Sciences Research, Research Design, Biomechanics, Orthopedics
Michael Lewek, Aging and Function, Biomechanics
Jason Mihalik, Sports Medicine, Mild Head Injury
Eric Ryan, Exercise Physiology, Acute and Chronic Influences of Exercise, Nutritional Supplementation, and Aging on Neuromuscular Function
Abbie Smith-Ryan, Exercise Physiology, Exercise and Nutrition Interventions, Body Composition, Cardiovascular and Metabolic Function
Robin Queen, Biomechanics, Orthopedics, Sport Injury

Program Description: Doctor of Philosophy

The Department of Allied Health Sciences in the School of Medicine offers an interdisciplinary program of study in human movement science leading to the doctor of philosophy degree. The intent of this program is to develop research and teaching scholars who are capable of producing and disseminating new knowledge in the field of human movement science.

The doctoral program in human movement science is offered with the cooperative effort of the following departments/divisions at UNC–Chapel Hill: Physical Therapy, Exercise and Sport Science, Biomedical Engineering, Orthopedics, Physical Medicine and Rehabilitation, and the Program on Aging. This program is designed to provide students an opportunity for doctoral study in areas that will increase our knowledge of human movement performance. The program focuses on contributing to the scientific basis of human movement, developing theory and methods for maintaining health, preventing disability, and improving movement ability. Focusing on normal movement and movement disability requires a special emphasis in research and education that draws upon yet differs from the focus of related sciences. Students of varied academic disciplines are accepted into the program. Students choose one of three tracks as a focus for their course work and research experiences:

- Biomechanics of human movement, including musculoskeletal mechanics and external mechanical constraints
- Exercise physiology of human movement, including exercise response and training in special populations
- Behavioral learning of human movement including neuromuscular control and motor learning.

(The Division of Physical Therapy retired the M.S. in human movement science degree, so applicants are no longer being accepted for the M.S. as a terminal degree. Bachelor's level applicants will be considered, given appropriate background and experience in movement science research.)

Program Requirements

The curriculum core requirements allow flexibility in designing programs of study to meet the needs of each track and the student's interests. Other specific requirements will vary depending on the student's background and program track. Each student's program of study is developed under the guidance of his or her advisor and committee. Among these requirements are the core courses HMSC 700, 701, 702 Scientific Basis of Human Movement (nine credits). Degree requirements also include a first year review, a doctoral written exam, a preliminary oral exam, a dissertation defense, and a written dissertation. Other specific requirements will vary depending on the student's background and program track.

Research Facilities

Several research facilities are available for students in the departments participating in the program. These include the Orthopedic Biomechanics Laboratory in the Department of Orthopedics; the Motion Analysis, Interdisciplinary Human Movement, and Neural Plasticity Laboratories in the Division of Physical Therapy's Center for Human Movement Science; and the Applied Physiology, Cadaver/Anatomy, Neuromuscular, Matthew Gfeller Center for Mild Traumatic Brain Injury, and Sports Medicine Laboratories in the Department of Exercise and Sport Science. These laboratories are equipped with state-of-the-art instruments for measuring a wide range of human movement and performance, which includes behavioral, physiological, biomechanical, and computer modeling.

Admission

Student selection is based primarily on academic records and research experience. Requirements include the following:

- A master's degree in a field related to human movement is preferred, but qualified candidates with a bachelor's degree will be considered for admission. (e.g., physical therapy, exercise science, athletic training, biomedical engineering, anatomy, etc).
- A grade point average of 3.0 or better in the last two years of the student's most recent degree program. A typical student who is admitted has a 3.4 GPA or better.
- GRE scores in the 50th percentile or higher. Only official scores submitted from ETS will be accepted. In rare cases, admission is granted when scores are below the 50th percentile.
- Course work in the following areas, completed within the past five years, is a prerequisite for admission. Completion of course work in these areas longer than five years ago may require completion of an admissions examination.
- Introductory graduate-level statistics
- Human anatomy
- Human physiology
- Physics
- Chemistry
- Psychology

Because of the varied backgrounds of applicants, decisions on additional prerequisite preparation for each student will be decided by the Graduate Education Committee.

- Three letters of academic recommendation
- Curriculum vitae
- Written statement of the academic/career goals and research interests
- Applicants should indicate the name of the faculty member who has agreed to mentor them
- Applicants are strongly encouraged to contact a faculty member in their area of interest

Courses

Course work appropriate for the student's area of interest may be taken from a wide range of departments. The programs listed here are examples, but are not meant to be inclusive. (Please refer to departmental listings for full course descriptions.)

BMME (Biomedical Engineering)

450 Linear Control Theory (4).

510 Biomaterials (3).

520 Fundamentals of Materials Engineering (3).

530 Digital Signal Processing I (3).

565 Biomedical Instrumentation I (4).

580 Microcontroller Applications I (3).

705 Biomaterials Instrumentation (3).

750 Digital Control Theory (3).

EXSS (Exercise and Sport Science)

730 Management of Athletic Injuries (3).

732 Human Anatomy (4).

735 Sports Medicine Analysis: Special Problems Related to Sports Medicine (3).

739 Practicum in Athletic Training (3).

742 Social Issues in Exercise and Sport (3).

780 Physiology of Exercise (3).

781 Clinical Exercise Prescription and Testing (2–3).

782 Nutritional Aspects of Exercise (2–3).

783 Assessment of Physiological Functions in Exercise (3).

785 Seminar in Exercise Physiology (3).

890 Special Topics in Exercise and Sport Science (1–3).

990 Research in Exercise and Sport Science (1–3).

Courses for Graduate Students

HMSC

700 Scientific Basis of Human Motion (3).

701 Scientific Basis of Human Motion (3).

702 Physiology of Exercise (3).

710 Muscle Mechanics and Electromyographic Kinesiology (2–4).

743 Topics in Motor Control and Motor Learning: Therapeutic Implications (3).

770 Electronics for Human Movement Science (1–21).

780 Introduction to Outcomes Research in Health Care (3).

782 Infant and Family Assessment (2–3).

782L Laboratory in Infant and Family Assessment (0.5–21).

790 Advanced Kinesiology and Biomechanics (4).

791 Analysis of Human Motion (3).

793 Advanced Ortho Assessment (4).

795 Human Kinetics (4).

801 Seminar in Human Movement Science (2).

803 Problems in Human Movement Science (1–3).

811 Basic Aspects of Aging (MEDI 486) (AHSC 411).

877 Independent Study in Human Movement Science (1–21).

879 Research in Human Movement Science (1–21).

881 The Neural Basis of Motor Control (3).

885 Beach Course (1–3). Human movement seminar held at the beach.

886 Understanding Research (3).

887 Developmental Motor Control (1–3).

904I Aging and Health (DENT 604I , EPID 620I, MEDI 604I, NURS 782I, PHCY 604I, PHYT 904I, PSYC 904I, SOCI 824, SOWO 604I) (3). See SOWO 604I for description.

911I Movement and Balance in Aging (3).

951I Aging and Public Policy (DENT 607I, FMME 607I, HPM 961I, MEDI 607I, NURS 783I, PHCY 607I, PSYC 907I, SOWO 607I) (3). See SOWO 607I for description.

993 Master's Thesis (3–6).

Courses for Graduate Students

IHMS (Interdisciplinary Human Movement Science)

850 Issues in Motor Control and Motor Learning (2).

870 Doctoral Development Seminar (1).

994 Doctoral Dissertation (3–9).

School of Information and Library Science

sils.unc.edu
GARY MARCHIONINI, *Dean*
Barbara Wildemuth, *Associate Dean for Academic Affairs*

Professors

Jane Greenberg
Stephanie W. Haas
Sandra Hughes-Hassell
Robert M. Losee
Gary J. Marchionini, Cary C. Boshamer Distinguished Professor
Richard Marciano
Joanne Gard Marshall, Alumni Distinguished Professor
Sarah C. Michalak, Associate Provost for Libraries and University Librarian
Reagan Moore
Barbara B. Moran, Louis Round Wilson Distinguished Professor
Javed Mostafa
Arcot Rajasekar
Helen R. Tibbo, Alumni Distinguished Professor
Barbara M. Wildemuth

Associate Professors

Claudia J. Gollop
Bradley M. Hemminger
Diane Kelly, Frances Carroll McColl Term Associate Professor
Christopher (Cal) Lee
Jeffrey Pomerantz
Brian W. Sturm

Assistant Professors

Jaime Arguello
Robert Capra
Ryan B. Shaw
Zeynep Tufekci

Clinical Professor

Paul Jones

Clinical Associate Professor

Cliff Missen

Clinical Assistant Professor

Ronald Bergquist

Lecturers

Denise Anthony
Ericka Patillo

Adjunct Faculty

Deborah Balsamo, Environmental Protection Agency
Angela Bardeen
Todd Barlow, SAS
Tamika Barnes, Environmental Protection Agency
Jennifer Bauer
Joan Boone
Jamie Bradway, North Carolina State University
Matthew Brody
Meg Brown, Duke University
Jeff Campbell
Shauna Collier
William Cross, North Carolina State University
Abe Crystal, ruzuku, Inc.
Evelyn H. Daniel
Jacqueline Dean
Joel Dunn, University of North Carolina at Greensboro
David Ernsthausen
Alan Forrest
Heather Gendron
Wanda Gunther
Chad Haefele
Lewis Hassell
Carol Jenkins
Caroline Keizer
Joni Keller
Emily King
Geraldine Larson
Charles B. McNamara
Lokman Meho, American University Beirut
Anne Morisseau
Jennifer Morgan
Rita Moss
Angela Myatt, University of Texas Health Center at San Antonio
Thomas Nixon
Ruth Palmquist
Dav Robertson
Beth Rowe
Jacquie Samples
Sara Sampson
Connie Schardt, Duke University
Seth Shaw
Tim Shearer

Michael Shffner
Kevin Smith, Duke University
Jacqueline Solis
Erin Stalberg
Arlene Taylor
Matthew Turi
Rebecca Vargha
Meredith Weiss
Steven Weiss

The programs of the School of Information and Library Science (SILS) are designed to prepare students for professional employment and advanced study in the fields of information and library science. The school offers graduate instruction leading to the degrees of master of science in information science (M.S.I.S.) and master of science in library science (M.S.L.S.), Post-master's certificate (PMC), and doctor of philosophy (Ph.D.) in information and library science. The school also offers an undergraduate minor in information systems and an undergraduate major in information science (B.S.I.S.).

The M.S.I.S. is designed to prepare students to contribute to the design, development, and maintenance of information systems; to provide leadership in the development of new technologies and new applications relating to the delivery of information to users; and to demonstrate a theoretical knowledge of information science, including the theory of information storage and retrieval, systems science, and social, political, and ethical implications of information systems. Within this degree program, students complete a core set of courses and build their own specialized program of studies on this foundation. Areas where students find jobs include (among others) database design and administration, social media, interface design and usability testing, systems analysis and design, archives and digital repositories, systems administration, user training and support, information resources/knowledge management, information systems security, competitive intelligence, and Web site design and management.

The goal of the M.S.L.S. program is to prepare students to contribute to the design, development, and management of libraries and their collections and services; to provide leadership in the development of new services and technologies to improve access to information for users; and to demonstrate a theoretical knowledge of library science, including the theory of information organization, effective communication, and social, political, cultural, and ethical issues surrounding libraries. Areas where students find jobs include library administration, administration of archives and manuscript collections, records management, documents librarianship, cataloging, public and reference services, acquisitions and collection management, children's librarianship, access to and manipulation of database information, special collections, academic subject specialties, and systems librarianship. Graduates of the program are ready to practice within various settings: academic, public, or special libraries, information centers or school library media centers.

The 48 credit hours of course work is selected, in consultation with the student's faculty advisor, from the information and library science curriculum, or as appropriate, from related subject fields in other schools and departments of the University or at neighboring universities. A master's paper or project (INLS 992) is also required of each master's student. A theme within the curriculum for both master's degrees is evidence-based practice, which requires students to interpret and apply the research of others to their professional situations, as well as to be able to design and conduct their own research where necessary data is not otherwise available.

Graduate certificates within either the M.S.L.S. or the M.S.I.S. are available in the following areas: aging, bioinformatics, clinical information science, digital curation, interdisciplinary health communication, nonprofit leadership, and international development. A program leading to a certificate as a school library media coordinate is also available as part of the M.S.L.S.

The School of Information and Library Science participates in several dual or cooperative degree programs. These include dual degree programs with:

- the Kenan–Flagler Business School, which combines the master of business administration (M.B.A.) degree and the M.S.I.S. degree.
- the Department of Health Policy and Management, School of Public Health, which combines the master of health administration (M.H.A.) degree with either the M.S.L.S. or M.S.I.S. degree.
- the School of Nursing, which combines the master of science in nursing (M.S.N.) with either the M.S.I.S. or M.S.L.S. degree.
- the Department of Art, which combines the master of arts in art history (M.A.) with either the M.S.I.S. or M.S.L.S. degree.
- the School of Government, which combines the master of public administration (M.P.A.) with either the M.S.I.S. or M.S.L.S. degree.
- the School of Law, which combines the juris doctor (J.D.) degree with either the M.S.L.S. or the M.S.I.S degree.

A cooperative archival program allows students to combine the master of arts (M.A.) in public history at North Carolina State University with either the M.S.L.S. or the M.S.I.S. with specializations in archival science. A similar dual degree cooperative program with Duke University's School of Medicine allows students to combine a degree in medicine with either the M.S.I.S. or M.S.L.S. degree..

Participation in any dual degree program requires separate admission to both degree programs.

The basic requirement for admission to the master's programs is a bachelor's degree from a recognized college or university. The student's undergraduate work should demonstrate a strong foundation in liberal arts and sciences. Each master's student is required to enter the program with a foundation in various technological tools (e.g., HTML, databases) employed in the field. Admission involves meeting the requirements for The Graduate School, which include submission of acceptable scores on the General Test of the Graduate Record Examination (GRE). For details about the entrance requirements and the curriculum for the master's programs, see the program descriptions of the School of Information and Library Science, whichare available on the Web at sils.unc.edu/programs.

The post-master's certificate (PMC) in information and library science is a 30-semester-hour post-master's degree program that is designed for practitioners who seek an articulated and systematic continuing education program to enhance their professional career development in information and library science. The School currently offers a specialized PMC in Data Curation. Students may also design a specialization to meet their individual needs.

The doctor of philosophy in information and library science (Ph.D.) is a research degree. Thus, the purpose of the doctoral program in SILS is to educate scholars who are capable of addressing problems of scholarly consequence in the field of information and library science. Toward this end each student develops a program of studies, which is tailored to individual interests and career goals. Required classes include a year-long seminar on research issues and questions (INLS 881/882) and completion of an appropriate sequence of courses in statistics. Additional courses in research methods and theory development are recommended, as are research experience and substantive content

courses, which are related to a student's research interests. There are also opportunities for students to develop teaching skills through both course work and teaching experience.

The school is located in Manning Hall, with the administrative and faculty offices, classrooms, ibiblio.org (one of the most popular Web sites on the Internet), and the Information and Technology Resource Center (ITRC) all contained in that building. The ITRC includes the Information and Library Science Library, which holds more than 100,000 volumes, and computer labs. Wireless network access is available in Manning Hall and many other locations on campus; direct connections to the campus network are also available in the ITRC.

Those interested in any of the SILS degree programs should see the SILS Web site (sils.unc.edu) or request information from the School of Information and Library Science, CB #3360, 100 Manning Hall, The University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-3360. (E-mail: info@ils.unc.edu.)

NOTE: The prefix for all School of Information and Library Science courses is INLS. When a prerequisite is listed for a course, it may be assumed that an equivalent course taken elsewhere or permission of the instructor also fulfills the prerequisite or corequisite. The course instructor must approve the equivalency of the substitute course.

Although graduate students may take courses numbered below 400, they will not receive credit toward a graduate degree for those courses.

Courses for Graduate and Advanced Undergraduate Students

INLS

461 Information Tools (3). This course may not be taken if the student has already taken INLS 261. Tools and concepts for information literacy: client-server relationships, Web and Internet standards (including open source), underlying structure and use of specific software. Undergraduates may take either INLS 261 or INLS 461.

465 Understanding Information Technology for Managing Digital Collections (3). Prepares students to be conversant with information technologies that underlie digital collections in order to evaluate the work of developers, delegate tasks, write requests for proposals, and establish policies and procedures. Teaches students how to think about information technology systems and recognize and manage interdependencies between parts of the systems.

490 Selected Topics (1–3). Exploration of an introductory-level special topic not otherwise covered in the curriculum. Previous offerings of these courses do not predict their future availability; new courses may replace these.

500 Human Information Interactions (3). The behavioral and cognitive activities of those who interact with information, with emphasis on the role of information mediators. How information needs are recognized and resolved; use and dissemination of information.

501 Information Resources and Services (3). Analysis, use, and evaluation of information and reference systems, services, and tools for both printed and electronic delivery. Provides a foundation in electronic information search techniques, question negotiation, interviewing, and instruction.

502 User Education (3). Prerequisite, INLS 501. Permission of the instructor for students lacking the prerequisite. Examines the history and context of LIS training programs. Pedagogy, teaching skills, methods of evaluation are addressed. Students may tailor learning projects to their own interests.

503 Communication Skills for Information Professionals (3). Through individual presentations, group exercises, and performance-centered feedback, this course seeks to improve students' ability to communicate their ideas clearly and present themselves positively in a professional setting.

509 Information Retrieval (COMP 487) (3). Study of information retrieval and question answering techniques, including document classification, retrieval and evaluation techniques, handling of large data collections, and the use of feedback.

512 Applications of Natural Language Processing (COMP 486) (3). Prerequisite, COMP 110, 116, or 121. Study of applications of natural language processing techniques and the representations and processes needed to support them. Topics include interfaces, text retrieval, machine translation, speech processing, and text generation.

513 Resource Selection and Evaluation (3). Identification, provision, and evaluation of resources to meet primary needs of clientele in different institutional environments.

515 Consumer Health Information (3). Examines concepts of health, health conditions, policy, and information collections and services from social and cultural perspectives. Analysis and design for provision and access to consumer health information services.

520 Organization of Information (3). Introduction to the problems and methods of organizing information, including information structures, knowledge schemata, data structures, terminological control, index language functions, and implications for searching.

523 Introduction to Database Concepts and Applications (3). Pre- or corequisite, INLS 261 or 461. Design and implementation of basic database systems. Semantic modeling, relational database theory, including normalization, indexing, and query construction, SQL.

525 Electronic Records Management (3). Explores relationships between new information and communication technologies and organizational efforts to define, identify, control, manage, and preserve records. Considers the importance of organizational, institutional and technological factors in determining appropriate recordkeeping strategies.

530 Young Adult Literature and Related Materials (3). A survey of print and nonprint library materials particularly suited to the needs of adolescents.

534 Issues for Children and Technology (3). This course will encourage students to explore the array of technologies available to children and adolescents, the issues surrounding their use, the role of care givers, and potential impacts on development.

541 Information Visualization (3). An introduction to information visualization through reading current literature and studying exemplars. The course reviews information visualization techniques, provides a framework for identifying the need for information visualization, and emphasizes interactive electronic visualizations that use freely available tools. Students will construct several visualizations. No programming skills are required.

550 History of the Book and Other Information Formats (3). The history of the origin and development of the book in all its formats: clay tablets to electronic. Coverage includes scientific and other scholarly publications, religious works, popular literature, periodicals, and newspapers.

551 History of Libraries and Other Information-Related Cultural Institutions (3). The history of cultural institutions related to information from earliest times to the present day. Includes specific institutions, trends in service and facilities, and individuals important in the development of these institutions.

554 Cultural Institutions (3). Explores cultural institutions—libraries, museums, parks, zoological and botanical gardens, reconstructions, and other settings—as lifelong educational environments.

556 Introduction to Archives and Records Management (3). Survey of the principles, techniques, and issues in the acquisition, management, and administration of records, manuscripts, archives, and other cultural and documentary resources in paper, electronic, and other media formats.

558 Principles and Techniques of Storytelling (3). An overview of storytelling, its historical development, and the presentation and administration of storytelling programs. The class focuses on performance skills merged with theoretical issues.

560 Programming for Information Science (3). Introduction to programming and computational concepts. Students will learn to write programs using constructs such as iteration, flow control, variables, functions, and error handling. No programming experience required.

566 Information Security (3). Prerequisite, INLS 261 or 461. Aspects of data integrity, privacy, and security from several perspectives: legal issues, technical tools and methods, social and ethical concerns, and standards.

572 Web Development I (3). Prerequisite, INLS 261 or 461. Introduction to Internet concepts, applications, and services. Introduces the TCP/IP protocol suite along with clients and servers for Internet communication, browsing, and navigation. Examines policy, management, and implementation issues.

574 Introduction to Local Area Networks (3). Prerequisite, INLS 261 or 461. Introduction to local area network hardware, topologies, operating systems, and applications. Also discusses LAN management and the role of the network administrator.

576 Distributed Systems and Administration (3). Prerequisite, INLS 261 or 461. Distributed and client/server-based computing. Includes operating system basics, security concerns, and issues and trends in network administration.

578 Protocols and Network Management (3). Prerequisite, INLS 261 or 461. Network protocols and protocol stacks. Included are discussions of protocol classes, packet filtering, address filtering, network management, and hardware such as protocol analyzers, repeaters, routers, and bridges.

582 Systems Analysis (3). Introduction to the systems approach to the design and development of information systems. Methods and tools for the analysis and modeling of system functionality (e.g., structured analysis) and data represented in the system (e.g., object-oriented analysis) are studied. Undergraduates are encouraged to take INLS 382 instead of this course.

584 Information Ethics (3). An overview of ethical reasoning, followed by discussion of issues most salient to information professionals, e.g., intellectual property, privacy, access/censorship, effects of computerization, and ethical codes of conduct.

585 Management for Information Professionals (3). Introduction to management principles and practices for information professionals working in all types of organizations. Topics include planning, budgeting, organizational theory, staffing, leadership, organizational change and evaluation, and decision making.

613 Text Mining (3). This course will allow the student to develop a general understanding of knowledge discovery and gain a specific understanding of text mining. Students will become familiar with both the theoretical and practical aspects of text mining and develop a proficiency with data modeling text.

621 Personal Information Management (3). This course focuses on issues in personal information management research and practice, including information organization, human cognition and memory, task continuity across devices, preservation, and the role of technology in personal information management.

623 Database Systems II: Intermediate Databases (3). Prerequisites, INLS 382 or 582, and 523. Intermediate-level design and implementation of database systems, building on topics studied in INLS 523. Additional topics include MySQL, indexing, XML, and nontext databases.

624 Policy-Based Data Management (3). Prerequisite, INLS 461 or COMP 110 or 116. Students will develop policies for managing digital repositories and persistent archives. The rules will be implemented in the integrated Rule-Oriented Data System (iRODS), which organizes and distributes data into shareable collections.

672 Web Development II (3). Prerequisite, INLS 572. Study of design and implementation of applications using both client and server side configuration and programming. Example topics include PHP, Ruby on Rails, and Javascript.

691H Research Methods in Information Science (3). Senior standing and permission of the instructor. Restricted to information science majors. An introduction to research methods used in information science. Includes the writing of a research proposal.

692H Honors Thesis in Information Science (3). Senior standing and permission of the instructor. Restricted to information science majors. Students in the SILS undergraduate honors program engage in independent research and write an honors thesis reporting the research under the supervision of a faculty member.

696 Study in Information and Library Science (1–3). Permission of the instructor. Study by an individual student on a special topic under the direction of a specific faculty member. Six credit maximum for master's students. Graduate faculty.

697 Information Science Capstone (3). Senior standing required. Information science major or minor. Contemporary topics of information science, information systems, information technology, information design, and information management. Assessment of future impact of new developments.

Courses for Graduate Students

INLS

700 Scholarly Communication (3). Prerequisite, INLS 500 or permission of instructor. Addresses how scholars approach academic work; social relationships within academia; external stakeholders in the scholarly communication system; and emerging technologies' impact upon work practices. Intended for students interested in academic libraries or digital collections of scholarly materials, and/or conducting research on scholarly communication.

701 Information Retrieval Search Strategies (3). Prerequisite, INLS 501 or 509. Investigates information retrieval techniques and strategies from the world of electronic information sources, including commercial and Internet databases and search engines. Data analysis, marketing, and end-user products and services are explored.

703 Science Information (3). Prerequisite, INLS 501. Survey of the communication of scientific information and the information sources in the physical and biological sciences; emphasis on major bibliographic and fact sources, including online reference services.

704 Humanities and Social Sciences Information (3). Prerequisite, INLS 501. Survey of information and its needs in the social sciences and humanities, with an emphasis on information use and search strategies and on reference and other information resources.

705 Health Sciences Information (3). Prerequisite, INLS 501. A survey of information used in the health sciences disciplines and professions. The organization of sources, current techniques and tools for its control, including online databases.

706 Biomedical Informatics Research Review (1.5). Develops understanding of information/library science research issues related to biomedical and health informatics through the review of journal articles, invited talks, and critical group discussions.

707 Government Documents (3). Prerequisite, INLS 501. A survey of the major publications of the United States federal government, United Nations, United States governments, and British government, with attention to the selection, classification, and administration of a document collection.

708 Law Libraries and Legal Information (3). Prerequisite, INLS 501. An introduction to the legal system and the development of law libraries, their unique objectives, characteristics, and functions. The literature of Anglo-American jurisprudence and computerized legal research are emphasized, as well as research techniques.

709 Business Information (3). Prerequisite, INLS 501. Combines an introduction to basic business concepts and vocabulary with consideration of current issues in business librarianship and of key print and electronic information sources.

710 Evidence-Based Medicine (3). An introduction to the process of evidence-based medicine (EBM) including question building, searching, and critical appraisal of studies and to the supporting roles and opportunities for medical librarians.

718 User Interface Design (3). Prerequisite, INLS 582. Basic principles for designing the human interface to information systems, emphasizing computer-assisted systems. Major topics: users' conceptual models of systems, human information processing capabilities, styles of interfaces, evaluation methods.

720 Metadata Architectures and Applications (3). Prerequisite, INLS 509, 520, or 521. Examines metadata in digital environment. Emphasizes the development and implementation of metadata schemas in distinct information communities and the standards and technological applications used to create machine understandable metadata.

721 Cataloging Theory and Practice (3). Prerequisite, INLS 520. Covers principles, practices, and future trends for cataloging library resources. Topics include RDA/AACR2, MARC, authority control, subject analysis, classification, and cataloging of print, nonprint, and digital resources.

723 Database Systems III: Advanced Databases (3). Prerequisite, INLS 623. Advanced study of database systems. Topics include database design, administration, current issues in development and use, optimization, indexing, transactions and database programming.

724 Abstracting and Indexing for Information Retrieval (3). Prerequisite, INLS 261, 461, 520, or 521. Examines abstracting, indexing and classification principles and techniques for document and object (nontextual materials) analysis. Human and automated techniques are covered.

725 Electronic Health Records (3). Focuses on EHR data standards with emphasis on data management requirements, applications, and services. Course includes HL7, CCHIT, and CDISC standards. For data management specialists, administrators, and health data analysts.

728 Seminar in Knowledge Organization (3). Prerequisite, INLS 509, 520 or 521. Permission of the instructor for students lacking the prerequisite. Explores theoretical foundations, historical approaches, and current practices for organizing knowledge. Covers general terminological and classificatory systems, domain semantic systems, and research.

732 Children's Literature and Related Materials (3). Survey of literature and related materials for children with emphasis on 20th-century authors and illustrators.

733 Administration of Public Library Work with Children and Young Adults (3). Objectives and organization of public library services for children and young adults; designed for those who may work directly with young people or who intend to work in public libraries.

739 Information Services and Specific Populations (3). Service, professional, and administrative issues related to information access by nontraditional information service users. The course examines trends, public policy, ethical issues, programming, and evaluation of services.

740 Digital Libraries: Principles and Applications (3). Research and development issues in digital libraries including: collection development and digitization, mixed mode holdings; access strategies and interfaces, metadata and interoperability, economic and social policies, and management and evaluation.

745 Curriculum Issues and the School Librarian (3). Considers the educational process, methods of teaching, scope, and sequence of curricular content in grades K–12. Examines the role of the library media specialist in providing access, instruction, and consultation.

746 Music Librarianship (3). Survey of the history and practice of music librarianship, with an emphasis on administration, collection development, and public service in academic and large public libraries.

747 Special Libraries and Knowledge Management (3). Prerequisite, INLS 585. Professional competencies required to work as a special librarian or knowledge manager in a corporate or nonprofit setting. Strategic planning. Organizational dynamics. Tailoring services. Intranet design. Value-added measures. Intellectual capital.

748 Health Sciences Environment (3). Prerequisite, INLS 501 or 585. Permission of the instructor for students lacking the prerequisite. Trends in health care delivery, biomedical research and health sciences education, with emphasis on the impact and use of information. Includes observation of clinical and research settings.

749 Art and Visual Information Management (3). Prerequisite, INLS 520 or 521. A survey of the history and practice of art and visual resources librarianship/curatorship, with an emphasis on administration, collection development, copyright practices, digital resource management, and public service.

752 Digital Preservation and Access (3). Focuses on best practices for the creation, provision, and long-term preservation of digital entities. Topics include digitization technologies; standards and quality control; digital asset management; grant writing; and metadata.

753 Preservation of Library and Archive Materials (3). An introduction to current practices, issues, and trends in the preservation of materials for libraries and archives, with an emphasis on integrating preservation throughout an institution's operations.

754 Access, Outreach, and Public Service in Cultural Heritage Repositories (3). Prerequisite, INLS 501. Explores user needs, information seeking behaviors, and provision of access to primary source materials in archives, manuscript repositories, and museums. User education and outreach are major foci.

755 Archival Appraisal (3). Prerequisite, INLS 556. Explores history, theories, techniques, and methods that archivists use to identify documents and other materials of enduring value for long-term preservation.

756 Data Curation and Management (3). Explores data curation lifecycle activities from design of good data, through content creator management, metadata creation, ingest into a repository, repository management, access policies and implementation, and data reuse.

757 Principles and Practices in Archival Description (3). Prerequisite, INLS 556. Recommended preparation, INLS 520 or 521. Explores the history, principles, development, and use of archival description with a focus on EAD and MARC structures. Presents authority and subject analysis work and description for special formats.

758 International and Cross-Cultural Perspectives for Information Management (3). Examines information in society for selected nations/cultures. Compares institutions, processes, and trends in the globalization of information management in the face of barriers of language and culture.

760 Web Databases (3). Prerequisites, INLS 572 and 623. Programming experience required. Explores concepts and practice surrounding the implementation and delivery of Web-enabled databases. Students will gain experience with and evaluate PC and Unix Web database platforms.

762 Internet Issues and Future Initiatives (3). Prerequisite, INLS 572. Members of this seminar discuss emerging Internet policy issues such as copyright, intellectual property, privacy, and security. Participants will also explore emerging Internet tools and applications.

780 Research Methods (3). Prerequisites, INLS 500, and 501 or 509. Required preparation, completion of 12 credit hours. An introduction to research methods used in library and information science. Includes the writing of a research proposal.

781 Proposal Development (1.5). Prerequisite, INLS 581. Development of a proposal for the master's paper/project/portfolio.

782 Library Assessment (3). Recommended preparation, INLS 780. Addresses evaluation and assessment activities in libraries. Existing tools for evaluation library operations will be considered. Students will design and conduct their own evaluation of one or more library operations.

785 Human Resources Management (3). Prerequisite, INLS 585. An in-depth look at the management of human resources in libraries and other information agencies. Includes topics such as recruitment, hiring, job analysis, performance appraisal, training, and compensation.

786 Marketing of Information Services (3). Application of marketing theory to libraries and other information settings. Includes consumer behavior, market research, segmentation, targeting and positioning, public relations, product design, and sales promotion.

795 Supervised Field Experience (3). Required preparation, completion of 18 semester hours. Permission of the instructor. Supervised observation and practice in an information service agency or library. The student will work a required amount of time under the supervision of an information/library professional and participate in faculty-led discussions for ongoing evaluation of the practical experience.

796 Field Experience in School Library Media (3). Required preparation, completion of at least 21 semester hours, including INLS 744 and INLS 754. Permission of the instructor. Supervised observation and practice in a school library media center. Faculty-led seminars, reflection journals, and on-site faculty observations enhance the experience.

818 Seminar in Human-Computer Interaction (3). Prerequisite, INLS 718. Permission of the instructor for students lacking the prerequisite. Research and development in design and evaluation of user interfaces that support information seeking. Major topics: interactivity, needs assessment, query and browser interactions, interactive design and maintenance, usability testing.

841 Seminar in Academic Libraries (3). Prerequisite, INLS 585. Study of problems in the organization and administration of college and university libraries with emphasis on current issues in personnel, finance, governance, and services.

842 Seminar in Popular Materials in Libraries (3). Selected topics relating to the roles of various types of libraries in the provision and preservation of popular materials (light romances, science fiction, comic books, etc.) existing in various forms (print, recorded sound, etc.).

843 Seminar in Public Libraries (3). Required preparation, completion of 12 semester hours. Selected topics in public library services, systems, networks, and their management. Current issues are emphasized, along with the interests of the participants.

857 Seminar in Rare Book Collections (3). A study of the nature and importance of rare book collections; problems of acquisition, organization, and service.

859 Seminar in Information and Culture (3). Explorations of scholarship and observations about information and its social appearances in contemporary culture. Reading, literacy, and cultural values will be emphasized.

881 Research Issues and Questions I (3). Doctoral standing or permission of the instructor. Intensive and systematic investigation of the fundamental ideas in information and library science. Exploration and discussion in seminar format. Must be taken in fall semester followed by INLS 882 in spring.

882 Research Issues and Questions II (3). Doctoral standing or permission of the instructor. Intensive and systematic investigation of the fundamental ideas in information and library science. Exploration and discussion in seminar format. Must be taken in the spring semester immediately after INLS 881 (offered fall only).

883 Research Colloquium (1). Doctoral standing required. Presentation and discussion of research issues, questions, methods, analytical approaches by students, faculty, or visitors.

884 Seminar in Research Methodology (3). Required preparation, doctoral standing or INLS 780 for Master's students. Permission of the instructor for students lacking this preparation. Exploration of topics related to research design and methodology in information and library science.

886 Graduate Teaching Practicum (1–3). Permission of the instructor. Doctoral students will observe and work with faculty in the classroom to gain foundational teaching skills. Students may practice designing a class session or exercise, leading a class, and/or grading.

887 Seminar in Theory Development (3). Doctoral or advanced master's standing required. Discussion and critique of the structural components and processes utilized in theory development. Seminar provides knowledge relating to the various stages of theory building.

888 Seminar in Teaching and Academic Life (3). Doctoral or advanced master's standing required. Examines teaching, research, publication, and service responsibilities. Provides perspective on professional graduate education and LIS educational programs. Explores changing curricula and discusses ethics, rewards, and problems of academic life.

889 Seminar in Teaching Practice (1). Pre- or corequisite, INLS 888. Doctoral standing required. For doctoral students currently involved in teaching activities, these regular seminar meetings are designed to discuss relevant literature and aspects of the teaching experience.

890 Advanced Selected Topics (1–6). Exploration of an advanced special topic not otherwise covered in the curriculum. Previous offering of these courses does not predict their future availability; new courses may replace these.

988 Research in Information and Library Science (1–6). Permission of the instructor. Supports individual and small group research undertaken by doctoral students in information and library science intended to produce research results of publishable quality.

992 Master's Paper (3). Provides a culminating experience for master's degree students, who engage in independent research or project effort and develop a major paper reporting the research or project under the supervision of a faculty member.

994 Doctoral Dissertation (3–9).

School of Journalism and Mass Communication

www.jomc.unc.edu
SUSAN KING, *Dean*

Professors

Penelope Muse Abernathy (92), Knight Chair in Journalism and Digital Media Economics. Digital Media, Economics
Richard R. Cole (18) John Thomas Kerr Jr. Distinguished Professor. International Communication, Professional Journalism, Mass Communication and Society
Jean Folkerts (93) Media History
James Hefner, Professor of the Practice of Journalism. Electronic Journalism
Ferrel Guillory, Professor of the Practice of Journalism; Director, Program on Southern Politics and Media and Public Life. Politics and the Media
Anne M. Johnston (50) James H. Shumaker Term Professor. Media Effects, Women and Media, Political Communication
Thomas R. Linden (58) Glaxo Wellcome Distinguished Professor of Medical Journalism. Medical Journalism
Cathy Packer (37) W. Horace Carter Distinguished Professor. Media Law and Ethics
Daniel Riffe (91) Richard Cole Eminent Professor. Media Processes and Production
Laura Ruel (73) Hugh Morton Distinguished Professor Visual Communication
JoAnn Sciarrino, Knight Chair, Digital Advertising and Marketing
Dulcie Straughan (36) James Howard and Hallie McClean Parker Distinguished Professor. Public Relations
John Sweeney (46) Distinguished Professor in Sports Communication. Advertising, Sports Marketing
Charles A. Tuggle (59) Reese Felts Distinguished Professor. Electronic Journalism
Lucila Vargas (53) Julian W. Scheer Term Professor. International/Development Communication, Women and Media, Qualitative Methods
Jan Yopp (42) Dean, Summer School; Walter Spearman Professor. News-Editorial Journalism, Public Relations

Research Professor

Brian Southwell (47) Health Communication

Associate Professors

Debashis Aikat (55) Media Technology
Andy Bechtel (77) News-Editorial Journalism, Media Ethics
Lois Boynton (61) Public Relations, Ethics
Napoleon Byars (78) Associate Dean for Undergraduate Studies. News-Editorial Journalism, Public Relations
Francesca Carpentier (80) Ph.D. Program Director. Broadcast Journalism
George W. Cloud (41) News-Editorial Journalism
Paul Cuadros (86) News Reporting
Patrick Davison (62) Visual Communication
Barbara Friedman (71) News-Editorial Journalism, Media History
Rhonda Gibson (63) Associate Dean for Graduate Studies. Print Journalism, Minorities and Media, Mass Communication Theory
Joe Bob Hester (64) Advertising
R. Michael Hoefges (70) Mass Communication Law, Advertising Law, Freedom of Information and Access Law, Privacy Issues
Heidi Hennink-Kaminski (82) Master's Program Director. Advertising, Social Marketing
Seth Noar (25) Interdisciplinary Health Communication
Sriram Kalyanaraman (66) New Media and Media Effects
Chris Roush (67), Senior Associate Dean and Walter E. Hussman Sr. Distinguished Scholar in Business Journalism; Business Journalism Director, Carolina Business News Initiative; News-Editorial Journalism; Business Reporting
Ryan Thornburg (87) News-Editorial Journalism
Janas Sinclair (74) Advertising
Clinical Associate Professor
Paul Jones, Director of ibiblio.org. Internet Issues and Applications (Digital Libraries, Electronic Publishing, Online News, Virtual Communities, Legal and Social Issues Relating to Networked Information and Access)

Assistant Professors

Spencer Barnes, Visual Communication
Queenie Byars (84) News-Editorial Journalism
Nori Comello (98) Strategic Communication, Identity, and Health
David Cupp (81) Broadcast Journalism
Victoria Ekstrand, Media Law and Ethics
Daniel Kriess (99) Political Communication, New Media
Trevy McDonald (88) Diversity
Dana McMahan (90), Advertising
Terence Oliver (96) Visual Communication
Chad Stevens (94), Visual Communication

Lecturers

Jock Lauterer, Senior Lecturer. Director, Carolina Community Media Project. Community Journalism, News-Editorial Journalism
Paul O'Connor, News-Editorial Journalism

Professors Emeriti

John B. Adams
Harry Amana
Richard J. Beckman
Thomas A. Bowers
Jane D. Brown

A. Richard Elam
Frank Fee
Robert F. Lauterborn
Raleigh Mann
Philip Meyer
James J. Mullen
Carol Reuss
Stuart Sechriest
Donald Shaw
Richard Simpson
Chuck Stone
Ruth Walden

The School of Journalism and Mass Communication offers programs leading to the master of arts in mass communication and the doctor of philosophy in mass communication.

Admission

Applications are available via the Web through gradschool.unc.edu. Completed forms are submitted to The Graduate School, whose admissions decisions are based largely on recommendations from the School of Journalism and Mass Communication. The minimum criteria for admission to a graduate program in journalism and mass communication are:

- A recognized undergraduate degree (or equivalent credential from a foreign university)
- A recognized master's degree or J.D., in addition, if applying for the Ph.D. program
- An undergraduate cumulative GPA of at least 3.0 (A = 4.0)
- The admissions committee has a preference for minimum scores on the Graduate Record Examination (GRE) of at least the 55th percentile on the verbal section, 50th percentile on the quantitative section, and 4.5 on the analytical writing section
- Three letters of recommendation
- A statement of career intent, indicating how the applicant intends to use graduate education in journalism and mass communication
- A current résumé
- A writing sample. For master's applicants, this could be an academic paper or magazine or newspaper article; for doctoral applicants, a chapter from their master's thesis or a copy of an academic paper.
- Ph.D. applicants must also include a separate statement that details a problem that they would like to solve during their time as a doctoral student. Applicants are not committed to researching this problem if accepted into the program, but the School of Journalism wants to know their research interests.

In addition, international applicants must submit Test of English as a Foreign Language (TOEFL) scores and the financial certificate as required by The Graduate School.

International applicants must also complete the International Student Data Form and Financial Certification Instructions/Worksheet (available in admission application) and must show proof of financial ability to pay for two years for the master's program and three years for the Ph.D. program. Applications will not be reviewed without these documents.

Applicants should be aware that the number of applications far exceeds the number of spaces available, and that many qualified applicants must be denied admission because of limited space in the program.

New students are admitted only for the fall semester. The application deadline is generally the second Tuesday in January for the following fall, but the definitive deadline is not determined until early summer, before the application system opens for the year.

Financial Assistance

Roy H. Park Fellowships are available to seven to eight new doctoral students and 10 to 11 incoming master's students each year. These fellowships provide handsome stipends, payment of tuition and fees, and health insurance for the student. The stipend for doctoral students each year is $20,500, and master's students receive a $14,000 annual stipend. Doctoral student funding is for three years, and master's student funding lasts for two years. Continuation of funding beyond the first year is dependent on satisfactory progress in the program. In return for this funding, doctoral and master's students must work as graduate assistants. These are 15-hour work weeks, and assignments vary according to the needs of the faculty and interest and skill levels of the students. The Roy H. Park Fellowships are available only to United States citizens. There is no special application for these fellowships. All U.S. citizens qualified for admission to the program are considered for Roy H. Park Fellowships. Fellowship finalists will be invited to participate in on-campus interviews in February or March.

Other financial assistance available for graduate students includes the Richard Cole Eminent Professor Graduate Fellowship, which provides the same level of funding with the same work requirement as the Roy H. Park Ph.D. Fellowships; the Peter DeWitt Pruden Jr. and Phyllis Harrill Stancill Pruden Fellowship, which provides the same level of funding with the same work requirement as the Roy H. Park Fellowships; and the Graduate Dean's Research Assistantship (work requirement of 15 hours per week), awarded each year to an incoming master's student with an interest in print journalism or public relations. The school also offers the William F. Clingman Award ($4,000–$8,000) for the study of ethics to continuing students and the $1,000 Tom Wicker Scholarship to continuing master's students interested in reporting careers. In addition, limited funds for dissertation or thesis research are available through the Minnie S. and Eli A. Rubinstein Awards. The Margaret Blanchard Dissertation Support Fund is available to help current doctoral students finance their dissertation research. The Jim D'Aleo award is given to a current graduate student who has gone above and beyond our already high expectations to contribute something special to the school, the university, the community, or the discipline.

The Master's Program

The master's program has three major tracks. The professional track is designed to educate students for professional careers in public relations, advertising, journalism, and other mass communication fields. The mass communication track gives students the background needed for teaching or research. The Interdisciplinary Health Communication (IHC) master's track offers a broadened program to include the study of how to effectively communicate with diverse audiences about health issues. Students will learn about the possibilities of traditional as well as electronic forms of media and the psychology of persuasion. In all tracks, students are taught to critically examine the role of mass communication in society and are provided with a firm grounding in theory and analysis. By setting high standards for both scholarly and professional achievement, the school seeks to prepare graduates to be leaders and critical thinkers, no matter what career paths they might take.

The M.A. is designed to meet the needs of 1) holders of the bachelor's degree in fields other than journalism-mass communication who wish to enter the field, 2) journalists who want more education in a specialized field, 3) experienced journalists or communicators who wish to prepare themselves for teaching, 4) individuals primarily interested in education

for media research, and 5) journalism-mass communication graduates who wish to continue their education and career development.

In other words, this is not strictly a professional master's program that aims to teach technical skills in writing, editing, photography, and graphic design. Nor is the focus solely academic and theoretical. Rather, the school seeks to achieve a balance.

Areas of Specialization

Early in the program, each master's student, with his or her advisor, chooses an area of specialization and selects courses that lead to a coherent goal. The area of specialization is usually determined by a career interest and includes courses numbered 400 and above both inside and outside the school. Students in the professional track take at least one 800-level seminar, and those in the mass communication track take two seminars. All of the courses are evaluated for consistency with the thesis, series of articles, or project that the student does as the capstone for the M.A. work. All students must take a research methods course appropriate to the capstone thesis or nontraditional thesis option.

Some examples of specializations in the professional track (please visit jomc.unc.edu/graduate-studies-content-items/ma-in-mass-communication-program-info for a complete listing and descriptions of specializations):

- ***Strategic Communication:*** Students preparing for careers leading to management and research positions in advertising may choose courses in advertising management and planning, research, new technologies, sales, or some other area. Courses from business, psychology, sociology, and information and library science are suggested as outside courses. Students prepare for careers leading to management positions in corporations, nonprofit organizations, government or public relations agencies. Their paths include skills and theory courses in public relations as well as outside areas of interest, including business, organizational and speech communication, and health communication.
- ***Reporting:*** For careers in writing and editing for the print media, students choose courses that teach the relevant skills. Students also learn the theory and analytical skills needed to eventually hold leadership positions in their chosen fields.
- Other fields for which professional specializations can be designed include business and media, visual communication/editing/multimedia, electronic communication, and medical and science journalism.
- Paths in the mass communication track can be just as diverse. Students learn the theory and research methods that they need to teach at a small college or to pursue a doctorate in mass communication. They can study mass communication law or history, media effects, new communication technologies, or international communication, among other subjects. Depending on the course of study they select, they may also be prepared for a variety of research positions in the public and private sectors. Students in this track do not take professional skills courses such as news writing and editing.

Students interested in mass communication law may want to consider the M.A./J.D. dual degree program. The program is intended for students with a variety of goals including those who plan to practice mass communication law, pursue academic careers in law and mass communication fields, pursue a Ph.D. degree in a related field or perhaps plan to practice professionally in a communication-related field such as journalism or strategic communication with a law-related emphasis. Information about the M.A./J.D. dual degree program can be obtained by visiting medialaw.unc.edu/for-students/dual-degree-program.

Requirements

Master's students must earn at least 36 graduate-level credits for the professional track and the IHC track and 39 graduate-level credits for the mass communication track, including three credits for a thesis or nontraditional thesis option. Course requirements for the professional track are divided into five categories: required School of Journalism and Mass Communication courses (12 credits); School of Journalism and Mass Communication specialization (nine credits); advanced School of Journalism and Mass Communication courses (six credits): courses outside the School of Journalism and Mass Communication (six credits); and thesis (three credits). Course requirements for the mass communication track are divided into four categories: foundation courses (nine credits); required School of Journalism and Mass Communication courses (nine credits); Path (18 credits which are School of Journalism and Mass Communication courses and outside courses); and thesis (three credits). This includes a research methods course, generally JOMC 703 or 704, appropriate to the thesis or nontraditional thesis option. Two to four of the graduate-level courses should be taken from other University departments. Students may select from courses offered by other departments or schools at UNC–Chapel Hill, Duke University, and North Carolina State University.

All residential master's students must pass the school's usage and grammar test. This exam is a basic requirement for graduation for our undergraduate students and normally poses no major problems for graduate students. Information on the spelling and grammar test, including instructions on how to study for it, is included in the orientation packet sent to new students each summer.

Required Courses: All master's students must take Mass Communication Research Methods (JOMC 701) and Mass Communication Law (JOMC 740). Master's students in the mass communication sequence must also take Theories of Mass Communication (JOMC 705). In addition, all professional track master's students must take JOMC 753 Reporting and Writing News (except for strategic communication students who take JOMC 732, Public Relations Writing) and JOMC 782, Multimedia Storytelling.

If a student receives an L in any required course, he or she must pass a comprehensive examination given during the second semester. If the student fails the exam, he or she must retake the course the following fall. If the student again makes an L, he or she will not be allowed to continue in the program.

Areas of Specialization courses: The master's program is designed to allow students, under the direction of their advisors, to design a course of study, or an area of specialization, that addresses their research and skills interests. Regardless of the area of specialization or path, each student must define a coherent theme connecting courses in the School of Journalism and Mass Communication and those outside the school. Those courses must be appropriate to the thesis or nontraditional thesis option. Students planning to write a series of articles as their thesis option must take Specialized Reporting (JOMC 754).

All students must pass the appropriate examinations, which include a comprehensive written examination covering the material in the student's path courses (given at the completion of course work), and an oral examination on the thesis or professional project, given by the student's thesis committee.

M.A. students must complete the degree within five years of admission to the program. Students who do not finish within five years may petition for an extension.

Thesis, Articles, or Project
In the mass communication track, students must do a traditional research thesis. In the professional track, students have the option of writing a thesis or presenting a professional-quality series of articles (JOMC 993) or project (JOMC 992). The series of articles or project requires the same effort and professionalism as the traditional thesis. In addition to the professional product itself, the nontraditional thesis option requires an extensive review of the literature and statement of methods.

Students enroll in Master's Thesis, JOMC 993, or Non-Traditional Thesis Option, JOMC 992, for three credits as they do the thesis, articles or project. A maximum of three thesis credits can be counted toward the 30 credits required for the M.A.

Length of Program
Most students complete the master's program in two years, typically attending classes full-time during three consecutive semesters and completing the thesis, articles, or project in the fourth semester. Some students find it necessary to stay the summer after their second year to complete their theses, articles, or special projects. Although it is possible to complete the degree by taking classes part time, the school does not recommend it and generally admits no more than one part-time M.A. student per year.

Graduate Committee
To gain the most from the program, students should select a three-member advisory committee early. Led by a member of the school's graduate faculty who serves as the student's advisor, the committee acts as a resource as well as referee of the thesis, articles, or special project. One member of the committee should be a faculty member from outside the school with whom the student has taken a course.

Master of Arts in Technology and Communication
matc.jomc.unc.edu

Admission
The M.A.T.C. application process is administered online by the UNC Graduate School at gradschool.unc.edu. This site allows you to complete and submit an application and supporting materials electronically. The link to the M.A. in technology and communication application is under degrees listed for "Journalism and Mass Communication." From the drop-down listing, select "Journalism and Mass Comm." Then select "Master of Arts Technology and Communication" to start an application.

The minimum criteria for admission to the M.A. in technology and communication are:

- A recognized undergraduate degree (or equivalent credential from a foreign university)
- An undergraduate cumulative GPA of at least 3.0 (A = 4.0)
- Graduate Record Examination (GRE) scores in the 50th percentile or higher. Preference is given to applicants with GRE verbal and quantitative scores in the 55th percentile or higher.
- At least three years of journalism or other communication-related professional experience.
- Three letters of recommendation from academic and professional sources best qualified to evaluate the applicant's potential as a graduate student.
- A statement of reasons for pursuing the degree that describes your career goals and research interests.
- A current résumé

In addition, international applicants must submit Test of English as a Foreign Language (TOEFL) scores and the financial certificate as required by The Graduate School.

Applicants should be aware that the number of applications far exceeds the number of spaces available, and that many qualified applicants must be rejected because of limited space in the program. New students are admitted only for the fall semester. The application deadline is in January for the following fall.

Overview of Program
Dramatic changes in the way news and information are created and delivered in today's wired world have left many journalists and communication professionals searching for ways to update their skills and knowledge. The M.A. in Technology and Communication is an online master's degree that focuses on interactive media, the Internet and digital economics, addressing issues that are reshaping journalism and mass communication in the 21st century. The M.A.T.C. draws on the expertise of the school's acclaimed faculty to position students for leadership roles in digital media and Web-based communication.

Classes are taught online, allowing working professionals to advance their educations while maintaining their work and family responsibilities. Students travel to Chapel Hill twice, for a two-day orientation before starting the program and for a weeklong summer residency after completing the first year.

Curriculum
The master of arts in technology and communication offers a rigorous and unique curriculum, enabling journalists and other communication professionals to address challenges and opportunities posed by technology. The M.A.T.C. provides students with the knowledge and skills to solve communication problems using the new media tools that are transforming business practices. The program prepares students to take on leadership positions in new media, journalism, advertising, public relations and internal communication.

M.A.T.C. courses are designed to take full advantage of the inherent benefits of online instruction by seamlessly integrating access to the Web-based content covered in the curriculum. The instruction methods used in the M.A.T.C. perfectly complement the new media focus of the curriculum.

All courses use an asynchronous course management system, which means students do not have to be online at the same time. M.A.T.C. students are able to continue their careers and maintain their family commitments with the flexibility to complete course work around other activities.

The M.A.T.C. admits annually one group of no more than 20 students. Each student group progresses through the program together over the course of two and a half years. Classes are small to simulate a seminar-like experience with an emphasis on interaction between faculty and students. Students take a set curriculum of nine courses and complete a final project and examination at the end of the second year. There are no electives.

Requirements
The M.A.T.C. offers a challenging graduate-level curriculum of emerging theories and applications in technology and communication. Courses are designed to provide students with concepts and skills as well as a thorough grounding in research and critical thinking.

M.A.T.C. students must earn 30 graduate-level credits, including three credits for a non-traditional thesis. There is a set curriculum, meaning there is a prescribed list of courses that are taken in order. The M.A.T.C. has no electives.

Required Courses:

JOMC 711: Writing for Digital Media

JOMC 714: Database and Web Research

JOMC 715: New Media and Society

JOMC 716: Research Methods and Applications

JOMC 717: Information Visualization

JOMC 718: Media Law for the Digital Age

JOMC 719: Leadership in Digital Media Economics

JOMC 720: Strategic Communication

JOMC 721: Usability and Multimedia Design

JOMC 992: Non-Traditional Thesis

Other requirements

- All students must pass the appropriate examinations, including a comprehensive written examination AND an oral examination on the final project, given by the student's thesis committee.
- All students must attend two on-campus sessions—a two-day orientation and a weeklong summer residency at UNC-Chapel Hill.
- All students must complete the degree within five years of admission to the program. Students who do not finish within five years may petition for an extension.
- If a student earns three Ls (9 credits) or an F in M.A.T.C. courses, he or she will not be allowed to continue in the program.

Non-Traditional Thesis (Final Project)

Student work in the M.A.T.C. culminates with enrollment in JOMC 992: Non-Traditional Thesis, a four-part final project that includes:

- a written proposal for the final project.
- a written document that summarizes the final project.
- a formal presentation and oral examination in which the student presents the completed work to his or her committee.

The final project involves a study around an issue or challenge facing an organization or business with a digital media focus. It emphasizes both scholarly and practical application in line with the professional orientation of the M.A.T.C. The subject of the project may be the student's employer or may be selected based on the scope of the study.

Students complete the final project under the direction of a full-time School of Journalism and Mass Communication faculty member, who serves as chairperson of the student's final project committee. Two additional faculty members and/or an industry professional join the chairperson on the committee.

Students enroll in Nontraditional Thesis Option, JOMC 992, following completion of their course work. A maximum of three thesis credits can be counted toward the 30 credits required for the M.A.T.C.

Length of Program

The M.A.T.C. is designed to be completed in two and a half years on a part-time schedule. There is a set curriculum, meaning there is a prescribed list of courses that are taken in order. During the first year, students enroll in two courses in the fall, two courses in the spring, and one course in the summer. In the second year, students enroll in two courses in the fall and two courses in the spring. In the third year, students enroll in Non-Traditional Thesis in the fall.

On-Campus Sessions

M.A.T.C. students must attend two on-campus sessions—a two-day orientation and a weeklong summer residency. These sessions provide essential supplementary training and opportunities to build relationships among students and faculty.

The sessions are held in Carroll Hall, the home of the UNC School of Journalism and Mass Communication, on the UNC–Chapel Hill campus. Completion of the residencies is a pre-requisite for subsequent M.A.T.C. course registration and is a required portion of the program.

Transportation, lodging and meal expenses to attend the on-campus sessions are the responsibility of the student and are in addition to tuition and fees.

Graduate Committee

To gain the most from the program, students should select a three-member advisory committee early. Led by a member of the school's graduate faculty who serves as the student's advisor, the committee acts as a resource as well as referee of the final project.

Financial Assistance

Federal financial aid is available for M.A.T.C. students who are enrolled a minimum of 4.5 hours per semester and who show financial need. The aid is typically limited to federal loans. No scholarships, grants, assistantships or fellowships are currently available through the UNC School of Journalism and Mass Communication.

Ph.D. Program

The Ph.D. in mass communication is designed to prepare students for college teaching and research positions or research careers in mass communication industries, advertising agencies, market or opinion research firms, business, or government. The school works closely with each student to develop a program of study that is both interdisciplinary, allowing the student to take full advantage of the University's rich academic offerings, and tailored to meet the specific needs and interests of the student. The goal of the program is to produce outstanding scholars who are highly knowledgeable about mass communication and highly skilled as researchers.

The program is small and very selective; 10 to 12 students are admitted each year. Admissions decisions are based not only on the standard criteria described elsewhere in this catalog—GRE scores, grade averages, and letters of recommendation—but also on a determination of whether the applicant's interests and goals fit with those of the program and faculty. For that reason, the statement of purpose and statement of research interests that must accompany an application are extremely important, and applicants are encouraged to be as specific as possible in outlining their research interests and career goals.

Requirements

Ph.D. students are required to develop 1) a broad understanding and knowledge of mass communication in modern society, 2) expertise in two areas of specialization in mass communication and 3) competence in an appropriate research methodology. Students have considerable flexibility in designing their programs around a core of four courses, which should be taken during the first year of study. The four core courses are Mass Communication Research Methods (JOMC 701), Readings in Mass Communication History (JOMC 742), Theories of Mass Communication (JOMC 705), and Mass Communication Law (JOMC 740). If a student receives an L in any core course, he or she must pass a comprehensive examination given during the second semester. If the student fails the exam, he or she must retake the course the following fall. If the student again makes an L, he or she will not be allowed to continue in the program.

Forty-eight graduate credits (400-level and above courses), in addition to at least six dissertation credits, are required for the Ph.D. Those 48 hours must be arrayed into three groups of courses: two substantive areas of specialization, a primary area consisting of at least 15 credits and a secondary area consisting of at least nine credits; and research methods consisting of at least four courses. Major and minor substantive areas should be selected from the list of approved substantive areas of study set by the program. The research methods that a student chooses to study must be appropriate to the student's areas of specialization and dissertation topic.

Other requirements include:

- At least eight courses, totaling at least 24 credits, of 700-, 800-, and 900-level courses within the School of Journalism and Mass Communication
- At least four semesters in residence, with a minimum of two semesters in continuous study at UNC–Chapel Hill
- Satisfactory performance on written and oral comprehensive exams. Students must take both written and oral exams at the end of their Ph.D. course work
- Successful completion and oral defense of a dissertation

Length of Program
Students normally spend two years taking courses, then take comprehensive exams very early in their third fall semester. They then write their dissertation proposals. After the proposal is approved by the student's doctoral committee, the dissertation must be completed and defended. The nature of the dissertation research will govern the length of time a student spends on the project, but many students find it takes about one year to complete a dissertation. In general, it takes three years, and often more, to complete the Ph.D. The Graduate School requires students to complete the degree within eight years of entry into the program. Students who do not finish within eight years may petition for an extension.

Doctoral Committee
Each Ph.D. student selects a five-member dissertation committee, which is approved by the associate dean for graduate studies. This committee consists of three School of Journalism and Mass Communication faculty members and two graduate faculty members from outside the school. The student's advisor serves as chair of the committee. The committee should consist of professors with whom the student has taken courses. The committee guides the student's academic development, administers and evaluates the comprehensive exams, and approves the dissertation proposal and dissertation.

Courses for Graduate and Advanced Undergraduate Students
JOMC

421 Electronic Journalism (3). Prerequisites, JOMC 121 and 221. Examination and application of in-depth broadcast news reporting techniques, especially hard news reporting and special events coverage.

422 Producing Television News (3). Prerequisite, JOMC 421. Permission of the instructor. Students work under faculty guidance to produce "Carolina Week," a television news program, and are responsible for all production tasks such as producing, reporting, anchoring, directing, and others.

423 Television News and Production Management (3). Prerequisite, JOMC 422. Permission of the instructor. Students participate in a collaborative-learning environment to hone skills learned in earlier courses and help less-experienced students acclimate to the broadcast news experience within the school. By invitation only.

424 Electronic Media Management and Policy (3). Introduces management, station operation, and economic and legal issues one might encounter while working in electronic media. Provides a background of electronic media organizations in addition to providing information needed to understand the policies under which media managers work.

425 Voice and Diction (3). Designed to help students develop presentation skills and use voices effectively as professional broadcast journalists.

426 Producing Radio (3). Prerequisite, JOMC 121. Students work under faculty guidance to produce "Carolina Connection," a weekly 30-minute radio news program, and are responsible for all production tasks: producing, reporting, anchoring, and editing.

427 Studio Production for Television News (3). Prerequisite, JOMC 221. This course is a project-based, hands-on studio production course with special focus on technical skill development and directing in a news environment.

428 Broadcast History (3). A theoretical course designed to help students develop an understanding of and an appreciation for the role broadcast journalism has played in recent American history.

431 Case Studies in Public Relations (3). Prerequisite, JOMC 137. Analysis of public relations practices, including planning, communication, and evaluation exercises, and management responsibilities.

433 Crisis Communication (3). Prerequisites, JOMC 137 and 431. Principles of effective crisis communication management are introduced, applied, and practiced in this service-learning class. Students apply the concepts, theories, and frameworks learned in the classroom by working with community partners to research, design, and deliver crisis communication plans and media training.

434 Public Relations Campaigns (3). Prerequisites, JOMC 232, 279, and 431. Capstone course that builds on concepts and skills from earlier courses. Students use formal and informal research methods to develop a strategic plan, including evaluation strategies, for a client.

435 Public Information Strategies (3). Prerequisite, JOMC 137. This course provides a comprehensive assessment and understanding of the role of public relations professionals throughout government and the nonprofit sector as well. The course examines the unique requirements placed on communicators who are simultaneously responsible for representing their respective organizations while keeping the public informed.

440 The Law of Cyberspace (3). This course reviews what the courts have said about the Internet as well as how other branches of the government and the private sector have responded to the Internet. Focuses on how the First Amendment applies to the Internet.

441 Diversity and Communication (3). An examination of racial stereotypes and minority portrayals in United States culture and communication. Emphasis is on the portrayal of Native Americans, African Americans, Hispanics, and Asian Americans in the mass media.

442 Gender and Mass Communication (WMST 415) (3). An examination of gender as it relates to media producers, subjects, and audiences with a focus on current practices and possibilities for change.

443 Latino Media Studies (3). An introductory course to the study of United States Latina/os and the media. It analyzes the media portrayal of Latina/os in United States mainstream media. The course also examines media that cater to Latina/os and explores the way in which Latina/o audiences use the multiple media offerings available to them.

445 Process and Effects of Mass Communication (3). Mass communication as a social process, incorporating literature from journalism, social psychology, sociology, political science, and history. To acquaint students with factors in message construction, dissemination, and reception by audiences.

446 International Communication and Comparative Journalism (3). Development of international communication; the flow of news and international propaganda; the role of communication in international relations; communication in developing nations; comparison of press systems.

447 International Media Studies (3). The study of media system operations in a particular country, such as Mexico, including how news and information are disseminated and used by audiences. Taught in the spring semester and includes a trip to that country during spring break.

448 Freedom of Expression in the United States (3). An examination of the development of freedom of expression in the United States within the context of the nation's history.

449 Blogging, Smart Mobs, and We the Media (3). For advanced undergraduates through Ph.D. students. Practical and theoretical approaches to understanding, designing, building, and using virtual communities, including studies of network capital, social capital, and social production.

450 Business and the Media (3). Role of media in United States society and effects on public perceptions of business. Relationship of business press and corporate America. Current issues in business journalism.

451 Economics Reporting (3). Prerequisite, JOMC 153. Coverage of Wall Street and the economy, including stocks, bonds, and economic indicators. Reporting on the Federal Reserve, labor, consumer sector, manufacturing and inflation, and certain industries.

452 Business Reporting (3). Prerequisite, JOMC 153. Methods and tactics of covering businesses for mass communication. Why and how companies operate and how to write stories about corporate news from public records and other sources.

453 Advanced Reporting (3). Prerequisites, JOMC 153 and 253. Rigorous, in-depth instruction and critiques of students' news and feature assignments done with different reporting methodologies: interviewing, official records, direct and participant observation, and survey research (the Carolina Poll).

454 Advanced Feature Writing (3). Prerequisites, JOMC 153 and 256. Writing and reporting important topics in in-depth feature articles. Discussion and utilization of writing and reporting techniques in order to complete articles for publication or other dissemination. In-depth instruction and critiques of student work.

455 Sports Writing (3). Researching and writing sports stories, including game coverage, magazine features, and opinion columns. Students complete reporting and writing exercises inside and outside of the classroom.

456 Magazine Writing and Editing (3). Prerequisites, JOMC 153 and 256. Instruction and practice in planning, writing, and editing copy for magazines.

457 Advanced Editing (3). Prerequisite, JOMC 157. Concentration on the editing and display of complex news and features stories and other print media content with a significant emphasis on newspaper design and graphics.

458 Southern Politics: Critical Thinking and Writing (3). News analysis with special attention to states of the American South and especially to elections. Social and economic trends, as well as politics and government serve as raw material for interpretive journalism.

459 Community Journalism (3). Prerequisite, JOMC 153. Comprehensive study of the community press, including policies, procedures, and issues surrounding the production of smaller newspapers within the context of the community in its social and civic setting.

463 Newsdesk (3). Permission of the instructor. Students work under faculty guidance to create and update a news Web site. Students will blog their reporting, conceptualize and execute multimedia news reports, and learn how to lead online conversations that engage both readers and sources. Requires travel in and around Chapel Hill.

471 Advanced Advertising Copywriting (3). Prerequisite, JOMC 271. Permission of the instructor. Rigorous, in-depth instruction and critiques of student advertising writing.

472 Art Direction in Advertising (3). This course provide students with finished advertising for their portfolios through visual theory instruction, creative exercises, and strategy application.

473 Advertising Campaigns (3). Prerequisite, JOMC 271 or 272. Planning and executing advertising campaigns; types and methods of advertising research; the economic function of advertising in society.

474 The Branding of Me (3). What have you done to brand yourself? Students will use YouTube, Twitter, and Facebook in a calculated plan with other new-media marketing tools to land that first job.

475 Concepts of Marketing (3). Designed for students anticipating careers in advertising, public relations, or related areas, this course teaches the vocabulary and basic concepts of marketing as it will be practiced, emphasizing the role of mass communication.

476 Ethical Issues and Sports Communication (3). Permission of the instructor. Ethical dilemmas and decisions in the commercialization and coverage of sports, including the influence of television, pressure to change traditions and standards for monetary reasons, and negative influences on athletes.

478 Media Marketing (3). Prerequisite, JOMC 137. Principles and practices of retail advertising in all media, with emphasis on selling, writing, and layout of retail advertising for the print media.

480 Advanced Photojournalism (3). Prerequisite, JOMC 180; pre- or corequisite, JOMC 153. Permission of the school. Advanced course in photojournalism content gathering, history, ethics and storytelling. Students shoot advanced newspaper and magazine assignments and create short multimedia stories combining photography, audio, and video.

481 Documentary Photojournalism (3). Prerequisite, JOMC 480. Permission of the school. Students study the documentary tradition and produce stories within the social documentary genre of photojournalism. Students choose a relevant social issue and create a multimedia Web site featuring long-form documentary storytelling.

482 Newspaper Design (3). Prerequisite, JOMC 182; pre- or corequisite, JOMC 153. Permission of the school. Detailed study of page layout and graphics techniques in newspapers.

483 Magazine Design (3). Prerequisite, JOMC 482. Permission of the school. Detailed study of page layout and graphics techniques in magazines.

484 Information Graphics (3). Prerequisite, JOMC 182. Permission of the instructor for students lacking the prerequisite. Study and application of graphic design and information-gathering techniques to creating charts, maps, and diagrams.

485 Publication Design (3). Prerequisite, JOMC 182; pre- or corequisite, JOMC 153; permission of the instructor. Detailed study and application of graphic design techniques in magazines, newspapers, advertising, and corporate communication.

486 Motion Graphics (3). Detailed study and application of motion-graphic techniques that utilize the combination of words, photos, graphics, video, sound, and voice-overs to convey stories for news and entertainment. Students learn Adobe After Effects software and the art of storytelling to enable them to conceptualize and execute digital animations.

490 Special Topics in Mass Communication (1–3). Small classes on various aspects of journalism–mass communication with subjects and instructors varying each semester. Descriptions for each section available on the school's Web site under Course Details.

491 Special Skills in Mass Communication (1–3). Courses on various skills in journalism-mass communication with subjects and instructors varying each semester. This course satisfies a skills- or craft-course requirement. Descriptions for each section available on the school's Web site under Course Details.

551 Digital Media Economics and Behavior (3). The course will focus on the changing economics affecting 21st century news organizations and the economic drivers of other content providers such as music companies, the film industry, online aggregators and commerce sites for lessons that can be applied across industry segments.

552 Leadership in a Time of Change (3). Prerequisite, JOMC 452, 475, or 551. During a time of fast-paced technological innovation, this course examines the critical strategic choices facing media executives. Students will observe and research a media company that is making the transition, as well as produce a case study on that effort.

560 Medical Journalism (HBEH 660, HPM 550) (3). Prepares students to work as medical and health journalists for a variety of media, including print, broadcast, and the Internet. The course emphasizes writing skills and interpreting medical and health information for consumers.

561 Medical Reporting for the Electronic Media (HBEH 561, HPM 551) (3). Students work in teams to produce, script, and report medical and health stories for broadcast on "Carolina Week," the award-winning, student-produced television newscast.

562 Science Documentary Television (HBEH 562, HPM 552) (3). Students conceive, produce, and write a science documentary feature-length story for broadcast on public television.

564 Medical and Science Reporting (3). Prerequisite, JOMC 153. Required preparation, a second reporting or writing course. Focuses on developing strategies to research and write about medical issues, specifically selecting topics, finding and evaluating sources, and information gathering. Students produce a range of stories, from short consumer pieces to in-depth articles.

581 Multimedia Design (3). Prerequisite, JOMC 187. Permission of the instructor for students lacking the prerequisite. Theory and practice of multimedia design with an emphasis on usability, design theory, and evaluative methodologies, including focus groups, survey research, eye-track testing, and search engine optimization.

582 Interactive Multimedia Narratives (3). Prerequisite, JOMC 180. Permission of the school. Students will learn audio and video content gathering, editing and storytelling techniques, and how to publish these media onto a variety of multimedia platforms.

583 Multimedia Programming and Production (3). Prerequisite, JOMC 187. Permission of the school. Advanced course in multimedia programming languages that includes designing and building dynamic projects.

584 Documentary Multimedia Storytelling (3). Permission of the instructor. Students work on a semester-long documentary multimedia project that includes photo and video journalists, audio recordists, designers, infographics artists, and programmers. Open by application to students who have completed an advanced course in visual or electronic communication.

586 Intermediate Multimedia (3). Prerequisite JOMC 187. This course covers basic programming, graphic design, and storytelling for the Web. Students work in a Flash authoring environment and learn how to design, storyboard, and script an interactive storytelling project. Students collect and incorporate photos, videos, sound, text, graphics, and database information into interactive multimedia presentations.

585 3D Design Studio (3). Prerequisites, JOMC 187 and 182. Permission of the instructor. The use of three-dimensional design and animation to create visual explanations.

602 Mass Communication Education in the Secondary School (3). Graduate standing. Readings, discussion, and projects fostering excellence in teaching journalism–mass communication in the high school, from philosophy and practice to professional skills.

603 Mass Communication Law in the Secondary School (3). Graduate standing. Application of First Amendment speech and press freedoms to secondary school media, including libel, privacy, access to information, journalistic privilege, prior restraint, advertising and broadcast regulations, and ethical practices.

604 Mass Communication Writing and Editing in the Secondary School (3). Graduate standing. High school journalism teachers and advisors learn to teach the skills journalists need to communicate. Emphasis on writing and thinking skills necessary to convert information into clear messages.

605 Design and Production of Secondary School Publications (3). Graduate standing. High school journalism teachers and advisors learn to teach the skills journalists need to produce publications. Designed for persons with no background in design. Degree-seeking students may not use both JOMC 182 and 605 to complete degree requirements.

671 Social Marketing Campaigns (3). Social marketing is the application of marketing concepts and practices to bring about behavior change for a social good. This course is designed as a service-learning course and fulfills the experiential education requirement.

690 Special Topics in Advertising (1–3). Courses on special topics in advertising with subjects and instructors varying each semester.

691H Introductory Honors Course (3). Permission of the instructor. Required of all students reading for honors in journalism.

692H Honors Essay (3). Permission of the instructor. Required of all students reading for honors in journalism.

Courses for Graduate Students

JOMC

701 Mass Communication Research Methods (3). Covers a broad range of research methods used in industry and academic research. Course content includes: the process and organization of writing research; applying a variety of quantitative and qualitative research methods; evaluating research design; and ethical issues inherent in research. Required course for all graduate students.

702 Mass Communication Pedagogy (3). Investigation of college teaching and academic life, including course planning, syllabus preparation, interpersonal skills, presentational modes, evaluation and ways of balancing teaching with other expectations.

704 Statistics for Mass Communication Research (3). Prerequisite, JOMC 701. Statistics with emphasis on application to studies in mass communication. Prior knowledge of statistics and familiarity with computer software are NOT assumed.

705 Theories of Mass Communication (3). Students prepare analytical papers on theories of mass communication based upon extensive review of behavioral science literature. Required of Ph.D. students and master's students in the mass communication sequence.

711 Writing for Digital Media (3). Communication in digital/online environments—learning/understanding the audience(s); how different media work (their unique limits/possibilities); developing appropriate content for different formats/environments. Students analyze technical/rhetorical elements of online content (i.e., interactivity, hyperlinking, spatial orientation, nonlinear storytelling). Limited to students admitted to Certificate in Technology/Communication program and JOMC graduate students.

712 Visual Communication and Multimedia (3). This course provides an understanding of current visual communication and multimedia storytelling theories and practices. Students will read scholarly and professional publications and critique media work across disciplines. A final project includes the creation of an original article or multimedia presentation that adds to the knowledge base in this area.

714 Database and Web Research (3). Online research often means going to Google and entering search terms. What strategies might improve the effectiveness of your research? What about authority and timeliness of information? This course answers those questions and others. Enrollment limited to students admitted to Certificate in Technology/Communication program and JOMC graduate students.

715 New Media and Society (3). This course examines digital environments from diverse conceptual perspectives (e.g., journalism, mass communication, psychology, information science and technology, sociology, business) and outlines theoretical implications and practical applications of new media.

716 Research Methods and Applications (3). This course is designed to help communication professionals make better and more informed research decisions given compelling research challenges and resource constraints.

717 Visual Communication and Information Architecture (3). This course explores the overlap between several related disciplines: information visualization and architecture, cognitive science, graphic design and journalism. Content covered includes cognitive psychology, information design, visualization, and ethics.

718 Media Law for the Digital Age (3). This course identifies and explains complex legal issues raised by Internet technology and guides students in thinking critically about how those issues can best be resolved.

719 Leadership in Digital Media Economics (3). This course examines the broad economic issues facing the media industry, including the changing dynamics of consumer behavior, pricing, loyalty, market segmentation, creative destruction, economic cycles, and global competition.

720 Strategic Communication (3). Underpinned by appropriate theory, this course examines strategic communication in today's cluttered information environment. While developing strategic communication programs, students will analyze case studies and research comprehensive digital-influence strategies.

721 Usability and Multimedia Design (3). Introduces students to five basic areas of multimedia design and develops expertise in each. By examining the latest eye-tracking research and usability testing, students will assess the practical application of many concepts. Through critiques and original storyboards, students will work to expertly integrate all this knowledge into well-designed packages.

730 Public Relations Foundations (3). Introduction to the growing field of public relations practice: its history, legal and ethical issues, types and areas of practice and construction of public relations campaigns. Must be used as a basic competency class by master's students. This course cannot be counted toward a program of study for doctoral students.

732 Public Relations Writing for Graduate Students (3). Prerequisite, JOMC 732. Graduate-level public relations writing. Service learning provides education and practice in communication skills for PR practitioners. Additional emphasis for M.A. students on news concepts and writing across media platforms.

740 Mass Communication Law (3). Intensive study of press freedom and the First Amendment, including libel, privacy, access to information, free press-fair trial, advertising and broadcast regulation, journalistic privilege, prior restraints. Required of all graduate students.

742 Readings in Mass Communication History (3). Directed readings in mass communication history. Required course for Ph.D. students.

743 Media Management (3). A study of planning policy functions related to media management concerns.

752 Leadership in a Time of Change (3). Required preparation, students should have taken a core business course or have equivalent professional experience before enrolling. Examines critical strategic choices facing media executives and offers students the opportunity to observe and research a media company making the transition and produce a case study on that effort.

753 Reporting and Writing News (3). Provides study and practice of the primary activities of a print journalist: gathering the news and writing about it for publication. Must be used as a basic competency class by master's students. This course cannot be counted toward a program of study for doctoral students.

754 Specialized Reporting (3). Prerequisite, JOMC 753. Permission of the instructor for students lacking the prerequisite. Reporting of complicated topics, using in-depth backgrounding, investigative reporting techniques, story conferences, and documents and other research data. Required of news-editorial master's students who plan to complete the articles option.

782 Multimedia Storytelling (3). Theories and practices of multimedia content creation. Students gain critical understanding of various multimedia presentation methods. Hands-on experience with audio/video collection/editing.

795 E-Health (3). An overview of the positive and negative impacts of the Internet on public health. Covers research, evaluation sites, ethics, and use of theory that addresses key public health problems.

801 Seminar in Mass Communication Research Methods (3). Prerequisite, JOMC 701. Permission of the instructor for students lacking the prerequisite. Advanced work in quantitative data analysis and research preparation.

810 Seminar in the Psychology of Human-Computer Interaction (3). Examines effects of computers, the Internet, and World Wide Web from a psychological perspective. Adopts an empirical approach to understand ways in which people respond to computers and new technologies.

825 Seminar in Interdisciplinary Health Communication (HBHE 825) (3). See HBHE 825 for description.

826 Interdisciplinary Health Communication Colloquium (HBHE 826) (1.5). Open to interdisciplinary Health Communication graduate certificate and master's track students. This course is structured for interactive student/faculty discussion on health communication research and practice. Seminar and online blog format.

830 Seminar in Public Relations (3). Readings, discussions and research in public relations.

840 Seminar in Mass Communication Law (3). Prerequisite, JOMC 740. Permission of the instructor for students lacking the prerequisite. Readings, discussion, and projects in major issues of mass communication law, including libel, privacy, access, court-press relations, the First Amendment, and regulation of telecommunications.

841 Seminar in Mass Communication and Society Perspectives (3). Readings, discussion, and papers on the roles and responsibilities of mass communication in society.

842 Seminar in Mass Communication History (3). Readings, discussion, and projects in mass communication history.

846 Seminar in International Communication (POLI 846) (3). Prerequisite, JOMC 446. Permission of the instructor for students lacking the prerequisite. Reading and research in selected topics. Focus in recent years has included global news flow, communication and social change, communication in the collapse of communism, Western dominance in international communication, global culture and the influence of technology.

847 Seminar in Communication for Social Change (3). Examines how grassroots and participatory strategies are being combined with communication technologies to promote social change in Third World settings of developed and developing nations.

850 Seminar in Qualitative Methods (3). Prerequisite, JOMC 701. Survey of naturalistic methods applied to mass communication research, including ethnography, in-depth interviews, life histories, and text-based analysis.

870 Seminar in Social and Economic Problems in Advertising (3). Readings, discussion, and papers on advertising as a social and economic force in contemporary society.

879 Seminar in Advertising Research (3). Readings and discussion examining theories underlying advertising and the testing of those theories through research projects.

890 Seminar in Special Topics in Mass Communication (3). Seminar on various aspects of mass communication, with content and instructors varying each semester.

900 Reading and Research (3). Permission of the instructor. Advanced reading or research in a selected field.

992 Nontraditional Thesis Option (3).

993 Master's Thesis (3).

994 Doctoral Dissertation (3–9).

Department of Linguistics

www.unc.edu/depts/ling
PAUL ROBERGE, *Chair*

Advisory Committee

Professors Connie Eble (English and Comparative Literature), Randall Hendrick, Evelyne Huber (Political Science), William G. Lycan (Philosophy), Paul Roberge, Steven Reznick (Psychology), James Thompson (English and Comparative Literature); Associate Professors Misha Becker, David Mora-Marín, Elliott Moreton, Jennifer L. Smith, J. Michael Terry.

Professors

Randall Hendrick (11) Syntax, Morphology, Psychology of Language
Paul Roberge (17) Pidgins and Creoles, Historical Linguistics, Germanic Linguistics

Associate Professors

Misha Becker (12) Language Acquisition, Psycholinguistics, Cognitive Science
David Mora-Marín (15) Historical Linguistics, Mayan Linguistics, Linguistic Anthropology
Elliott Moreton (8) Phonetics, Phonology
Jennifer L. Smith (7) Phonology, Phonetics, Japanese
J. Michael Terry (9) Semantics, African American English

Assistant Professor

Katya Pertsova (10) Computational Linguistics, Morphology

Professor Emeritus

H. Craig Melchert

Associated Faculty

Patrícia Amaral (Romance Languages and Literatures), Spanish and Portuguese Linguistics
Jennifer Arnold (Psychology), Psychology and Psycholinguistics
Dorit Bar-On (Philosophy), Philosophy of Language and Mind
Connie Eble (English and Comparative Literature), English Linguistics
Bruno Estigarribia (Romance Languages and Literatures), Spanish Linguistics, Language Development and Cognition
Peter C. Gordon (Psychology), Psychology of Language
Larry D. King (Romance Languages and Literatures), Spanish and Portuguese Linguistics
William G. Lycan (Philosophy), Philosophy of Language, Philosophy of Mind
Patrick O'Neill (English and Comparative Literature), Celtic Languages
Dean Pettit (Philosophy), Philosophy of Language and Mind
Patricia E. Sawin (American Studies), Ethnography of Communication
Mamarame Seck (African and Afro-American Studies), Wolof Language and Linguistics, African Language Pedagogy

The Department of Linguistics offers graduate work leading to the degree of master of arts in linguistics.

Degree candidates must demonstrate both a basic knowledge of the field of linguistics as a whole and the ability to do independent study in a chosen specialty. Basic knowledge of linguistics is acquired by taking certain required courses; knowledge of a specialty is gained through elective courses as well as by writing a thesis.

The elective courses are expected to form a coherent program in a subfield of linguistics (e.g., phonology, syntax, historical linguistics, sociolinguistics, language acquisition) or in the application of linguistics to a closely related discipline (e.g., anthropology, the study of a particular language or language family). To this end, each student, after

consultation with the director of graduate studies, will by the end of the second semester of residence choose a permanent advisor, who will supervise the student's program of study.

Degree programs must satisfy the general requirements of The Graduate School. In addition, the student must fulfill the following curriculum requirements.

Master of Arts

Course Requirements. LING 400 (Introduction to General Linguistics) or approved equivalent, 520 (Linguistic Phonetics), 523 (Phonological Theory I), 530 (Syntactic Theory I), one course from among 525 (Historical Linguistics), 528 (Language Acquisition) and 537 (Semantic Theory I), plus four elective courses in linguistics or related areas, as approved by the student's academic advisor, plus three hours of thesis credit, for a total of 30 hours.

Note: Students are expected to complete their nonelective courses during their first year. This schedule qualifies students to be considered for a linguistics teaching assistantship by their third semester. Deviations from it are therefore strongly discouraged.

Foreign Language Requirement. Reading knowledge of one foreign language. This requirement may be met in one of three ways:

1. By passing the Graduate Student Foreign Language Test, given each November and April by The Graduate School. For information and registration, go directly to gradschool.unc.edu/student/gflpa.html.
2. Where available, by passing the reading courses for graduate students numbered 601 and 602 (these courses do not earn graduate credit). Note: Students with some prior experience may find it feasible to meet the requirement by enrolling directly in and passing 602, bypassing 601.
3. Where neither option 1 nor option 2 is available, students may arrange to have their competence certified by a qualified faculty member, usually through an informal examination.

Comprehensive Examination. During the semester following completion of the nonelective courses (which should be the fall term of the second year), students will form an examining committee of three faculty members in the department. It is expected that this committee will also serve as the M.A. thesis committee. The student will submit a prospectus of the M.A. thesis, as described below. The oral examination will assess the student's mastery of topics from the first-year sequence of course work and gauge the merits of the prospectus.

Thesis. The master's thesis (normally 50 to 100 pages in length) must be approved by a committee of the thesis director plus two other faculty members at the oral comprehensive exam. Students form their thesis committee with the advice of their academic advisor, who may (but need not) be the thesis director. At the comprehensive oral exam for the M.A., the department requires that students submit a prospectus of the thesis. The prospectus should state clearly what problem is to be investigated, how the investigation is to be carried out (written research, fieldwork, experiment, etc.) and a preliminary bibliography. The prospectus should first be discussed with the thesis director. Students should then submit a 'clean' version to all three committee members and set up a meeting where the prospectus may be informally discussed and approved (perhaps with modifications). Students are also expected to consult their thesis director regularly during the actual writing of the thesis. Formal requirements regarding the format and submission of the M.A. thesis are found in the *Thesis and Dissertation Guide* (gradschool.unc.edu/etdguide).

Final Oral Examination. This exam, administered by the thesis committee, focuses on a defense of the thesis, but the faculty reserves the right to question students on other relevant topics. Students should avoid scheduling a thesis defense during the summer, since faculty members often are not available. If it is absolutely unavoidable, students should consult committee members well in advance.

Important Degree Deadlines. Each year The Graduate School sets deadlines for graduation in a given term (fall, spring, summer). There are two sets of dates to watch out for:

1. Students wishing to graduate must submit an application to graduate (handbook.unc.edu/graduation.html). These documents must be submitted in advance: typically July for August graduation, February for May graduation, and October for December graduation, but official dates will be posted on the Registrar's calendar (registrar.unc.edu/AcademicCalendar/index.htm). There is no penalty for failure to complete requirements for a requested graduation date, but one cannot graduate without having submitted the application to graduate. Therefore students should submit it in time for any semester in which they feel they may graduate.
2. The final electronic version of the thesis must be submitted to The Graduate School before the student can graduate (gradschool.unc.edu/etdguide/submission.html). The deadline for submission is shortly before graduation; please see the Registrar's calendar for current dates (registrar.unc.edu/AcademicCalendar/index.htm).

Note: The previous Ph.D. program in linguistics (1967–2011) no longer admits new students. Legacy students should consult the Linguistics Department Web site (www.unc.edu/linguistics/gradprogram.html) for degree requirements.

Courses for Graduate and Advanced Undergraduate Students

LING

400 Introduction to General Linguistics (ANTH 400) (3). An introduction to the scientific study of language. The nature of language structure. How languages are alike and how they differ.

409 Cognitive Linguistics (3). Development of and present state of research in cognitive linguistics. Readings discuss various language phenomena and are drawn from linguistics, psychology, philosophy, artificial intelligence, and literary analysis of metaphor.

422 Research Methods in Phonetics and Laboratory Phonology (3). Prerequisite, LING 200, 520, 523, or SPHS 540. Focuses on the practical skills required to carry out basic experiments in speech production or perception. Includes training in a general-purpose programming language (such as Perl) for automating repetitive tasks, experiment-control software, audio stimulus manufacture and editing, palatography, aerodynamic measurements, and other laboratory techniques relevant to student interests.

444 Origin and Evolution of Human Language (3). Prerequisite, LING 101. Recommended preparation, at least one higher-level core course in linguistics. Surveys current answers to such questions as, When and how did language first appear? What do other animal communication systems share with language? Do restricted linguistic systems (e.g., pidgins) preserve "fossils" of early human language?

445 Philosophy of Language (PHIL 445) (3). See PHIL 445 for description.

455 Symbolic Logic (PHIL 455) (3). See PHIL 455 for description.

484 Discourse and Dialogue in Ethnographic Research (ANTH 484, FOLK 484) (3). See ANTH 484 for description.

490 Advanced Topics in Linguistics (3). Directed readings on linguistic topics not covered in specific courses.

496 Independent Study in Linguistics (1–3). Permission of the director of undergraduate studies. LING 101 and additional coursework in linguistics strongly recommended. An intensive mentored project; topic to be determined in a learning contract between student and instructor.

506 Greek Dialects (GREK 506) (3). See GREK 506 for description.

520 Linguistic Phonetics (ANTH 520) (3). Introduction to the general principles of linguistic phonetics; anatomy of vocal tract, physiology of speech production, universal phonetic theory. Practice in the recognition and transcription of speech sounds.

522 Experimental Phonetics and Laboratory Phonology (3). Prerequisites, LING 520, and 200 or 523. This course relates linguistic theory to experimental findings. Students design and carry out experiments to test theoretical issues of current theoretical importance.

523 Phonological Theory I (ANTH 523) (3). Prerequisite, LING 520, or SPHS 530 or 540. Permission of the instructor for undergraduates. Introduction to the principles of modern generative phonology. Methods and theory of phonological analysis.

524 Phonological Theory II (3). Prerequisite, LING 200 or 523. Intermediate phonological theory and analysis.

525 Introduction to Historical and Comparative Linguistics (3). Permission of the instructor for undergraduates. Theories and methods of historical and comparative linguistics, with emphasis upon the Indo-European family.

527 Morphology (3). Prerequisite, LING 101 or 400. Cross-linguistic investigation of internal word structure: inflection and derivation, word formation rules versus affixation, autosegmental morphology, morpholexical and morphophonemic rules, and the interaction of morphology with phonology and syntax.

528 Language Acquisition I (3). Permission of the instructor for undergraduates. One course in phonology or syntax recommended. Child language from a theoretical perspective. Topics include segmentation problems, acquisition of phonology, morphology and syntax, lexical acquisition, and language development in blind and deaf children and in bilinguals.

529 Language Acquisition II (3). Prerequisite, LING 203 or 528, and LING 201 or 530. This course focuses on the development of syntax in first-language acquisition in children. Topics will include parameter setting, null subjects, root infinitives, aspect, A-movement, binding theory, and control.

530 Syntactic Theory I (3). Permission of the instructor for undergraduates. Methods and theory of grammatical analysis within the transformational generative framework. Special emphasis on analyzing syntactic and semantic structures of English.

533 Syntactic Theory II (3). Prerequisite, LING 530. Methods and theory of grammatical analysis, with special reference to transformational grammar.

537 Semantic Theory I (3). Prerequisite, LING 101 or 400. Semantics as a part of linguistic theory: co- and disjoint reference among nominals, "crossover" phenomena, quantifier scope, lexical semantics, Montague grammar and compositional semantics, and explanatory universals in semantic theory.

538 Semantic Theory II (3). Prerequisite, LING 537. A continuation of LING 537 (Semantic Theory I), this course prepares the student to read the formal semantic literature and to do original research in the field.

539 Language of Time (3). Prerequisite, LING 101 or 400. The representation of time and temporal relations in natural languages. Cross-linguistic study of tense and aspect distinctions, modality, temporal adverbials, temporal anaphora, and sequences of tenses.

540 Mathematical Linguistics (3). Prerequisite, LING 101. Introduction to topics in logic, set theory, and modern algebra with emphasis on linguistic application. Automata theory and the formal theory of grammar with special reference to transformational grammars. No previous mathematics assumed.

541 Sociolinguistics (ANTH 541) (3). Prerequisite, LING 101 or 400. Introduction to the study of language in relation to society; variation as it correlates with socioeconomic status, region, gender; the social motivation of change; language and equality; language maintenance, planning, shift.

542 Pidgins and Creoles (ANTH 542) (3). Prerequisite, LING 101 or 400. Examination of the social contexts of language contact and their linguistic outcomes, with particular emphasis on the formation of pidgins and creoles. The course investigates the structural properties of these new contact languages and evaluates the conflicting theories that explain their genesis.

543 Language in Politics (3). Examines language as a political issue in the 19th and 20th centuries. Emphasis placed on American and British politics but attention to one other national context as well.

545 Language and Mind: Linguistics and the Brain (3). Prerequisite, ENGL 313, or LING 101 or 400, or PHIL 145. Permission of the instructor for students lacking the prerequisite. The course treats the relationship among linguistics, artificial intelligence, neurobiology, cognitive psychology, and the philosophies of mind, language, and science.

547 Language Deficits and Cognition (3). Prerequisite, LING 101 or 400. Survey of the linguistic properties associated with aphasia, autism, Williams syndrome, dyslexia, and schizophrenia. Emphasis on the implications of these conditions for theories of mind.

550 Introduction to Indo-European: Phonology (3). A survey of the phonological systems of the major Indo-European languages and their development from Proto-Indo-European.

551 Introduction to Indo-European: Morphology (3). Prerequisite, LING 550. Introduction to the major morphological categories in the Indo-European languages and their development from the proto-language.

558 Mesoamerican Writing Systems (3). This course is an introduction to the ancient scripts of pre–Columbian Mexico and Central America. It focuses on the following scripts: Mayan, Epi-Olmec, Zapotec, and Mixtec.

560 Mesoamerican Languages and Linguistics (3). Surveys the basic characteristics that unify Mesoamerica as a cultural and linguistic area (e.g., sound systems, word order, color systems, diffused vocabulary, etc.), the basic sources of cultural and linguistic information available (e.g., ancient hieroglyphs, colonial manuscripts, contemporary documents, linguistic fieldwork), and the consequences of ancient and modern cross-cultural interaction.

561 Native Languages of the Americas (3). Prerequisite, LING 101 or 400. This course explores the phonological and morphological structure of selected Amerindian languages indigenous to the Americas. Emphasis is on the linguistic analysis of original as well as published primary data.

562 Structure of Russian (3). Prerequisite, LING 101 or RUSS 102. Permission of the instructor for students lacking the prerequisite. Examines Russian from the perspective of linguistic analysis. How do sounds, words, and sentences pattern in Russian? How do these compare with patterns in other languages? Also considers the influence of evidence from Russian on the development of linguistic theory.

563 Structure of Japanese (JAPN 563) (3). Prerequisite, JAPN 102 or LING 101. Introductory linguistic description of modern Japanese. For students of linguistics with no knowledge of Japanese and students of Japanese with no knowledge of linguistics.

564 History of the French Language (FREN 564) (3). See FREN 564 for description.

565 French Phonetics and Phonology (FREN 565) (3). See FREN 565 for description.

566 Structure of Modern French (FREN 566) (3). See FREN 566 for description.

573 Linguistic Field Methods I (ANTH 793) (3). Analysis and description of a language unknown to the class from data solicited from a native-speaker consultant.

574 Linguistic Field Methods II (ANTH 794) (3). Continuation of LING 573.

583 History and Philosophy of Linguistics (3). Prerequisite, LING 101. Linguistic theories from classical times to the present with special emphasis on the origins of contemporary theories.

613 Modern English Grammar (ENGL 613) (3). See ENGL 613 for description.

678 Cultural and Linguistic History of the Spanish Language (SPAN 678) (3). See SPAN 678 for description.

691H Senior Honors Thesis (3). See the program for honors in the College of Arts and Sciences and the department honors advisor.

692H Senior Honors Thesis (3). See the program for honors in the College of Arts and Sciences and the department honors advisor.

For Irish and Welsh, see English; for Hebrew, see Religious Studies; for Arabic, Chinese and Japanese, see Asian Studies in the *Undergraduate Bulletin*.

Courses for Graduate Students

LING

712 Advanced Studies in Philosophy of Language (PHIL 745) (3).

715 Advanced Methods in Phonology (3). Prerequisite, LING 524. Methods of theoretical argumentation in generative phonology with emphasis on recent proposals in the published literature.

716 Advanced Methods in Syntax (3). Prerequisite, LING 533. Permission of the instructor for students lacking the prerequisite. Examination of recent developments in the theory and methods of syntactic analysis.

723 Seminar in Anthropological Linguistics (ANTH 723) (3). See ANTH 723 for description.

730 Comparative Grammar of Ancient Languages (3). Introductory and advanced work in the earlier stages of extant languages and in extinct languages.

790 Dialectology (ANTH 790) (3). Principles and methods of areal linguistics and social dialectology

793 Linguistic Field Work I (ANTH 793) (3). Analysis and description of a language unknown to the class from data solicited from a native-speaker consultant.

794 Linguistic Field Work II (ANTH 794) (3). Continuation of LING 793.

814 History of the English Language (ENGL 814) (3). Prerequisite, ENGL 719 or permission of the instructor. See ENGL 814 for description.

860 Seminar (3). Topics vary to include specialized areas of linguistics study.

861 Seminar (3). Seminar in phonological theory.

862 Seminar (3). Seminar in grammatical theory.

893 Current Problems in Linguistics (3). This course explores relations of linguistics with neighboring fields and theoretical problems of current relevance within linguistics itself; some attention given to pedagogical methodology.

897 Special Readings (3). Readings in linguistic topics that are not covered in the existing courses.

992 Master's Thesis (3–21).

994 Doctoral Dissertation (3–21).

Department of Marine Sciences

www.marine.unc.edu
HARVEY SEIM, *Chair*
Marc J. Alperin, *Associate Chair*
John M. Bane, *Director of Graduate Studies*
Marc J. Alperin, *Director of Graduate Admissions and Undergraduate Studies*

Professors

Carol Arnosti, Marine Organic Geochemistry, Microbial Biogeochemistry
John M. Bane, Physical Oceanography and Meteorology, Gulf Stream and Upwelling Dynamics
John Bruno, Coastal Ecology, Population Ecology
Jaye Cable, Groundwater Dynamics at the Land-Sea Interface, Biogeochemical Cycling, Wetland and Coastal Hydrology
Niels Lindquist, Chemical Ecology, Natural Products
Rick Luettich, Coastal Physical Oceanography, Modeling, Coastal Hazards
Christopher S. Martens, Marine Geochemistry
Brent A. McKee, Geochemistry/Geology of River-Ocean Environments, Sedimentary Geochemisty/Radiochemistry
Rachel Noble, Dynamics of Marine Microbial Food Webs
Hans W. Paerl, Microbial Ecology
Charles H. Peterson, Ecology, Population Interactions
Harvey E. Seim, Observational Physical Oceanography, Coastal and Estuarine Dynamics
Andreas Teske, Microbial Systematics and Evolution, Microbial Ecology, Microbiology of Hydrothermal Vents and the Marine Subsurface

Associate Professors

Marc J. Alperin, Chemical Oceanography, Biogeochemistry
Mike Piehler, Coastal Ecosystems and Estuarine Ecology
Antonio B. Rodriguez, Sedimentology, Marine and Coastal Geology
Alberto Scotti, Computational and Theoretical Fluid Dynamics, Environmental and Stratified Flows, Turbulence

Assistant Professors

Karl D. Castillo, Marine Physiological Ecology, Climate Change and Coral Reefs
Joel Fodrie, Fisheries Oceanography and Ecology, Restoration Ecology
Adrian Marchetti, Ecophysiology and Molecular Biology of Marine Phytoplankton
Brian L. White, Fluid Dynamics of Coastal Marine Systems, Hydrodynamics of Aquatic Vegetation, Gravity Currents, Shear Flows and Internal Waves

Research Assistant Professor

Barbara MacGregor, Microbial Ecology

Faculty Emeriti

A. Conrad Neumann
Jan J. Kohlmeyer
Dan Albert

Adjunct Faculty

Stephen R. Fegley (UNC Institute of Marine Sciences) Marine Biology/Ecology
Johanna Rosman (UNC Institute of Marine Sciences) Physical Oceanography
Larry K. Benninger (Geological Sciences) Sedimentary Geochemistry
Joseph G. Carter (Geological Sciences) Invertebrate Paleontology
Frederick M. Bingham (UNC–Wilmington, Physics), Circulation and Water Mass Transportation
Mark E. Hay (Georgia Tech), Marine Ecology
William M. Kier (Biology), Functional Morphology of Invertebrates, Biomechanics
Kenneth J. Lohmann (Biology), Sea Turtle Navigation, Neuroethology of Sea Slug Orientation, Lobster Homing and Navigation
Joseph Pawlik (UNC–Wilmington, Biology), Marine Ecology
Martin H. Posey (UNC–Wilmington, Biology), Population Dynamics of Marine Organisms
Stephen A. Skrabal (UNC–Wilmington, Chemistry), Trace Metal Geochemistry in Natural Waters
Mark D. Sobsey (Environmental Sciences), Environmental Health Microbiology
Robert H. Stavn (UNC–Greensboro, Biology,) Ocean Optical Properties
Joan D. Willey (UNC–Wilmington, Chemistry), Chemical Composition of Rainwater, Silica Geochemistry

The Department of Marine Sciences provides teaching and research in estuarine, coastal, and oceanographic sciences, leading to M.S. and Ph.D. degrees in marine sciences. The two elements of the program are the Department of Marine Sciences (MASC) located in Murray Venable Hall on the Chapel Hill campus and the Institute of Marine Sciences (IMS) located on the waterfront in Morehead City, North Carolina. The Department of Marine Sciences is the degree granting unit; all marine sciences graduate students are enrolled in the department. Most IMS faculty have joint faculty appointments in the department, and this enables their participation in graduate student academic activities. Research programs in physical oceanography, marine biology and ecology, marine geochemistry, marine geology and coastal meteorology are conducted in North Carolina and throughout the world by faculty from the department and the IMS.

Courses and facilities at other coastal laboratories are also available to UNC–Chapel Hill marine sciences students through cooperative agreements. Courses at North Carolina State University and at Duke University may be taken for credit through an inter-institutional program.

Each graduate student in the Department of Marine Sciences must gain a broad background in the marine sciences as well as an in-depth understanding of his or her own subdiscipline (e.g., chemical oceanography). This is accomplished by taking the four core courses, *Marine Geology, Biological Oceanography, Chemical Oceanography*, and *Physical Oceanography* (MASC 503, 504, 505, and 506, respectively), and advanced courses determined by each student's advisory committee, as well as by participating in research that ultimately results in an M.S. thesis or a Ph.D. dissertation. By the end of the 24-month period that begins when the student first enrolls in the department, the student is expected to have completed the four core courses, How to Give a Seminar (MASC 705), Interdisciplinary Seminar (MASC 706), and to have taken a written comprehensive exam (M.S. students) in his or her subdiscipline. Further information on degree requirements may be found at www.marine.unc.edu, and are described below.

Requirements for Admission

For admission to the Department of Marine Sciences, an undergraduate degree is required in a basic science such as physics, mathematics, chemistry, biology, bacteriology, botany, zoology, geology, or in computer science or engineering. Students are advised to develop a broad undergraduate science major with as many as possible of the following courses: mathematics through calculus, computer science, physics, general and organic chemistry, physical chemistry, invertebrate zoology or paleontology, botany, zoology, ecology, physiology, geology, and statistics.

Degree Requirements

Doctor of Philosophy. The academic program for a Ph.D. student will be supervised by a faculty advisory committee of at least five drawn from the UNC graduate faculty. Course requirements normally include the four core courses, additional advanced courses determined by the student's advisory committee, one hour of MASC 705 *How to Give a Seminar* and one hour of MASC 706 *Interdisciplinary Seminar*. A waiver for one or more of the core courses can be arranged with approval of the student's advisory committee and the Department of Marine Sciences Performance Committee. Additional requirements include passing a comprehensive examination containing both written (research proposal) and oral (proposal defense seminar) parts, a period of study or research at a marine station or participation on an oceanographic cruise, teaching experience sufficient to develop and demonstrate competence, and scientific research resulting in a written dissertation, which is defended by the student. More details on the Ph.D. comprehensive examination, admission to candidacy, semesters of residence credit, the dissertation, and final oral examination (the dissertation defense) are provided in the *Marine Sciences Graduate Student Handbook* and in *The Graduate School Handbook* (both available at marine.unc.edu).

Master of Science. The M.S. degree program is similar to the Ph.D. program except for the following: the advisory committee will be composed of three faculty members, the comprehensive examination is a written exam only, and scientific research will result in a written thesis, to be defended by the student. Additional details on the comprehensive examination, admission to candidacy, residence credit, the thesis, and final oral examination (the thesis defense) are provided in the *Marine Sciences Graduate Student Handbook* and in *The Graduate School Handbook* (both available at marine.unc.edu).

Marine Sciences Core Courses

503 *Marine Geology*

504 *Biological Oceanography*

505 *Chemical Oceanography*

506 *Physical Oceanography*

Courses for Graduate and Advanced Undergraduate Students *MASC*

401 Oceanography (BIOL 350, ENVR 417, GEOL 403) (3). Required preparation, major in a natural science or two courses in natural sciences. Studies origin of ocean basins, seawater chemistry and dynamics, biological communities, sedimentary record, and oceanographic history. Term paper. Students lacking science background should see MASC 101. No credit for MASC 401 after receiving credit for MASC 101.

410 Earth Processes in Environmental Systems (ENST 410, GEOL 410) (4). See ENST 410 for description.

411 Oceanic Processes in Environmental Systems (ENST 411, GEOL 411) (4). See ENST 411 for description.

415 Environmental Systems Modeling (ENST 415, ENVR 461, GEOL 415) (3). See ENST 415 for description.

430 Coastal Sedimentary Environments (GEOL 430) (3). See GEOL 430 for description.

431 Micropaleontology (GEOL 431) (4). See GEOL 431 for description.

432 Major Rivers and Global Change: Mountains to the Sea (3). What are the linkages between rivers and global change? This course examines the hydrological, geological, and biogeochemical processes that control material flux from land to the oceans via rivers.

436 Coastal Processes (4). An interdisciplinary description and analysis of environmental processes that form and maintain coastal habitats. Coastal aspects of geology, fluid dynamics, chemistry, and biology are considered. Two lectures per week and two coastal field trips.

440 Marine Ecology (BIOL 462) (3). See BIOL 462 for description.

441 Marine Physiological Ecology (3). This course introduces students to the physiological, morphological, and behavioral factors employed by marine organisms to cope with their physical environment. Emphasis will be placed on the response of marine organisms to environmental factors such as seawater temperature, light, water salinity, ocean acidification, etc.

442 Marine Biology (BIOL 457) (3). Recommended preparation, BIOL 201 or 475. A survey of plants and animals that live in the sea: characteristics of marine habitats, organisms, and the ecosystems will be emphasized. Marine environment, the organisms involved, and the ecological systems that sustain them.

443 Marine Microbiology (3). Restricted to junior or senior science majors or graduate students, with permission of the instructor. Seminar class focuses on the primary research literature. Physiology of marine microorganisms, microbial diversity and ecology of the marine environment, biogeochemical processes catalyzed by marine microorganisms.

444 Marine Phytoplankton (3). Permission of the instructor. For junior and senior science majors or graduate students. Biology of marine photosynthetic protists and cyanobacteria. Phytoplankton evolution, biodiversity, structure, function, biogeochemical cycles and genomics. Harmful algal blooms, commercial products, and climate change. Three lecture/practical session hours per week.

445 Marine Invertebrate Biology (BIOL 475) (4). See BIOL 475 for description.

448 Coastal and Estuarine Ecology (ENST 472) (4). Prerequisites, CHEM 102 and MATH 231. A field-intensive study of the ecology of marine organisms and their interactions with their environment, including commercially important organisms. Laboratory/recitation/field work is included and contributes two credit hours to the course.

450 Biogeochemical Processes (ENST 450, ENVR 415, GEOL 450) (4). See ENST 450 for description.

460 Fluid Dynamics of the Environment (3). Prerequisite, MATH 232. Permission of the instructor for students lacking the prerequisite. Principles and applications of fluid dynamics to flows of air and water in the natural environment. Conservation of momentum, mass, and energy applied to lakes, rivers, estuaries, and the coastal ocean. Dimensional analysis and scaling emphasized to promote problem-solving skills.

470 Estuarine and Coastal Marine Science (4). Graduate students only; undergraduate students should take ENST 222. Introduction to estuarine environments: geomorphology, physical circulation, nutrient loading, primary and secondary production, carbon and nitrogen cycling, benthic processes and sedimentation. Considers human impacts on coastal systems, emphasizing North Carolina estuaries. Three lecture hours and one recitation hour per week.

471 Human Impacts on Estuarine Ecosystems (ENST 471) (4). See ENST 471 for description.

472 Barrier Island Ecology and Geology (6). Recommended preparation, one introductory geology course. An integration of barrier island plant and animal ecology within the context of physical processes and geomorphological change. Emphasis on management and impact of human interference with natural processes.

480 Modeling of Marine and Earth Systems (ENVR 480, GEOL 480) (3). Prerequisite, MATH 232. Permission of the instructor for students lacking the prerequisite. Mathematical modeling of dynamic systems, linear and nonlinear. The fundamental budget equation. Case studies in modeling transport, biogeochemical processes, population dynamics. Analytical and numerical techniques; chaos theory; fractal geometry.

483 Geologic and Oceanographic Applications of Geographical Information Systems (GEOL 483) (4). See GEOL 483 for description.

490 Special Topics in Marine Sciences for Undergraduates and Graduates (1–3). Directed readings, laboratory, and/or field study of marine science topics not covered in scheduled courses.

503 Marine Geology (GEOL 503) (4). For graduate students; undergraduates need permission of the instructor. Investigates formation of ocean basins, coastal and fluvial processes, sediment transport, plate tectonics, petrography of marine rocks, evolution of ocean chemistry, oceanic biogeochemical cycles, application of geochemical proxies in paleoceanographic reconstructions, macroevolutionary patterns of marine biota, and global oceanic change. Mandatory weekend fieldtrip.

504 Biological Oceanography (BIOL 657, ENVR 520) (4). For graduate students; undergraduates need permission of the instructor. Marine ecosystem processes pertaining to the structure, function, and ecological interactions of biological communities; management of biological resources; taxonomy and natural history of pelagic and benthic marine organisms. Three lecture and one recitation hours per week. Two mandatory weekend fieldtrips.

505 Chemical Oceanography (ENVR 505, GEOL 505) (4). Graduate students only; undergraduates must have permission of the instructor. Overview of chemical processes in the ocean. Topics include physical chemistry of seawater, major element cycles, hydrothermal vents, geochemical tracers, air-sea gas exchange, particle transport, sedimentary processes, and marine organic geochemistry. Three lecture and two recitation hours per week.

506 Physical Oceanography (GEOL 506) (4). For graduate students; undergraduates need permission of the instructor. Descriptive oceanography, large-scale wind-driven and thermohaline circulations, ocean dynamics, regional and nearshore/estuarine physical processes, waves, tides. Three lecture and one recitation hour per week.

550 Biogeochemical Cycling (GEOL 550) (3). Recommended preparation, four ENVR, GEOL, or MASC courses above 400. This course explores interfaces of marine, aquatic, atmospheric, and geological sciences emphasizing processes controlling chemical distributions in sediments, fresh and salt water, the atmosphere, and fluxes among these reservoirs.

552 Organic Geochemistry (GEOL 552) (3). Recommended preparation, CHEM 261 or MASC 505, and one additional ENVR, GEOL, or MASC course above 400. Sources, transformations, and fate of natural organic matter in marine environments. Emphasis on interplay of chemical, biological, and physical processes that affect organic matter composition, distribution, and turnover.

553 Geochemistry (GEOL 512) (3). See GEOL 512 for description.

560 Fluid Dynamics (ENVR 452, GEOL 560, PHYS 660) (3). Prerequisite, PHYS 301. Permission of the instructor for students lacking the prerequisite. The physical properties of fluids, kinematics, governing equations, viscous incompressible flow, vorticity dynamics, boundary layers, irrotational incompressible flow.

561 Time Series and Spatial Data Analysis (3). Prerequisite, MATH 233. Permission of the instructor for students lacking the prerequisite. Three components: statistics and probability, time series analysis, and spatial data analysis. Harmonic analysis, nonparametric spectral estimation, filtering, objective analysis, empirical orthogonal functions.

562 Turbulent Boundary Layers (3). Prerequisite, MASC 506 or 560. Permission of the instructor for students lacking the prerequisite. Turbulence and transport in near-bottom boundary regions. Turbulence and mixing theory in boundary layers. Field deployment and recovery of turbulence measuring instruments. Data analysis from turbulence measurements.

563 Descriptive Physical Oceanography (GEOL 563) (3). Prerequisite, MASC 506. Permission of the instructor for students lacking the prerequisite. Observed structure of the large-scale and mesoscale ocean circulation and its variability, based on modern observations. In-situ and remote sensing techniques, hydrographic structure, circulation patterns, ocean-atmosphere interactions.

Courses for Graduate Students

MASC

705 How to Give a Seminar (1). Discussion of methods and strategies for giving effective technical presentations. Topics will include seminar structure, use of visual aids, personal and professional presentation, and responding to questions.

706 Seminar in Oceanography (1). Discussion of theories and contemporary research in ocean systems. Topics stress interactions between physical, chemical, geological, and biological processes in the sea. For graduate students in marine sciences. Students who enroll must present an interdisciplinary seminar.

741 Seminar in Marine Biology (2). Discussion of selected literature in the field of marine biology, ecology, and evolution.

742 Molecular Population Biology (BIOL 758) (4). Prerequisite, BIOL 471. Permission of the instructor. Hands-on training, experience, and discussion of the application of molecular genetic tools to questions of ecology, evolution, systematics, and conservation.

750 Modeling Diagenetic Processes (3). Prerequisite, MASC 480. Permission of the instructor. An introduction to the theory and application of modeling biogeochemical processes in sediments. Diagenetic theory, numerical techniques, and examples of recently developed sediment models. Three lecture hours a week.

761 Geophysical Fluid Dynamics (3). Prerequisite, MASC 560 or MATH 528. Permission of the instructor for students lacking the prerequisite. Momentum equations in a rotating reference frame, vorticity, potential vorticity, circulation, the shallow water model, Rossby and Kelvin waves, the Ekman layer. Three lecture hours a week.

762 Ocean Circulation Theory (3). Prerequisite, MASC 506 or 560, or MATH 529, Permission of the instructor for students lacking the prerequisite. Theories, models of large-scale dynamics of ocean circulation. Potential vorticity, quasi-geostrophy, instabilities.

763 Coastal Circulation (3). Prerequisite, MASC 506 or 560, or MATH 529. Permission of the instructor for students lacking the prerequisite. Dynamics of the coastal ocean. Shallow water equations, boundary layer and long wave theory, wind driven circulation, fronts, estuaries.

764 Ocean Circulation Modeling (3). Prerequisite, MASC 506 or MATH 529. Permission of the instructor for students lacking the prerequisite. Computational methods used in modeling oceanic circulation. Numerical solution of equations governing mass, momentum, and energy equations.

765 Small-Scale Physics of the Ocean (3). Prerequisites, MASC 506 and 560. Physics of sub-mesoscale processes in the ocean. Nonequilibrium thermodynamics. Air-sea interaction. Mixing in the ocean boundary layer, convection, double diffusion. Near-inertial and high frequency internal waves. Three lecture hours a week.

781 Numerical ODE/PDE, I (MATH 761, ENVR 761) (3). See MATH 761 for description.

782 Numerical ODE/PDE, II (MATH 762, ENVR 762) (3). See MATH 762 for description.

783 Mathematical Modeling I (MATH 768, ENVR 763) (3). See MATH 768 for description.

784 Mathematical Modeling II (MATH 769, ENVR 764) (3). See MATH 769 for description.

940 Research in Marine Sciences (2–21).

993 Master's Thesis (3–21).

994 Doctoral Dissertation (3–21).

Courses in other departments that are considered appropriate for a graduate major in marine sciences:

BIOL

451 Comparative Physiology (3).

451L Comparative Physiology Laboratory (1).

453 Animal Societies and Communication (3).

455 Behavioral Neuroscience (3).

475 Biology of Marine Animals (4).

478 Invertebrate Paleontology (GEOL 478) (4).

551 Comparative Biomechanics (3).

565 Conservation Biology (3).

663 Population Ecology (3).

663L Laboratory in Population Ecology (1).

ENVR

421 Environmental Health Microbiology (3).

422 Air and Industrial Hygiene (3).

442 Biochemical Toxicology (BIOC 442, TOXC 442) (3).

522 Environmental Change and Human Health (ENST 522) (3).

725 Environmental Physical-Organic Chemistry (3).

770 Biology Monitoring (3).

GEOL

509 Groundwater (3).

510 Geochemistry of Natural Waters (3).

518 Geodynamics (3).

655 Physical Geochemistry (3).

707 Stratigraphic Micropaleontology: Mesozoic Calcareous Nannofossils (4).

708 Stratigraphic Paleontology: Cenozoic Calcareous Nannofossils (4).

MATH

523 Functions of a Complex Variable with Applications (3).

524 Elementary Differential Equations (3).

528 Mathematical Methods for the Physical Sciences I (3).

529 Mathematical Methods for the Physical Sciences II (3).

Department of Mathematics

www.math.unc.edu
RICHARD McLAUGHLIN, *Interim Chair*

Professors

Idris Assani (45) Dynamical Systems, Ergodic Theory of Operators
Prakash Belkale (57) Algebraic Geometry
Roberto A. Camassa (16) Mathematical Modeling, Nonlinear Waves, Propagation, Dynamical Systems
Ivan V. Cherednik (48) Representation Theory, Mathematical Physics, Algebraic Combinatorics
Joseph A. Cima (4) Complex Analysis, Functional Analysis
James N. Damon (14) Singularity Theory, Differential Topology
Patrick B. Eberlein (6) Differential Geometry
M. Gregory Forest (7) Nonlinear Waves, Solitons, Fiber Flows of Complex Liquids
Sue E. Goodman (3) Topology, Dynamical Systems
Jane M. Hawkins (38) Ergodic Theory, Dynamical Systems
Jingfang Huang (51) Integral Equation Methods and Fast Algorithms
Christopher K. R. T. Jones (55) Applications of Dynamical Systems, Nonlinear Partial Differential Equations, Ocean Dynamics, Nonlinear Optics
Shrawan Kumar (46) Representation Theory, Geometry of Flag Varieties
Richard McLaughlin (50) Fluid Dynamics and Turbulent Transport
Peter J. Mucha (60) Network Analysis, Fluid Dynamics, Computer-Generated Animation
Karl E. Petersen (20) Ergodic Theory
Joseph F. Plante (23) Foliations, Dynamical Systems
Robert A. Proctor (43) Combinatorics, Representation Theory
Lev Rozansky (52) Three-Dimensional Topology
Michael E. Taylor (40) Partial Differential Equations, Harmonic Analysis, Operator Theory
Alexandre N. Varchenko (47) Geometry, Mathematical Physics
Jonathan M. Wahl (28) Algebraic Geometry
Mark Williams (36) Partial Differential Equations

Associate Professors

David Adalsteinsson (1) Applied Mathematics and Scientific Computation
Jason Metcalfe (61) Partial Differential Equations
Laura Miller (22) Mathematical Biology and Fluid DynamicSorin Mitran (58) Computational Methods for Partial Differential Equations, Continuum-Kinetic Methods, Fluid Dynamics, Biological Fluid Dynamics and Mechanics
Richard Rimanyi (59), Topology, Geometry, Singularities

Assistant Professors

Hans Christianson (8) Semiclassical Analysis and Partial Differential Equations
Ellen Eischen (002) Algebraic Number Theory, Arithmetic Geometry
Robert Lipshitz (005) Topology
Jeremy Marzuola (9) Partial Differential Equations
Jason Metcalfe (61) Partial Differential Equations
Justin Sawon (64) Differential Geometry
Professors Emeriti

Ladnor Gessinger

William H. Graves
Robert G. Heyneman
Norberto Kerzman
Ancel C. Mewborn
John Pfaltzgraff
Michael Schlessinger
William W. Smith
Johann Sonner
James Stasheff
Warren R. Wogen

The Department of Mathematics offers graduate training leading to the degrees of master of arts, master of science, and doctor of philosophy. A master's degree may be included or bypassed in the doctoral program. All of a student's graduate work may be done within the department or, when appropriate, may be done under the direction of an approved advisor in an allied discipline. The Department of Mathematics is housed in Phillips Hall and Chapman Hall. The Department of Mathematics offers a number of teaching assistantships and teaching fellowships each year. Applicants for financial aid are also considered for several University fellowships awarded by The Graduate School in the University-wide competition. Applications for admission and financial assistance may be obtained from The Graduate School. Applications filed by our posted deadline will receive full consideration.

Degree Requirements

The general regulations of The Graduate School govern the work for graduate degrees in mathematics. Specific requirements are explained below. In general, a graduate student in mathematics may receive credit only for mathematics courses numbered 600 and above.

These descriptions summarize the requirements for the master's and Ph.D. degrees. More detailed statements may be obtained from the department. The director of graduate studies must approve all aspects of a student's program. The purpose of the graduate programs is to develop mathematical skills appropriate for competition in academia or industry.

The course schedule for first-year students will depend upon each student's undergraduate training. The normal course load for a graduate student is three courses (nine credit hours) per semester. Graduate students must keep full time status in order to qualify for tuition and health insurance benefits. First-year students typically choose courses from five year-long sequences in algebra (676, 677), analysis (653, 656), geometry-topology (680, 681), scientific computation (661, 662), and methods of applied mathematics (668, 669). The Ph.D. comprehensive exams are based on the content of the first-year sequences. These exams are offered in January and August of each year, just before the semester begins. A Ph.D. student can pass either the Pure Math option or the Applied Math option for the qualifying examination. To pass the Pure Math option a student must pass any three of the five qualifying exams. To pass the Applied Math option, a student is required to pass Methods of Applied Math and Scientific Computation.

During the second year a typical Ph.D. student will take the Ph.D. comprehensive exams and select courses from a list of 20 more advanced "second tier" courses. A typical master's student will complete that degree during the second year. The department considers two years to be the normal time needed to complete a master's degree.

A candidate for a master's degree must satisfy each of the following requirements:

1. Earn at least two semesters of residency credit and complete all requirements within five years.
2. Demonstrate computer programming ability by passing an approved undergraduate or graduate course in programming, or by passing an exam administered by the Mathematics Department.
3. Perform satisfactorily in 30 hours of graduate work in a program approved by the director of graduate studies. At least 15 of these hours must be in Mathematics Department courses numbered 600 or above.
4. Complete a master's project or thesis for a master of science degree or a master's thesis for a master of arts degree.
5. Pass an oral examination upon completion of the master's project or master's thesis. The exam will cover coursework as well as the project or thesis.
6. A master's candidate must pass one of the written comprehensive exams given to doctoral students.

A candidate for a Ph.D. degree must satisfy each of the following requirements:

1. Earn at least four semesters of residency credit and complete all requirements within eight years.
2. Satisfy the same computer programming requirement as a master's student.
3. Demonstrate reading competence in one approved foreign language by passing an approved course or by passing a translation exam administered by the Mathematics Department.
4. Complete either the pure math option or the applied math option for qualifying examinations by the beginning of the sixth semester.
5. Pass at least six courses from the following two lists: a) the second tier courses or b) first-year comprehensive courses that are not basic courses for any of the comprehensive exams passed by the student. Of these six courses at least three must be numbered over 700 and drawn from the second tier list.
6. Pass the TA Teaching Seminar and perform a minimum of two semesters of instructional service.
7. Pass a preliminary oral exam on the chosen Ph.D. specialty area.
8. Write a Ph.D. thesis and defend it successfully during a final oral exam chaired by the thesis advisor.

The student/faculty ratio of about 2/1 makes it possible for graduate students to take reading courses from individual faculty members that are tailored to meet the student's needs.

Minor in Mathematics

Graduate students in other departments who plan to offer mathematics as a (complete or partial) minor field for the Ph.D. should consult the director of graduate studies in mathematics for approval of their programs and for assignment of an advisor in the Department of Mathematics. This should be done at the earliest possible time, in order to prevent disappointment for the student.

Courses for Graduate and Advanced Undergraduate Students

MATH

401 Mathematical Concepts in Art (3). Mathematical theories of proportion, perspective (projective invariants and the mathematics of visual perception), symmetry, and aesthetics will be expounded and illustrated by examples from painting, architecture, and sculpture.

406 Mathematical Methods in Biostatistics (1). Prerequisite, MATH 232. Special mathematical techniques in the theory and methods of biostatistics as related to the life sciences and public health. Includes brief review of calculus, selected topics from intermediate calculus, and introductory matrix theory for applications in biostatistics.

410 Teaching and Learning Mathematics (4). Study of how people learn and understand mathematics, based on research in mathematics, mathematics education, psychology, and cognitive science. This course is designed to prepare undergraduate mathematics majors to become excellent high school mathematics teachers. It involves fieldwork in both the high school and college environments.

411 Developing Mathematical Concepts (3). Permission of the instructor. An investigation of various ways elementary concepts in mathematics can be developed. Applications of the mathematics developed will be considered.

418 Basic Concepts of Analysis for High School Teachers (3). Prerequisites, MATH 233 and 381. An examination of high school mathematics from an advanced perspective, including number systems and the behavior of functions and equations. Designed primarily for prospective or practicing high school teachers.

452 Mathematical and Computational Models in Biology (BIOL 452) (4). See BIOL 452 for description.

515 History of Mathematics (3). Prerequisite, MATH 381. A general survey of the history of mathematics with emphasis on elementary mathematics. Some special problems will be treated in depth.

521 Advanced Calculus I (3). Prerequisites, MATH 233 and 381. The real numbers, continuity and differentiability of functions of one variable, infinite series, integration.

522 Advanced Calculus II (3). Prerequisites, MATH 383 and 521. Functions of several variables, the derivative as a linear transformation, inverse and implicit function theorems, multiple integration.

523 Functions of a Complex Variable with Applications (3). Prerequisite, MATH 383. The algebra of complex numbers, elementary functions and their mapping properties, complex limits, power series, analytic functions, contour integrals, Cauchy's theorem and formulae, Laurent series and residue calculus, elementary conformal mapping and boundary value problems, Poisson integral formula for the disk and the half plane.

524 Elementary Differential Equations (3). Prerequisite, MATH 383. Linear differential equations, power series solutions, Laplace transforms, numerical methods.

528 Mathematical Methods for the Physical Sciences I (3). Prerequisites, MATH 383; and PHYS 104 and 105, or PHYS 116 and 117. Theory and applications of Laplace transform, Fourier series and transform, Sturm-Liouville problems. Students will be expected to do some numerical calculations on either a programmable calculator or a computer.

529 Mathematical Methods for the Physical Sciences II (3). Prerequisites, PHYS 104 and 105, and one of MATH 521, 524, or 528. Introduction to boundary value problems for the diffusion, Laplace and wave partial differential equations. Bessel functions and Legendre functions. Introduction to complex variables including the calculus of residues.

533 Elementary Theory of Numbers (3). Prerequisite, MATH 381. Divisibility, Euclidean algorithm, congruences, residue classes, Euler's function, primitive roots, Chinese remainder theorem, quadratic residues, number-theoretic functions, Farey and continued fractions, Gaussian integers.

534 Elements of Modern Algebra (3). Prerequisite, MATH 381. Binary operations, groups, subgroups, cosets, quotient groups, rings, polynomials.

535 Introduction to Probability (STOR 435) (3). See STOR 435 for description.

547 Linear Algebra for Applications (3). Prerequisite, MATH 233 or 283. Algebra of matrices with applications: determinants, solution of linear systems by Gaussian elimination, Gram-Schmidt procedure, eigenvalues. MATH 416 may not be taken for credit after credit has been granted for MATH 547.

548 Combinatorial Mathematics (3). Prerequisite, MATH 381. Topics chosen from generating functions, Polya's theory of counting, partial orderings and incidence algebras, principle of inclusion-exclusion, Moebius inversion, combinatorial problems in physics and other branches of science.

550 Topology (3). Prerequisite, MATH 233; corequisite, MATH 383. Introduction to topics in topology, particularly surface topology, including classification of compact surfaces, Euler characteristic, orientability, vector fields on surfaces, tessellations, and fundamental group.

551 Euclidean and Non-Euclidean Geometries (3). Prerequisite, MATH 381. Critical study of basic notions and models of Euclidean and non-Euclidean geometries: order, congruence, and distance.

555 Introduction to Dynamics (3). Prerequisite, MATH 383. Topics will vary and may include iteration of maps, orbits, periodic points, attractors, symbolic dynamics, bifurcations, fractal sets, chaotic systems, systems arising from differential equations, iterated function systems, and applications.

564 Mathematical Modeling (3). Prerequisite, MATH 283 or 383. Requires some knowledge of computer programming. Model validation and numerical simulations using differential equations, probability, and iterated maps. Applications may include conservation laws, dynamics, mixing, geophysical flows and climate change, fluid motion, epidemics, ecological models, population biology, cell biology, and neuron dynamics.

565 Computer-Assisted Mathematical Problem Solving (3). Prerequisite, MATH 383. Personal computer as tool in solving a variety of mathematical problems, e.g., finding roots of equations and approximate solutions to differential equations. Introduction to appropriate programming language; emphasis on graphics.

566 Introduction to Numerical Analysis (3). Prerequisite, MATH 383. Requires some knowledge of computer programming. Iterative methods, interpolation, polynomial and spline approximations, numerical differentiation and integration, numerical solution of ordinary and partial differential equations.

577 Linear Algebra (3). Prerequisites, MATH 381 and 383. Vector spaces, linear transformations, duality, diagonalization, primary and cyclic decomposition, Jordan canonical form, inner product spaces, orthogonal reduction of symmetric matrices, spectral theorem, bilinear forms, multilinear functions. A much more abstract course than MATH 416 or 547.

578 Algebraic Structures (3). Prerequisite, MATH 547 or 577. Permutation groups, matrix groups, groups of linear transformations, symmetry groups; finite abelian groups. Residue class rings, algebra of matrices, linear maps, and polynomials. Real and complex numbers, rational functions, quadratic fields, finite fields.

590 Topics in Mathematics (3). Permission of the instructor. Topics may focus on matrix theory, analysis, algebra, geometry, or applied and computational mathematics.

594 Nonlinear Dynamics (PHYS 594) (3). See PHYS 594 for description.

635 Probability (STOR 635) (3). See STOR 635 for description.

641 Enumerative Combinatorics (3). Prerequisite, MATH 578. Basic counting; partitions; recursions and generating functions; signed enumeration; counting with respect to symmetry, plane partitions, and tableaux.

643 Combinatorial Structures (3). Prerequisite, MATH 578. Graph theory, matchings, Ramsey theory, extremal set theory, network flows, lattices, Moebius inversion, q-analogs, combinatorial and projective geometries, codes, and designs.

653 Introductory Analysis (3). Requires knowledge of advanced calculus. Elementary metric space topology, continuous functions, differentiation of vector-valued functions, implicit and inverse function theorems. Topics from Weierstrass theorem, existence and uniqueness theorems for differential equations, series of functions.

656 Complex Analysis (3). Prerequisite, MATH 653. A rigorous treatment of complex integration, including the Cauchy theory. Elementary special functions, power series, local behavior of analytic functions.

657 Qualitative Theory of Differential Equations (3). Prerequisite, MATH 653. Requires knowledge of linear algebra. Existence and uniqueness theorems, linear and nonlinear systems, differential equations in the plane and on surfaces, Poincare-Bendixson theory, Lyapunov stability and structural stability, critical point analysis.

661 Scientific Computation I (ENVR 661) (3). Requires some programming experience and basic numerical analysis. Error in computation, solutions of nonlinear equations, interpolation, approximation of functions, Fourier methods, numerical integration and differentiation, introduction to numerical solution of ODEs, Gaussian elimination.

662 Scientific Computation II (COMP 662, ENVR 662) (3). Prerequisite, MATH 661. Theory and practical issues arising in linear algebra problems derived from physical applications, e.g., discretization of ODEs and PDEs. Linear systems, linear least squares, eigenvalue problems, singular value decomposition.

668 Methods of Applied Mathematics I (ENVR 668) (3). Requires an undergraduate course in differential equations. Contour integration, asymptotic expansions, steepest descent/stationary phase methods, special functions arising in physical applications, elliptic and theta functions, elementary bifurcation theory.

669 Methods of Applied Mathematics II (ENVR 669) (3). Prerequisite, MATH 668. Perturbation methods for ODEs and PDEs, WKBJ method, averaging and modulation theory for linear and nonlinear wave equations, long-time asymptotics of Fourier integral representations of PDEs, Green's functions, dynamical systems tools.

676 Modules, Linear Algebra, and Groups (3). Modules over rings, canonical forms for linear operators and bilinear forms, multilinear algebra, groups and group actions.

677 Groups, Representations, and Fields (3). Internal structure of groups, Sylow theorems, generators and relations, group representations, fields, Galois theory, category theory.

680 Geometry of Curves and Surfaces (3). Requires advanced calculus. Topics include (curves) Frenet formulas, isoperimetric inequality, theorems of Crofton, Fenchel, Fary-Milnor; (surfaces) fundamental forms, Gaussian and mean curvature, special surfaces, geodesics, Gauss-Bonnet theorem.

681 Introductory Topology (3). Prerequisites, MATH 653 and 680. Topological spaces, connectedness, separation axioms, product spaces, extension theorems. Classification of surfaces, fundamental group, covering spaces.

690 Topics in Mathematics (3). Permission of the department. Directed study of an advanced topic in mathematics. Topics will vary.

Courses for Graduate Students

MATH

751 Introduction to Partial Differential Equations (3). Prerequisite, MATH 653. Basic methods in partial differential equations. Topics may include: Cauchy-Kowalewski Theorem, Holmgren's Uniqueness Theorem, Laplace's equation, Maximum Principle, Dirichlet problem, harmonic functions, wave equation, heat equation.

753 Measure and Integration (3). Prerequisite, MATH 653. Permission of the instructor for students lacking the prerequisite. Lebesgue and abstract measure and integration, convergence theorems, differentiation, Radon-Nikodym theorem, product measures, Fubini theorem, Lebesgue spaces, invariance under transformations, Haar measure and convolution.

754 Introductory Functional Analysis (3). Prerequisite, MATH 753. Hahn-Banach and separation theorems. Normed and locally convex spaces, duals of spaces and maps, weak topologies; closed graph and open mapping theorems, uniform boundedness theorem, linear operators.

755 Advanced Complex Analysis (3). Prerequisite, MATH 656. Laurent series; Mittag-Leffler and Weierstrass Theorems; Riemann mapping theorem; Runge's theorem; additional topics chosen from: harmonic, elliptic, univalent, entire, meromorphic functions; Dirichlet problem; Riemann surfaces.

756 Several Complex Variables (3). Prerequisite, MATH 656. Elementary theory, the Cousin problems, domains of holomorphy, Runge domains and polynomial approximation, local theory, complex analytic structures, coherent analytic sheaves and Stein manifolds, Cartan's theorems.

761 Numerical ODE/PDE, I (ENVR 761, MASC 781) (3). Prerequisites, MATH 661 and 662. Single, multistep methods for ODEs: stability regions, the root condition; stiff systems, backward difference formulas; two-point BVPs; stability theory; finite difference methods for linear advection diffusion equations.

762 Numerical ODE/PDE, II (ENVR 762, MASC 782) (3). Prerequisite, MATH 761. Elliptic equation methods (finite differences, elements, integral equations); hyperbolic conservation law methods (Lax-Fiedrich, characteristics, entropy condition, shock tracking/capturing); spectral, pseudo-spectral methods; particle methods, fast summation, fast multipole/vortex methods.

768 Mathematical Modeling I (ENVR 763, MASC 783) (3). Prerequisites, MATH 668, 669, 661, and 662. Nondimensionalization and identification of leading order physical effects with respect to relevant scales and phenomena; derivation of classical models of fluid mechanics (lubrication, slender filament, thin films, Stokes flow); derivation of weakly nonlinear envelope equations.

769 Mathematical Modeling II (ENVR 764, MASC 784) (3). Prerequisites, MATH 668, 669, 661, and 662. Current models in science and technology: topics ranging from material science applications (e.g., flow of polymers and LCPs); geophysical applications (e.g., ocean circulation, quasi-geostrophic models, atmospheric vortices).

771 Commutative Algebra (3). Prerequisite, MATH 677. Field extensions, integral ring extensions, Nullstellensatz and normalization theorem, derivations and separability, local rings, valuations, completions, filtrations and graded rings, dimension theory.

773 Lie Groups (3). Prerequisites, MATH 676 and 781. Lie groups, closed subgroups, Lie algebra of a Lie group, exponential map, compact groups, Haar measure, orthogonality relations, Peter-Weyl theorem, maximal torus, representations, Weyl character formula, homogeneous spaces.

774 Lie Algebras (3). Prerequisite, MATH 676. Nilpotent, solvable, and semisimple Lie algebras, structure theorems, root systems, Weyl groups, weights, classification of semisimple Lie algebras and their finite dimensional representations, character formulas.

775 Algebraic Geometry (3). Prerequisite, MATH 771. Topics may include: algebraic varieties, algebraic functions, abelian varieties, projective and complete varieties, algebraic groups, schemes and the Grothendieck theory, Riemann-Roch theorem.

776 Algebraic Topology (3). Prerequisites, MATH 681 and 676. Homotopy and homology; simplicial complexes and singular homology; other topics may include cohomology, universal coefficient theorems, higher homotopy groups, fibre spaces.

781 Differentiable Manifolds (3). Prerequisites, MATH 681, 676, and 653. Calculus on manifolds, vector bundles, vector fields and differential equations, Lie groups, connections, de Rham cohomology.

782 Differential Geometry (3). Prerequisite, MATH 781. Riemannian geometry, first and second variation of area and applications, effect of curvature on homology and homotopy, Chern-Weil theory of characteristic classes, Chern-Gauss-Bonnet theorem.

853 Harmonic Analysis (3). Permission of the instructor. Subjects may include topological groups, abstract harmonic analysis, Fourier analysis, noncommutative harmonic analysis and group representation, automorphic forms and analytic number theory.

854 Advanced Functional Analysis (3). Permission of the instructor. Subjects may include operator theory on Hilbert space, operators on Banach spaces, locally convex spaces, vector measures, Banach algebras.

857 Theory of Dynamical Systems (3). Permission of the instructor. Topics may include: ergodic theory, topological dynamics, stability theory of differential equations, classical dynamical systems, differentiable dynamics.

891 Special Topics (1–3). Advance topics in current research in statistics and operations research.

892 Topics in Computational Mathematics (3). Prerequisites, MATH 661 and 662. Topics may include: finite element method; numerical methods for hyperbolic conservation laws, infinite dimensional optimization problems, variational inequalities, inverse problems.

893 Topics in Algebra (3). Prerequisite, MATH 677. Topics from the theory of rings, theory of bialgebras, homological algebra, algebraic number theory, categories and functions.

894 Topics in Combinatorial Mathematics (3). Prerequisite, MATH 642. Permission of the instructor for students lacking the prerequisite. Topics may include: combinatorial geometries, coloring and the critical problem, the bracket algebra, reduced incidence algebras and generating functions, binomial enumeration, designs, valuation module of a lattice, lattice theory.

895 Special Topics in Geometry (3). Prerequisite, MATH 781. Topics may include elliptic operators, complex manifolds, exterior differential systems, homogeneous spaces, integral geometry, submanifolds of Euclidean space, geometrical aspects of mathematical physics.

896 Topics in Algebraic Topology (3). Prerequisite, MATH 776. Permission of the instructor for students lacking the prerequisite. Topics primarily from algebraic or differential topology, such as cohomology operations, homotopy groups, fibre bundles, spectral sequences, K-theory, cobordism, Morse Theory, surgery, topology of singularities.

920 Seminar and Directed Readings (1–3).

921 Seminar (3).

925 Practical Training Course in Mathematics (3–5). Required preparation, passed Ph.D. written comprehensive exam. An opportunity for the practical training of a graduate student interested in mathematics is identified. Typically this opportunity is expected to take the form of a summer internship.

992 Master's Project (3–21).

993 Master's Thesis (3–6). This should not be taken by students electing non-thesis master's projects.

994 Doctoral Dissertation (3–9).

Department of Microbiology and Immunology

med.unc.edu/microimm
WILLIAM E. GOLDMAN, *Chair*

Professors

Steven L. Bachenheimer (30) Molecular Biology of Herpesviruses
*Ralph Baric (76) Molecular Mechanisms of Virus Cross-Species Transmissibility and Systems Genetics and Pathogenesis
Robert Bourret (64) Signal Transduction in Bacteria
Stephen H. Clarke (53) Mechanisms of B Cell Tolerance and Autoimmunity, Human Autoimmune Translational Research
*Myron S. Cohen (55) Biology and Epidemiology of Transmission of STD Pathogens (Including HIV)
Peggy Cotter (97) Microbial Pathogenesis, Molecular Genetics, Protein Secretion
Blossom Damania (79) Kaposi's Sarcoma-Associated Herpesvirus (KSHV/HHV-8), Rhesus Monkey Rhadinovirus (RRV)
*Jeff Dangl (87) Plant Genetics, Plant Disease Resistance and Cell Death Control, Bacterial Type III Secretion Systems
Aravinda de Silva (73) Arthropod Vector-Borne Infectious Diseases and Microbial Pathogenesis
Dirk Dittmer (88) West Nile Virus (WNV) and Kaposi's Sarcoma-Associated Herpesvirus (KSHV/HHV-8)
Susan A. Fiscus (65) HIV Pathogenesis and Diagnostics
*J. Victor Garcia-Martinez (101) Viral Pathogenesis/Immunology, Humanized Mice, HIV/AIDS
*Peter H. Gilligan (51) Bacterial Toxins, Clinical Microbiology
Jack Griffith (35) Chromosome Structure: Viruses and Their Host Cells
William E. Goldman (95) Pathogenesis of Respiratory Tract Infections: Histoplasmosis, Pertussis, and Plague
Thomas Kawula (63) Bacterial Genetics, Microbial Pathogenesis
*Stanley M. Lemon (59) Molecular Virology, Innate Immunity, Viral Carcinogenesis
*Zhi Liu (91) Biochemistry, Cell Biology, and Immunology of Hemidesmosome and Basement Membrane
*David M. Margolis (90) Regulation of Gene Expression, Molecular Biology of Retroviruses, HIV Pathogenesis
*Steven R. Meshnick (81) Malaria and Pneumocystis, Molecular Epidemiology, Pathogenesis, Drug Resistance
*Virginia L. Miller (96) Molecular and Genetic Analysis of Microbial Pathogenesis, Virulence Gene Regulation, Host-Pathogen Interactions
*Robert A. Nicholas (94) Antibiotic Resistance Mechanisms, Bacterial Genetics, Neisseria gonorrhoeae
*Joseph S. Pagano (14) Epstein-Barr Virus and Ubiquitin-Proteasomal Systems, Interferon Regulatory Factors, Invasion and Metastasis and Antiviral Drugs
*David Peden, Translational and Clinical Research in Environmental Lung Disease
*Matthew Redinbo, Structural and Chemical Biology of Host-Pathogen Contacts
Nancy Raab-Traub (52) Molecular Virology and Oncogenesis
*Howard M. Reisner (32) Immunogenetics of Human Plasma Proteins (Particularly IgG and Coagulant Factors VII and IX)
*R. Balfour Sartor (77) Etiology and Pathogenesis of Inflammatory Bowel Disease (Especially Crohn's Disease and Associated Extraintestinal Manifestations)
*Jonathan Serody (82) Transplantation and Tumor Immunology
*P. Frederick Sparling (18) Bacterial Pathogenesis, Molecular Biology of Bacterial Membranes

Lishan Su (71) Immune Development, Viral Pathogenesis
*Ronald Swanstrom (74) Molecular Biology and Pathogenesis of HIV
Jenny P. Ting (50) Molecular Immunology, Transcription, Signal Transduction, Apoptosis, Neuroimmunology, Transplantation
Roland Tisch (70) Immune Tolerance, T-Cell Antigen Recognition, T-Cell Mediated Autoimmunity, Tumor Antigen-Specific Genetic Vaccines, Type 1 Diabetes
*William J. Yount (25) Genetic Control of Antibody Response and Gamma Globulin Synthesis in Humans

Associate Professors

*Cornelus Beckers, Motility and Signal Transduction in Toxoplasma and Plasmodium
Miriam Braunstein (80) Bacterial Pathogenesis, Molecular Genetics, Tuberculosis
*Christina Burch, Experimental Studies of Evolution using Viruses
*Bruce Cairns (93) Immune Response to Injury, Cellular Immunology, Transplantation
Edward J. Collins (69) Immune Recognition, T-Cell Activation, Host-Pathogen Interactions
*Mark Heise (83) Molecular Genetics of Viral Pathogenesis
*Ilona Jaspers (106), Respiratory Viruses, Host Innate Defense in the Respiratory Mucosa, Virus-Host Cell Interaction, Epithelial-Immune Cell Interaction, Environmental Effects
Tal Kafri, Development of HIV-Based Vector for Gene Therapy, the Epigenetics of HIV and HIV-1 Vectors, the Basic Biology of Nonintegrating HIV-1 and HIV-1 Vectors
*Silva Markovic-Plese, Autoimmune Response in Multiple Sclerosis, New Immunomodulatory Therapies
Glenn Matsushima (68) Molecular Neuroimmunology, Innate Immunity
Raymond Pickles (86) Respiratory Viruses, Host Innate Defense in the Airway, Virus-Host Cell Interactions, Gene Therapy for Cystic Fibrosis and Other Lung Diseases
*Scott Plevy (92) Inflammatory Bowel Disease Research and Treatment
Barbara J. Vilen (78) Molecular Immunology, Signal Transduction, and B Cell Tolerance
*Jennifer Webster-Cyriaque (84) Oral Manifestations of Systemic Disease, Host-Virus Interactions, Viral Oncogenesis, Viral Pathogenesis during Immunosuppression, Signal Transduction, Cellular Biology, Gene Expression
Matthew C. Wolfgang (89) Microbial Pathogenesis, Bacterial Gene Regulation, Host-Pathogen Interactions

Assistant Professors

Kristina Abel (98) Neonatal/Pediatric Immunology; Pathogenesis of Infectious Diseases; HIV and Co-Infections
Edward Miao (107) Innate Immune Detection of Microbial Virulence
Cary Moody (103) Pathogenesis of Human Papillomaviruses
Nathaniel Moorman (104) Molecular Virology, Host Pathogen Interactions, HCMV Pathogenesis
Anthony Richardson (99) Bacterial Physiology and Pathogenesis
*Stefanie Sarantopoulos, Immunology
*Maureen Su, Autoimmune Polyendocrinopathy Syndrome Type 1, Chronic Inflammatory Demyelinating Polyneuropathy, Diabetes
Rita Tamayo (100) Microbial Pathogenesis, Bacterial Genetics, Bacterial Gene Regulation
*Teresa Tarrant, Leukocyte Trafficking, Kinase Regulation of Chemokine Receptors, Inflammatory Models of Autoimmunity and Cancer
Yisong Wan (103) Regulatory T Cell and TGF-Beta Signaling Controlled T Cell Function under Normal and Pathological Conditions
*Jason Whitmire, Viral Immunology, Memory T Cell Differentiation, Vaccines, Inflammation, Microbial Immunology

Research Professors

Nancy C. Fisher, Flow Cytometry
*Marcia M. Hobbs, Pathogenesis of Nonviral Sexually Transmitted Infections (Trichomonas vaginalis, Neisseria gonorrhoeae) and Molecular Diagnostics

Research Associate Professor

Ruth Silversmith, Bacterial Chemotaxis, Mechanisms of Phosphotransfer Reactions

Research Assistant Professors

W. June Brickey, Host Immune Responses, Radiation Injury, Expression Profiling
*Robert Maile, Cellular Immunology, Burn Immunology, Transplantation, T Cell Regulation, Bacterial and Viral Infectivity
Karen McKinnon, Dendritic Cell Induction of Tumor Specific CD4 and CD8 T Lymphocytes
Julie A.E. Nelson, Molecular Virology, HIV Evolution and Pathogenesis, HCV Co-Infection, HIV Assay Development
Bo Wang

Professors Emeriti

Kenneth F. Bott
Janne G. Cannon
William J. Cromartie
Marshall H. Edgell
Jeffrey A. Frelinger
Harry Gooder
Jean Handy
Eng Shang Huang
Clyde A. Hutchison III
Robert E. Johnston
David G. Klapper
John E. Newbold
John H. Schwab
Robert Twarog
** joint faculty members*

The Department of Microbiology and Immunology, an administrative division of the School of Medicine, is a unit of The Graduate School. It offers instruction leading to the doctor of philosophy degree. A terminal master of science degree is granted only under special conditions. The department is highly regarded in many scientific disciplines, including immunology, microbial pathogenesis, virology, infectious diseases, host/pathogen interactions, molecular genetics, prokaryotic and eukaryotic molecular and cellular biology, and cancer biology.. Research in the department is supported by funds from the University, the National Institutes of Health, the National Science Foundation, the American Cancer Society, and other private foundations and granting agencies.

For detailed information, visit the department's Web site at med.unc.edu/microimm.

Program of Study

As is the case for all graduate students in the basic science departments of the UNC School of Medicine, education during the first year is under the guidance of the interdisciplinary Biological and Biomedical Sciences Program (BBSP). Students rotate through three different research laboratories of their choosing in year one. For students interested in microbiology and immunology, recommended classroom courses include Immunobiology (MCRO 614), Virology (MCRO 630), Microbial Pathogenesis I (MCRO 635), and Microbial Pathogenesis II (MCRO 640).

Upon choosing a dissertation lab and joining the Department of Microbiology and Immunology, students are provided with an outstanding learning environment, an opportunity to conduct cutting-edge research, and most importantly, thorough preparation for a successful career in science. The Microbiology and Immunology Ph.D. program is designed to provide a foundation of fundamental knowledge in modern microbiology and immunology, foster critical scientific thinking, develop written and oral communication skills, allow students to gain teaching experience, and offer opportunities to travel and present posters or talks at national meetings. Specific components of the Microbiology and Immunology Ph.D. training program include:

Completion of six relevant courses, including two courses based directly on discussion of the primary literature (e.g. MCRO 710, MCRO 711, MCRO 712), is required. Students typically finish four of the six classes while in BBSP and the remainder during year two. There is no language requirement.

The Doctoral Preliminary Examination (typically at the end of year two) is a non-thesis research proposal in the format of an NIH grant application. Many students prepare by taking the MCRO 795 writing class in year two. The exam is intended to be an assessment of each student's ability to formulate an original and independent experimental approach and adequately express his or her ideas in writing.

The Doctoral Oral Preliminary Examination (typically at the start of year three) is an oral defense of the written research proposal. The oral exam provides an opportunity for students to demonstrate their ability to discuss the fields of science related to their proposal, as well as their ability to analyze problems and design experiments.

Students must regularly attend weekly student and departmental seminars beginning in year two and present their research annually in the student seminar series beginning in year three.

Students act as a Teaching Assistant for two semesters in department-approved courses, typically in years two and three.

Students form a dissertation committee in the middle of year three, obtain approval of their dissertation project, and meet annually with their committee to discuss research progress. Completion of sufficient original research for at least two first author papers in high-quality refereed journals is expected. At a minimum, authorship on at least two manuscripts (one accepted for publication), with peer reviews returned for at least one first-author research paper, is required. After writing a dissertation, students undergo a final oral examination and present their research in a public seminar. The Ph.D. degree is typically completed in five to six years.

Research Environment

The Department of Microbiology and Immunology consists of approximately60 faculty members with active research laboratories, 72 graduate students, 60 postdoctoral scientists, 50 research staff, and 7 administrative staff, who together form a highly interactive, friendly, and collaborative community.

The department has long occupied approximately 33,000 square feet of the Mary Ellen Jones Building. The department expects to move into the new Imaging Research Building, as well as renovated space in the Burnett-Womack building, in 2013/14. A significant number of faculty who hold primary appointments in the department have laboratories in the nearby Lineberger Comprehensive Cancer Center, as well as other departments within the Schools of Medicine and Public Health.

A wide variety of modern equipment is available in individual laboratories or shared by multiple users throughout the department. Well-equipped research laboratories are supplemented by specialized rooms dedicated to tissue culture, controlled temperature environments, BSL3 physical containment for research on microbial select agents, supervised animal care, etc. In addition, the University operates an extensive network of core facilities with major equipment and expert support staff, including flow cytometry, genomics, proteomics, oligonucleotide synthesis, DNA sequencing, X-ray crystallography, NMR, animal models (transgenic mouse and embryonic stem cell services), animal histopathology, bioinformatics, gene chips, confocal microscopy, electron microscopy, and mass spectrometry.

The department is fully supplied with high-speed Internet connections (both wired and wireless). University libraries provide electronic access to thousands of professional journals.

Admission

Students seeking admission to the Department of Microbiology and Immunology apply to BBSP, a common portal by which students interested in any of the 14 participating graduate programs begin their studies at UNC. To apply, visit www.med.unc.edu/bbsp and gradschool.unc.edu/admissions, fill out the online application, and select Microbiology and Immunology as your first choice of interest.

Financial Assistance

All Ph.D. students making satisfactory degree progress receive a stipend plus in-state tuition, fees, and health insurance. Funds are available from individual research grants, training grants, the department, and the University. Students are encouraged to apply for a pre-doctoral fellowship from the National Institute of Health, the National Science Foundation, or other organizations.

Courses for Graduate and Advanced Undergraduate Students

MCRO

515 Introduction to Microbiology (4). Open only to dental students. A course covering basic aspects of microbiology and immunology including sterilization, action of antimicrobial chemotherapeutic agents, concepts of infection and immunity, and the study of certain selected infectious agents.

614 Immunobiology (3). A strong background in molecular biology, eukaryotic genetics, and biochemistry is required. Advanced survey course with topics that include molecular recognition, genetic mechanisms of host resistance, development of cells and cell interactions; hypersensitivity, autoimmunity, and resistance to infection. Course material from textbook and primary literature.

630 Virology (3). Required preparation, coursework in molecular biology and cell biology. Current concepts of the chemistry, structure, replication, genetics, and the natural history of animal viruses and their host cells.

631 Advanced Molecular Biology I (BIOC 631, BIOL 631, GNET 631) (3). See GNET 631 for description.

632 Advanced Molecular Biology II (BIOC 632, BIOL 632, GNET 632) (3). See GNET 632 for description.

635 Microbial Pathogenesis I (3). Permission of the instructor. Required preparation, coursework in molecular biology and genetics. Topics will include aspects of basic bacteriology as well as bacterial and fungal pathogens and mechanisms of disease.

640 Microbial Pathogenesis II (3). Permission of the instructor or a fundamental understanding of molecular virology and immunology. Molecular pathogenesis, with a primary focus on viral pathogens. Additional topics include vaccines and genetics of host-pathogen interactions.

643 Cell Structure, Function, and Growth Control I (BIOC 643, CBIO 643, PHCO 643, PHYI 643) (3). See CBIO 643 for description.

644 Cell Structure, Function, and Growth Control II (BIOC 644, CBIO 644, PHCO 644, PHYI 644) (3). See CBIO 644 for description.

690 Special Topics in Microbiology or Immunology (1–21). Permission of the department except for department majors. Designed to introduce the student to research methods. Minor investigative problems are conducted with advice and guidance of the staff. Hours and credit to be arranged, any term. May be repeated for credit two or more semesters.

Courses for Graduates
MCRO

701 Seminar in Microbiology and Immunology (1). Faculty and student seminars on current research in microbiology and immunology..

702 Seminar in Microbiology (1). Seminar on selected topics in microbiology.

710 Seminar/Tutorial in Prokaryotic Molecular Biology (1–21). One or two faculty and a small number of students will consider current research of importance in depth. Emphasis is on current literature, invited speakers, etc., rather than textbooks.

711 Seminar/Tutorial in Animal Virology (1–21). One or two faculty and a small number of students consider current research of importance in depth. Emphasis is on current literature, invited speakers, etc., rather than textbooks.

712 Seminar/Tutorial in Immunology (1–21). One or two faculty and a small number of students consider current research of importance in depth. Emphasis is on current literature, invited speakers, etc., rather than textbooks.

790 Directed Readings in Prokaryotic Molecular Biology (1). Permission of the instructor or one prior prokaryotic molecular biology course. Directed readings in prokaryotic molecular biology under the direction of a member of the graduate faculty. May be repeated for credit.

791 Directed Readings in Virology (1). Permission of the instructor or one prior virology course. Directed readings in virology under the direction of a member of the graduate faculty. May be repeated for credit.

792 Directed Readings in Immunology (1). Permission of the instructor or one prior immunology course. Directed readings in immunology under the direction of a member of the graduate faculty. May be repeated for credit.

795 Research Concepts (2). Permission of the instructor. This course will provide multiple opportunities for the student to write parts of hypothesis-based proposals, receive substantial feedback, and to rewrite the text. There will be approximately twelve single-page writing assignments.

901 Research in Microbiology or Immunology (1–21). Permission of the department. Designed to introduce the student to research methods and special techniques. Short-term problems are conducted with the advice and guidance of the staff. May be repeated for credit.

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Department of Music

music.unc.edu
MARK KATZ, *Chair*
Annegret Fauser, *Associate Chair for Academic Studies*
David Garcia, *Director of Graduate Studies*
Mark Evan Bonds, *Director of Graduate Admissions*

Professors
Allen Anderson (4) Music Theory
Mark Evan Bonds (6) Late 18th- and 19th-Century Music, Aesthetics
Tim Carter (3) Late 16th- and 17th-Century Music, Music and Theater, Analysis, American Musical Theater
Annegret Fauser (7) 19th- and 20th-Century Music, France, America, Women's and Gender Studies, Cultural Studies
Mark Katz (11) 20th- and 21st-Century Music, Music Technology, Popular Music, American Music
Stefan Litwin (9) 20th-Century Music, Performance Practices
John L. Nádas (57) Late Medieval Music, Italian Opera
Severine Neff (12) 20th-Century Music and Theory

Associate Professors
David Garcia (10) Latin American Music, African Diaspora, Popular Music, Critical Theory
Anne MacNeil (8) 16th- and 17th-Century Music, Music and Theater, Gender Studies, Historiography
Jocelyn Neal (5) 20th-Century Theory, Popular Music

Adjunct Associate Professor
Philip Vandermeer (15) Traditional and American Popular Music

Assistant Professors
Andrea Bohlman () East Central Europe, Sound Studies, Music Technology, Activism
Chérie Rivers Ndaliko (25) Music and Media, Conflict and Social/Political Change, African Expressive Culture, Film Scoring

Degrees
The department offers the degrees of master of arts (M.A.) in musicology and the doctor of philosophy (Ph.D.) in musicology, construing "musicology" in its broad sense to encompass the interrelated disciplines of music history, music theory, ethnomusicology, and studies of popular culture.

Special Facilities
Central to the departmental resources is the Music Library, which ranks high among the nation's music libraries for its scholarly editions, periodicals, early source materials, iconographic aids, microfilms, folk-music collections, and recordings. In addition, the Southern Folklife Collection is one of the nation's foremost archival resources for the study of American folk music and popular culture. SFC holdings extensively document all forms of southern musical and oral traditions across the entire spectrum of individual and community expressive arts, as well as mainstream media production.

Prerequisites for Degree Programs
The usual prerequisite for admission to graduate work leading to the M.A. and Ph.D. degrees is a bachelor of arts degree with a major in music, or a bachelor of music degree, comparable to those given at this university. All applicants for graduate study in music are required to take the departmental diagnostic exam and the verbal and quantitative aptitude tests of the Graduate Record Examination (GRE). The GRE should be taken early enough for the scores to be submitted with the application for admission, preferably in the summer or fall preceding

application for admission. Applicants for the M.A. or the Ph.D. program must also submit with their application samples of their recent writing on musical subjects.

Language and Course Requirements, Examinations

M.A. candidates must either pass an approved language proficiency test for or complete the fourth semester of the undergraduate language sequence in one modern foreign language at UNC–Chapel Hill with a grade of B or better. Ph.D. candidates must demonstrate proficiency in a second foreign language in one of the two ways described above. M.A. candidates must fulfill departmental theory proficiency requirements by examination, or by completing a series of specified undergraduate courses in the department with a grade of B or better. Students entering the Ph.D. program with a completed M.A. from another institution must also meet these theory requirements as early in their course of study in the department as possible, and in any event, before they can advance to candidacy for the Ph.D.

MUSC 750 (Resources and Methods in Musicology) is required of all M.A. students in their first semester, as is MUSC 992 (Master's Thesis) in the fourth semester. Other courses are drawn from a range of offerings comprising proseminars (repertory-, method-, or issue-based studies) and seminars (on more precise topics normally requiring significant research on primary sources). Graduate students have the option to include courses from other departments that may be organized as a formal minor (nine hours for the M.A., 15 for the Ph.D.) or as a supporting program. Courses taken outside the department must be approved in advance by the director of graduate studies in music and by the departments concerned as directly relevant to a proposed course of study.

M.A. candidates take courses totaling 30 credit hours and write a thesis that is a revision and expansion of a paper prepared for a graduate seminar taken in the music department. All candidates for a master's degree take a final oral examination covering course work; a final written examination is not given.

Students entering with an equivalent M.A. from another institution are required to take MUSC 750 (Resources and Methods in Musicology) in their first semester, in addition to five proseminars or seminars in the department at the graduate level during their first, probationary year.

At the beginning of each spring semester a qualifying examination is given to those who wish to proceed to the Ph.D. program after gaining the M.A. Students already in the department's M.A. program take the examination in the second year. Those who received the M.A. at another institution must take the examination in the spring of their first year of study.

Following the completion of an additional 12 hours of seminars above the 30 hours required for the M.A., Ph.D. students take a written examination in an area of specialization to be determined through consultation with the faculty and director of graduate studies in music. In the sixth semester of study (fourth semester for those with a M.A. from another institution), Ph.D. students must meet the second language requirement and take an oral examination on a proposed dissertation topic. They then register for at least two semesters of MUSC 994 (Doctoral Dissertation) and MUSC 994's co-requisite MUSC 991 (Dissertation Colloquium), complete the dissertation, and undergo a second oral examination in its defense.

More detailed explanation of these requirements appears in the Music Department's *Graduate Handbook* (music.unc.edu/graduate/grad_degree_info/handbook).

Fellowships, Assistantships and Other Student Aid

In addition to campus-wide grants (discussed elsewhere in this Record), assistantships and special grants are available to selected graduate students in music. The deadline for all graduate applications is in December; a separate application for aid is not necessary but may be indicated on the general application form for admission to The Graduate School. Selected applicants are nominated for University-wide awards that range from $16,000 to $22,000. Teaching assistantships may be awarded by the department; these awards average $18,000 and usually include tuition remission for out-of-state students, payment of in-state tuition and other benefits.

Courses for Graduate and Advanced Undergraduate Students

MUSC

471 Instrumental Performance Repertory (3). Available to MAT students only. Advanced study of selected performance issues.

691H Senior Honors Thesis in Music I (3). Admission by permission of the honors advisor to students with a cumulative grade point average of 3.5 or higher. Independent study by a student who has been designated a candidate for undergraduate honors in music.

692H Senior Honors Thesis in Music II (3). Prerequisite MUSC 691H. Continuance and completion of an honors thesis in music.

Courses for Graduate Students

MUSC

750 Resources and Methods of Musicology I (3). Introduction to the field of musicology, including its scope, methodology, and bibliography. Taught in three-week modules, each directed by a different member of the academic faculty. Individual modules will include music history, music theory, ethnomusicology, music aesthetics, and cultural studies.

751 Resources and Methods of Musicology II (3). When offered, continuation of MUSC 750.

830 Proseminar in Music Theory (3).

850 Proseminar in Musicology (3).

870 Proseminar in Ethnomusicology (3).

890 Special Studies (3). The faculty assists and advises graduate students in work on particular research projects. Available to musicology graduate students only. (M.A.T. students taking special studies must register under MUSC 471.)

930 Seminar in Music Theory (3).

950 Seminar in Musicology (3).

970 Seminar in Ethnomusicology (3).

991 Dissertation Colloquium (1.5). Co-requisite, MUSC 994. Forum for group discussion of on-going dissertation work and professional development.

992 Master's Thesis (3).

994 Doctoral Dissertation (3). Co-requisite, MUSC 991.

Curriculum in Neurobiology

www.med.unc.edu/neurobiology
WILLIAM SNIDER, *Director*
ALDO RUSTIONI, *Co-Director*

Professors

Eva Anton, Molecular Analysis of Neuronal Migration and Layer Formation in Cerebral Cortex
Aysenil Belger, Cortical Circuits Underlying Attention and Executive Function in the Human Brain
George R. Breese (2) Cellular and Molecular Neurobiology, Neuropharmacology, Alcoholism, Neuroplasticity, Transcription Factors, RT/PCR Developmental Disorders, Neuropsychiatric Disorders
Regina M. Carelli (142) Behavioral Neurophysiology, Neurobiology of Drug Abuse, Brain Reward Systems
Richard E. Cheney (136) Molecular Motors in the Nervous System, Cellular and Molecular Neurobiology of the Cytoskeleton
Fulton T. Crews (133) Molecular Aspects of Neuronal Vitality and Alcohol
Stephen T. Crews (129) Molecular Genetics of Drosophila Nervous System Development, Control of Neural Gene Regulation
Serena Dudek, Connections in the Brain (Synapses) Change in Response to Activity, How Synaptic Plasticity During Early Postnatal Development is Different from Plasticity in the Adult
Linda Dykstra (51) Behavioral Pharmacology, Opioid Analgesics, Opioid/Immune Interactions
John H. Gilmore (137) Human Brain Development, Immune Regulation of Neurodevelopment, Schizophrenia
Kelly Giovanello, Exploring the Cognitive and Neural Processes Mediating Memory in Young Adults and Specifying How These Processes Change with Healthy Aging and Neurodegenerative Disease
Susan Girdler, Women's Health, Neuroendocrine Dysregulation in Premenstrual Dysphoric Disorder (PMDD)
Michael F. Goy (111) Biochemistry and Physiology of Excitable Cells, Synapse Formation, Second Messenger Mechanisms in Signal Transduction, Epithelial Biology
Klaus Hahn, To Understand Cell Behaviors Mediated by Structural Dynamics
T. Kendall Harden (59) G-proteins, Phospholipase C, and Receptor-Mediated Regulation of Second Messenger Signaling; P2-purinergic Receptors
Clyde W. Hodge (150) Neurobehavioral Pharmacology and Pharmacogenomics of Addiction
Donald T. Lysle (122) Neuroimmunology, Learning Processes
William Maixner (112) Pain Mechanisms and Analgesia
Patricia F. Maness (90) Cell Adhesion and Signal Transduction in Developing Neurons
Paul B. Manis (151) Cellular Basis of Auditory Information Processing in Brainstem and Cortex
Greg Matera, Genetics and Cell Biology of RNP Assembly and Transport
Glenn Matsushima, The Responses of Macrophages during Injury to the Central Nervous System and during Inflammation after Insult by Bacterial Pathogens
Ken D. McCarthy (77) Neuronal-Glial Interactions Studied in Hippocampal Brain Slices Using Electrophysiology, Confocal Imaging, and Conditional Gene Knockout Mice
Rick B. Meeker (107) Neuroendocrine Regulation, Glutamate Receptors, Mechanisms of AIDS Dementia
A. Leslie Morrow (121) Molecular Neurobiology of GABAA Receptors and Alcoholism
Robert A. Nicholas (147) Signaling and Targeting Pathways of P2Y Nucleotide Receptors
Mark Peifer, Cell Adhesion, Signal Transduction, and Cytoskeletal Regulation in Development and Disease
Joseph Piven, Pathogenesis of Autism including Neural Mechanisms, Genetic Basis and Neuropsychological and Behavioral Phenotype
Bryan Roth, GPCR Structure and Function, Drug Discovery
Richard J. Samulski (135) Development of Viral Vectors for Brain Specific Gene Delivery
Richard Segal, Spatial Organization and Plasticity of Lower Limb Muscle Activity
William D. Snider (148) Developmental Regulation of Neuronal Growth Factors
Jenny P. Ting (105) Use of Murine Models to Study the Role and Regulation of Inflammatory Genes in Demyelination and Remyelination
Todd Thiele, Neurobiology of Alcoholism
Alex Tropsha, Methodologies and Software Tools for Computer-Assisted Drug Design
Richard Weinberg, Supramolecular Organization of the Postsynaptic Density, Calcium Sources and Actin-Binding Proteins in Spines
R. Mark Wightman (118) Neurotransmitters, Dopamine Reward Exocytosis, Neurochemistry

Associate Professors

James Bear, Actin-Based Cell Motility
Jay Brenman, Neuronal Dendrite and Axon Morphologies
Sabrina Burmeister, Mechanisms and Evolution of Social Behavior by Studying Communication in Frogs
Mohanish Deshmukh, Neuronal Apoptosis, the Mechanisms by Which Different Cells Regulate Apoptosis
Joseph Hopfinger, Investigation of Attention Mechanisms in the Brain Using the Methods of Event-Related Potential (ERP) Recording, Eye-Tracking, and Functional Magnetic Resonance Imaging (FMRI)
Josephine Johns, Behavioral Pharmacology, Toxicology, Teratology, Neuroendocrinology
Rita Fuchs-Lokensgard, Associative Learning and Memory in Cue-Induced Relapse to Drug Seeking
Carl J. Malanga, Child Neurology, Movement Disorders
Silva Markovic-Plese, Autoimmune Response in MS, New Immunomodulatory Therapies
Benjamin Philpot, Modification of the Cerebral Cortex by Sensory Experience
Keith Sockman, Using Birds, Study of the Ultimate and Proximate Mechanisms for Reproductive Flexibility
Ellen R. Weiss (144) Regulation of G Protein Signaling Pathways, Visual Signal Transduction
Kirk Wilhelmsen, The Genetic Mapping of Susceptibility Loci for Complex Neurological Diseases, Development of Large-Scale Automated Gene Mapping Technologies to Facilitate These Mapping Efforts
Mark Zylka, Molecules and Mechanisms for Pain

Assistant Professors

Charlotte Boettiger, Determining the Cognitive Effects of Addiction Treatments and the Brain Mechanisms of Such Effects
Andrea Nackley, Pain Neurobiology and Genetics
Joyce Besheer, Neurobiological Mechanisms Underlying Alcoholism and Addiction
Gabriel Dichter, Understanding and Improving Treatments for Neurodevelopmental and Neuropsychiatric Disorders
Flavio Frohlich, Combining Electrophysiology, Computational

Modeling, and Engineering Principles to Investigate How Cortical Networks Generate Physiological and Pathological Activity States
Tim Gershon, Regulation of Neural Progenitor Proliferation in Normal Development and in Pediatric Brain Tumors
Stephanie Gupton, Coordination and Regulation of Cytoskeletal Dynamics and Membrane Trafficking that Underlie Cell Shape Change and Cell Motility during Both Development and Cancer Metastasis
Tom Kash, Synaptic Transmission and Plasticity
Rebecca Knickmeyer-Santelli, Understanding the Mechanisms which Modulate the Differential Vulnerability to and Expression of Neurodevelopmental Disorders in Each Sex with a Particular Focus on Hormonal and Genetic Factors
Ryan Miller, Characterization of the Molecular Genetic Mechanisms Responsible for This Heterogeneity Using Tumor Tissues
Donita Robinson, Chemistry and Physiology of the Nucleus Accumbens
Yen-Yu Ian Shih, Developing and Applying Innovative Magnetic Resonance Imaging (MRI) Technologies to Study Neurovascular Functions in the Brain and the Eye, with an Ultimate Goal of Translating Preclinical Indications to Successful Clinical Development
Spencer Smith, Neural Circuitry and How it Changes Moment-to-Moment, as Well as Over a Lifetime, Using Imaging, Electrophysiology, and Behavior
Garret Stuber, Elucidating the Synaptic Mechanisms That Underlie Storage and Expression of Learned Association in Models of Psychiatric Disorders
Lisa Tarantino
Ann Marion Taylor, Micro-Scale Devices, Microfluidics, Synapse Formation, Synaptic Plasticity, Protein Synthesis
Doug Fitzpatrick, Sound Localization Pathways

The Curriculum in Neurobiology at the University of North Carolina at Chapel Hill is a broadly-based interdisciplinary graduate training program in the neurosciences. With 80 active faculty, strong research funding, and a long and successful training history, the Curriculum ranks among the best programs in the country.

Our program has 70 primary faculty members who can serve as dissertation advisors. Research opportunities in the curriculum are supported by the presence of an active neuroscience community at UNC–Chapel Hill. This community includes members of every basic science department in the School of Medicine, members of many clinical departments, as well as several departments in the Arts and Sciences. University research and clinical centers with a neuroscience component also contribute to the vibrant and active community that makes Neurobiology a major intellectual focus at UNC–Chapel Hill.

The Neurobiology Curriculum has an average of 45 students at different levels of training at any given time; typically 5–8 students are accepted each year depending on available funding. Students in the Curriculum are supported during their first 1–2 years by a long-standing training grant funded through NINDS and NIMH, and in subsequent years by either their mentor's research grants or individual fellowships. The average time to graduation is 5.3 years.

Neuroscience is by its very nature an interdisciplinary endeavor, and at UNC–Chapel Hill the Curriculum in Neurobiology provides a broadly structured training curriculum and research environment that spans the range from genetic studies of the nervous system through the complexities of human cognitive function

Applicants are urged to complete their applications through BBSP by early December.

www.med.unc.edu/bbsp/apply.html?searchterm=bbsp

Courses required for the Ph.D. degree in neurobiology include:

I. NBIO 722A, 722B, 722C, 723A, 723B, 723C

***Block 1* — Introduction / Electrical Signaling (NBIO 722A) (18 sessions).** This first half of this block introduces such topics as brain cell biology, molecular biology applied to neurons, membrane potentials and imaging methods. The second half of this block introduces such topics as resistance, capacitance, passive membranes, classes of ion channels, potassium and calcium channels and action potential initiation. Fall. *Pevny, Hutton, Street, Ghuksyan, Robinson, Newbern, Brenman, Sealock, Stuber, and Manis.

***Block 2* — Postsynaptic Mechanisms- Receptors (NBIO 722B) (10 sessions).** This block covers such topics as cell and G Protein signaling, ligand binding, GABA-gated ion chanels, neurotransmitter receptor trafficking and dopamine release and receptors. Fall. *Manis, Brenman, Harden, Nicholas, Weiss, Robinson, Kash, Stuber, and McElligott.

***Block 3* — Synaptic Mechanisms and Intracellular Signaling (NBIO 722C) (10 sessions).** This block introduces calcium signaling, electrophysiological analysis and molecular mechanisms of neurotransmitter release, synaptic plasticity and expression and maintenance of LTP and LTD. Fall. *Philpot, Carelli, Kash, McCarthy, Wightman, and Stuber.

***Block 4* — Development of the Nervous System (NBIO 723A) (11 sessions).** This block covers neural induction, neural stem cells, glial development, neural cell death and neurotrophin during development and synaptic adhesion molecules. Spring. *Crews, Maness, Anton, Deshmukh, and Stuber.

***Block 5* — CNS: Anatomy and Function of Sensory and Motor Systems (NBIO 723B) (17 sessions).** This block introduces the sensory pathways of vision, audition, taste, olfaction, pain, and touch, as well as the motor pathways of the spinal cord, basal ganglia, cerebellum, and motor cortex. Mechanisms of sensory information processing and motor execution are discussed. The section includes peripheral and central mechanisms of pain. Spring. *Zylka, Manis, Fitzpatrick, Philpot, Segal, Shoemaker, Stuber and Weiss.

***Block 6* —Imaging and Disease (NBIO 723C) (12 sessions).** This block covers CNS imaging, regeneration, and such diseases as Alzheimer's, ALS, Parkinson's, epilepsy, addiction, autism and schizophrenia. Spring. *Snider, Manis, Boettiger, Gilmore, Frohlich, McNamara, Stuber and Piven.

**denotes block head*

II. Communicating Scientifics Results Seminar in Neurobiology (NBIO 850)

This class employs faculty coaching and peer critiquing to develop students' skills in speaking and writing about science with ease, clarity, and precision. The class aims to build self-confidence and the ability to take criticism without defensiveness. It meets once a week for 1.25 hours for both semesters. Students take this course for two semesters; second-year students are paired with first-year students as mentors, as rehearsal partners, and as editing partners for written assignments. The class size is approximately 16 students. Each session is coached by two faculty members, Ann Stuart and an invited neurobiology or cell and molecular physiology faculty member. Thus, the class also provides a mechanism for expanded student-faculty bonding, reinforced by a social event at the end of each semester.

Two elective specialty courses and three research apprenticeships (via BBSP) in different laboratories fulfill the course requirement. The courses menu lists descriptions of these core courses of the Neurobiology Curriculum; other selected offerings are shown under the "Electives." Additional elective courses in biochemistry, statistics, molecular biology,

physiology, etc., are available to compensate for specific deficiencies or enhance training. It is the current philosophy of the curriculum faculty that students should receive a broad exposure to as many aspects of neuroscience as reasonable, from molecules and genetics through systems, behavior, and human diseases of the nervous system.

The following is a partial list of courses that neurobiology students may consider for their elective requirements. Please see the relevant section of this publication for current detailed course descriptions. Fall and Spring. Goy

Special Topics in Neurobiology: Microscopy and Imaging in Neurobiology (NBIO 890)

Special Topics in Neurobiology: The Methods in Genetic Engineering (NBIO 890-002)

Special Topics in Neurobiology: Network Neuroscience (NBIO 890-003)

Developmental Neurobiology (NBIO 724)

Neural Information Processing (NBIO 729)

Clinical Syndromes and Neurodevelopmental Disorders (NBIO 801)

Gene-Brain-Behavior Interactions in Neurodevelopmental Disorders: Towards an Integration of Perspectives on Disease Mechanisms (NBIO 800)

Biological Bases of Behavior I (PSYC 701)

Biological Bases of Behavior II (PSYC 702)

Translational Seminar in Cognitive and Clinical Neuroscience (NBIO 727)

Seminar in Neurobiology: Principles of Brain Evolution (BIOL 850)

Neuropharmacology of Alcohol and Substance Abuse (PHCO 728)

Developmental Genetics (BIOL 624)

Principles of Statistics Infer (BIOS 600)

Applied Biostatistics (PHCO 750)

Research Ethics (GRAD 721)

Developmental Toxicology and Teratology (CBIO 423)

Studies in Oral Biology (OBIO 732)

Clinical Psychopharmacology (PSYC 707)

Behavioral Pharmacology (NBIO 705)

Seminar in the Biological Foundations of Psychology (PSYC 708)

Special Readings in Psychology (PSYC 791)

Statistical Methods in Psychology (PSYC 830)

Courses for Graduate and Advanced Undergraduate Students

NBIO

400 Conditioning and Learning (PSYC 400) (3). See PSYC 400 for description.

401 Animal Behavior (PSYC 401) (3). See PSYC 401 for description.

402 Advanced Biopsychology (PSYC 402) (3). See PSYC 402 for description.

411 Neurobiology Laboratory Apprenticeship (1–21). Permission of the department. A laboratory-tutorial course to acquaint the student with methods used in several areas of neurobiology.

412 Neurobiology Laboratory Apprenticeship (1–21). Permission of the department. A laboratory-tutorial course to acquaint the student with methods used in several areas of neurobiology.

450 Tutorial in Neurobiology (3). Permission of the instructor. A tutorial in selected topics in neurobiology tailored to meet interests of the students and competencies of instructors.

Courses for Graduate Students

NBIO

701A Behavior and its Biological Bases I (PSYC 701) (3). See PSYC 701 for description.

702A Behavior and Its Biological Bases II (PSYC 702) (3). See PSYC 702 for description.

703 Advanced Biological Psychology: Central Nervous System (PSYC 703) (3). See PSYC 703 for description.

704 Applications of Experimental Psychology to Health Research (PSYC 704) (3). See PSYC 704 for description.

705 Behavioral Pharmacology (PSYC 705, PHCO 705) (3). See PSYC 705 for description.

708 Seminar in the Biological Foundations of Psychology (PSYC 708) (3). See PSYC 708 for description.

710 Medical Neurobiology (PHYI 710) (3). See PHYI 710 for description.

722A Cellular and Molecular Neurobiology: Introduction and Electrical Signaling (BIOC 722A, PHCO 722A, PHYI 722A) (2). Permission of the department. Introduces topics as brain cell biology, molecular biology applied to neurons, membrane potentials and imaging methods. The second half of this block introduces such topics as resistance, capacitance, passive membranes, classes of ion channels, potassium and calcium channels, and action potential initiation.

722B Cellular and Molecular Neurobiology: Postsynaptic Mechanisms-Receptors (BIOC 722B, PHCO 722B, PHYI 722B) (2). Permission of the department. Consideration of membrane receptor molecules activated by neurotransmitters in the nervous system with emphasis on ligand binding behavior and molecular and functional properties of different classes of receptors. Course meets for four weeks with six lecture hours per week.

722C Cellular and Molecular Neurobiology: Synaptic Mechanisms & Intracellular Signaling (BIOC 722C, PHCO 722C, PHYI 722C) (2). Permission of the department. Explores biochemical signal transduction events following activation of neurotransmitter receptors including G-protein coupling, desensitization, signaling specificity, downstream effectors, calcium signaling, and tyrosine kinases. Course meets for five weeks with six lecture hours per week.

723A Cellular and Molecular Neurobiology: Development of the Nervous System (BIOC 723A, PHCO 723A, PHYI 723A) (2). Permission of the department. This block covers neural induction, neural stem cells, glial development, neural cell death and neurotrophin during development, and synaptic adhesion molecules.

723B Cellular and Molecular Neurobiology: Anatomy and Function of Sensory and Motor Systems (BIOC 723B, PHCO 723B, PHYI 723B) (2). Permission of the department. This block introduces the sensory pathways of vision, audition, taste, olfaction, pain, and touch, as well as the motor pathways of the spinal cord, basal ganglia, cerebellum, and motor cortex. Discusses mechanisms of sensory information processing and motor execution. Includes peripheral and central mechanisms of pain.

723C Cellular and Molecular Neurobiology: Imaging & Disease (2). This block covers CNS imaging, regeneration, and such diseases as Alzheimer's, ALS, Parkinson's, epilepsy, addiction, autism, and schizophrenia..

724 Developmental Neurobiology (PHYI 724) (3). See PHYI 724 for description.

725 Experimental Neurophysiology (3). Permission of the instructor. Six or more laboratory hours a week.

727 Translational Seminar in Cognitive and Clinical Neuroscience (2). Introduces new neuroimaging techniques and their application to the study of neural correlates of cognitive and behavioral impairments in brain disorders. Reviews the theories and research methodologies that investigate how brain functions support and give rise to mental operations such as attention, memory, emotions, social cognition in the healthy brain.

728 Diseases of the Nervous System (2). Prerequisites, NBIO 201, or 222 and 223. Explores the basic neurobiology and the clinical aspects of a range of diseases of the nervous system, including ALS, Alzheimer's, autism, schizophrenia, multiple sclerosis, deafness, epilepsy, pain, brain tumors, stroke, Parkinson's and other neurodegenerative diseases.

729 Sensory Neural Information Processing and Representation (3). Prerequisites, NBIO 722 and 733. Additional required preparation, one year of calculus, familiarity with MATLAB or Python, or permission of the instructor. A discussion/reading seminar covering the fundamentals of nervous system information processing and integration, with examples from sensory systems.

735 Seminar in Chemical Neurobiology (2). Required preparation, two semesters of biochemistry.

800 Gene-Brain-Behavior Interactions in Neurodevelopmental Disorders: Perspectives on Disease Mechanisms (1-5). This seminar examines the topics of genetics, neuroanatomy, physiology, and behavioral development to provide a broad-based and integrated background to understand the etiology and potential mechanism underlying neurodevelopmental disorders.

801 Clinical Syndromes and Neurodevelopmental Disorders (1-5). This seminar will review the epidemiology, pathogenesis, diagnosis and treatment of neurodevelopmental syndromes and disorders. Topics will range from single gene (e.g. fragile X syndrome and tuberous sclerosis) to complex genetic (e.g., autism, schizophrenia), to environmental disorders with varied phenotypes, pathogenetic mechanisms, and treatments.

824 Pain and Somatic Sensation (PHYI 824) (1–21). See PHYI 824 for description.

850 Seminar in Neurobiology (BIOL 850, PHYI 850, PHCO 850) (3). Permission of the department. An intensive consideration of selected topics and problems in neurobiology. The course focuses on the development of presentation and evaluation skills of the trainees. Six credit hours required for neurobiology graduates.

857 Seminar in Comparative Animal Behavior (BIOL 857) (1-2). See BIOL 857 for description.

858 Seminar in Comparative Physiology (BIOL 858) (1-2). See BIOL 858 for description.

890 Special Topics in Neurobiology (1-5). Special topics in neurobiology. Content will vary from semester to semester.

891 Special Topics in Physiology (PHYI 712A) (1–5). See PHYI 712A for description.

892 Special Topics in Physiology (PHYI 712B) (1–5). Permission of the instructor. Individually arranged in-depth programs of selected topics such as membrane function, transport physiology, renal physiology, etc.

951 Research in Neurobiology (BIOL 951, PHCO 951, PHYI 951) (3–12). Permission of the department. Research in various aspects of neurobiology. Six to 24 hours a week.

993 Master's Thesis (3–9). Course is designed to certify that the students have achieved a high level of knowledge competence in clinical and basic neurosciences, without the rigorous research experience required of a Ph.D.

994 Doctoral Dissertation (3–9).

School of Nursing

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KRISTEN M. SWANSON (5) *Dean*
Gwen Sherwood (33) *Associate Dean for Academic Affairs*
Jennifer D'Auria (85) *Director of Master's Programs*
Suzanne Thoyre (45) *Director of Ph.D. and Postdoctoral Programs*
Debra Barksdale (122) *Director of Doctor of Nursing Practice Program*

Distinguished Professors
Linda Beeber (109) Health Care Environments
Linda R. Cronenwett (105) Health Care Environments
Kathleen Knafl (48) Research Division
Barbara Mark (124) Health Care Environments
Merle Mishel (82) Adult and Geriatric Health
Marilynn Oermann (36) Adult and Geriatric Health
Mary H. Palmer (6) Adult and Geriatric Health
Margarete Sandelowski (64) Family Health
Sheila Santacroce (51) Family Health
Mi-Kyung Song (22) Adult and Geriatric Health

Professors
Catherine I. Fogel (4) Family Health
Sandra G. Funk (32) Research Division
Donna Havens (123) Health Care Environments
George Knafl (47) Research Division
Mary Lynn (84) Health Care Environments
Gwen Sherwood (33) Adult and Geriatric Health
Marcia Van Riper (120) Family Health

Associate Professors
Debra Barksdale (122) Family Health
Diane Berry (130) Adult and Geriatric Health
Barbara Carlson (113) Adult and Geriatric Health
Jennifer D'Auria (85) Family Health
Jill Hamilton (15) Adult and Geriatric Health
Edward Halloran (79) Health Care Environments
Cheryl Jones (112) Health Care Environments
Shawn Kneipp (134) Health Care Environments
Deborah Mayer (28) Adult and Geriatric Health
Virginia J. Neelon (13) Adult and Geriatric Health
Pamela Rowsey (44) Adult and Geriatric Health
Suzanne Thoyre (45) Family Health
SeonAe Yeo (108) Family Health

Assistant Professors
Anna Beeber (14) Adult and Geriatric Health
Beth Black (42) Family Health

Cheryl Giscombe (31) Adult and Geriatric Health
Eric Hodges (16) Family Health
Coretta Jenerette (39) Adult and Geriatric Health
Jennifer Leeman (133) Health Care Environments
Lixin Song (56) Adult and Geriatric Health
Theresa Swift-Scanlan (30) Adult and Geriatric Health
Debbie Travers (38) Health Care Environments
Jia-Rong Wu (Research) Adult and Geriatric Health

Emeriti Faculty

Eleanor M. Browning
Barbara Bunker
Margaret E. Campbell
Jo Ann Dalton
Molly C. Dougherty
Margery Duffey
Cynthia M. Freund
Barbara Germino
Joanne Harrell
Carol C. Hogue
Margaret F. Hudson
Diane Kjervik
Betty H. Landsberger
Patricia Lawrence
Margaret Miles
Nancy Milio
Helen M. Murphy
Susan Pierce
Barbara C. Rynerson
Anne Skelly
Ingrid Swenson
Eleanor Taggart

Master of Science in Nursing

The Master of Science in nursing (M.S.N.) program prepares nurses for advanced practice nursing focused on direct patient care or as advanced specialists in health care systems

Length of Program

The program of study varies from 32 to 46 credits of academic course work including clinical practice, a professional portfolio as a substitute for the oral comprehensive examination, and a master's paper (or in some cases, a thesis). Students may pursue the M.S.N. degree on a full-time or part-time basis.

Master's Program Curriculum

The curriculum consists of four components: the professional core, the research core, the clinical core, and the advanced nursing practice core courses. The professional core courses (NURS 646, NURS 647) and research core courses (NURS 778, NURS 779, NURS 992 or 993) are required of most M.S.N. students. The clinical core courses and advanced practice area courses focus on the student's selected area of specialization and role preparation.

The program options offered reflect a combination of current practice trends as well as available faculty resources. . In some advanced practice specialty areas, electives in nursing or other disciplines or courses to support a focus area are required. Each student is admitted to a specific advanced practice area and assigned a faculty advisor to design a program of study that is appropriate to the student's educational and career goals. Upon completion of the program, students are eligible to sit for national certification examinations appropriate to their advanced area of preparation.

The current advanced practice nursing population foci include adult/gerontology nurse practitioner, family nurse practitioner, pediatric nurse practitioner/primary care, and psychiatric-mental health nursing nurse practitioner. The advanced specialties in health care systems include administration, clinical nurse leader, education, informatics, and outcomes management. The M.S.N. program also includes advanced practice courses in adult oncology. M.S.N. students may elect to take these offerings as electives or declare an oncology focus in addition to their primary population of interest. For students in the health care systems informatics option, dual M.S.N./M.S.I.S. and M.S.N./M.S.L.S. degree options are available through the School of Nursing and the School of Information and Library Science.

Doctor of Philosophy in Nursing

The Ph.D. program of the University of North Carolina at Chapel Hill is grounded in our commitment to enhancing the health of individuals, families and communities, increasing the effectiveness of health care systems, and furthering the translation of research into practice. Graduates of the program are prepared to advance the theoretical and empirical underpinnings of nursing science, engage in interdisciplinary inquiry, and disseminate knowledge. The Ph.D. curriculum reflects the goals of the National Institutes of Health to foster discovery and increase the knowledge base for improving the health of all populations and to reduce health disparities. The program emphasizes the integration of the biological and behavioral sciences, the development and testing of evidence-based, theoretically grounded interventions, and the improvement of health care quality and outcomes. Faculty research addresses three areas of emphasis: enhancing health in vulnerable populations, managing chronic health problems, and strengthening health care systems. Students work closely with internationally renowned faculty from nursing and other disciplines to develop the skills and expertise needed to launch their program of research and pursue a successful career in academic and health care settings.

Length of Ph.D. Program

The Ph.D. program of study is a minimum of 50 credits of academic coursework including a qualifying examination and a dissertation. Students may pursue the Ph.D. degree on a full-time or part-time basis.

Ph.D. Program Curriculum

The curriculum in the School of Nursing includes the following components: coursework, a written qualifying exam, and the dissertation. The program of study for students incorporates both required and menu-driven courses distributed as follows: core knowledge and competencies (16 credits); research methods (13 credits); elective courses in the student's substantive area or courses that support the development of methods or additional research practicum (9 credits); courses from a secondary area of concentration outside of Nursing (6 credits); and a minimum of 6 dissertation credits.

Doctor of Nursing Practice

The doctor of nursing practice (DNP) program prepares nurses for the highest level of advanced practice nursing focused on direct patient care (e.g. nurse practitioner, clinical nurse specialist) or as advanced specialists in health care systems (e.g. administration, outcomes).

Length of Program

The program has a minimum of 68 credits hours for those with baccalaureate preparation and 37 credits hours for those with MSN preparation in certain practice areas. The program includes academic course work, clinical practice, a comprehensive examination, and a practice-focused scholarly project. Students may pursue the DNP degree on a full-time or part-time basis.

DNP Program Curriculum

The DNP program of study builds upon baccalaureate education and expands current MSN education to prepare nurses for clinical leadership and advanced practice. Graduates of the DNP program receive preparation in such key areas as evidence-based practice, scientific inquiry, organization and systems leadership, finance, health policy, information technology, population health, quality improvement, patient safety, and translational research with the goal of improving patient and population health status and outcomes. The DNP does not create a new role; rather it provides advanced practice nurses and specialist in health care systems with additional knowledge and skills that better prepares them to address evolving and increasingly complex societal needs.

The DNP program offers two tracks: (a) advanced clinical practice focused on direct patient care (e.g., NPs), and (b) administration and organizational leadership focused on support of clinical practice. The curriculum for the DNP program is based on national accreditation standards. The following options are available at the DNP level: Adult-Gerontology Nurse Practitioner/Primary Care, Family Nurse Practitioner, Pediatric Nurse Practitioner/Primary Care, Psychiatric Mental Health Nurse Practitioner, and advanced roles in health care systems.

Courses for Graduate and Advanced Undergraduate Students

NURS

456 Discipline of Nursing II (2). Prerequisites, NURS 254 and at least one of the following: NURS 470, 472, 477, or 479. Majors only. This course emphasizes professional development through exploration of a variety of roles and practice environments. Students analyze personal and professional goals and values to develop a framework for nursing practice.

470 Public Health Nursing (5). Prerequisites, NURS 364 and 371. Corequisites, NURS 472, 477, or 479. Majors only. Students apply public health concepts to community practice to improve health and reduce disparities across the lifespan, emphasizing interventions using partnership strategies at individual/family, organizational, and policy levels.

472 Nursing Care of Infants, Children, and Their Families (5). Prerequisite, NURS 364. Majors only. Nursing care of infants, children, and their families is explored. Knowledge from a variety of disciplines is applied through the nursing process to the direct care of infants and children.

477 Psychiatric Mental Health Concepts for Broad Clinical Application in Nursing (5). Prerequisites, NURS 253, 361, and 362. Corequisites, NURS 364 and 382. Majors only. Using theories of psychosocial development, psychopathology, therapeutic communication, and psychotherapy, this course requires students to examine the range and complexities of human emotional suffering and methods of effective intervention.

479 Maternal/Newborn Nursing (5). Prerequisite, NURS 364. Majors only. The course focuses on application of caring and critical thinking skills in providing evidence-based nursing care to childbearing families.

487 Practicum in Nursing: Work-Study Experience (3). Prerequisites, NURS 254 and 364. Certification as Nurse Aide I and II also required as pre- or corequisite. Majors only. This course provides the student an opportunity to participate in a work-study experience in participating health care agencies. Students participate in a reflective experience that integrates classroom and experiential learning.

488 Practicum in Nursing: Health Services Improvement Work Experience (3). Prerequisites, NURS 254 and 364. Majors only. Certification as a Nurse Aide I and Nurse Aide II are recommended. Practice in health care settings is the course focus. Students participate in a reflective experience that provides the context to integrate classroom and experiential learning into an evolving professional identity.

489 Practicum in Nursing: Global Health Experience (3). Prerequisites, NURS 254 and 364. Majors only. Certification as a Nurse Aide I and Nurse Aide II are recommended. Practice in global health care settings is the course focus. Students participate in a reflective experience that provides the context to integrate classroom and experiential learning into an evolving professional identity.

491 Improving Nursing Practice: Application of Concepts, Theories, and Research (3). Majors only. This course emphasizes analysis of clinical problems that affect the nursing care of selected populations. Students also apply the nursing process, therapeutic communication skills, and teaching-learning principles in clinical situations.

492 Conceptual Bases of Professional Nursing Practice (3). Majors only. Selected concepts, theories, and models are explored as a basis for making judgments and decisions in nursing practice. Emphasis is on helping students expand and refine the body of knowledge upon which they base practice decisions. Critical thinking skills are developed as an essential component of professional practice.

494 Community Health Nursing for the Public's Health (3–6). Majors only. Prepares R.N. students for population-focused practice in community health nursing. Analyses and applications of selected theories; health promotion/protection and disease prevention strategies are emphasized.

496 Advanced Practicum in Nursing (1–3). Majors only. The focus of this course is the development of knowledge and experience related to research or service learning and its application to the practice of nursing and health care.

585Alternative Paradigms for Nursing Practice (3). Majors only. Concepts and principles underlying biomedical and biopsychosocial approaches to health care delivery are analyzed to determine their impact on health and to provide a framework for integrating both approaches to care.

586 Contemporary Issues in Nursing Practice (3). Majors only. The context of professional nursing practice will be analyzed from a social, economic, and policy perspective. Analysis will include projections for the future of the profession.

588 Leadership in Health Care Organizations (4). Prerequisites, NURS 364, 371, and 487 or 489, and 472 or 477 or 479. Corequisite NURS 488. Majors only. This course explores organizational leadership and management practices and theories. Current social, economic, legal, ethical, and policy issues affecting practice, education, and the profession of nursing are examined.

591 Nursing Care of Adults with Major Health Problems, II (8). Prerequisites, NURS 364 and 371. Corequisite NURS 456. Majors only. This senior-level course focuses on applying critical thinking, clinical decision making, and evidence-based nursing practice to complex health problems of adults. Unique health needs of older adults are addressed.

600 SHAC: Student Health Action Coalition (0). This course provides service-learning opportunities to apply nursing practice within the context of interprofessional care for vulnerable populations by participating with Student Health Action Coalition (SHAC) activities.

607I Interprofessional Team Work and Communication: Key to Patient Safety (3). Majors only. This interprofessional course focuses on understanding roles, teamwork, and communication to improve patient safety within the health care environment. National standards and initiatives will be the foundation of the course. Pass/Fail only.

609 Health Care in the Global Context (1). Majors only or permission of the instructor. A faculty led experiential learning opportunity focusing on development and knowledge related to research, health care systems, or service learning and its application to nursing and health care.

613I Intermediate Spanish for Health Care I (AHSC 613I, PHCY 613I, PUBH 613I, SOWO 613I) (3). See PUBH 613I for course description.

614I Intermediate Spanish for Health Care II (AHSC 614I, PHCY 614I, PUBH 614I, SOWO 614I) (3). See PUBH 614I for course description.

615I Advanced Spanish for Health Care I (AHSC 615I, DENT 615I, MEDI 615I, PHCY 615I, PUBH 615I, SOWO 615I) (3). See PUBH 615I for course description.

646 Health Care Policy in the United States: Development, Impacts, and Implications for Nurses (3). This course examines health care policy development, impacts, and prospects for change. Content enables nurses to draw implications for nursing practice and advocacy for improving systems.

680 Experimental Courses (1–3). Pilot test for new courses in the nursing program.

685 Care of the Dying and Bereaved throughout the Life Span (3). Permission of the instructor for nonmajors. Students from a variety of health sciences-related disciplines gain an understanding of issues in working with dying and bereaved individuals of all ages and their families.

686 Advanced Concepts in the Clinical Care of Older Adults (2). Graduate students only. Focuses on advanced concepts for nursing management of older adults and their families with an emphasis on interdisciplinary care.

687 Ethical Issues in Nursing (2). Examination and discussion of major ethical issues arising in the professional practice of nursing in the context of systematic consideration of the nature of ethical choice.

689 Advanced Concepts in Oncology Nursing (2). Admission to Adult-Gerontology Nurse Practitioner program or permission of the instructor required. This course focuses on an evidence-based approach for the advanced practice nurse, incorporating pathophysiology; prevention/detection; medical treatment; nursing management; and socioeconomic, ethical, and legal issues related to adult cancer care.

691H Honors in Nursing, Part I (3). Permission of the program director. Majors only. Preparation of a two-semester honors project under the direction of department advisors.

692H Honors in Nursing, Part II (3). Permission of the program director. Majors only. Preparation of a two-semester honors project under the direction of department advisors.

Courses for Graduate Students

NURS

703I Alternative Medicine (3).

704 Scientific Writing (1). Focuses on the principles and practice of scientific writing, with emphasis on research proposals, theses, research reports, dissertations and articles for publication.

710 Developmental Physiology and Pathophysiology (3). This course explores developmental changes in morphological processes and normal and pathologic physiology in humans from conception through adolescence. Physiological differences between infants and children and adults are emphasized.

715 Pathophysiology for Advanced Nursing Practice (3). This course examines the physiological and pathophysiological responses to injury-effects on cell function, host defense responses, maintenance of vital functions, and neuro-endocrine-immune responses to stress across the lifespan.

720 Pharmacotherapeutics in Advanced Nursing Practice (3-4). Prerequisite, NURS 710 or 715. Examines principles of pharmacotherapeutic decision making in advanced nursing practice with application to clinical management of common health problems specific to all age groups, encompassing a life-span approach.

721 Pediatric Pharmacology (1). Prerequisites, NURS 715 and 720. Permission of the instructor for students lacking the prerequisites. The course will examine the principles of pharmacotherapeutic decision making in advanced nursing practice, with application to the clinical management of common health problems specific to pediatrics.

722 Psychopharmacology in Psychiatric-Mental Health Advanced Practice Nursing (2). Prerequisites, NURS 715, 726, and 727. Co-requisite, NURS 720. Permission of the instructor for students lacking the pre- and corequisites. Examines the principles of psychopharmacology and neurobiology for safe and effective psychotherapeutic management of individuals with psychiatric and mental health problems across the lifespan.

725 Advanced Health Assessment and Diagnostic Reasoning in Pediatric Nursing (4). Pre- or corequisite, NURS 710. Course is designed to prepare the advanced practice nurse to comprehensively assess pediatric clients using a diagnostic reasoning process.

726 Advanced Health Assessment and Diagnostic Reasoning in Primary Care (4). Pre- or corequisite, NURS 715. This course examines the process of diagnostic reasoning as a framework to synthesize comprehensive assessment of patients throughout the lifespan.

727 Advanced Diagnostic Process in Psychiatric-Mental Health Nursing (4). Pre- or corequisites, NURS 715 and 726. This course introduces students to the role of the advanced practice psychiatric-mental health nurse. Models for assessment, intervention, and evaluation are explored and tested clinically.

776 Research for Advanced Clinical Practice (3). Graduate standing and successful completion of an undergraduate statistics course required. This course explores approaches to research problems in advanced practice nursing. Theories, methods, designs, measurement, ethical conduct, and skills in critical appraisal are emphasized.

777 Intermediate Statistical Applications in Health Care (3). Graduate standing required. This course provides an introduction to probability, statistical concepts, and analytical techniques useful in health care research and for interpreting the literature.

778 Interpreting Research Reports (3). For Nursing students admitted to The Graduate School. Focuses on approaches for critical reading of research reports to evaluate the evidence base for practice.

779 Synthesis and Translation of Evidence (3). Prerequisite, NURS 778. Permission of the instructor for students lacking the prerequisite. Focuses on the translation of research evidence to support improved models of care delivery.

780I Multidisciplinary Perspectives on Managing Diabetes Mellitus (PHCY 608I) (2). This course examines the current issues involved in managing diabetes mellitus in persons over their life span. Contributions of the multidisciplinary team are an important theme throughout this course.

781I Genomics and Society (3). This multidisciplinary course offers students the opportunity to gain a basic understanding of human genetics and explore the ethical, legal, and social implications of recent advances in genetics.

782I Aging and Health (DENT 604I, EPID 620I, HMSC 904I, MEDI 604I, PHCY 604I, PHYT 904I, PSYC 904I, SOCI 824, SOWO 604I) (3). See SOWO 604I for description.

783I Aging and Public Policy (DENT 607I, FMME 607I, HMSC 951I, HPM 961, MEDI 607I, PSYC 907I, SOWO 607I) (3). See SOWO 607I for description.

799 Special Problems (1–3).

810 Primary Care Management of Adults (5). Prerequisites, NURS 715 and 726; pre- or corequisite, NURS 720. Focuses on the management of illnesses common to young, middle, and older adults in ambulatory care.

811 Selected Issues in Adult Health (5). Prerequisites, NURS 715, 720, 726, and 810. Permission of the instructor for students lacking the prerequisites. Provides the opportunity for an in-depth examination of management strategies with selected health problems in adults. Also examines issues inherent in the management of women and elderly populations.

812 Management of Complex Health Problems in Adults (6). Prerequisites, NURS 715, 720, 726, 810, and 811. This capstone course focuses on the management of complex health problems in adult populations for the adult nurse practitioner.

815 Advanced Practice Nursing Role (1). Prerequisites, NURS 810, 840, or 860. Permission of the instructor for students lacking the prerequisites. Examines current advanced practice nursing roles issues, within the context of contemporary healthcare delivery, legal, and sociopolitical systems.

819 Practicum in Primary Care Management of Adults (2). Prerequisites, NURS 715, 720, 726, and 810. A precepted practicum in community-based ambulatory care settings that provides experiences in continuity of care in the delivery of personal health services to adult individuals and their families.

820 Clinical Practicum in Advanced Oncology Nursing (2-4). Prerequisites, NURS 688 and 699. Corequisite, NURS 821. Permission of the instructor for students lacking the corequisite. Focuses on the evidence-based management of common acute, episodic, and chronic health problems in adult cancer patients for the oncology nurse practitioner.

821 Seminar in Advanced Oncology Nursing (0.5). Prerequisites, NURS 688 and 689. Co-requisite, NURS 820. Permission of instructor for students lacking the corequisite. Focuses on evidence-based nursing and medical management issues relevant to the care of patients and their families across the cancer continuum and practice settings.

825 Sexual and Reproductive Health (4). Prerequisites, NURS 715, 720, 726, and 810. Permission of the instructor for students lacking the prerequisites. Uses a life span approach to examine principles of primary care management of childbearing couples and sexual reproductive health in women and men. Application is in community-based settings.

826 Introduction to Population Health and Community-Based Practice (2). This course introduces fundamental concepts and models of population-oriented nursing practice and the central issues affecting that practice. Focuses on health disparities and underserved populations.

827 Child Health Issues in Primary Care (4). Prerequisites, NURS 715, 720, 726, and 810. Examines the principles of assessment, management, evaluation, and continuing care of children in primary care settings. Developmentally-appropriate, family-centered approaches and management of common medical problems are addressed.

828 Advanced Clinical Practicum in Primary Care of Families (4). Prerequisites, NURS 715, 720, 726, 810, 825, and 827. This course is the capstone practicum for family nurse practitioner students. It emphasizes the comprehensive clinical management of primary health care needs in the context of the individual, the family, and/or the community.

833 Specialty Care in the Health of Women (4). Prerequisites, NURS 715, 720, 726, 810, and 825. Permission of the instructor for students lacking the prerequisites. Focuses on the primary care of women with complex gynecological problems, reproductive complications, and socially derived health care problems. Emphasis is placed on assessment, diagnosis, management, and clinical decision making.

835 Population Health and Epidemiology (3). Admission to Nursing graduate program. Focuses on epidemiologic approaches for studying the impact of social, economic, and cultural inequalities on health and illness patterns at population and clinical levels.

838 Health Care of Women Practicum (1–5). Prerequisites, NURS 715,726, 810, 825, and 833. The women's health care advanced practicum focuses on the synthesis and clinical management of primary health care and specialty health care problems of women.

840 Primary Care of Children (5). Prerequisites, NURS 710 and NURS 725. Pre- or corequisite, NURS 720. Permission of the instructor for students lacking the prerequisites. This course focuses on advanced practice nursing management of common clinical symptomatology and problems in pediatric primary care.

841 Advanced Concepts in Family-Centered Health Care of Children and Adolescents (4). Prerequisites, NURS 710, 725, and 840. Permission of the instructor for students lacking the prerequisites. Focuses on advanced concepts in family-centered health care of selected child and adolescent health problems. Students function in an advanced practice role working with children, adolescents, and their families in primary care, acute, and/or chronic illness settings.

842 Management of Complex Conditions in Advanced Practice Pediatric Nursing (4). Pre- or corequisites, NURS 710, 720, and 840. Permission of the instructor for students lacking the pre- or corequisites. This course prepares the advanced practice nurse to design, implement, and evaluate a coordinated system of interventions that aim to promote optimal health and maximize outcomes for infants, children, and adolescents with complex conditions.

849 Clinical Practicum in Advanced Practice Pediatric Nursing (1–5). Prerequisites, NURS 710 and 725. Corequisites, NURS 720 and 840. Permission of the instructor for students lacking the pre- or corequisites. Supervised practicum in an advanced practice role in a selected health care setting that provides primary care and/or specialized health care to infants, children, or adolescents.

860 Psychiatric Nursing Interventions with Individuals (5). Prerequisite, NURS 727. Focuses on theories, techniques, and research related to providing individual psychotherapy. Contextual factors affecting the delivery of psychiatric-mental health nursing services are analyzed.

863 Psychiatric-Mental Health Nursing for Underserved Populations (3). Prerequisites, NURS 727 and 860. Utilizing epidemiology, psychoeducation, case management, and health policy, students examine the scope of mental health problems and services for underserved populations.

864 Psychiatric-Mental Nursing Interventions: Families and Groups (4). Prerequisites, NURS 727 and 860. Permission of the instructor for students lacking the prerequisites. Students will analyze theories, techniques, and research relevant to therapy with groups and families experiencing mental health problems.

865 Psychiactric-Mental Health Nursing Interventions with Children (2). Prerequisites, 715, 720, 722, 726, 727, and 860. Permission of the instructor for students lacking the prerequisites. Students will analyze theories, techniques, and research relevant to therapeutic interventions with children experiencing mental health problems.

868 Management of Complex Psychiatric-Mental Health Problems Across the Lifespan (6). Prerequisites, NURS 715, 720, 722, 726, 727, 860, 864, and 865. Permission of the instructor for students lacking the prerequisites. This courses focuses on the management of complex psychiatric-mental health problems across the lifespan for the psychiatric-mental health nurse practitioner.

869 Practicum in Psychiatric Mental Health Care for Advanced Practice Nurses (1–3). Prerequisites, NURS 727, 860, 863 and 864. Permission of the instructor for students lacking the prerequisites. This is the final advanced clinical course for students to apply knowledge and skills in selected domains of the advanced practice of psychiatric-mental health nursing. Supervision, peer evaluation, seminar, and independent readings will enhance the experience.

870 Health Care Informatics (3). Focuses on developing an understanding of the concepts relevant to health care informatics and the use of computerized information systems, as well as the use of computer applications to support clinical and administrative decision making.

871 Leadership and Advanced Practice Roles in Health Care Organizations (3). This course examines health care and nursing practice organizations, and the influence of the external and internal environment on these organizations. Roles and functions of nurses at different levels and in different types of health care settings are explored.

872 Human Resource Management (3). Explores the knowledge and skills required for effective human resource management. Managerial behaviors that promote and maintain a professional nursing practice environment are emphasized.

873 Financing for Valued-Based Care (3). Admission to graduate program. This course examines theoretical underpinnings and financial management concepts that pertain to costs, cost analysis, budgeting, variance analysis, staffing, productivity, and forecasting to prepare nurse leaders for decision-making in complex health care organizations.

874 Improving Quality, Safety, and Outcomes in Healthcare Systems (3). Majors only. Explores theories and methods for improving the quality, safety, and outcomes of care and patient and organizational levels, with emphasis on the quality and patient safety movement, improvement science, and evidence based practice.

875 Principles of Teaching Applied to Nursing (3). Provides students who have had minimal or no teaching experience with the educational principles necessary to teach in nursing programs or health care settings.

876 Innovations in Nursing and Health Care Curricula (3). This online course examines foundations of contemporary nursing and health care education, including academic, staff development, patient education programs, and lifelong learning.

878 Health Care Residency and Integrative Seminar (5). Required preparation, all required courses for the HCS specialty or concurrent enrollment in final HCS coursework. Course provides students an opportunity to develop, implement, and evaluate advanced practice and leadership strategies in a Health Care Systems area of focus.

880 Evidence-Based Care for Clinical Nurse Leaders I (5). Prerequisite, NURS 715. Permission of the instructor. First of two courses preparing clinical nurse leaders. Emphasis is on the use of evidence-based approaches from outcomes/quality, transitional care, and finance to improve nursing care delivery in clinical systems.

881 Evidence-Based Care for Clinical Nurse Leaders II (6). Pre- or corequisites, NURS 715 and 880. Advanced clinical nurse leadership course emphasizing collaboration with key stakeholders to implement evidence-based interventions and improve care delivery in clinical systems.

882 Clinical Teaching (3). Graduate standing required. Prepares nurses for teaching in clinical settings. Focuses on how to develop a clinical course, select clinical settings, work with staff, plan teaching methods and learner activities, and evaluate outcomes.

889 Special Topics in Nursing (1–5). Topics directed by an authority in the field.

912 Theoretical Foundations of Scientific Inquiry (3). Critically analyzes historical and current views of knowledge development and scientific development. It examines the underlying ontological and epistemological assumptions of these views and how they influence scientific inquiry. Students will learn to critically evaluate extant theories, concepts, and models for use in research, including their testability and utility.

915 Nursing, Health Organizations and Policy Making (3). Examines interrelated changes in nursing, ethical and legal expectations, and the organization of health care and health policy. Ways that nurse leaders in health care organizations adapt to and challenge public policies throughout the policymaking process and consequences for organizations and for health, practice, research, and education are explored.

920 Theoretical Foundations in Advanced Practice (3). Admission to Nursing graduate program. Focuses on philosophical and theoretical foundations for practice and the utility of these foundations for advanced practice.

928 Organizational Theories (3). Examines the major theoretical paradigms, perspectives, and issues in organization theory, particularly as applied to organizations providing health care services.

930 Infants and Children at Risk (3). Applies the developmental science perspective to children at risk for health problems. Students examine conceptual models, design, measurement, and ethical issues involved in preventing or ameliorating these health problems.

932 Families and Health (3). Explores theoretical, methodological, and ethical issues related to research in families and health across the life span. Content includes family research related to health promotion, risk reduction, vulnerability, and health risk, and the family in the context of acute and chronic illness. Cultural, ethnic, and socioeconomic issues are included.

933 Health Care Quality and Patient Outcomes: Conceptual and Empirical Approaches (3). Prerequisite, NURS 976. Permission of the instructor for students lacking the prerequisite. Examines literature on quality of care -- effectiveness, safety, efficiency, equity, timeliness, and patient-centeredness. Critically evaluates conceptual frameworks, research designs, sources of data, analytic approaches, and implications for health care policy.

941 Practice Inquiry Seminar I (1). Admission to Nursing graduate program. Seminar focused on exploration of resources to guide the practice inquiry project and development of a problem statement.

942 Practice Inquiry Seminar II (1). Prerequisite, NURS 941. Seminar focused on design and implementation issues related to the practice inquiry project.

943 Practice Inquiry Seminar III (1). Prerequisites, NURS 941 and 942. Seminar focused on issues related to the implementation, evaluation, and dissemination of findings of the practice inquiry project.

950 Analysis of the Academic Role in Nursing Education (3). Knowledge, theories, and skills necessary for transition into an academic teaching role in university schools of nursing. Particular emphasis on the teaching-learning process as used in higher education.

953 Ethics and Law in Health Care and Research (3). Focuses on the analysis of contemporary ethical/legal dilemmas in health care and research. Examines nurses' ethical/legal responsibilities, law and the impact of judicial precedent upon clinical practice and research, the interface of law and ethics, and comparative theories/models of ethical reasoning and decision-making.

957 From Theory to Intervention (3). Required preparation, NURS 912 or graduate level theory course. In-depth exploration of selected programmatic research in nursing and related fields on prevention and management of chronic conditions in order to generate and evaluate treatment theory and intervention protocol.

958 Designing Intervention Studies (3). Prerequisite, NURS 957. Permission of the instructor for students lacking the prerequisite. Examines methodological, ethical, and practical issues in the design and implementation of theory-based intervention studies.

959 Research Grant Writing (3). Course is designed to assist doctoral students and post-docs with preparation of Individual National Research Service Award (NRSA) or other research grant application. All steps in grant writing process will be addressed. Student should have solidified research idea prior to course. Mentor must agree to work with student throughout course.

960 Proseminar in Nursing (1–3). Proseminars are offered for one, two, or three credits. Topics differ each semester.

962 Conducting Systematic Reviews and Writing Specific Aims (4). Designed to develop students' skills in conducting systematic reviews of the literature in their area of research focus. In addition, students will gain proficiency in developing aims for a research study and in using findings from their systematic literature reviews to further develop and refine those aims.

963 Writing for Publication (3). In this course, students apply principles and practices of writing to the preparation of manuscripts for publication.

965 Issues in Gerontological Research (3). This course is designed to enhance the student's knowledge of relevant issues researchers face when planning, designing, and implementing research with an older adult population.

972 Statistical Models for Health Research (4). Prerequisite, NURS 671 or 777. Permission of the instructor for students lacking the prerequisite. This course will examine principles of bivariate and multiple regression and correlation, as well as univariate ANOVA, multiple ANOVA, ANCOVA, and repeated measures ANOVA. Emphasis is on application of these techniques in the analysis of nursing and health-related data.

976 Issues in Sampling and Design (3). Systematic and critical analysis of quantitative research designs including experimental, quasi-experimental, longitudinal, comparative, correlational, and descriptive. Examines sampling frameworks, types of samples, sampling errors and biases, and advantages and disadvantages of these designs for the study of nursing and healthcare issues.

977 Qualitative Approaches to Knowledge Development in Nursing (3). Examines the philosophical orientation and techniques of qualitative methodologies including qualitative description, grounded theory, ethnography, and narrative. Design issues related to sampling, data collection, data analysis, and data re-presentation, validation, rigor, and ethical concerns are considered.

978 Principles of Measurement (3). Required preparation, graduate level statistics course in the previous three years. Permission of the instructor for students lacking the required preparation. Examination of measurement and techniques for assessing validity, reliability, and structure of data collection instruments. Instrument construction and procedures for critical evaluation of instruments are included.

979 Qualitative Analysis (3). Required preparation, doctoral level qualitative methods course or NURS 977. Emphasizes the work of analysis and interpretation. Students apply relevant qualitative techniques to their own data.

980 Observational Methods (3). Explores quantitative observational research techniques. Strategies for developing coding systems, determining reliability and validity, and analyzing data are included.

981 Longitudinal Methods and Analysis (3). Prerequisite, NURS 972. Permission of the instructor for students lacking the prerequisite. Examines longitudinal research methods, including conceptualization, design, and analysis. Assumptions and limitations of longitudinal statistics, relationship between design and analyses, and strategies to maintain scientific integrity are covered.

985 Research Seminar and Practicum: Guided Individual Research Experience (1–5). Directs students to develop research skills related to the dissertation and to their future research.

986 Doctor of Nursing Practice Residency (3-5). Clinical residency focused on the synthesis of knowledge related to advanced practice, leadership, and practice-based inquiry.

992 Master's Paper (3).

993 Thesis (3–6).

994 Dissertation Registration (3–9).

Division of Occupational Science and Occupational Therapy

www.med.unc.edu/ahs/ocsci
RUTH A. HUMPHRY, *Director*

Professors

Grace Baranek (10) Autism and Related Developmental Disorders, Sensory Processing and Sensorimotor Performance Related to Childhood Occupations

Ruth Humphry (4) Parents and Infants during Co-Occupation/Feeding, Family-Centered Services and Young Children with Developmental Disabilities

Clinical Professor
Susan Coppola (9) Geriatric Functional Assessment, Physical Rehabilitation, Fieldwork Effectiveness in Clinic

Clinical Associate Professors
Linn Wakeford, Occupation-Centered Services for Infants and Preschoolers with Developmental Delay
Jenny Womack, Aging, Physical Rehabilitation, Community-Based Practice, Assistive Technology, Universal Design and Environmental Accommodations

Assistant Professors
Antoine Bailliard, Social Justice, Migration, Mental Health
Brian Boyd, Behavioral Interventions for Preschool-Aged Children with Autism Spectrum Disorders

Clinical Assistant Professors
Lauren Holahan, School-Based Occupational Therapy

Professor Emerita
Cathy Nielson

Associate Professors Emeritae
Virginia Dickie
Jane Rourk

The Division of Occupational Science and Occupational Therapy in the Department of Allied Health Sciences offers two graduate programs: a master of science (M.S.) degree with a major in occupational therapy (OT) and a doctor of philosophy (Ph.D.) degree in occupational science. The M.S. in occupational therapy program is a two-year program designed for individuals with a baccalaureate degree in a field other than occupational therapy. It is an entry-level program for individuals who wish to become occupational therapists. The Ph.D. program in occupational science accepts applicants with an earned master's degree in occupational therapy or a related field (see admission requirements below). The doctoral program prepares individuals who wish to pursue academic careers that could include teaching, research, and other scholarly activities related to occupational science and occupational therapy.

Requirements for Admission into the M.S. Program in Occupational Therapy
1. Bachelor's degree from an accredited institution
2. Submission of Graduate Record Examination (GRE) scores from the Educational Testing Service
3. Academic record that demonstrates potential to do work at the graduate level
4. Completion of the OT supplemental application

The M.S. program has the following prerequisites:
There are eight total prerequisite courses, four of which are fixed (core body of knowledge) and four of which come from a flexible and diverse menu of categories. All prerequisites except the occupation course must be taken for credit in an accredited academic institution of higher learning

Fixed Prerequisites
1. Human anatomy with a lab *
2. Human physiology*
3. Abnormal psychology
4. Introductory statistics

* a two-semester sequence of combined anatomy and physiology; parts I and II may be substituted for separate courses.

Flexible Prerequisites
1. Human/individual behavior (For example: developmental psychology, child development, adulthood and aging, cognitive psychology, neuropsychology)
2. Modes of reasoning (For example: philosophy and ethics, statistics or data analysis [beyond the introductory course], religion, literature taught in a foreign language, research design or method of inquiry in a social science)
3. Study of social relationships, institutions and systems (For example: linguistics, cultural/social anthropology, sociology, public health, public policy, leisure studies, social work, political science, minority studies)
4. Occupation: Complete a course in either an academic or community-based setting that requires the skills of your body as well as your mind. The occupation prerequisite must have the following characteristics:
   - new learning/challenge (not something you already do or know how to do)
   - formal (structured) learning context, but does not have to be a "for credit" course
   - at least once a week for a minimum of 6 weeks
   - social context (other learners present in person; online courses are not accepted)
   - results in an end product or performance
   - learners must be active (not just recipients of information)
   - course content is not designed to be used to benefit, teach or communicate with others

Examples includecreative writing, poetry writing, studio art class, woodworking, jewelry making, theatre, dance, music, and some sports.)

The master of science program requires a minimum of 63 semester credit hours. The program is 24 months in length and includes substantial fieldwork experience.

Occupational therapy courses are available only to graduate students enrolled in the M.S. program at the University.

Requirements for Admission into the Ph.D. Program in Occupational Science
The Ph.D. program in occupational science accepts academically qualified applicants who have completed master degrees in occupational therapy, relevant social and behavioral sciences or related health fields. Applicants receive a thorough review for evidence of potential success in a doctoral program in The Graduate School at UNC–Chapel Hill. In order to achieve closely mentored research experiences, only applicants with expressed interests consistent with existing programs of research and scholarly work of the faculty are admitted. Final selection among qualified applicants will be based on his or her interview with core faculty members in the Ph.D. program in occupational science. Review the UNC–Chapel Hill Web site for information about applying to The Graduate School. In addition to the formal application to The Graduate School, the following information is required:

1. Copies of all undergraduate and graduate transcripts
2. Graduate Record Examination (GRE) scores (taken within the last five years)
3. Results of the TOEFL (Test of English as a Foreign Language, if applicable)

4. A reflective essay detailing personal and professional goals relevant to the pursuit of a Ph.D. in occupational science at UNC–Chapel Hill (submit directly to the Division of Occupational Science) and
5. Three letters of recommendation from individuals that support the applicant's potential as an educator and scholar (sent to the division)

The Ph.D. program requires a minimum of 45 semester credit hours beyond the master's degree. This course of study covers four domains: a) occupational science, b) an interdisciplinary cognate area that complements occupational science, c) research design and methodology and d) competencies for an academic career. All graduates must complete a doctoral dissertation in occupational science. Students are also expected to reach satisfactory competence in teaching and research as determined by their career goals.

With approval from the instructor, occupational science courses are open to graduate students interested in 1) the study of people engaged in everyday activities in different situations and 2) how various experiences in an activity or patterns of engagement influence development, health, and quality of life across the lifespan.

Courses for Graduate Students

OCCT (Occupational Therapy)

704 Research in Occupational Science and Therapy (3). Examination of research approaches and issues within occupational science and occupational therapy. Development of skills in writing research proposals and applying research results to insure evidence-based practice.

718 Musculoskeletal Dimensions of Occupational Performance (4). An in-depth review of musculoskeletal anatomy and kinesiology. Application is stressed as related to anatomical, physiological, and biomechanical dimensions of movement and occupational performance.

720 Neuroscience: Processes Supporting Occupation (3). Neurophysiological processes contributing to functional abilities. Study of CNS related to observed behaviors, affect, and higher cognitive components of function.

720A Fieldwork II (6). Direct experience with clients/patients in varied service treatment settings. Experience will include adult disabilities.

720B Fieldwork II (6). Direct experience with clients/patients in varied service treatment settings. Experience in an area of special focus.

722 Biomedical and Phenomenological Perspectives on Illness and Disability (4). The biomedical and phenomenological aspects are presented and contrasted, using medical literature and personal narratives. Emphasis on humanistic values, biomedical information, and investigative reasoning for effective occupation-centered practice.

736 Occupational Therapy Practice Environments (2). Overview of OT practice settings, professional organizations, and regulatory bodies. Factors influencing practice, including legislation, reimbursement, documentation and culture of communities. Ethics, confidentiality, self-awareness, teamwork and professionalism in practical settings.

738 Political, Administrative, and Financial Contexts of Service Delivery (3). Exploration of public policies and regulations, administrative systems and skills, reimbursement, and financial aspects of traditional service delivery system.

740 Evolution of Community-Based Practice: Development, Implementation and Evaluation (2). History and development of occupation-based services in community settings; evolution, structure, and operation of community programs; use of consulting and planning skills in a comprehensive and systematic planning model.

748 Fundamentals of Occupation-Centered Practice (4). In-depth examination of core principles and methods involved in comprehensive occupational analysis, assessment of occupational performance and therapeutic occupation across practice areas.

750 Occupations, Adaptation, and Technology I (5). Prerequisites, OCCT 726 and748. Problem-orientation approach to assessment, treatment planning, and use of clinical reasoning to develop intervention strategies. Remediative, compensatory, and adaptive approaches to physical and psychosocial dysfunction are explored through case studies.

751 Older Adults: Occupations, Adaptation, and Technology II (2–3). Prerequisites, OCCT 826 and748. A problem-based learning approach to the occupational therapy clinical reasoning process; assessments, interventions, and adaptations for older adults.

752 Children: Occupations, Adaptation, and Technology III (3). Prerequisites, OCCT 828, 750, and 751. A problem-based learning approach to the occupational therapy clinical reasoning process, assessments, interventions, and adaptations for children with disabilities.

826 Occupational and Environmental Transformations I (3). Investigation of continuity/discontinuity in pattern, function, and meaning of occupations from early adulthood through old age. Analysis of individual differences in occupational performance within family, SES and cultural contexts.

828 Occupational and Environmental Transformations II (3). Prerequisite, OCCT 826. Age-related changes in occupational performance from infancy through adolescence. Developmental contextualism used to frame intrinsic changes and environmental influences.

842 Historical Evolution of Occupational Therapy and Science (3). This historical analysis of occupational therapy and occupational science centers upon questions of philosophical foundations, knowledge development, division of labor and professionalism within health care.

890 Independent Study: Occupational Therapy and Science (1–21). Elective. Independent study to pursue specific interests and topics. Faculty supervision. May be repeated for credit.

992 Applied Research Experience (3). Collaborative research projects in occupational science or occupational therapy. Emphasis on data collection, analysis and professional communications of research findings.

993 Master's Thesis (3–6). Permission of the department.

Courses for Graduate Students

OCSC (Occupational Science)

826 Occupational and Environmental Transformations I: Adulthood (3). Investigation of continuity/discontinuity in pattern, function, and meaning of occupations from early adulthood through old age. Analysis of individual differences in occupational performance within family, SES, and cultural contexts.

828 Occupational and Environmental Transformations II: Childhood (3). Study of age-related change process shaping everyday activities from infancy through adolescence within family, SES, and cultural contexts.

842 Historical Evolution of Occupational Therapy and Science (3). The historical analysis of occupational therapy and occupational science centers upon questions of philosophical foundations, knowledge development, division of labor, and professionalism within health care.

844 Research Theory and Methodology in Occupational Science and Therapy (3). Investigation of different underlying philosophical dispositions found in occupational science and therapy and the associated methodologies guiding the study of people engaged in occupations. Applied examples of research design.

845 Conceptual Introduction to Occupational Science (3). Deconstruction of the original precepts of occupational science while examining several works from other disciplines. Study of early and recent trends and critiques of occupational science to develop an assessment of the state of the discipline and future directions.

850 Independent Study in Occupational Science (1–3). Independent study to pursue specific interests and topics under faculty supervision.

855 Action Theories (3). A reading and discussion of major theories of action from various disciplines. Works read will also entail associated issues such as identity, place, culture, and social relations.

858 Grant Writing (3). Applied introduction to proposal and grant writing. Preparation to seek external funding for further graduate studies and future support. Consideration given to effective communication and writing for different audiences.

890 Seminar on Special Topics in Occupational Science (3). Discussion and critical evaluation of philosophy, theory, and scientific issues associated with the study of people's activities in the context of their everyday lives. Topics differ each semester.

994 Doctoral Dissertation in Occupational Science (3). Doctoral dissertation in occupational science.

Department of Pathology and Laboratory Medicine

www.pathology.unc.edu

J. CHARLES JENNETTE, *Chair*

Herbert C. Whinna, *Vice Chair for Clinical Services and Director of McLendon Clinical Laboratories*

Professors

Dwight A. Bellinger (89) Laboratory Animal Medicine, Comparative Pathology

Thomas W. Bouldin (72) Neuropathology, Ocular Pathology, Neurotoxicology

Frank C. Church (107) Thrombosis and Hemostasis, Macromolecular Protein Structure-Function, Molecular Pathology

William B. Coleman (139) Breast Cancer Epigenetics, Biology of Liver Stem Cells, Hepatocarcinogenesis, Cancer Molecular Diagnostics

Marila Cordeiro-Stone (96) DNA Replication, DNA Repair, Cell Cycle Checkpoints in Human Cells, Mechanisms of Mutagenesis and Carcinogenesis

Leslie G. Dodd, Surgical Pathology Cytopathology

Ronald J. Falk (172) Glomerular Disease, Lupus, Vasculitis, Dialysis

Rosann A. Farber (118) Genetic Instability in Cancer, Human Molecular Genetics, Microsatellite Instability

Susan A. Fiscus (173) Retrovirology

William K. Funkhouser Jr. (152) Surgical Pathology, Molecular Pathology, Immunology

Peter H. Gilligan (174) Diagnostic Bacteriology, Pulmonary Disease in Cystic Fibrosis, Toxin Mediated Diarrheal Disease

Thomas R. Griggs (50) Blood Coagulation, Atherosclerosis

Margaret L. Gulley (196) Molecular Diagnostics, Oncology, Epstein-Barr Virus

Catherine A. Hammett-Stabler (171) Clinical Chemistry, Toxicology, Clinical Pharmacology

J. Charles Jennette (61) Renal Pathology, Immunopathology

David G. Kaufman (34) Human Origins of DNA Replication; Interactions between Human Endometrial Epithelial and Stromal Cells

William K. Kaufmann (95) Human DNA Metabolism and Cancer

Nigel Mackman (239) Thrombosis and Hemostasis

Nobuyo Maeda (116) Molecular Genetics of Atherosclerosis, Transgenic Laboratory Animals as Model Systems, Molecular Evolution

Susan J. Maygarden (131) General Surgical Pathology, Cytopathology, Prostate Carcinogenesis

Timothy C. Nichols (156) General Cardiology, Cardiac Catheterization, Per-Cutaneous Transluminal Coronary Angioplasty

Volker Nickeleit (190) Renal Pathology, Fibronectins

Charles M. Perou (209) Breast Cancer, Genomics, Microarrays, Tumor Classification; Drug Resistance

Howard M. Reisner (38) Immunogenetics of Blood Coagulation, Immunochemistry

John L. Schmitz (168) Flow Cytometry, HIV, Diagnostic Immunology, Sexually Transmitted Diseases

Harsharan K. Singh (186) Cytopathology, Fine Needle Aspiration Biopsy, Renal Pathology

Oliver Smithies (115) Molecular Pathology, Genetically Engineered Animal Models of Human Disease, Targeted Mutagenesis

Darrel W. Stafford (127) Molecular Biology

James A. Swenberg (66) Chemical Carcinogenesis, Toxicology, Mass Spectroscopy, DNA Damage and Repair, Endogenous DNA Damage

Joan M. Taylor (187) Adhesion Signaling, Cardiovascular Disease

Richard R. Tidwell (42) Medicinal Chemistry, Antiviral and Antimicrobial Agents, Protease Inhibitors

Michael D. Topal (41) Genomic Instability and Disease

Bernard E. Weissman (119) Tumor Suppressor Genes

Elizabeth M. Wilson (235) Steroid Hormone Regulation of Gene Expression

John T. Woosley (133) Dermatopathology, Hepatobiliary and Gastrointestinal Pathology, Histopathologic Assessment of Prognosis

Associate Professors

Georgette A. Dent (117) Hematopathology, Medical Education

Mehmet Kesimer Mucin Glycobiology and Airway Epithelial Pathobiology

Christopher P. Mack (188) Transcriptional Regulation in the Cardiovascular System, Smooth Muscle Cell Biology

C. Ryan Miller (231) Neuropathology, Genetics of Gliomagenesis and Experimental Therapeutics

Melissa B. Miller (211) Molecular Diagnostics, Antimicrobial Resistance, Molecular Epidemiology of MRSA

Cyrus Vaziri (249) Regulation of DNA Replication, S-Phase Checkpoints, and Post-Replication DNA Repair on Mammalian Cells

Young E. Whang, (236) Androgen Receptor, Prostate Cancer

David C. Williams Jr. Hematopathology, NMR Spectrophotometry and Structural Biology

Monte S. Willis (223) Molecular Mechanisms of Cardiac Disease and Ubiquitin-Proteasome Biology

Alisa S. Wolberg (198) Cellular and Molecular Mechanisms in Hemostasis and Thrombosis

Assistant Professors

George Fedoriw (242) Hematopathology; Applications of Flow Cytometry

Yara A. Park (246) Transfusion Medicine

Arlin B. Rogers (244) Liver Carcinogenesis; Comparative Pathology
Dimitri G. Trembath (250) Surgical Pathology and Neuropathology

Clinical Professors

Debra A. Budwit (132) Surgical Pathology, Cytopathology, Diagnostic and Prognostic Markers in Gynecologic Neoplasms
Pamela M. Groben (157) Dermatopathology
H. Michael Jones (241) Medical Education at Medical Student and Resident Level; Medical History, Autopsy Pathology, Research Support
Kathleen A. Kaiser-Rogers (212) Clinical Cytogenetics
Clay Nichols (266) Forensic Pathology
Deborah L. Radisch (213) Forensic Pathology
Harold R. Roberts (15) Thrombosis and Hemorrhage Research and Therapy, Hematology
Scott V. Smith (164) Surgical Pathology, Cardiovascular Pathology, Pediatric Pathology
Karen E. Weck (210) Molecular Genetic Pathology

Clinical Associate Professors

Jessica K. Booker (199) Genetics, Breast Cancer
Susan C. Hadler (194) Oral Diagnosis
Jonathon W. Homeister (226) Molecular Mechanisms of Leukocyte Trafficking and Homing; Inflammatory Vascular Disease; Thrombosis and Hemostasis; Cardiovascular Pathology; Autopsy Pathology
Ruth A. Lininger (166) Surgical Pathology, Breast Pathology
Leigh B. Thorne (207) Molecular Pathology, Autopsy Pathology
Herbert C. Whinna (167) Mechanisms of Hemostasis and Thrombosis, Biochemistry and Vascular Biology of Blood Coagulation, Protein Structure-Function

Clinical Assistant Professors

Claudia M. Brady (230) Surgical Pathology
Megan J. DiFurio (260) Cytopathology, GYN/Breast Pathology
Kevin Greene (255) Surgical Pathology of the Liver and Gastrointestinal Tract
Johann D. Hertel Cytopathology
Nicole L. Korpi-Steiner Clinical Chemistry
Stephanie P. Mathews (262) Hematopathology
Vincent J. Moylan Jr. (218) Cardiac Pathology and Autopsy Pathology
Siobhan M. O'Connor (257) Breast Pathology, GYN Pathology, Cytopathology
Jay S. Raval Transfusion Medicine
Lori R. Scanga (256) Surgical Pathology, Cytopathology
Samuel Simmons (263) Forensic Pathology
Ruth E. Winecker (165) Forensic Pathology
Daniel Zedek (269) Dermatopathology

Clinical Instructors

Steve Holmes (254) Examination of Simple and Complex Specimens, Surgical Pathology
April E. Kemper (259) Autopsy Pathology, Surgical Pathology
Tracie Wagner (247) Tissue Procurement; Surgical Pathology

Research Professors

C. Robert Bagnell Jr. (109) Application of Advanced Light and Electron Microscopy to Research in Basic Medical Sciences
Virginia L. Godfrey (148) Veterinary Pathology, Animal Models of Genetic Disease, Autoimmunity
Hyung-Suk Kim (137) Gene Targeting and Animal Models for Human Diseases, Hypertension and Hereditary Cerebral Hemorrhage with Amyloidosis and Molecular Evolution
Judith N. Nielsen (222) Animal Health Maintenance, Diagnosis and Eradication

Research Associate Professors

Arlene S. Bridges (248) Molecular Pharmaceutics and Mass Spectrometry
David A. Eberhard (253) Pathology, Scientific and Business Support for Clinical Trials
Craig A. Fletcher (251) Vascular Biology
Tracy M. Heenan (163) Laboratory-, Exotic- and Companion-Animal Medicine
Masao Kakoki (224) Prevention of Cardiovascular Diseases
Hong Xiao (215) Immune-Mediated Glomerular Disease and Vasculitis
Maimoona A. Zariwala (205) Genetic Analysis of Patients with Primary Ciliary Dyskinesia (PCD)

Research Assistant Professors

Adil Hussein Gasim (265) Nephropathology
Oleg V. Gorkun (195) Coagulation, Fibrinolysis, Fibrinogen Structure
Peiqi Hu (261) Immune-Mediated Kidney Disease
Jiandong Liu Cardiovascular Biology
Li Qian Cardiovascular and Stem Cell Biology
Dennis A. Simpson (204) Cell Biology, Molecular Biology, Virology
Scott Williams Stem Cell and Developmental Biology
Julia W. Whitaker (227) Laboratory Animal Medicine
Qing Zhang Cancer Cell Biology

Adjunct Professors

Mark E. Brecher (128) Blood Component Processing and Storage, Transfusion Strategies, Transfusion Transmitted Diseases
Cherie H. Dunphy (189) Hematopathology
J. Ed Hall (177) Infectious Diseases, Pathogenic Protozoa, Drug Metabolism
Joe N. Kornegay (232) Duchenne Muscular Dystrophy; Canine Model, Translational Studies, Muscle Hypertrophy
Chad A. Livasy (193) Surgical Pathology
Richard S. Paules (144) Oncogenes Tumor Suppressor Genes and Cell Cycle Control in Neoplastic Transformation of Mammalian Cells
Gary J. Smith (85) Prostate Cancer, Cancer Cell-Tissue Microenvironmental Interaction, Angiogenesis

Adjunct Associate Professors

Gary A. Boorman (102) Toxicological Pathology, Myelotoxicology
Jeffrey I. Everitt (180) Experimental Pulmonary and Toxicology Pathology
Thomas H. Fischer (169) Gene Therapy, Blood Coagulation, Atherosclerosis
Suzanne L. Kirby (181) General Hematology/Oncology and Bone Marrow Transplantation
Tara C. Rubinas 229) Gastrointestinal Pathology and Hepatopathology
Nobuyuki Takahashi (184) Animal Models of Hypertension, Preeclampsia, Diabetic Nephropathy and Obesity
Douglas C. Wolf (185) Mechanisms of Toxicity and Carcinogenesis

Adjunct Assistant Professors

Araba N. Afenyi-Annan (220) Transfusion Medicine
Christopher W. Gregory (201) Prostate Cancer, Androgen Receptor
Heike Hunt (245) Liver and Gastrointestinal Pathology
John P. Hunt (243) Surgical Pathology and Hematopathology

Professors Emeriti

Nadia Malouf Anderson
Stuart Bentley
John F. Chapman Jr.
Myra L. Collins
Robert E. Cross
Frederic G. Dalldorf
Cora-Jean S. Edgell

James D. Folds
Donald T. Forman
Joe W. Grisham
John E. Hammond
Susan T. Lord
William W. McLendon
James R. Pick
Marjorie S. Read
Kinuko I. Suzuki

Graduate work in the Department of Pathology and Laboratory Medicine is offered through the Molecular and Cellular Pathology program to those interested in acquiring more extensive knowledge of disease pathogenesis. Major emphasis is given to investigation of molecular and cellular mechanisms responsible for disease initiation, progression, and treatment. Students are given the opportunity to undertake candidacy for the doctor of philosophy degree. Participation in research activities leading to an original dissertation is required of all advanced degree candidates.

Prospective candidates must hold a bachelor's degree from an accredited college or university.

The department is located in the Brinkhous-Bullitt Building, and offers well-equipped laboratories for research and advanced work in pathology.

Please visit www.med.unc.edu/pathology/mcp for more graduate program information.

Courses for Graduate and Advanced Undergraduate Students

PATH

426 Biology of Blood Diseases (BIOL 426) (3). Prerequisite, BIOL 205. Permission of the instructor for students lacking the prerequisite. An introduction to the biology and pathophysiology of blood and the molecular mechanisms of some human diseases: anemias; leukemias; hemorrhagic, thrombotic, and vascular disorders; and HIV disease/AIDS.

462 Experimental Pathology (1–9). Hours, credits, and instructor to be arranged on an individual basis. Hands-on research experience in a predetermined instructor's laboratory. Students learn and apply specific techniques and participate in investigations of molecular mechanisms responsible for disease processes (pathobiology). Contact the director of graduate studies in pathology for information. May be repeated.

464 Light Microscopy (3). Permission of the instructor. Course focuses on practical fundamentals of light microscopy including optics, contrast mechanisms, fluorescence, laser scanning confocal microscopy, photography, and digital imaging.

Courses for Graduate Students

PATH

713 Mechanisms of Disease (3). Corequisite, PATH 714L. A graduate course on cell injury and pathogenesis of disease with emphasis on basic mechanisms at the molecular, cellular, and organismal levels. Three lecture hours (three credits) with a complementary two-and-a-half-hour laboratory (two credits) each week.

714L Molecular and Cellular Pathophysiological Basis of Disease: Laboratory I (2). Pre- or corequisite, PATH 713. A graduate-level laboratory course on basic mechanisms of disease pathogenesis, emphasizing cell and tissue-based examples of major disease mechanisms.

715 Molecular and Cellular Pathophysiological Basis of Disease: Systemic Pathology (3). Corequisite, PATH 716L. A graduate-level course on systemic pathology, emphasizing the molecular and cellular pathogenesis of diseases of major organ systems. A follow-up to PATH 713/714L. Three lecture hours (three credits) with a complementary two-and-a-half-hour laboratory (two credits) each week.

716L Molecular and Cellular Pathophysiological Basis of Disease: Laboratory II (2). Pre- or corequisite, PATH 715. A graduate-level laboratory course on mechanisms of systemic disease pathogenesis, emphasizing cell and tissue-based examples of diseases of the major organ systems.

723 Translational Pathology and Laboratory Medicine (2). Permission of the instructor. A multi-disciplinary course providing students principles involved in translating basic science into clinically applicable diagnostics and therapies to improve human disease outcomes. The course is focused on bioinformatics, bioethics, trial design, FDA approval, and commercialization of laboratory diagnostics.

725 Cancer Pathobiology (3). Permission of the instructor. This course examines pathobiological features of cancer. An interdisciplinary approach draws from epidemiology, genetics, molecular biology, and clinical medicine to investigate cancer etiology, pathogenesis, prevention, and treatment.

726 Human Environmental Disease (1–3). This course will study human disease processes that are induced or exacerbated by our environment. Environmental disease stressors include solar radiation, air and water pollution, bioreactive substances in foods, pesticides, metals, dusts, particles, and allergens. Lectures will emphasize epidemiology, mechanisms of toxicity, and human disease pathogenesis.

766 Current Topics in Cardiovascular Biology (3). Permission of the instructor. Second-year graduate students only. This manuscript-based course will emphasize recent advances in heart and blood vessel development, the molecular mechanisms that regulate cardiovascular cell function, and current methodologies in the cardiovascular field. It will be team taught by members of UNC's McAllister Heart Institute.

767 Molecular and Cellular Biology of Cardiovascular Diseases (3). Second year graduate students or permission of the instructor. Course reviews the molecular, cellular, and organismal pathogenesis of cardiovascular disease. It is team-taught by faculty with topic expertise and stresses primary literature and current methodologies. May be taken as a companion to PATH766 or on its own.

792 Seminar in Carcinogenesis (TOXC 792) (2). Permission of the instructor. Survey of classical and current literature on selected critical issues in carcinogenesis. Students discuss experimental methods and observations as well as theories and generalizations. Two seminar hours a week.

801 Scientific Critical Thinking (3). A graduate-level course designed to teach the 'scientific method' and based on student presentations of primary literature and group discussions. Teaches students the process by which scientists identify problems, formulate testable hypotheses, collect data through experiments, and eventually establish new models describing biological processes.

890 Special Topics in Pathology (1-3). A study in special fields under the direction of the faculty. Offered as needed for presenting material not normally available.

900 Research in Pathology (2–12). Permission of the department. This is a research course in which advanced students in pathology carry on investigations on mechanisms of disease. Six or more laboratory hours a week, to be arranged. May be repeated.

920 Seminar in Interdisciplinary Vascular Biology (1). Permission of the instructor. Participants in the Interdisciplinary Vascular Biology Training Program only. Students will be required to present their thesis work as a formal seminar, give an introductory lecture to introduce their project (in cooperation with their thesis advisor), and to attend and discuss the seminars of other students.

993 Master's Thesis (3–6). May be repeated.

994 Doctoral Dissertation (3).

Department of Pharmacology

www.med.unc.edu/pharm
GARY L. JOHNSON, *Chair*

Professors

*Nancy Allbritton (136) Signaling in Single Cells and Microfabricated Systems for Cellular Analysis
*George R. Breese (15) Drugs and Neural Plasticity, Molecular Neurobiology
*Frank C. Church (107) Proteases and Their Inhibitors Involved in Regulating Thrombosis and Tumor Cell Invasion
Fulton T. Crews (88) Excitotoxicity, Gene Delivery, Neuroprogenetor Stem Cells and Addiction
Channing Der (74) Ras Protein Superfamily, Signal Transduction and Oncogenesis
*Joseph Desimone (137) Polymer Synthesis, Liquid and Supercritical CO2 Processing, Gene Therapy and Drug Delivery
*H.G. Dohlman (127) Receptor and Signal Transduction: Mechanisms of Drug Desensitization
*Linda Dykstra (55) Opioid Analgesics, Drugs of Abuse
*H. Shelton Earp (63) Growth Regulation, Growth Factor and Protein Kinases
Timothy Elston (129) Mathematical Modeling of G Protein and MAP Kinase Signaling Pathways
Barry Goz (29) Virus and Cancer Chemotherapy
Klaus Hahn (126) Development of Fluorophores for Site-Specific Protein Labeling, Live Cell Biosensors and Their Biological Applications, Motility, Apoptosis and Crosstalk in Signaling
T. Kendall Harden (37) Receptor Biochemistry, Regulation of Second-Messenger Signaling
*Clyde Hodge (123) Molecular Mechanisms Mediating the Reinforcing/Pleasurable Subjective Effects of Alcohol and Other Drugs
Gary L. Johnson (124) Receptors/G-Proteins, Defining the Signal Relay Systems Initiated by Various Cellular Stimuli (Including Cytokines), Growth Factors, Antigens, and Drugs Used to Treat Human Disease
*Alan Jones (138) Heterotrimeric G Protein Signaling in Model Systems
*Rudolph L. Juliano (62) Membrane Biochemistry of Cell Interactions, Drug Delivery Systems
*J. Stephen Kizer (34) Molecular and Cellular Biology of Post-Translational Processing
*David Lawrence (139) Chemical Biology of Signal Transduction
*William Maixner (64) Pain Research and Autonomic Nervous System Research
Ken D. McCarthy (42) Neuronalglial Interactions Studied in Situ Using Electrophysiology, Confocal Imaging and Conditional Knockouts
*Howard McLeod (140) Pharmacogenomics, Applied Therapeutics, Clinical Pharmacology, and Integration of Genetics Principles into Clinical Practice
*Leslie Morrow (105) Molecular Neuropharmacology of GABA Receptors and Alcohol
Robert A. Nicholas (68) G-Protein-Coupled P2Y Receptors, Mechanisms of Antibiotic Resistance
*David A. Ontjes (30) Endocrine Pharmacology, Clinical Endocrinology
*Leslie V. Parise (70) Adhesion Receptors and Signal Transduction in Platelets, Sickle Cell Disease and Cancer
*Cam Patterson (115) Angiogenesis, Vascular Biology Endothelium, Atherosclerosis
Bryan Roth (130) Regulation of Signaling and Trafficking, Drug Discovery
*David Rubenstein (141) Cell Adhesion and Signal Transduction and the Role of Human Proteins B-Catenin and Plakoglobin
*Janet Rubin (142) Mechanical and Hormonal Control of Bone Remodeling, Mesenchymal Stem Cell Differentiation, and Osteoporosis
R. Jude Samulski (77) Development of Efficient Viral Vectors for Gene Delivery into Eukaryotic Genes
John Sondek (100) X-Ray Crystallography and Transmembrane Signaling

Associate Professors

*JeanCook (144) Regulation of DNA Replication in Mammalian Cells
*Adrienne D. Cox (90) Ras Family Oncogenes, Lipid Modification and Protein Function
Lee M. Graves (89) Growth Factor-Mediated Signal Transduction
*Christian Jobin (135) Molecular Mechanism of Intestinal Inflammation and Regulation of Intestinal Homeostasis by Signaling Cascades
*Yanping Zhang (143) Molecular Basis of Cancer

Assistant Professors

*J. Alex Duncan (145) Inflammation and Immune Response, and Host Pathogen Interactions
Thomas Kash (134) Neurophysiological Alterations Underlying Dysregulated Emotional Behavior
*Andrea Nackley Neely (146) Functional Pain Genetics, Pain Neurobiology and Signaling, and Pain Biomarker Discovery
Zefeng Wang (131) Splicing Regulation and Modulation
Angelique Whitehurst (132) Cancer Pharmacology, Genome-Wide Sirna Screens

Adjunct Professors

James W. Putney (84) Second Messenger Signaling
Robert L. Rosenberg (69) Regulation of Ion Channels
David Siderovski (111) Regulator of G-Protein Signaling (RGS) Family of Proteins

Adjunct Associate Professors

Kenneth S. Korach (85) Biochemistry and Biology of Steroid Hormone Receptors
Sommath Mukhopadhyay (143) Cannabinoid and G-protein Coupled Receptor-Mediated Regulation of Neurogenesis and Angiogenesis

Adjunct Assistant Professors

Antonio Baines (141) Molecular Targets Involved in the Transformation of Pancreatic Cancer
John P. O'Bryan (114) Signal Transduction by Tyrosine Kinases, Role of Adaptor Proteins, Oncogenesis

Professors Emeriti

Hugh J. Burford
Philip L. Carl (Research Associate Professor)
Kenneth H. Dudley
Curtis Harper
John T. Gatzy
Philip F. Hirsch
Tom S. Miya

Paul L. Munson
William Henry Pearlman
Doris T. Poole
Gene A. Scarborough
Roy V. Talmage
Svein U. Toverud
** joint faculty members*

The Department of Pharmacology offers a program of study that leads to the degree of doctor of philosophy in pharmacology. The curriculum is individualized in recognition of the diverse backgrounds and interests of students and the broad scope of the discipline of pharmacology. The basic course requirements for the Ph.D. degree include introductory and advanced courses in pharmacology and related programs in accord with the principal interest of the students in molecular pharmacology, neuropharmacology, or in toxicology. In addition, in order to satisfy the requirements of the department and The Graduate School, the student must pass written and oral doctoral examinations, write a dissertation based on original research, and submit to a final oral examination. Under special circumstances, the department will offer a program leading to the M.S. degree. The requirements are appropriate course work, a written comprehensive examination, a thesis based on original research, and a final oral examination.

The department offers a variety of research areas including 1) receptors and signal transduction, 2) ion channels, 3) neuropharmacology, 4) cancer pharmacology, 5) gene therapy, and 6) pharmacology of alcohol and drugs of abuse. The student is expected to begin independent research early in his or her training and to participate in an intensive program of research seminars. Close personal contact between preceptor and trainee is encouraged.

Research Facilities

Laboratory facilities and a wide variety of research equipment are available in the department, which is located primarily in the Genetic Medicine Building, where it occupies approximately 30,000 square feet (exclusive of classrooms and animal facilities). In addition, several faculty members are located in the Lineberger Comprehensive Cancer Center, the Thurston Bowles Alcohol Center, and the Neurosciences Building.

Assistantships and Other Student Aid

Financial assistance is provided to all students. The stipend for the 2013–2014 fiscal year will be $27,500 per year. In addition, tuition, fees and health insurance coverage are provided.

Requirements for Admission

All students in the basic science departments in the Medical School and the biological sciences divisions in biology and chemistry enter graduate school through the Biological and Biomedical Sciences Program (www.med.unc.edu/bbsp). During the first year students take courses and complete three rotations in labs from any of the participating departments or curricula.

After identifying a research mentor, if that faculty member is affiliated with the Pharmacology Department (www.med.unc.edu/pharm/people/primaryfaculty), students can choose to join the pharmacology graduate program. Once in the program, students complete required course work and qualifying examinations, propose a research topic, choose a dissertation committee, and engage in dissertation research. The anticipated duration of training is five years.

The pharmacology graduate program is dedicated to the training of outstanding scientists in the pharmacological sciences. An outstanding graduate program is a high priority of the department, and the training faculty participate fully at all levels. The department has the highest level of NIH funding of all pharmacology departments and a great diversity of research areas is available to trainees. These areas include: cell surface receptors, G proteins, protein kinases and signal transduction mechanisms; neuropharmacology; nucleic acids, cancer, and antimicrobial pharmacology; and experimental therapeutics. Cell and molecular approaches are particularly strong, but systems-level research such as behavioral pharmacology and analysis of knock-in and knock-out mice is also well-represented. Excellent physical facilities are available for all research areas.

Students completing the training program will have acquired basic knowledge of pharmacology and related fields, in-depth knowledge in their dissertation research area, the ability to evaluate scientific literature, mastery of a variety of laboratory procedures, skill in planning and executing an important research project in pharmacology, and the ability to communicate results, analysis, and interpretation. These skills provide a sound basis for successful scientific careers in academia, government, or industry.

To apply to BBSP, students must use The Graduate School's online application form which can be accessed at gradschool.unc.edu/admissions/ . Please read the information for domestic or international applicants at the above Web site before beginning the application. For Question 2 of the application, scroll down to School of Medicine and select "Biological and Biomedical Sciences" from the dropdown list.

The following are required for an application to be considered complete:

1. Nonrefundable application fee (the department cannot review your application until this is paid)
2. Copies of each of the student's transcripts
3. Letters of recommendation (submit online)
4. Personal statement (submit online)
5. GRE scores (must be less than five years old; UNC institution code is 5816)
6. TOEFL score (must be less than two years old, and is necessary only if the student is an international applicant who does not have an undergraduate degree from a U.S. university)

For Graduate School information and submission of application materials:
UNC Graduate School, Admissions Office, gradschool.unc.edu/admissions

For program information and submission of application materials:
BBSP Admissions
130 Mason Farm Road
1125 Bioinformatics Bldg.
CB#7108
University of North Carolina
Chapel Hill, NC 27599-7108
Telephone: (919) 843-6960
E-mail: bbsp@unc.edu

Courses for Graduate and Advanced Undergraduate Students
PHCO

643 Cell Structure, Function, and Growth Control I (BIOC 643, CBIO 643, MCRO 643, PHYI 643) (3). See CBIO 643 for description.

644 Cell Structure, Function, and Growth Control II (BIOC 644, CBIO 644, MCRO 644, PHYI 644) (3). See CBIO 644 for description.

Courses for Graduate Students

PHCO

701 Introduction to Molecular Pharmacology (2). Permission of the instructor. A first-year pharmacology course outlining the basic of molecular pharmacology, including molecular biology, drug/receptor interactions, receptors and ion channels, regulation of second messengers and drug metabolism. Two lecture hours a week.

702 Principles of Pharmacology and Physiology (TOXC 702) (3). Prerequisite, CHEM 430. Permission of the instructor for students lacking the prerequisite. Introduces students to the major areas of pharmacology and physiology and serves as a basis for more advanced courses. Three lecture hours a week

705 Behavioral Pharmacology (NBIO 705, PSYC 705) (3). See PSYC 705 for description.

707 Advanced Toxicology (ENVR 707, TOXC 707) (3). See TOXC 707 for description.

715 the Molecular Pharmacology of Cancer (2). Required preparation, advanced graduate or advanced undergraduate courses in biochemistry and molecular biology. This course deals with the molecular and cellular basis of anticancer and antiviral chemotherapy, with emphasis on novel approaches including immunotherapy, antisense oligonucleotides, and gene therapy. The course includes faculty lectures and student presentations.

721 Seminar Courses in Pharmacology (1–3). This is a series of seminar courses dealing with advanced topics in modern molecular pharmacology based mainly on discussion of current literature.

722 Cellular and Molecular Neurobiology I (PHYI 722) (2–6). Lecture/discussion course on the physiology, pharmacology, biochemistry, and molecular biology of the nervous system. Topics include function and structure of ion channels, neurotransmitter biosynthesis and release mechanisms, neurotransmitter receptors, and intracellular signaling pathways.

722A Cellular and Molecular Neurobiology: Introduction and Electrical Signaling (BIOC722A, NBIO 722A, PHYI 722A) (2). See NBIO 722A for description.

722B Cellular and Molecular Neurobiology: Postsynaptic Mechanisms-Receptors (BIOC 722B, NBIO 722B, PHYI 722B) (2). See NBIO 722B for description.

722C Cellular and Molecular Neurobiology: Synaptic Mechanisms & Intracellular Signaling (BIOC 722C, NBIO 722C, PHYI 722C) (2). See NBIO 722C for description.

723 Cellular and Molecular Neurobiology II (PHYI 723) (2–6). See PHYI 723 for description.

723A Cellular and Molecular Neurobiology: Development of the Nervous System (BIOC 723A, NBIO 723A, PHYI 723A) (2). See NBIO 723A for description.

723B Cellular and Molecular Neurobiology: Anatomy and Function of Sensory and Motor Systems (BIOC 723B, NBIO 723B, PHYI 723B) (2). See NBIO 723B for description.

724 Ras Superfamily Proteins and Signal Transduction (2). Seminar/discussion course covering recent advances in the role of these proteins in signaling and growth.

725 Signal Transduction (BIOC 725) (2). Seminar/discussion course on molecular aspects of the receptors, G-proteins, effector proteins, kinases, and phosphatases that mediate hormone, neurotransmitter, growth factor, and sensory signaling.

726 Adhesion Receptors and Signaling in Cancer and CV Disease (2). Examines the growing number of families of cell adhesion receptors and their role in biological processes including signal transduction, control of gene expression, hemostasis, cancer, neuronal development, immunobiology, and embryologic development.

727 Structure and Function of Ion Channels (2). Seminar/discussion course on the physiology, pharmacology, biochemistry, and molecular biology of ion channel proteins.

728 Neuropharmacology of Alcohol and Substance Abuse (3). A lecture/discussion course on the biological bases of alcohol and substance abuse.

729 Gene Therapy: Medicine for the Twenty-First Century (2). A seminar/discussion course on recent advances in targeted gene delivery and gene therapy.

730 Seminar in Recent Advances in Pharmacology (1). Students meet as a group with faculty members to develop skills in critical reading and to summarize and discuss selected aspects of current pharmacological literature. Two hours a week.

732 Grant Writing (2). Prerequisite, PHCO 701. Permission of the instructor. A discussion course covering the elements of successful grant proposals and scientific ethics.

733 Drug Discovery and Development (2). A seminar/discussion course on the research, development and regulatory processes involved in bringing new drugs to clinical use.

734 Pain and Analgesia (2). A lecture/discussion course on pain transmission and pain measurement. The neuropharmacological basis of pain modulation will be discussed.

735 Discovery Biology and Pharmacogenomics (2). Lecture/discussion course covering a variety of aspects of new biological and computational technologies. The course is predominantly in a lecture format with computer-based and literature assignments.

736 Protein Kinases as Targets for Novel Pharmacological Inhibitors (2). A seminar/discussion course to evaluate the use of small molecule inhibitors of protein kinases from a structural and signal transduction perspective.

737 Target-Based Drug Discovery and Cancer Treatment (2). A lecture/discussion course that emphasizes preclinical and clinical studies for the development of anti-cancer drugs that target signal transduction. Topics include target identification and validation, drug discovery, the process of government approval for clinical trials, design of clinical trials, and new genetic-based technologies to foster drug development.

738 Nanomedicine (2). Required preparation, completion of undergraduate major in physical or biological science or permission of the instructor. This course offers an introduction to the nascent interdisciplinary field of nanomedicine for students with physical/biological science backgrounds; course will be based on student-led discussions of current literature.

739 Reprogramming of Somatic and Stem Cells and Its Applications in Pharmacology (2). The objective of this new elective is to provide graduate students with an overview of stem cell biology with a unique emphasis on the applications of stem cells in pharmacology, particularly in areas of cancer and tissue regeneration.

740 Contemporary Topics in Cell Signaling: Phosphorylation Control (1). Required preparation, coursework in biochemistry, pharmacology and/or cell & molecular biology. Permission of the instructor. This graduate-level course is an in-depth analysis of how protein kinases and protein phosphorylation regulates key aspects of cell signaling. This class is one of the "Contemporary Topics in Cell Signaling" modules.

741 Contemporary Topics in Cell Signaling: GTPases (1). Required preparation, coursework in biochemistry, pharmacology, and/or cell & molecular biology. Permission of the instructor. This graduate-level course conveys principles of signal transduction controlled by GTPases and emphasizes in-depth discussion of current literature and unanswered questions. This class is one of the "Contemporary Topics in Cell Signaling" modules.

742 Contemporary Topics in Cell Signaling: Cell Cycle Control (1). Permission of the instructor. Required preparation, coursework in biochemistry and/or cell & molecular biology. This graduate-level course conveys principles of eukaryotic cell proliferation control emphasizing in-depth discussion of current literature and unanswered questions. This class is one of the Contemporary Topics in Cell Signaling modules.

746 Introduction to Computer Vision Tools for Modern Microscopy (1). This course will introduce computer vision methods for cell biology. Each topic will be motivated with an explanation of a computational challenge, followed by a discussion of available techniques to address the need and practical examples for how to apply the techniques.

850 Seminar in Neurobiology (BIOL 850, NBIO 850, PHYI 850) (3). See NBIO 850 for description.

900 Special Pharmacology Research (3–6).

901 Research in Pharmacology (1–21). Permission of the department.

951 Research in Neurobiology (BIOL 951, NBIO 951, PHYI 951) (3–12). See NBIO 951 for description.

989 Special Pharmacology Research (3–6).

993 Thesis for Master's Degree (3–6). Permission of the department.

994 Doctoral Dissertation (3–9). Permission of the department.

Eshelman School of Pharmacy

www.pharmacy.unc.edu
ROBERT A. BLOUIN, *Dean*

Professors

Susan J. Blalock (115) Risk Communication, Behavior Change, and Psychosocial Aspects of Chronic Illness
Robert A. Blouin, Effects of Infectious Disease and Trauma on Altered Physiologic States (i.e., Aging and Obesity), and the Expression and Regulation of Drug Metabolizing Enzymes
Kim L. R. Brouwer (62) Hepatobiliary Drug Disposition, Drug Transport, Prediction of Drug Interactions and Hepatotoxicity, Clinical Pharmacokinetics and Quantitative Systems Pharmacology
Moo J. Cho (79) Targeted Drug Delivery
Frederick M. Eckel (9) Exploration and Role Development of Pharmacist as Health Team Member
Stephen Frye, Drug Design, Enzyme Inhibitor Design, Protein Kinases
Leaf Huang (121) Gene Therapy, Targeted Gene/Drug Delivery
Timothy J. Ives, Pharmacotherapy of Chronic Pain and Neuropathic Pain
Bill Janzen, Drug Discovery, High Throughput Screening, Automation, and Process Improvement
Michael Jay (137) Nanotechnology, Nuclear Sciences
Rudolph Juliano, Cell Adhesion Molecules and Signal Transduction, Macromolecular Therapeutics
Alexander Kabanov
Angela Kashuba (114) Clinical Pharmacology of Antiretroviral Agents in HIV Treatment, Prediction of Drug-Drug and Drug-Cytokine Interactions and Adverse Effects, Role of Sex and Ethnicity in Drug Disposition.
Harold Kohn (106) Organic, Medicinal, and Bio-Organic Chemistry; Mechanisms of Biochemical and Medicinal Processes; Synthesis and Investigation of Heterocyclic Compounds of Medicinal Interest
David Lawrence (133) Application of Chemical Tools to Biological Questions–Enzyme Sensors; Light-Activated Inhibitors, Sensors, and Signaling Proteins; Light-Induced Gene Expression; Chemical Genomics
Kuo-Hsiung Lee (13) Medicinal Chemistry of Bioactive Natural Products and Synthetic Analogs including Antitumor, Anti-AIDS, Antimalarial, Antihepatic, Anti-inflammatory, Anti-Arthritis, and Antiviral Agents; Antifungal Antibiotics; Insect Antifeedants; Chinese Herbal Medicine
Jian Liu (108) Carbohydrate Biochemistry, Structural and Functional Relationships of Heparan Sulfate
Howard L. McLeod (127) Pharmacogenomics, Translational Pharmacology, Colorectal Cancer
Russell J. Mumper (132) Nanoparticle Engineering for Tumor and Dendritic Cell Targeting Vaccines; Biocompatibility, Hemocompatibility and Toxicology of Nanoparticles and Nanomaterials; Muco-Adhesive Gels and Thin Films for Mucosal Delivery of Drugs, Vaccines and Microbicides' Anticancer and Anti-inflammatory Properties of Berries and Berry Extracts
J. Herbert Patterson (47) Individualized Pharmacotherapy of Heart Failure
Betsy L. Sleath (91) Provider-Patient Communication about Medications, Health Disparities, Improving Adherence to Medication Regimens
Dhiren R. Thakker (87) Mechanisms of Drug Transport; Pro-Drug Strategies for Enhanced and Targeted Drug Delivery; Disposition of Macromolecules (e.g., Genes)
Alexander Tropsha (81) Molecular Modeling, Computer-Assisted Drug Design, Molecular Dynamics of Proteins, Protein Folding
Paul Watkins, Clinical Pharmacology; Drug-Induced Liver Injury
Xiao Xiao (126) Viral-Based Gene Delivery, Gene Therapy for Muscular Dystrophy and Other Diseases

Associate Professors

Kenneth F. Bastow (84) Design and Testing of Antiviral/Anticancer Drugs
Elena Batrakova, Development of Active Targeted Delivery of Therapeutic Polypeptides to the Brain for Treatment of Parkinson's Disease using Inflammatory-Response Cells as Vehicles
Joel Farley (124) Pharmaceutical Policy, Pharmaceutical Outcomes Research, Comparative Effectiveness Research, Medication Adherence
Federico Innocenti, Clinical Pharmacology–Oncology/Pharmacogenomics
Michael B. Jarstfer (112) Chemical Biology to Study Social Behavior and Telomere Biology
Richard J. Kowalsky (26) Application of Radiopharmaceuticals in Nuclear Medicine and Investigational Studies
Andrew Lee (111) Structural Biology, NMR Spectroscopy, Protein Dynamics, Biophysical Dissection of Proteins and Protein-Ligand Interactions
Rihe Liu (113) Proteomics and Functional Genomics

Mary T. Roth-McClurg (125) Medication Management in Primary Care, Clinical Pharmacists and the Medical Home, Medication Management and Medical Home, The Quality of Medication Use and Drug Administration. Wayne Pittman (30) Hypertension, Clinical Pharmacokinetics, Cardiology and Drug Administration
Denise Rhoney, Pharmacotherapy of Acute Neurological Disorders, CSF Pharmacokinetics
Robert Shrewsbury, Basic and Applied Biopharmaceutics and Pharmacokinetics, Patient Care Compounding
Scott Singleton (116) Bio-Organic and Biophysical Chemical Investigations of the Mechanisms DNA Repair, Directed Evolution of Novel Enzymes, Development of Alternate Strategies for Targeting Drug-Resistant Pathogenic Microorganisms
Philip C. Smith (85) Pharmacokinetics, Drug Metabolism
Dennis M. Williams (92) Inhalation Therapy for Pulmonary Disease, Hypertension, Clinical Pharmacokinetics
Timothy J. Wiltshire, Preclinical Pharmacogenetics
William C. Zamboni, Optimization of Chemotherapeutic Treatment of Cancer, Pharmacokinetics, Pharmacodynamics, Pharmacogenetics

Assistant Professors

Stacy Bailey, Health literacy, Health disparities, Medication understanding and use
Gang Fang, Pharmacoepidemiology, Medication Adherence, Evaluation of Treatment Utilization and Outcomes in Populations, Comparative Treatment Effects Research, Patient-Centered Outcomes, Health Disparities.
Joel Farley (124) Pharmaceutical Policy, Pharmaceutical Outcomes Research, Comparative Effectiveness Research, Medication Adherence
Shawn Hingtgen, Cell-Based Delivery for Treatment of Brain Cancer
Craig R. Lee (128) Cardiovascular Biology, Genomics and Biomarkers, Eicosanoid Metabolism, Inflammation Sam Lai, Infectious Diseases and Lymphatic Drug Delivery
Samuel K. Lai, Mucosal Immunity, Immune-Nanoparticle Interactions and Lymphatic Drug Delivery
Christine Oramasionwu, HIV/AIDS Health Disparities and Health Outcomes, Medication Use in Minority, Underserved, and International Populations Mary Paine, Clinical Pharmacokinetics, Drug Metabolism and Intestinal Transport, Pharmacogenetics
Qisheng Zhang (130) Endogenous Small Molecule-Regulated Cell Signaling and Relevance to Diseases, Phosphoinositide Signaling, Chemistry and Biology of S-adenosylmethionine, Imaging and Regulating Phosphatase PRL-3

Research Professors

Clark D. Jeffries, Chemical Biology and Medicinal Chemistry
Dmitri Kireev, Computational Drug Discovery
Feng Liu, Gene and Drug Delivery
Michael Wagner, Pharmacogenomics, Translational Pharmacology
Research Associate Professors
Jian Jin, Integrative Chemical Biology and Drug Discovery
Juan Li, Gene Therapy
Alexander Golbraikh, Chemical Biology and Medicinal Chemistry, Informatics
Charles Green, Innovative Educational Technologies
Susan Morris-Natschke (102) Design, Synthesis and Structural Optimization of Antiviral Phospholipids

Research Assistant Professors

James Auman, Pharmacogenomics and Individualized Therapy
Rahima Benhabbour, Organic Chemistry and Drug Delivery
Delesha Carpenter, Medication Adherence, Chronic Disease Self-Management, mHealth and eHealth Interventions, Patient-Provider Communication
Anthony Di Pasqua, Bioorganic Chemistry and Tumor Biology
Julie Dumond, Pharmacometrics, Clinical Pharmacokinetics
Ruth Everett, Metformin Intestinal Absorption, Transport Mechanisms and Anticancer Activities, Modulation of Tight Junctions for Enhanced Drug Delivery
John R. Kagel, Bioanalysis, GLP
Xin Ming
Kyoko Nakagawa-Goto
Keduo Qian, Chemical Biology and Medicinal Chemistry
Chunping Qiao, Gene Therapy
Mary Roederer, Medical Decision-Making Integrating Pharmacogenomics/Pharmacogenetics Data at the Individual Patient Level and Formulary Level, Education of Pharmacists and Pharmacy Students Regarding Pharmacogenomics/Pharmacogenetics
Vyas Sharma, Chemical Biology and Medicinal Chemistry
Ruhang Tang, Molecular Pharmaceutics
Qunzhao Wang, Biochemistry
Xiang Wang, Molecular Modeling
Xiaodong Wang, Therapeutic Targets in Oncology
Zhuo Wang, Drug Metabolism and Pharmacokinetics
Kristina Wolf, Intestinal Metabolism and Transporter-Based Drug Interactions
Wei Yue, Regulation of Hepatic Uptake Transporters
Hao Zhu, Molecular Modeling

Clinical Professors

J. Heyward Hull, Cardiovascular Pharmacology, Clinical Pharmacokinetics, Study Design and Analysis
Greene Shepherd, Clinical Toxicology
K.T. L. Vaughn, Pharmacy Practice and Experiential Education, Clinical Library Sciences

Clinical Associate Professors

Betsy Bryant Shilliday, Pharmacy Practice and Experiential Education, Pharmacotherapy of Anticoagulation, Health Literacy, Transitions of Care, Quality Improvement, Patient Outcomes Research
Amanda H. Corbett, Pharmacology of Antiretrovirals, Opportunistic Infection Therapies in Resource-Poor Countries
Stephen Dedrick, Continuing Professional Education
Betty Dennis, Pharmacy Practice and Experiential Education
Robert E. Dupuis, Clinical Pharmacokinetics, Drug Metabolism of Immunosuppressants in Organ Transplant Recipients, Relationship between Drug Metabolism, Toxicity and Outcomes
Stefanie P. Ferreri, Evaluating Pharmaceutical Care in the Community Pharmacy Setting
John Kessler, Medication Safety
Macary Marciniak, Evaluating Pharmaceutical Care in the Community Pharmacy Setting
Robb Malone, Pharmacy Practice and Experiential Education
Elizabeth Michalets, Pharmacy Practice and Experiential Education
Adam M. Persky, Pharmacy Education, Pharmacokinetics and Pharmacodynamics of Dietary Supplements
Jo Ellen Rodgers, Clinical and Translational Research in Heart Failure
Phillip T. Rodgers, Experiential Education Methods and Outcomes
Mollie A. Scott, Pharmacy Practice and Experiential Education, Patient Centered Medical Homes Models of Pharmacy Practice, Osteoporosis, Billing for Cognitive Services, Interprofessional Education

Clinical Assistant Professors

Heidi Noel Anksorus, Pharmacy Practice and Experiential Education, Patient Care Laboratory, Acute Care Pharmacotherapy
Jena Ivey Burkhart, Innovative Practice Models in Geriatrics, Geriatric Interdisciplinary Training among Healthcare Professional Students, Clinical Pharmacist Interventions in the Primary Care Setting

Paul Bush, Pharmacy Practice and Experiential Education, Expansion of Pharmacists' Role in the Delivery of Patient Care
Kristen Bova Campbell, Pharmacy Practice and Experiential Education
Wendy Cox, Professional Education
Rowell Daniels, Pharmacy Practice and Experiential Education, Expansion of Pharmacists' Role in the Delivery of Patient Care
Lisa Dinkins, Pharmaceutical Care Labs, Evaluating Pharmaceutical Care in the Community Pharmacy Setting
Stephen Eckel, Pharmacy Practice and Experiential Education, Utilization of Pharmacy Automation, Role of Pharmacists in Improving Patient Care
Robert Granko, Pharmacy Practice and Experiential Education, Expansion of Pharmacists' Role in the Delivery of Patient Care
Roy Hawke (118) Clinical Pharmacology of Natural Products and Their Mechanisms of Action and Disposition in Liver Disease
Bill Hitch, Pharmacy Practice and Experiential Education
Debra Kemp, Pharmacy Practice, Ambulatory Care Pharmacotherapy Evaluation
Ruth Ann Lee, Innovative Ambulatory Care Practice Model in Solid Organ Transplant
Barbara Kostic, Pharmacy Practice and Experiential Education
Kim Leadon, Professional Experience
Adam Orsborn, Pharmacy Practice and Experiential Education, Improving Efficiency in Workflow Systems
Tracie Rothrock-Christian, Pharmacy Practice and Experiential Education
Scott W. Savage, Pharmacy Practice and Experiential Education, Expansion of Pharmacists' Role in the Delivery of Patient Care
Kelly Scolaro, Patient Care Labs, Geriatric Pharmacotherapy
John M. Valgus, Pharmacy Practice and Experiential Education
Christine M. Walko, Clinical Pharmacology of Anticancer Drugs, Clinical Pharmacokinetics of Anticancer Drugs, Cancer Pharmacogenomics
Latasha Weeks, Health Disparities, Rural and Minority Health, Cultural Competency, Health Literacy
Carla White, Educational Policy and Philosophy, Communication Theory, and Strategic Program and Leadership Development

Adjunct Professors

Nancy Allbritton
Patricia J. Bush
Michael Crimmins, New Methodology and Synthesis of Natural Products
Joseph DeSimone, Polymer Synthesis, Liquid and Supercritical CO2 Processing, Gene Therapy and Drug Delivery
John Grabenstein
Klaus Hahn, Tools for Studying Signaling Dynamics
Robert Konrad
Lawrence Lesko, Clinical Pharmacology and Drug Development
Wenbin Lin, Crystal Engineering
Matthew Maciejewski
Elaine Mardis, Characterization of Cancer Genomes, Genome Sequencing Technologies
Gerald Miwa, Drug Metabolism and Drug Development
Gary Pollack, Pharmacokinetics, Pharmacodynamics
John Robert Powell, Clinical Pharmacology and Drug Development
Jack Reynolds, Toxicity and Drug Development
Bryan Roth, GPCR Structure
Til Sturmer
Robert Voyksner, Mass Spectrometry
Morris Weinberger
Daryl C. Zeldin, Respiratory Biology, Exposure Assessment and Prevention of Asthma, Eicosanoid Metabolism

Adjunct Associate Professors

Elizabeth Andrews
Andrea K. Biddle
David M. Cocchetto, Clinical Pharmacology, Antiviral/Antibacterial Regulatory Affairs
Paul A. Dayton, Biomedical Engineering and Ultrasound
Patricia Deverka, Medical Technology Policy
Marisa Domino
Felix Frueh, Pharmacogenomics and Clinical Pharmacology
Sandra Greene
Alan Higgins, Preclinical Drug Development
Nancy Allen Lapointe, Translational Research of Antiarrythmic Drug Therapy
Steven R. Moore
Michael Murphy, Molecular Genetics
William T. Sawyer, Drug Development
Susan Sutherland
Dan Weiner, Pharmacometrics, Pharmaceutical Biostatistics
Issam Zineh, Pharmacogenomics and Clinical Pharmacology
Zhiyang Zhao, Pharmacokinetics and Drug Metabolism

Adjunct Assistant Professors

Hisham Aljahedy
Christopher Blanchette
Peter Bonate, Pharmacokinetics Modeling Simulation
Jack W. Campbell
Lynn Dressler
Stacie Dusetzina
Stephanie Earnshaw
Eric Faulkner, Personalized Medicine Development
Mona Fiuzat, Heart Failure Drug Development and Pharmacogenomics
Alex Zhenghong Fu
Giulia Ghibellini, Pharmacokinetics, Clinical Pharmacology
Alicia Gilsenan
Allison Harrill, Toxicology, Drug-induced Liver Injury
Charles Lee
Martin Marciniak
Phil Mendys, Cardiovascular Drug Development and Preventive Cardiology
Alison A. Motsinger, Pharmacogenetics, Bioinformatics
Kouros Owzar, Biostatistics and Bioinformatics
Nita Patel, Preclinical Drug Development
Erick Peters, Psychiatric and Cancer Pharmacogenomics
Cosette Serabjit-Singh, Computational Approaches to Predicting ADME Parameters/Pharmacogenetics
Richard Stanford
Russell Thomas, Genomic Biology and Bioinformatics
Andrew Z. Wang, Radiation Oncology, Nanomedicine
Keele Wurst
Maceij Zamek-Gliszczynski, Preclinical Drug Development

Professors Emeriti

William Campbell
George H. Cocolas
Dale Christensen
Boka Hadzija
Anthony Hickey
Khalid S. Ishaq
Tom S. Miya
G. Joseph Norwood

The UNC Eshelman School of Pharmacy offers graduate curricula leading to the master of science in pharmaceutical sciences with a specialization in health-system pharmacy administration, and doctor of philosophy in pharmaceutical sciences with concentrations in one of four research areas: chemical biology and medicinal chemistry; molecular pharmaceutics; pharmacotherapy and experimental therapeutics; or pharmaceutical outcomes and policy. Graduate study is concentrated in the disciplinary areas represented by the divisions of chemical biology and medicinal chemistry, molecular pharmaceutics, pharmaceutical outcomes and policy, pharmacotherapy and experimental therapeutics, and practice advancement and clinical education within the School of Pharmacy.

Instruction emphasizes contemporary research methods, study design, and results and is delivered in the form of small group lectures/discussions, group activities and recitations, and seminars combined with intensive laboratory-based research. The excellent rapport that exists between schools, departments, institutes, and centers within the University facilitates interdisciplinary collaborative research by graduate students and faculty. The graduate degree programs also benefit from faculty affiliations with GlaxoSmithKline, Inc., the Research Triangle Institute, the Hamner Institutes for Health Sciences, Duke University, the Wake Forest University School of Medicine, and many other organizations in the Research Triangle Park area. The UNC Eshelman School of Pharmacy is housed in Beard Hall, Kerr Hall, and the Genetic Medicine Building which are located on the health sciences campus together with the Schools of Dentistry, Medicine, and Nursing and the Gillings School of Global Public Health. The Health Sciences Library has an outstanding collection of books and journals as well as computer and support services. Library and laboratory resources residing in other University departments are also available for use by students and faculty.

Chemical Biology and Medicinal Chemistry

Chemical biology and medicinal chemistry are multidisciplinary fields that integrate organic chemistry, biochemistry, molecular biology, structural biology, pharmacology, and physiology. The research in the division applies and extends the basic concepts of chemistry, biochemistry, and pharmacology to the investigation of biomedical problems. General areas of study include structure-activity relationships, drug-receptor interactions, synthetic drug design, and target discovery and validation. Specific focus areas include cancer chemotherapy, computer-aided drug design, enzymology, glycobiology, molecular modeling, natural products, neurochemistry, parasitology, and structural biology.

A Ph.D. is offered with a concentration in chemical biology and medicinal chemistry.

Molecular Pharmaceutics

Molecular pharmaceutics represents interdisciplinary specialties encompassing a range of scientific endeavors, including: 1) the design, fabrication, evaluation, use of, and delivery strategies for dosage forms, 2) elucidation of the behavior of pharmacologic agents in biologic systems, 3) determination of the ability of pharmacologic agents to reach the relevant site of biologic effect and 4) determination of the time course of biologic activity. These areas of specialization represent critical steps in the development of new therapeutic agents, the evaluation of new and existing drugs, and the optimal clinical use of pharmacologic agents.

Students in the Division of Molecular Pharmaceutics are required to participate in a common core of entry-level graduate courses. This core provides a broad perspective of the pharmaceutical sciences as well as an appreciation for how different sub disciplines interact. Many dissertation projects are collaborative in nature and rely upon interactions with faculty in other divisions of the UNC Eshelman School of Pharmacy, as well as with colleagues in the School of Medicine, the Department of Chemistry, or at pharmaceutical companies or institutions located in the Research Triangle Park area.

A Ph.D. is offered with a concentration in molecular pharmaceutics.

Pharmaceutical Outcomes and Policy

The Division of Pharmaceutical Outcomes and Policy offers a Ph.D. program in pharmaceutical sciences emphasizing an interdisciplinary approach to addressing issues relevant to medication use at the patient, provider, community, and societal levels. Faculty research interests and course offerings reflect this interdisciplinary orientation. Students develop knowledge and skills that enable them to conduct high quality research directed at improving the use and cost effectiveness of medications, technology and services. Education and research in the division draws heavily upon expertise in numerous fields such as: health services research, health policy, health communication, health behavior and behavior change, epidemiology, and psychometrics. Areas of faculty and student research include: communication and decision making, comparative effectiveness of medications and pharmacy practice models, medication adherence and self-management, health disparities, health literacy, patient reported outcomes assessment, pharmaceutical policy analysis, and policy and ethical issues related to pharmacogenomics.

A Ph.D. is offered with a concentration in pharmaceutical outcomes and policy.

Pharmacotherapy and Experimental Therapeutics

The Division of Pharmacotherapy and Experimental Therapeutics offers a Ph.D. program in the pharmaceutical sciences with a focus on translational research, clinical pharmacology, and experimental therapeutics. The goal of the program is to develop clinician scientists who are prepared to generate, integrate and disseminate new knowledge to optimize drug therapy and improve health outcomes for the benefit of patients and society. Graduate students engage in clinical experiences throughout the program that are designed to complement each student's research interests while also facilitating their development as translational scientists. Areas of graduate coursework and research include drug metabolism and transport, pharmacokinetics/pharmacodynamics/pharmacometrics, pharmacogenomics, clinical research, drug development, experimental therapeutics, and mechanisms of drug toxicity. Therapeutic and research areas of particular strength include cardiovascular disease, infectious disease/HIV, oncology/hematology, hepatology/gastroenterology/transplant, and pulmonary disease.

A Ph.D. is offered with a concentration in pharmacotherapy and experimental therapeutics.

Requirements for Admission to the Ph.D. Program

Applicants who have completed a standard collegiate curriculum in pharmacy, chemistry, biochemistry, biology, engineering, or in an allied field in the University, or in other universities or colleges having curricula acceptable to the UNC–Chapel Hill Graduate School, are eligible for admission to the graduate program in pharmaceutical sciences. Applications for admission must be supported by scores on the Graduate Record Examination, letters of recommendation, official transcripts, and a statement of personal goals as they relate to graduate study at the UNC Eshelman School of Pharmacy.

The Graduate School online application (gradschool.unc.edu/admissions) is the standard means of applying for admission. Inquiries concerning admission to programs in the pharmaceutical sciences may be directed to the Office of Student Affairs, CB# 7566, 109 Beard Hall, Chapel Hill, NC 27599-7566.

Master of Science in Pharmaceutical Sciences

The Division of Practice Advancement and Clinical Education (PACE) offers the master of science in pharmaceutical sciences with a specialization in health system pharmacy with a goal of preparing pharmacists for leadership positions in health care. In order to accomplish this goal, the program will provide students with the knowledge, skills and experience necessary to assume a variety of roles and responsibilities. Our graduates will serve as vibrant, committed professionals with a focus on improving patients' health, health-care delivery, and the profession of pharmacy. This will occur through both didactic education and experiential opportunities in class and in the workplace.

Graduate Assistantships and Fellowships in the UNC Eshelman School of Pharmacy

Graduate teaching and research assistantships in the UNC Eshelman School of Pharmacy provide a stipend of $27,500 for 12 months' service. All awards are made on a competitive basis with consideration given to the applicant's academic record and Graduate Record Examination scores. Information concerning these assistantships, fellowships, and traineeships may be obtained by writing directly to the Office of Research and Graduate Education at the UNC Eshelman School of Pharmacy.

Chemical Biology and Medicinal Chemistry Courses for Graduate Students

CBMC

805 Molecular Modeling (BIOC 805) (3). See BIOC 805 for description.

807 Foundations of Chemical Biology I: Organic and Medicinal Chemistry (3). Prerequisite, CHEM 262. The elements of organic chemistry required for the design and synthesis of chemical probes and biologically active compounds.

833 Molecular Target-Based Drug Discovery (3). Prerequisite, CBMC 804. An integrated introduction to molecular target-based drug discovery including bioactive natural products, neuropharmacology, chemical biology, and recent advances and techniques in drug discovery.

Medicinal Chemistry Courses for Graduate Students

MEDC

804 Drug Discovery Targets I (3). Prerequisites, CHEM 261 and 262. Introduction to the principles of design and discovery of effective therapeutic agents. Concepts of physical chemistry, pharmacokinetics and disposition, and analytical techniques in the context of drug design.

806 Macromolecular Modeling (BIOC 806) (3). Prerequisites, MATH 231, 232, and CHEM 430. Introduction to modeling and simulation techniques for biological macromolecules. Two lecture and three to four laboratory hours per week.

821 Chemistry of Natural Products (3). Prerequisite, CHEM 466. Permission of the instructor. An introduction to the isolation, structure determination, biosynthesis, and synthesis of bioactive natural products; emphasis on aspects relating to medicinal chemistry. Three hours a week.

822 Selected Topics in Natural Products (2). Prerequisites, CHEM 466 and 468. Discussions of important recent developments in the chemistry of natural products of biomedical significance.

836 Selected Topics in Synthetic Medicinal Chemistry (2). Prerequisite, CHEM 460. Discussions from current literature on the strategy and techniques involved in the synthesis of drug molecules. Two lecture hours a week.

842 Therapeutic Proteins (3). This course covers applications of modern information theory and information technologies to biomolecular systems. The core of this course is an overview and practical applications of methods and techniques for the analysis of nucleic acid and protein sequences, sequence-structure, and sequence-function correlations.

899 Seminar (1). Seminar consists of presentations on current research topics by the division's graduate students, faculty and invited speakers from industry, government, and other academic departments and institutions. Only four credits of MEDC 899 may count toward requirement for the PhD degree (two credits for MS).

900 Introduction to Research in Medicinal Chemistry (1–3). Prerequisites, CHEM 261 and 262. Permission of the instructor. One conference and three or more laboratory hours a week.

991 Research in Medicinal Chemistry (1–9). One conference and nine laboratory hours a week per course.

993 Master's Thesis (3). After didactic course work is complete, master's students register for three credits of MEDC 993 during the fall and spring semesters.

994 Doctoral Dissertation (3). Students register for dissertation credits after successfully completing all didactic course work. A minimum of six credit hours are required for graduation.

Molecular Pharmaceutics Courses for Graduate Students

MOPH

738 Nanomedicine (3). Offers an introduction to the interdisciplinary field of nanomedicine for students with physical, chemical, or biological sciences background. It will emphasize emerging nanotechnologies and biomedical application.

801 Nuclear Pharmacy 1 (3). Prerequisite, PHCY 411. Permission of the instructor. Basic principles of radiation physics, instrumentation, radiation safety, and radiation biology.

802 Nuclear Pharmacy 2 (3). Prerequisite, MOPH 801. Permission of the instructor. Chemical principles underlying the preparation, regulatory control, and use of radioactive drugs in nuclear medicine.

810 Drug Metabolism (3). Permission of the instructor. Introduction to the use of concepts, chemistry, enzymology, and techniques in drug metabolism for the design and development of safe and effective therapeutic agents.

840 Introduction to Research (1–3). Permission of the instructor. Students participate in research projects designed to introduce them to research opportunities in the pharmaceutical sciences.

850 Pharmaceutical Analysis (1). Permission of the instructor. Introduction to quantitative instrumental analysis in pharmaceutics. One lecture hour a week.

862 Advanced Pharmaceutics (3). Discuss industrial approaches to pharmaceutical formulation development.

864 Advances in Drug Delivery (4). Prerequisites, PHCY 410 and 411. Permission of the instructor for students lacking the prerequisites.

865 Trends in Molecular Pharmaceutics Research (3). Prerequisite, MOPH 864. An interactive course in which students actively participate by critical evaluation and discussion of current literature in the field of drug delivery.

890 Special Topics in Advanced Pharmaceutics (1–12). Permission of the instructor. A lecture and/or laboratory course designed to present new concepts and innovations in the area of drug delivery and disposition.

899 Seminar (1). Seminar consists of presentations on current research topics by the division's graduate students, faculty and invited speakers from industry, government, and other academic departments and institutions. Only four credits of MOPH 899 may count toward requirement for the PhD degree (two credits for MS).

900 Introduction to Research in MOPH (2–3). This course provides students the opportunity to work with a faculty mentor on a research project.

991 Research (1–12). Graduate course consisting of laboratory-based research, conferences with the major professor, and library investigations relating to research. One conference and nine laboratory hours a week per course.

993 Master's Thesis (3). After didactic course work is complete, master's students register for three credits of MOPH 993 during the fall and spring semesters.

994 Doctoral Dissertation (3). Students register for dissertation credits after successfully completing all didactic course work. A minimum of six credit hours are required for graduation.

Pharmacy Practice and Experiential Education Courses for Graduate Students

DPPE

800 Geriatric Pharmacy Practice (3).

801 Perspectives in Public Health (3). Examines the scope and implications of current public health concerns at the community, state and national level. Includes practical approaches to the integration of public health activities into the community.

804 Teaching and Learning Concepts of Pharmacy Practice (3). This course introduces pharmacy students to teaching and learning theories and concepts that may be used during future teaching opportunities and assist in the development of lifelong learning techniques.

807 Pharmaceutical Approaches to ID Therapy (2).

808 Critical Care (3).

810 Institutional Pharmacy (3).

811 Infectious Disease (2).

812 Pediatric Pharmacotherapy (3).

825 Principles and Practices of Medication Safety and Quality Improvement (3). To prepare students to effectively manage people, systems, data, information and automation to improve the safety and quality of the medicine use process in health-systems.

899 Seminar in DPPE (1).

991 Research in DPPE (1-9). DPPE research is aimed at helping students develop necessary research skills, while exposing students to relevant issues, processes, investigations, and unanswered questions in pharmacy practice.

Practice Advancement and Clinical Education Courses for Graduate Students

PACE

803 Ambulatory Care (3). Prerequisites, PHCY 442, 443, 444, 445, and 446. Provides comprehensive immunization education, discusses strategies to develop, implement, and maintain pharmacy-based immunization services, and provides opportunities to practice administration of subcutaneous and intramuscular injections.

806 Medication Therapy Management (2). Prerequisites, PHCY 442, 443, 444, 445, and 446. This course examines the expanded role of pharmacists in the community setting with the focus on integrating their pharmacotherapy knowledge into the Medication Therapy Management role.

820 Managing the Practice of Pharmacy (3). Graduate student status in the MS in Pharmaceutical Sciences (Health-System Pharmacy Administration subplan) required. Case-based discussion format as an exercise in individual personal and professional development. Content emphasizes conceptual issues and ideas relevant to the practice of pharmacy, rather than on particular factual content or narrowly focused problem identification skills.

830 The Leadership Challenge (2). Introducing students to the principles of leadership and strategies used by leaders, regardless of position or pharmacy practice setting, and helps prepare student pharmacists to meet the leadership challenge. Active learning strategies are used to examine and model leadership principles. Instructors will lead discussions on various topics pertaining to leadership.

831 Applied Case Studies in Self Care Therapeutics (3). Prerequisite, PHCY 452. This course emphasizes evaluating literature to determine the best practices for patients seeking self care. It utilizes a team-based learning approach to engage students in a higher level of active learning as it relates to community pharmacy practice.

860 Advanced Hospital Pharmacy Operations (3). This course is intended to build on the basic principles of pharmacy operations learned through coursework and experience as professional students as well as work experience.

896 Independent Study in PACE (1). Independent Study in the Division of Practice Advancement and Clinical Education.

Pharmaceutical Outcomes and Policy Courses for Graduate Students

DPOP

801 Economics and Behavior of the International Pharmaceutical Industry (HPM 653) (3). This course focuses on the empirical investigation of the economic and health impact of major pharmaceutical policies, regulations, market conditions, prescription drug use, and pharmaceutical care.

803 Social and Behavioral Aspects of Pharmaceutical Use (3). This course will draw upon medical sociology and health psychology to familiarize students with core theories, research, measures and design issues relevant to conducting social/behavioral research in pharmaceutical use.

804 Informatics: Use of Large Health Care Databases (3). Interdisciplinary course providing practical training in the analysis of large, secondary databases containing physician, hospital, and pharmaceutical data. Course topics include data preparation, algorithm development, quality control, and dataset limitations.

805 Patient-Reported Outcomes: Theory, Methods, and Applications (3). Course examines theoretical and methodological issues related to the assessment of patient reported outcomes, including health-related quality-of-life, in pharmaceutical research. Current and potential applications are highlighted.

806 Pharmaceutical Policy (3). Course examines policies that influence pharmacy. Structured methods of policy analysis are examined and used to assess theoretic and analytic applications for evaluating pharmaceutical policy.

870 Pharmaceutical Outcomes Research (3). Required preparation, introductory statistics and research methods coursework. Permission of the instructor for students lacking the required preparation. This is an intermediate-to-advanced-level applied and contemporary research methods class for students to build methodological and analytical knowledge to conduct high quality studies in evaluating pharmaceutical treatment utilization and outcomes.

872 Proposal Writing in DPOP (3). How to write research proposals, including dissertation grants.

899 Seminar (1). Forum for scholarly discussion of policy issues, research ideas and methods, campus and industry research resources, and the presentation of ongoing research. In addition to presentations by DPOP faculty and students, seminar will include presentations from invited researchers from industry, managed care, foundations, health care organizations, clinicians, and other departments.

900 Introduction to Research in DPOP (2–3). This course offers students the opportunity to work with a faculty mentor on a research project.

901 Selected Topics in Pharmaceutical Outcomes and Policy (1–3). A reading and/or special projects course for both undergraduate and graduate students interested in pursuing additional work in the administrative and social sciences as they pertain to pharmacy practice. One to three hours a week.

902 Methods in Pharmaceutical Outcomes Research (3). Includes formulating a research question, stating aims and hypothesis. Students are introduced to formulating a research strategy to write the background of the protocol, developing a research methodology, addressing measurement issues, selecting an appropriate design, and performing statistical analysis and power calculations. Three lecture hours a week.

991 Research in Pharmaceutical Outcomes and Policy (1–6). Consists of laboratory work, conferences with the major professor and library investigations relating to research.

993 Master's Thesis (3). A minimum of six hours of thesis credit must be taken in order to complete the requirements for the master's degree.

994 Doctoral Dissertation (3). There is no limit to the number of dissertation hours that can be taken; however, no more than six hours may be applied to the minimum of 45 hours needed to satisfy graduation requirements.

Pharmacotherapy and Experimental Therapeutics Courses for Graduate Students

DPET

809 Hubbard Program (3). This interdisciplinary course for health professions students trains students to practice collaboratively in the care of their older patients.

813 Cardiovascular Pharmacy (3). Provides an in-depth discussion of the pharmacotherapy of major cardiovascular diseases such as hypolipidemia, hypertension, ischemic heart disease, heart failure, and arrhythmias.

815 Interdisciplinary Teamwork in Geriatrics (3). Course emphasizes the acquisition of skills and competencies necessary to provide effective interdisciplinary geriatrics care and leadership in a variety of settings, including rural and/or underserved communities.

816 Integrative Medicine (2). This is a survey course intended to introduce students to various complementary and alternative medicine practices, and their integration into traditional medicine. It will utilize active learning strategies to enhance student involvement.

818 Foundations in Exercise Prescription (2). This course is designed to introduce basic concepts and selected therapeutic applications of exercise testing and prescription.

819 The Package Insert: Drug Development for Clinicians (2). This course reviews the components of the package insert, provides an understanding of the key studies required to support each component, and provides insight into the strategic thinking required for planning these studies. Students will learn the drug development process and ways in which clinicians scientifically contribute to this effort.

821 Principles of Pharmacy Practice (3). Prerequisite, PHPR 249. Students discuss the modern role of the hospital pharmacist and how the role integrates progressive management with innovative services. The problems with implementing these programs are evaluated. Three lecture hours a week.

822 Advanced Clinical Pharmacy (3). Discussions, workshops, and lectures to develop the student's skills and abilities to make therapeutic recommendations, utilize drug literature, educate patients and health professionals, and record observations, plans, and actions in a problem-oriented record.

830 Clinical Investigation of Drugs (2). Includes preclinical drug safety evaluation, preclinical pharmacology, design of protocols for Phases I–IV, FDA guidelines for clinical study, preparation of study plan, statistics in clinical trials, data analyzing, and FDA interactions with industry.

831 Quantitative Methods in Clinical Research (3). Required preparation, introductory biostatistics or general statistics. Graduate standing or permission of the instructor. This course reviews statistical concepts and discusses the most commonly used statistical methods for analysis of data from clinical studies or research experiments. Students will analyze problem datasets using SAS.

833 Experimental Design Considerations in Clinical Research (2). Course provides an overview of clinical trials methodology, focusing primarily on designs of (and common flaws in) clinical drug trials and nonclinical research experiments intended to answer clinical questions.

834 Methods in Quantitative Systems Pharmacology (3). Prerequisites, DPET 855 and 856. Open to graduate and PY3 students. This course utilizes hands on experiences to introduce the student to the principles and practices of contemporary quantitative systems pharmacology.

836 Elements of Scientific Writing and Communication (2). This course is designed to help students develop strategies for presenting research ideas and results in written and oral form and for participating effectively in the peer review process.

838 Methods in Pharmacogenomics (2). Prerequisite, DPET 832. Permission of the instructor for students lacking the prerequisite. The goals of this course are to provide graduate students with an understanding of major genomic discovery methodologies and their application for solving translational research problems.

840 Advanced Pharmacotherapy (3). A modular approach to advanced level pharmacotherapy. Coursework using the Pharmacotherapy Self Assessment Program (PSAP) aimed at improving clinical skills and reviewing standards of practice.

841 Science and Methods in Drug Development (2). Provides working knowledge of commonly-used processes, techniques, and methods involved in drug development processes, emphasizing pre-clinical aspects. Lectures and in-class case-based interactive discussion. Students will develop problem-solving skills, writing and presentation skills, and will be exposed to analytical and pharmaceutical methods and gain experience interpreting data for regulatory approval.

855 Principles of Pharmacokinetics (3). Prerequisite, PHCY 413. Permission of the instructor. Introduction to pharmacokinetic theory, mathematical model development, and data analysis techniques.

856 Advanced Pharmacokinetics and Pharmacodynamics (4). Prerequisite, MOPH 855. Permission of the instructor. Advanced treatment of contemporary pharmacokinetic theory and application, with emphasis on model development, analytical approaches to parameter estimation, and experimental design/data analysis.

900 Introduction to DPET Research: Translational Science Journal Club (1). This one credit hour course is offered jointly with the Universities of Minnesota and Pittsburgh. Students participate in journal club discussions by video teleconferencing on articles emphasizing methods which allow the translation from preclinical to clinical investigation in different therapeutic areas with emphasis on pharmacometrics, pharmacogenomics, and biomarker validation.

Pharmaceutical Sciences Courses for Graduate Students
PHRS

801 Ethical Dilemmas in Translational Research (1). All first year Pharmaceutical Sciences graduate students must enroll in this course to satisfy responsible conduct of research training requirements. Topics include research misconduct, conflicts of interest, data management, mentoring, authorship, peer review, publication, plagiarism, and ethical decision making. Students participate in lecture-based classroom discussion and group activities.

899 Seminar in Pharmaceutical Sciences (1). This course is required for all Pharmaceutical Sciences graduate students. Other students must obtain permission from the divisional course director. Class format consists of seminar presentations by students and/or faculty or invited speakers. Students are expected to actively engage in seminar activities and discussions.

990 Practicum in Pharmaceutical Sciences (1-9). Enrollment in this variable credit course requires a signed agreement between the Chair of the student's academic division and a representative of the institutional sponsor providing the research practicum. Teaching/learning methods consist of a pharmaceutical sciences-based research training experience at the participating institution involving independent work and written and oral reports.

991 Research in Pharmaceutical Sciences (1-9). This is a variable credit course required for all Pharmaceutical Sciences graduate students by their second semester. Teaching/learning methods consist of a pharmaceutical sciences-based mentored research training experience involving independent work and research reports that must be filed at the end of the semester.

992 Thesis Substitute in Pharmaceutical Sciences (3). Prerequisite, PHRS 991 or equivalent. Students register for thesis substitute credits after successfully passing their comprehensive written examinations. A minimum of 3 credit hours of thesis substitute research and writing is required for Pharmaceutical Sciences graduate students.

993 Thesis in Pharmaceutical Sciences (3). Prerequisite, PHRS 991 or equivalent. Students register for thesis credits after successfully passing their comprehensive written examination. A minimum of 3 credit hours of thesis research and writing is required for Pharmaceutical Sciences graduate students.

994 Dissertation in Pharmaceutical Sciences (3). Prerequisite, PHRS 991 or equivalent. Students register for dissertation credits after successfully passing their qualifying preliminary and oral examinations. A minimum of 6 credit hours of dissertation research and writing is required for Pharmaceutical Sciences graduate students.

Pharmaceutical Sciences (Interdisciplinary) Courses for Graduate Students
PHCY

800 Applied Pharmaceutical Statistics (3). Application of statistical analysis concepts and tools including probability, statistical inference, and regression analysis. Experimental design and statistical modeling approaches appropriate to common pharmaceutical research scenarios.

805 Independent Study and Research in Pharmacy (1–6). Required preparation, arranged with the faculty member in each individual case. Contract with a faculty member required. Permission of the instructor. Provides opportunities for professional (doctor of pharmacy) students to conduct independent study or participate in research projects designed to introduce them to a specialized area of practice or research.

806 Contemporary Topics in Pharmacy (1–3). Experimental course, for professional (doctor of pharmacy) students, to determine the need and demand of courses in new content areas. Topics will be chosen by faculty based on current issues.

Department of Philosophy

www.unc.edu/depts/phildept/phil.htm
MARC LANGE, *Chair*

Distinguished Professors
Dorit Bar-On (29) Philosophy of Language, Philosophy of Mind, Epistemology
Simon Blackburn, Philosophy of Mind, Philosophy of Language, Philosophy of Psychology, Metaethics
Bernard Boxill (26) Social and Political Philosophy, African American Philosophy
Geoffrey Brennan (23) Political Philosophy, Economics, Rationality
Thomas E. Hill Jr. (24) Ethics, Political Philosophy
Marc Lange (44) Philosophy of Science, Metaphysics, Epistemology
William G. Lycan (22) Philosophy of Mind, Philosophy of Language, Epistemology
Gerald J. Postema (20) Legal Philosophy, Political Philosophy, Ethics
C. D. C. Reeve (39) Ancient Philosophy, Metaphysics, Moral Psychology, Ethics
Geoffrey Sayre-McCord (25) Moral Theory, Metaethics, Epistemology, History of Modern Philosophy
Susan Wolf (40) Moral Theory and Moral Psychology

Professors
Thomas Hofweber (42) Metaphysics, Philosophy of Language, Epistemology, Philosophy of Mathematics
James Lesher (21) Ancient Greek Philosophy
Alan Nelson (36) History of Modern Philosophy
Ram Neta (43) Epistemology, Philosophy of Mind
Douglas MacLean (38) Moral Theory, Social and Political Philosophy
L.A. Paul (45) Metaphysics, Philosophy of Mind
John T. Roberts (37) Philosophy of Science, Philosophy of Physics, Metaphysics
Keith Simmons (27) Logic, Philosophy of Language, Philosophy of Mind

Associate Professors
Matthew Kotzen (46) Epistemology, Philosophy of Science
Mariska Leunissen (41) Ancient Philosophy, Philosophy of Science

Assistant Professor
Ryan Preston-Roedder (31) Political Philosophy, Moral Philosophy, Philosophy of Religion

Master Lecturer
Jeanette M. Boxill (33) Social and Political Philosophy, Feminism

Adjunct Professors
Michael Corrado, Philosophy of Law
Rebecca Walker, Bioethics, Ethical Theory

Professors Emeriti
Marilyn McCord Adams
Robert Merrihew Adams
Edward Galligan
Douglas Long
Stanley Munsat
Michael Resnik
George Schlesinger
Robert D. Vance

The graduate program in philosophy is designed to equip students to engage with both perennial and cutting edge philosophical enquiry. The program is intended to prepare students for college and university positions in philosophy.

The Department of Philosophy offers a program of study leading to the Ph.D. in philosophy. Prerequisite for admission to graduate work in the department is a B.A. degree or equivalent, typically with a major in philosophy, with a broad range of courses. Students earn an M.A. as part of the Ph.D. program.

Candidates for the master's degree must satisfactorily complete 30 semester hours of graduate work. They are normally required to participate in a first-year program including PHIL 700 and PHIL 455; there may be adjustments with the consent of the department. Successfully completing an M.A. thesis is a condition for receiving the degree of master of arts.

Candidates for the doctoral degree must satisfactorily complete 60 semester hours of graduate work, including six hours of Ph.D. dissertation credit.

The candidate for the degree of doctor of philosophy must pass two examinations. First, there is the Admission to Candidacy examination, which itself has two parts—a written general portion and a special oral portion. The written portion, normally taken in the spring term of the third year, is in the student's field of specialization. The oral portion tests the feasibility of the dissertation proposal and is normally taken in the fall term of the fourth year. Second, there is an oral defense of the completed dissertation. For further details on degree requirements, see the Graduate Degree Requirements section of this catalog.

The department offers several nonservice fellowships. These include the Graham Kenan Fellowship and the Horace Williams, Mary Taylor Williams, and Bertha Colton Williams Fellowships. The department has available teaching assistantships with stipends of over $15,000. In addition, The Graduate School offers a variety of fellowships and assistantships with stipends up to $22,000 that are open to students in philosophy.

The department maintains close relations with the Department of Philosophy at Duke University. Graduate students in either institution may register for credit in graduate courses or seminars at the other institution and may have faculty from either on their dissertation committees. Library facilities are available to students at each institution.

More information about our program can be found on our department Web site, philosophy.unc.edu.

Courses for Graduate and Advanced Undergraduate Students

(Required preparation, one course below 400 or permission of the instructor.)
PHIL

411 Aristotle (3). An examination of some representative works of Aristotle, with reference to common emphases and basic problems, together with an analysis of their philosophic content.

412 Plato (3). An examination of some representative works in the context of contemporary scholarship.

415 Medieval Philosophy (3). An intensive study of some medieval philosophical author (e.g., Aquinas, Scotus, or Ockham) or topic (e.g., arguments for the existence of God, universals, knowledge of individuals).

421 Rationalism (3). An in-depth study of the Continental rationalist philosophers Descartes, Spinoza, and Leibniz.

422 Empiricism (3). An in-depth study of the British empiricist philosophers, Locke, Berkeley, and Hume.

423 Kant (3). An intensive introduction to Kant's accounts of space, time, concepts, perception, substance, causation, and the thinking self through a careful study of his masterwork, The Critique of Pure Reason.

427 Hegel (3). In-depth study of Hegel's systematic philosophy emphasizing its roots in Kant's critical philosophy. Primary focus on *Phenomenology of Spirit*, supplemented by selections from the *Encyclopedia* and *Philosophy of Right*.

428 History of American Philosophy (3). An in-depth study of American contributions to philosophy, including for example the transcendentalists, the pragmatists, Quine, Rorty, and others.

432 The Beginnings of Analytic Philosophy (3). Two courses in philosophy other than PHIL 155 strongly recommended. Frege, Russell, Moore, and Wittgenstein among others are considered.

433 Current Issues in Analytic Philosophy (3). Two courses in philosophy other than PHIL 155 strongly recommended. Recent work in epistemology and metaphysics.

440 Philosophy of Mind (3). At least two courses in philosophy other than PHIL 155, including PHIL 340, strongly recommended. An examination of dualism, behaviorism, the identity theory, and forms of functionalism with special focus on the problems of mental aboutness and the problems of consciousness.

445 Philosophy of Language (LING 445) (3). At least two courses in philosophy other than PHIL 155, including PHIL 345, strongly recommended. A study of important contemporary contributions in philosophy of language. Topics include meaning, reference, and truth.

450 Philosophy of Natural Sciences (3). An in-depth survey of general issues in contemporary philosophy of natural science intended for advanced philosophy students. Topics include confirmation, explanation, theory-choice, realism, reduction.

451 Philosophy of Physics (3). Topics may include the nature of space and time, the ontological status of fields and energy, or causation and locality in quantum physics.

452 Philosophy of Biology (3). The logical structure of evolutionary theory, fitness, taxonomy, the notion of a living thing, reductionism, evolutionary explanations, teleology.

453 Philosophy of Psychology (3). Topics may include reasoning, the relationship between language and thought, concepts, moral cognition, and emotions.

454 Philosophy, History, and the Social Sciences (3). The nature of historical explanation, structural and functional explanation, the weighing of historical testimony, the concept of meaning, normative judgments, and predictions in the social sciences.

455 Symbolic Logic (LING 455) (3). Introduction for graduates and advanced undergraduates not taking the PHIL 155–356 sequence.

456 Advanced Symbolic Logic (3). Prerequisite, PHIL 455. Presupposes propositional and quantificational logic as a basis of further deductive development with special attention to selected topics: alternative systems, modal and deontic logic, inductive logic, the grammar of formalized languages, paradoxes, and foundations of mathematics.

457 Set Theory and Logic (3). Prerequisite, PHIL 455. Permission of the instructor for students lacking the prerequisite. Natural and real numbers. Infinite cardinal and ordinal numbers. Alternative axiom systems and their consistency problems.

459 Philosophy of Mathematics (3). Prerequisite, PHIL 455. Philosophical problems concerning logic and the foundation of mathematics.

460 History of Moral Philosophy (3). Two courses in philosophy other than PHIL 155, including PHIL 360, strongly recommended. Examination of classic texts of Plato, Aristotle, Aquinas, Hobbes, Butler, Hume, Kant, and Mill. Selections may vary from year to year.

462 Contemporary Moral Philosophy (3). Required preparation, two courses in philosophy other than PHIL 155, including PHIL 362. Advanced discussion of moral issues such as fact and value, reason and morality, the nature of morality.

463 Contemporary Moral and Social Problems (3). Two courses in philosophy other than PHIL 155 strongly recommended. A detailed examination of one or more of the following contemporary issues: environmental ethics, animal rights, abortion, euthanasia, pornography, racism, sexism, public versus private morality.

465 Justice in Health Care (3). One course in philosophy strongly recommended. Medical students welcome. The course will focus on the question of how scarce health care resources ought to be distributed in order to meet the demands of justice.

468 Risk and Society (3). Prerequisite, PHIL 155. One additional course in philosophy strongly recommended. The course examines attitudes toward risk and how they affect our preferences for different public policies in the areas of environmental protection, technology regulation, and workplace and product safety.

470 Political Philosophy from Hobbes to Rousseau (3). Two courses in philosophy other than PHIL 155, including PHIL 170 or 370, strongly recommended. Explores the foundations of justice and authority in the idea of contract or covenant, the nature of law, rights, liberty, and democracy in the work of Hobbes, Locke, Hume, Rousseau.

471 Hegel, Marx, and the Philosophical Critique of Society (3). An examination of central issues in social and political philosophy as they figure in the work of Hegel, Marx, Nietzsche, and others.

473 American Political Philosophy (3). One course in philosophy other than PHIL 155 strongly recommended. Juniors and seniors only. The issue of unity and diversity in America is analyzed through the writings of Jefferson, the Federalists and Anti-Federalists, Calhoun, MacKinnon, DuBois, and Rawls.

474 Foundations of Modern Political Philosophy (3). Prerequisite, PHIL 170. This course traces the emergence and development of central themes of modern political philosophy from the 13th through the 17th century.

475 Philosophical Issues in Gender, Race, and Class (WMST 475) (3). Prerequisite, PHIL 275 or WMST 101. Examines in greater depth and complexity one or more of the issues addressed in PHIL 275, investigating issues of gender, race, and class within the dominant theories of philosophy.

476 Recent Developments in Political Philosophy (3). Two courses in philosophy other than PHIL 155, including PHIL 370, strongly recommended. Investigation of major contemporary contributors (Rawls, Nozick, Dworkin, Cohen, Waldron, Arrow) to philosophical debate concerning justice, equality, liberty, democracy, public reason, or rights versus community.

480 Philosophy of Law (3). An exploration of whether and under what conditions the state has the right to control crime by punishment of past crimes and preventive detention to prevent future crimes.

482 Philosophy and Literature (CMPL 482) (3). Philosophical readings of literary texts, including novels, plays, and poems.

485 Philosophy of Art (3). Competing theories of art and art criticism. The relationship between art and emotional expression, the formal character of art, and standards of taste.

491 Health Care, Science, and Philosophy (3). Interdisciplinary course to develop critical thinking capacities through philosophical study of the nature of scientific presuppositions and concepts, including events, causality, and determinism, with specific application to health care issues.

494 Existentialism and Phenomenology (3). A study of one or two major systematic works by Sartre, Heidegger, or Merleau-Ponty.

496 Advanced Directed Studies (1–3). Permission of the director of undergraduate studies. Advanced independent work in philosophy.

562 Ethics, Responsibility, and Justice (1). Ethics explores obligations to act in the interest of others as well as ourselves. Justice explores the ways people should organize and govern themselves. Course addresses such questions as, What principles govern our relationships with other people? What do we owe others and ourselves? How should we treat other people?

691H Courses for Honors (3). Permission of the director of undergraduate studies. See the director of undergraduate studies of the department.

692H Courses for Honors (3). Permission of the director of undergraduate studies. See the director of undergraduate studies of the department.

698 Philosophy, Politics, and Economics II: Capstone Course (ECON 698, POLI 698) (3). Prerequisite, PHIL 384. This capstone course advances PHIL 384, focusing on such theoretical and philosophical issues as the analysis of rights or distributive justice and the institutional implications of moral forms.

Courses for Graduate Students
PHIL

700 Proto-Seminar in Philosophy (3).

705 Advanced Studies in Systematic Philosophy (3).

710 Advanced Studies in Ancient Philosophy (3).

715 Advanced Studies in Medieval Philosophy (3).

720 Advanced Studies in Modern Philosophy (3).

725 Advanced Studies in 19th-Century Philosophy (3).

730 Advanced Studies in Metaphysics (3).

735 Advanced Studies in Epistemology (3).

740 Advanced Studies in Philosophy of Mind (3).

745 Advanced Studies in Philosophy of Language (LING 712) (3).

750 Advanced Studies in Philosophy of Science (3).

755 Advanced Studies in Philosophy of Logic (3).

760 Advanced Studies in Moral Theory (3).

765 Advanced Studies in Value Theory (3).

770 Advanced Studies in Political Philosophy (3).

775 Advanced Studies in Feminism (WMST 775) (3).

780 Advanced Studies in Philosophy of Law (3).

790 Colloquium Series Seminar (3).

800 Pre-Dissertation Seminar in Philosophy (3).

805 Research Seminar in Systematic Philosophy (3).

810 Research Seminar in Ancient Philosophy (3).

815 Research Seminar in Medieval Philosophy (3).

820 Research Seminar in Modern Philosophy (3).

825 Research Seminar in 19th-Century Philosophy (3).

830 Research Seminar in Metaphysics (3).

835 Research Seminar in Epistemology (3).

840 Research Seminar in Philosophy of Mind (3).

845 Research Seminar in Philosophy of Language (3).

850 Research Seminar in Philosophy of Science (3).

855 Research Seminar in Philosophy of Logic (3).

860 Research Seminar in Moral Theory (3).

865 Research Seminar in Value Theory (3).

870 Research Seminar in Political Philosophy (3).

880 Research Seminar in Philosophy of Law (3).

901 Readings in Philosophy (3).

990 Current Research Group Seminar (3).

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Department of Physics and Astronomy

www.physics.unc.edu
ARTHUR E. CHAMPAGNE, *Chair*

Professors

Bruce W. Carney (32) Optical Observational Astrophysics
Gerald N. Cecil (47) Experimental Astrophysics
Arthur E. Champagne (51) Experimental Nuclear Physics and Astrophysics
Thomas B. Clegg (5) Nuclear Physics, Polarization Phenomena
J. Christopher Clemens (64) Observational Astronomy, Astrophysics, Astronomical Instrumentation
Louise A. Dolan (49) Theoretical Particle Physics, Quantum Gravity
Jonathan Engel (57) Theoretical Nuclear Physics
Charles R. Evans (48) Gravity, Relativity, Theoretical Astrophysics
Christian G. Iliadis (61) Experimental Nuclear Astrophysics
Hugon J. Karwowski (37) Experimental Nuclear Physics and Astrophysics
Dmitri V. Khveshchenko (1) Theoretical Physics
Jianping Lu (56) Condensed Matter Theory, Nanotechnology, Medical Physics
Laurie E. McNeil (36) Experimental Condensed Matter and Materials Physics
Y. Jack Ng (30) Theoretical Particle Physics, Gravitation
Lu-Chang Qin (27) Materials Science, Nanotechnology
Richard Superfine (55) Experimental Studies of Interfaces, Biophysics
Frank Tsui (59) Experimental Condensed Matter and Materials Physics
Sean Washburn (50) Experimental Condensed Matter and Materials Physics
John Wilkerson, (12) Experimental Neutrino Physics and Fundamental Symmetries
Yue Wu (54) Nuclear Magnetic Resonance, Electron Spin Resonance in Solids
Otto E. Zhou (62) Materials Science, Nanotechnology

Associate Professors

Laura Mersini (19) Theoretical Cosmology
Daniel E. Reichart (13) Gamma Ray Bursts, Early Universe, Interstellar Extinction, Galaxy Clusters

Assistant Professors

Rosa Tamara Branca, NMR Imaging
Joaquin Drut, Theory of Strongly Interacting Systems
Fabian Heitsch (26), Computational Astrophysics
Reyco Henning (11) Neutrino Physics, Particle Astrophysics
Sheila Kannappan (14) Observational Extragalactic Astronomy
Rene Lopez (25) Experimental Condensed Matter Physics
Amy Oldenburg, Biophotonics and Biomechanics

Research Professors

Russell M. Taylor II, Nanotechnology, Computer Imaging
Michael R. Falvo, Biophysics, Nanomechanics

Research Associate Professors

Alfred Kleinhammes, Condensed Matter Physics, Materials Science
Nalin R. Parikh (58) Solid State Physics, Materials Science

Research Assistant Professor

E. Timothy O'Brien, Physics Related to Biology, Light Microscopy, Biological Sample Preparation

Adjunct Professors
William W. Clark III, Electronics, Optics
Richard T. Hammond, General Relativity, Gravity, Optics
Ryan M. Rohm, Quantum Field Theory, Theoretical Particle Physics
Jie Tang, Materials Physics, Nanomaterials

Adjunct Associate Professor
John D. Hunn, Applied Condensed Matter Physics

Adjunct Assistant Professors
Bower, Nanotechnology
Yueh Lee, Nanotechnology

Professors Emeriti
C. Victor Briscoe
Sang-Il Choi
Wayne Christiansen
Morris S. Davis
Kian S. Dy
John Hernandez
William M. Hooke
Paul S. Hubbard
Horst Kessemeier
Edward J. Ludwig
J. Ross Macdonald
Eugen Merzbacher
James Rose
Larry Rowan
Dietrich Schroeer
Stephen M. Shafroth
Lawrence M. Slifkin
William J. Thompson
Hendrik Van Dam
James W. York Jr.

The Department of Physics and Astronomy offers graduate work leading to the degrees of master of science and doctor of philosophy.

The active fields of research are biophysics, medical physics, condensed-matter physics, materials physics, nanotechnology, nuclear physics, neutrino physics and nuclear astrophysics, quantum field theory, theoretical particle physics, general relativity and gravitation, extragalactic and stellar astronomy, and astrophysics. Students can also work in the UNC–Chapel Hill biophysics program, or they can study under any advisor so long as the research project is supervised by a committee that contains a majority of UNC–Chapel Hill Physics and Astronomy faculty. The graduate courses are designed to give students a broad foundation and to introduce them to the special fields in which the research interests of the department lie.

The general regulations of The Graduate School govern the work for the degrees of master of science and doctor of philosophy. To begin a graduate program in physics or astrophysics, the student should have completed most of the requirements for the degree of bachelor of science with a major in physics at the University, or their equivalent elsewhere. The minimum prerequisite for graduate study consists of the basic undergraduate courses PHYS 116, 117, 128, 128L, 301, 302, 341, 415, 311, and 312, together with MATH 232, 233, and 528. At the end of the spring semester a student must take the Ph.D. written examination. The examination is based upon the graduate student's first-year course work and will cover dynamics, quantum mechanics, statistical mechanics, and electromagnetic theory.

The M.S. degree in physics may be taken with or without thesis. However, even if a thesis is not submitted, a student must work with a research group for at least one semester, in order to learn the research techniques in a field of physics or astronomy. If the research is theoretical, the student must also gain experimental experience. A minor is not required for the M.S. degree, but one may be chosen in accord with the regular graduate requirements for this option. The equivalent of one semester teaching experience is required of all M.S. degree candidates. The M.S. astrophysics track must include ASTR 701 and a minimum of six hours from ASTR 519, 702, 703 or 704.

The requirements for a Ph.D. in physics are a) successful completion of the following core courses in the department, or completion of their equivalents elsewhere as an undergraduate or graduate student: 701, 711, 712, 741, 721, and 722; b) passing the Ph.D. written examination based on core graduate courses in physics as listed in a), c) gaining experimental experience either through master's or doctoral research, or (if student's research is theoretical) by performing an experimental project deemed adequate by the director of graduate studies, d) taking a course outside his or her field of specialization from a list approved by the director of graduate studies and e) passing at least three other advanced graduate-level courses appropriate to his or her field of specialization. A Ph.D. candidate must also take a preliminary doctoral oral examination within the first three years of graduate study in physics at UNC–Chapel Hill. The oral examination is concerned mainly with the student's dissertation research project. A minor is not required, but may be elected, in which case requirement c) above is replaced by the requirement that the student pass at least five graduate-level courses selected from no more than two departments, with no fewer than two courses in either department. The minor program must be approved in advance by the minor department. Teaching experience, as part of professional training, is required of all doctoral candidates. This experience can be gained through laboratory or lecture instruction as a teaching assistant, either for two semesters or until teaching competence is acquired.

The astrophysics Ph.D. track requirements are similar except that the course requirements are PHYS 701, 711, 721, 741 and ASTR 701, 702, 703, 704, 705 and an additional 700-level course. To gain familiarity with experimental astrophysics or observational astronomy, a student must pass ASTR 519/719, earn an M.S. degree which involves experimental or observational research in astrophysics, or perform other experimental/observational research deemed suitable by the director of graduate studies.

Research Interests
Astronomy and Astrophysics. Research includes the formation, structure, and evolution of stars, our Milky Way galaxy, other galaxies, gamma ray bursters and cosmology. Theory involves numerical relativity and sources of gravitational radiation, stellar seismology and quasars, and interstellar medium physics. UNC–Chapel Hill has guaranteed observing time on the 4.1-meter SOAR Telescope in Chile, which began regular operations in 2004, and on the 11-meter SALT Telescope in South Africa, which began operations in 2005. UNC–Chapel Hill operates a number of smaller robotic telescopes as well.

Biological and Medical Physics. Experimental studies include manipulation and force measurement techniques with applications to DNA, molecular motors, cells, and cilia; hydration effects in adsorption of biochemicals. There is also a strong focus on the theoretical and experimental translational research in medical imaging technologies, including radiotherapy instruments based on carbon nanotube X-ray emitters such as single-cell irradiation and in vivo micro-CT; optical coherence tomography using nanoparticle molecular imaging agents; systems level implementation of tomographic imaging instruments.

Condensed-Matter Physics. Experimental and Theoretical Studies of Nanomaterials. Atomic scale studies of devices and nanoelectromechanical systems, including quantum computation and transport, actuating nanomotors and sensors, amorphous materials, semiconductors, superconductors, the optical properties of solids, charge transport in solids and fluids, epitaxial growth, magnetic materials and heterostructures.

Field Theory, Particle Physics, Cosmology, Gravitation and Relativity. Research includes gauge field theories, quantum chromodynamics, electroweak theory, grand unified theories, string theory, supersymmetry, supergravity, quantum gravity, theoretical cosmology, numerical relativity, gravitational radiation, and relativistic astrophysics.

Materials Science and Materials Physics. Experimental and theoretical research in the design, synthesis, integration, and characterization of novel solid state materials, including nanostructured materials such as quantum dots, carbon nanotubes and nanorods, quasi-crystals, and metallic glass. Applications of novel materials for solar energy, electron field emission, probes and sensors, and data storage. Applications include flat-panel displays, an X-ray system for biomedical imaging, and rechargeable batteries.

Nuclear Physics. Experimental and theoretical work includes neutrino oscillations and neutrino mass measurements, fundamental symmetries and weak interactions in supernovae. The structure and evolution of stars are investigated using nuclear probes. The origin of the elements in the universe is studied using local accelerator facilities. The nature of the nuclear force and properties of few-body systems. Polarized beams of light ions and gamma-rays and polarized 3He target. Applied nuclear physics.

Facilities and Equipment

Research in physics and astronomy is carried out in laboratories on and off the Chapel Hill campus. Within Phillips Hall and Chapman Hall there are several major research laboratories including the "nanomanipulator" (a combination of a scanning electron microscope, an atomic force microscope, and sophisticated visualization graphics), the Keck Laboratory for Atomic Imaging and Manipulation, which includes two transmission electron microscopes, and the Goodman Laboratory for Astronomical Instrumentation. Other facilities include apparatus for nuclear magnetic resonance studies, scanning probe microscopes, and Raman and optical spectrometers. For synthesis and fabrication, major facilities include molecular beam epitaxy, microwave plasma-enhanced chemical vapor deposition, laser ablation, and photolithography and reactive ion etching. Resources for highly parallel computing are provided by UNC's Information and Technology Services, as well as by national centers.

The department is a partner in the Triangle Universities Nuclear Laboratory and plays a major role in experiments using the Laboratory for Experimental Nuclear Astrophysics (LENA), Tandem Accelerator, and the High-Intensity Gamma-Ray Source at the Free Electron Laser facility. UNC–Chapel Hill has an active program in low-background physics at the KURF underground facility near Blacksburg, VA. UNC–Chapel Hill has a 0.6-meter on-campus telescope, and is a major partner in the 4.1-meter SOAR Telescope in Chile and the 11-meter Southern African Large Telescope (SALT) in South Africa. The department operates the PROMPT array of robotic telescopes in Chile and manages the SkyNet array of robotic telescopes. Numerous national laboratories, including Oak Ridge, Brookhaven, NIST, Los Alamos and Argonne, as well as KamLAND, NRAO, NOAO, the Hubble Space Telescope, and the Chandra X-ray Observatory, are also vital parts of our research efforts.

Fellowships and Assistantships

Many teaching assistantships (with stipends of $17,100 for nine months) are available to qualified graduate students. Summer employment is usually available. The duties of assistants include supervising laboratory classes in elementary physics or astronomy, assisting in the supervision of advanced laboratories, teaching recitation sections, and grading papers. Graduate School fellowships are available for well-qualified applicants to the department's graduate program. Teaching assistants can usually be supported in the summer by teaching or research.

Research assistantships are also offered, especially to those who have completed a year or two of graduate work. The stipend is $22,800 for the calendar year.

Application forms for admission, including graduate appointments, should be completed online at gradschool.unc.edu/admissions.

Courses for Graduate and Advanced Undergraduate Students *ASTR*

501 Astrophysics I (Stellar Astrophysics) (3). Prerequisites, MATH 383 and PHYS 128. Permission of the instructor for students lacking the prerequisites. An introduction to the study of stellar structure and evolution. Topics covered include observational techniques, stellar structure and energy transport, nuclear energy sources, evolution off the main-sequence, and supernovae.

502 Astrophysics II (Interstellar Matter and Galaxies) (3). Prerequisites, MATH 383 and PHYS 128. Permission of the instructor for students lacking the prerequisites. An introduction to the study of the structure and contents of galaxies. Topics covered include the interstellar medium, interstellar hydrodynamics, supersonic flow and shock formation, star formation, galactic evolution, the expanding universe, and cosmology.

503 Structure and Evolution of Galaxies (3). Prerequisites, ASTR 301, MATH 383, and PHYS 128. Internal dynamics and structure of galaxies; physics of star formation, active galactic nuclei, and galaxy interactions; large-scale clustering and environment-dependent physical processes; evolution of the galaxy population over cosmic time.

505 Physics of Interstellar Gas (3). Prerequisites, ASTR 301, MATH 383, and PHYS 128. Surveys the physical processes governing the interstellar medium (ISM), which takes up the "refuse" of old stars while providing fuel for young stars forming. Covers the processes regulating the galactic gas budget and the corresponding observational diagnostics. Topics: radiative transfer, line formation mechanisms, continuum radiation, gas dynamics, star formation.

519 Observational Astronomy (4). Prerequisite, ASTR 101. Permission of the instructor for students lacking the prerequisite. A course designed to familiarize the student with observational techniques in optical and radio astronomy, including application of photography, spectroscopy, photometry, and radio methods. Three lecture and three laboratory hours a week.

Courses for Graduate and Advanced Undergraduate Students *PHYS*

405 Biological Physics (BIOL 431) (3). Prerequisites, PHYS 116 and 117. How diffusion, entropy, electrostatics, and hydrophobicity generate order and force in biology. Topics include DNA manipulation, intracellular transport, cell division, molecular motors, single molecule biophysics techniques, nerve impulses, neuroscience.

410 Teaching and Learning Physics (4). Prerequisites, PHYS 116 and 117. Permission of the instructor for students lacking the prerequisites. Learning how to teach physics using current research-based methods. Includes extensive fieldwork in high school and college environments. Meets part of the licensure requirements for North Carolina public school teaching.

415 Optics (3). Prerequisites, PHYS 311 and 312. Permission of the instructor for students lacking the prerequisites. Elements of geometrical optics; Huygens' principles, interference, diffraction, and polarization. Elements of the electromagnetic theory of light; Fresnel's equations, dispersion, absorption, and scattering. Photons. Lasers and quantum optics.

422 Physics of the Earth's Interior (GEOL 422) (3). Prerequisites, MATH 383 and either PHYS 201 and 211, or 301 and 311. Origin of the solar system: the nebular hypothesis. Evolution of the earth and its accretionary history. Earthquakes: plate tectonics and the interior of the earth. The earth's magnetic field. Mantle convection.

424 General Physics I (4). PHYS 104 equivalent, specifically for certification of high school teachers.

425 General Physics II (4). PHYS 105 equivalent, specifically for certification of high school teachers.

471 Physics of Solid State Electronic Devices (3). Prerequisite, PHYS 117; pre- or corequisite, PHYS 211 or 311. Properties of crystal lattices, electrons in energy bands, behavior of majority and minority charge carriers, PN junctions related to the structure and function of semiconductor diodes, transistors, display devices.

472 Chemistry and Physics of Electronic Materials Processing (APPL 472, CHEM 472, MTSC 472) (3). Prerequisite, CHEM 482 or PHYS 117. Permission of the instructor. A survey of materials processing and characterization used in fabricating microelectronic devices. Crystal growth, thin film deposition and etching, and microlithography.

481L Advanced Laboratory I (2). Prerequisite, PHYS 351 or 352. Permission of the instructor for students lacking the prerequisite. Selected experiments illustrating modern techniques such as the use of laser technology to study the interaction of electromagnetic fields and matter. Six laboratory hours a week.

482L Advanced Laboratory II (2). Prerequisite, PHYS 481. Permission of the instructor for students lacking the prerequisite. Independent laboratory research projects. Scientific writing and oral presentations, abstracts, and reports. Six laboratory hours per week.

491L Materials Laboratory I (APPL 491L) (2). Prerequisites, APPL 470 and PHYS 351. Structure determination and measurement of the optical, electrical, and magnetic properties of solids.

492L Materials Laboratory II (APPL 492L) (2). Prerequisite, APPL 491L or PHYS 491L. Continuation of PHYS 491L with emphasis on low- and high-temperature behavior, the physical and chemical behavior of lattice imperfections and amorphous materials, and the nature of radiation damage.

510 Seminar for Physics and Astronomy Teaching Assistants (1). How students learn and understand physics and astronomy. How to teach using current research-based methods.

521 Applications of Quantum Mechanics (3). Prerequisite, PHYS 321. Emphasizes atomic physics but includes topics from nuclear, solid state, and particle physics, such as energy levels, the periodic system, selection rules, and fundamentals of spectroscopy.

543 Nuclear Physics (3). Prerequisite, PHYS 321. Permission of the instructor for students lacking the prerequisite. Structure of nucleons and nuclei, nuclear models, forces and interactions, nuclear reactions.

545 Introductory Elementary Particle Physics (3). Prerequisites, PHYS 312 and 321. Relativistic kinematics, symmetries and conservation laws, elementary particles and bound states, gauge theories, quantum electrodynamics, chromodynamics, electroweak unification, standard model and beyond.

573 Introductory Solid State Physics (MTSC 573) (3). Prerequisite, PHYS 321. Permission of the instructor for students lacking the prerequisite. Crystal symmetry, types of crystalline solids; electron and mechanical waves in crystals, electrical and magnetic properties of solids, semiconductors; low temperature phenomena; imperfections in nearly perfect crystals.

594 Nonlinear Dynamics (MATH 594) (3). Prerequisite, MATH 383. Permission of the instructor for students lacking the prerequisite. Interdisciplinary introduction to nonlinear dynamics and chaos. Fixed points, bifurcations, strange attractors, with applications to physics, biology, chemistry, finance.

631 Mathematical Methods of Theoretical Physics I (3). Prerequisites, MATH 383 and PHYS 128. Vector fields, curvilinear coordinates, functions of complex variables, linear differential equations of second order, Fourier series, integral transforms, delta sequence.

632 Mathematical Methods of Theoretical Physics II (3). Prerequisite, PHYS 631. Permission of the instructor for students lacking the prerequisite. Partial differential equations, special functions, Green functions, variational methods, traveling waves, and scattering.

633 Scientific Programming (3). Prerequisite, MATH 528 or 529, or PHYS 631 or 632. Required preparation, elementary Fortran, C, or Pascal programming. Structured programming in Fortran or Pascal; use of secondary storage and program packages; numerical methods for advanced problems, error propagation and computational efficiency; symbolic mathematics by computer.

660 Fluid Dynamics (ENVR 452, GEOL 560, MASC 560) (3). See MASC 560 for description.

671L Independent Laboratory I (3). Prerequisites, PHYS 301 and 312. Permission of the instructor for students lacking the prerequisites. Six laboratory hours a week.

672L Independent Laboratory II (3). Prerequisites, PHYS 301 and 312. Permission of the instructor for students lacking the prerequisites. Six laboratory hours a week.

Courses for Graduate Students

ASTR

701 Stellar Interiors, Evolution, and Populations (3). Stellar structure and evolution including: equations of stellar structure, stellar models, star and planet formation, fusion and nucleosynthesis, stellar evolution, stellar remnants, and the comparison of theory to observations.

702 High Energy Astrophysics (3). Prerequisites, PHYS 711 and 721. White dwarfs and neutron stars: physical properties and observational manifestations. Extragalactic radio sources, relativistic jets and supermassive black holes. Particle acceleration and radiative processes in hot plasmas. Accretion phenomena. X-ray and gamma-ray astrophysics.

703 Structure and Evolution of Galaxies (3). Internal dynamics and structure of galaxies; physics of star formation, active galactic nuclei, and galaxy interactions; large-scale clustering and environment-dependent physical processes; evolution of the galaxy population over cosmic time.

704 Cosmology (3). Corequisite, PHYS 701. General relativity and cosmological world models; thermal history of the early universe, nucleosynthesis, and the cosmic microwave background; growth of structure through cosmic time.

705 Astrophysical Atmospheres (3). Prerequisites PHYS 711 and 721. Radiative transfer, opacities, spectral line formation, energy transport, models, chemical abundance determination, interstellar chemistry, magnetic fields. Applications to observations of planetary, stellar and solar, galactic (ISM) and intergalactic gaseous atmospheres.

719 Astronomical Data (4). Required preparation, physics-based cosmology course or permission of the instructor. A course designed to familiarize the student with observational techniques in optical and radio astronomy, including application of photography, spectroscopy, photometry, and radio methods. Three lecture and three laboratory hours a week.

891 Seminar in Astrophysics (1–21). Recent observational and theoretical developments in stellar, galactic, and extragalactic astrophysics.

Courses for Graduate Students

PHYS

**The PHYS 821 and PHYS 896 sequence alternates with PHYS 822 and 823.*

701 Classical Dynamics (3). Required preparation, advanced undergraduate mechanics. Variational principles, Lagrangian and Hamiltonian mechanics. Symmetries and conservation laws. Two-body problems, perturbations, and small oscillations, rigid-body motion. Relation of classical to quantum mechanics.

711 Electromagnetic Theory I (3). Prerequisites, PHYS 631 and 632. Electrostatics, magnetostatics, time-varying fields, Maxwell's equations.

712 Electromagnetic Theory II (3). Prerequisite, PHYS 711. Plane electromagnetic waves and wave propagation, wave guides and resonant cavities, simple radiating systems, scattering and diffraction, special theory of relativity, radiation by moving charges.

715 Visualization in Science (COMP 715, MTSC 715) (3). See COMP 715 for description.

721 Quantum Mechanics (3). Prerequisite, PHYS 321. Review of nonrelativistic quantum mechanics. Spin, angular momentum, perturbation theory, scattering, identical particles, Hartree-Fock method, Dirac equation, radiation theory.

722 Quantum Mechanics (3). Prerequisite, PHYS 321. Review of nonrelativistic quantum mechanics. Spin, angular momentum, perturbation theory, scattering, identical particles, Hartree-Fock method, Dirac equation, radiation theory.

741 Statistical Mechanics (3). Prerequisites, PHYS 701 and 721. Classical and quantal statistical mechanics, ensembles, partition functions, ideal Fermi and Bose gases.

771L Advanced Spectroscopic Techniques (3). Prerequisite, PHYS 301 or 312. Permission of the instructor for students lacking the prerequisite. Advanced spectroscopic techniques, including Rutherford backscattering-channeling, perturbed angular correlation, Raman scattering, electron paramagnetic resonance, nuclear magnetic resonance, optical absorption, and Hall effect. Two hours of lecture and three hours of laboratory a week.

772L Advanced Spectroscopic Techniques (3). Prerequisite, PHYS 301 or 312. Permission of the instructor for students lacking the prerequisite. Advanced spectroscopic techniques, including Rutherford backscattering-channeling, perturbed angular correlation, Raman scattering, electron paramagnetic resonance, nuclear magnetic resonance, optical absorption and Hall effect. One hour of lecture and five hours of laboratory a week.

***821 Advanced Quantum Mechanics (3).** Prerequisite, PHYS 722. Advanced angular momentum, atomic and molecular theory, many-body theory, quantum field theory.

***822 Field Theory (3).** Prerequisite, PHYS 722. Quantum field theory, path integrals, gauge invariance, renormalization group, Higgs mechanism, electroweak theory, quantum chromodynamics, Standard Model, unified field theories.

***823 Field Theory (3).** Prerequisite, PHYS 722. Quantum field theory, path integrals, gauge invariance, renormalization group, Higgs mechanism, electroweak theory, quantum chromodynamics, Standard Model, unified field theories.

824 Group Theory and its Applications (3). Required preparation, knowledge of matrices, mechanics and quantum mechanics. Discrete and continuous groups. Representation theory. Application to atomic, molecular, solid state, nuclear and particle physics.

827 Principles of Chemical Physics (CHEM 788) (3). Prerequisite, CHEM 781 or PHYS 321. Permission of the instructor for students lacking the prerequisite. The quantum mechanics of molecules and their aggregates. Atomic orbitals, Hartree-Fock methods for atoms and molecules. Special topics of interest to the instructor and research students.

829 Principles of Magnetic Resonance (3). Prerequisite, CHEM 781 or PHYS 721. Permission of the instructor for students lacking the prerequisite.

831 Differential Geometry in Modern Physics (3). Prerequisites, PHYS 701, 711, and 712. Applications to electrodynamics, general relativity and nonabelian gauge theories of methods of differential geometry, including tensors, spinors, differential forms, connections and curvature, covariant exterior derivatives, and Lie derivatives.

832 General Theory of Relativity (3). Prerequisite, PHYS 831. Permission of the instructor for students lacking the prerequisite. Differential geometry of space-time. Tensor fields and forms. Curvature, geodesics. Einstein's gravitational field equations. Tests of Einstein's theory. Applications to astrophysics and cosmology.

861 Nuclear Physics (3). Prerequisites, PHYS 543 and 721. Nuclear reactions, scattering, Nuclear structure, Nuclear astrophysics.

862 Nuclear Physics (3). Prerequisites, PHYS 543 and 721. Overview of Standard Model of particle physics. Fundamental symmetries and weak interactions. Neutrino physics. Particle-astrophysics and cosmology.

871 Solid State Physics (MTSC 871) (3). Prerequisite, PHYS 321. Topics considered include those of PHYS 573, but at a more advanced level, and in addition a detailed discussion of the interaction of waves (electromagnetic, elastic and electron waves) with periodic structures, e.g., X-ray diffraction, phonons, band theory of metals and semiconductors.

872 Solid State Physics (MTSC 872) (3). Prerequisite, PHYS 321. Topics considered include those of PHYS 573, but at a more advanced level, and in addition a detailed discussion of the interaction of waves (electromagnetic, elastic, and electron waves) with periodic structures, e.g., X-ray diffraction, phonons, band theory of metals and semiconductors.

873 Theory of the Solid State (3). Prerequisite, PHYS 722. Calculation of one-electron energy band structure. Electron-hole correlation effect and excitons. Theory of spin waves. Many-body techniques in solid state problems including theory of superconductivity.

883 Current Advances in Physics (3). Permission of the instructor. In recent years, elementary particle physics, amorphous solids, neutrinos, and electron microscopy have been among the topics discussed.

893 Seminar in Solid State Physics (1–21). Research topics in condensed-matter physics, with emphasis on current experimental and theoretical studies.

895 Seminar in Nuclear Physics (1–21). Current research topics in low-energy nuclear physics, especially as related to the interests of the Triangle Universities Nuclear Laboratory.

***896 Seminar in Particle Physics (1–21).** Symmetries, gauge theories, asymptotic freedom, unified theories of weak and electromagnetic interactions, and recent developments in field theory.

897 Seminar in Theoretical Physics (1–21). Topics from current theoretical research including, but not restricted to, field theory, particle physics, gravitation, and relativity.

899 Seminar in Professional Practice (1–21). Required preparation, Ph.D. written exam passed. The role and responsibilities of a physicist in the industrial or corporate environment and as a consultant.

901 Research (1–21). 10 or more laboratory or computation hours a week.

992 Master's Research Project (3–6).

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Department of Political Science

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EVELYNE HUBER, *Chair*

Professors

Frank Baumgartner (72) Public Policy, Agenda Setting, Interest Groups, Lobbying
Thomas Carsey (67) American Politics, Methods
Pamela Conover (10) Political Psychology, Mass Political Behavior, Gender Politics
Virginia Gray (40) State Politics, Public Policy, Interest Groups
Jonathan Hartlyn (46) Comparative Politics, Latin American Politics
Liesbet Hooghe (04) Comparative Politics, European Union, West European Politics
Evelyne Huber (54) Comparative Politics, Political Economy, Latin American Politics
Michael Lienesch (38) History of Political Thought, American Political Theory
Stuart Elaine Macdonald (39) Political Behavior, Public Opinion, Research Methods
Michael MacKuen (66) American Politics, Political Methodology
Gary Marks (18) Comparative Politics, Western Europe
Kevin McGuire (60) Judicial Politics, American Politics
Timothy McKeown (22) International Relations, International Political Economy
Layna Mosley (9) International Relations, International Political Economy, Comparative Political Economy
Lars Schoultz (20) U.S.-Latin American Relations
Donald Searing (30) Comparative Politics, Political Psychology
Jeffrey Spinner-Halev (11) History of Political Thought, Contemporary Political Theory, Democratic Theory
Jurg Steiner (31) Comparative Politics, Ethics in Politics
John Stephens (55) Political Economy, Western Europe, Caribbean
James Stimson (65) American Politics, Political Methodology

Associate Professors

Susan Bickford (58) History of Political Thought, Feminist Theory, Democratic Theory
Mark Crescenzi (05) International Politics, Conflict Processes, Political Economy
Stephen Gent (8) International Conflict, Civil Conflict, Game Theory
Michele Hoyman (06) American Politics, Public Administration, Labor Relations and Labor Law, Rural Economic Development
Stephen Leonard (15) History of Political Thought, Philosophy of Social and Political Inquiry, Republicanism, History of the Academic Disciplines
Kevin McGuire (60) Judicial Politics, American Politics
Thomas Oatley (57) International Relations, International Political Economy, European Countries
Andrew Reynolds (13) Comparative Politics, Political Institutions, African Politics
Jason Roberts (73) American Political Institutions with Emphasis on Congress
Graeme Robertson (7) Comparative Politics, Russian Politics, Labor and Social Movements, Democratization
Terry Sullivan (47) Congressional and Executive Politics
Isaac Unah (62) Judicial Politics, Regulatory Policy, Bureaucratic Implementation
Milada Vachudova (12) Comparative Politics, International Institutions, Western and Eastern European Politics

Assistant Professors

Navin Bapat (68) International Relations, Insurgency and Terrorism
Anna Bassi (41) Formal Theory, Experimental Methodology
Andrea Benjamin (14) Race and Politics
Xi Chen (43) Social Movements, Democratization and State-Society Relations
Chris Clark (16) Race and Representation; State Politics
Skyler Cranmer (42) Political Methodology and International Relations
Cecilia Martinez-Gallardo (69) Comparative Politics, Latin American Political Institutions, Government Formation and Change
Justin Gross (48) Statistical Methods, Network Analysis, Political Communication
Sarah Treul, American Political Institutions, the U.S. Congress, Courts, and the Separation of Powers

Lecturers

Donna LeFebvre, Law-Related Courses
Holger Moroff, Comparative Politics, Security Theories and European Integration

Professors Emeriti

Thad Beyle
Raymond Dawson
Lewis Lipsitz
Richard Richardson
Robert Rupen
Glenn Snyder
Alan Stern
James White

The political science graduate program is small and very selective: Each year about 15 students enroll. Most graduate students pursue the doctor of philosophy in political science. However, the department also offers courses of study leading to the master of arts in political science and the master of arts in political science with a certificate in Latin American studies.

Admission

The general prerequisite for admission to graduate study is a bachelor of arts degree or equivalent. A student is not required to have an undergraduate major in political science but will normally be expected to have had at least nine semester hours of course work in political science.

All applicants for admission to graduate study must take the Graduate Record Examination (GRE). Prospective applicants should take the test early enough to enable them to submit official reports of scores with their application for admission. In considering applications for fellowship awards, these test scores receive heavy emphasis. Applicants are encouraged to have their applications complete by December 1 and no later than posted deadlines. Applicants are also required to submit a writing sample and a personal statement.

Graduate Study in Political Science

Departmental programs of graduate study are intended to train professional political scientists. Thus, graduate work is expected to be qualitatively different from undergraduate work. Its emphasis is upon the acquisition of tools, skills, and knowledge at a level to qualify the student to: carry on research, to teach, to fill active political and administrative duties, and to carry on other roles that advance the profession of practicing political scientists.

All candidates for graduate degrees will be expected to achieve broad mastery at the professional level of the literature, problems, and skills of the academic fields and subfields offered for the degree, and will have gained experience in teaching and research. Much more is required of the candidate than mere compilation of credits in relevant courses.

At the M.A. level, the student is required, in addition to passing the course programs successfully, to write a thesis and to be examined orally on the major field of interest and in defense of the thesis.

At the doctoral level, preliminary examinations are both written and oral, in that order. Written examinations are given twice each year, in September and in March. The final part of the examination is an oral defense of the dissertation proposal. Successful completion of these examinations permits a student to become a doctoral candidate. Following completion of the dissertation, a final oral examination will be held, which is primarily a defense of the dissertation but may include such excursions into underlying theory and related fields as are germane to the dissertation.

Field and Course Requirements

The political science curriculum is designed to ensure that graduate students develop a professional competence in the discipline as a whole, as well as expertise in one major and one minor field. The courses in the department are grouped under the following broad categories: international relations, comparative politics, political theory, American politics, methodology, and public policy/public administration (minor field only).

Ph.D. students are required to demonstrate competence in two fields of study and, by participating in the instructional program, to undergo training as teachers. A minimum of four courses and a comprehensive examination is required in the major field. A comprehensive examination and three courses are required in the minor field.

The Institute of Latin American Studies and the Graduate Certificate

The Institute of Latin American Studies and the Consortium in Latin American Studies at UNC–Chapel Hill and Duke University serve as a medium for interdisciplinary communication on Latin America, encouraging and stimulating instruction and research on the region. They provide funding for interdisciplinary working groups, visiting scholars, research workshops, and guest lectures, as well as support for graduate students through academic year and summer fellowships and research and conference travel grants. The program has been funded as a National Resource (Title VI) Center since 1991 by the U.S. Department of Education.

Although the University of North Carolina at Chapel Hill does not grant an interdisciplinary postgraduate degree in Latin American studies, graduate students seeking to document their area expertise are encouraged to earn a certificate in Latin American studies in conjunction with any advanced degree in any University graduate program. The requirements for the certificate are 1) a minimum of two semesters of residence, 2) language competence in Spanish or Portuguese, 3) four graduate courses on Latin American topics, 4) a thesis on a topic related to Latin America, and 5) an oral defense of the thesis. For students in professional schools or departments that do not require defense of a thesis, a letter from the student's advisor indicating that a major research project on a Latin American topic was successfully completed will be sufficient to waive the requirement. Graduate students interested in obtaining a certificate in Latin American studies should contact the director of the Institute of Latin American Studies.

The Center for European Studies

The Center for European Studies (CES) and the European Union Center of Excellence (EUCE) provide a focus for interdisciplinary and political research on Europe by funding faculty course development, research projects, research working groups, and travel as well as funding graduate student research, travel, and foreign language learning. In recent years the center has hosted international conferences on the European Union, regional regimes, comparative social policy, and the political economy of capitalist democracies as well as hosting three doctoral dissertation workshops in conjunction with European universities. Graduate students are always closely involved in our conferences and activities. The center has established a master's degree program with tracks in Transatlantic Relations and European Governance in consortium with European and American universities. CES is funded as a National Resource Center by the U.S. Department of Education and as a European Union Center of Excellence by the European Commission. We are also network coordinators for all commission-funded EU centers in the United States.

Center for Slavic, Eurasian, and East European Studies

The Center for Slavic, Eurasian, and East European Studies (CSEEES) is an interdisciplinary center run jointly with a sister center at Duke University. In addition to offering an undergraduate major in Russian and East European studies, the center actively promotes graduate education and research in this area of the world.

As a U.S. Department of Education Title VI Center, CSEEES awards Foreign Language and Area Studies (FLAS) fellowships to a few graduate students each academic year and summer to help them acquire the language skills and area expertise necessary for advanced study and field research in this part of the world.

The Louis Harris Data Center

The national polling company Harris Interactive (formerly Louis Harris & Associates) has been surveying Americans' opinions on issues of national importance since the late 1950s. Harris surveys cover many topics, including national morale, the arts, energy policy, women's roles, political candidates, violence, health, and housing. The breadth and scope of the Harris surveys make them a rich source for secondary analysis by social scientists.

In 1965, Louis Harris agreed to make his data available for secondary analysis by researchers. Harris and the University of North Carolina jointly agreed to establish at Chapel Hill the Louis Harris Data Center as the national archive for all Harris data. Since 1965, more than 200 national, state, and community studies conducted by Harris Interactive have been deposited at the Harris Data Center for use by researchers at the University and elsewhere.

Publications

The James Sprunt Studies in History and Political Science, established by the late Dr. James Sprunt, of Wilmington, North Carolina, is published under the direction of the departments involved.

Courses for Graduate and Advanced Undergraduate Students *POLI*

400 Executive Politics (3). This course explores how presidents select policy options, how they decide timing, what shapes their congressional support, and how they build successful coalitions.

401 Political Economy I: The Domestic System (3). Problems of the national government in managing capitalist development and economic growth; political constraints; patterns of conflict among domestic actors.

406 State Governments: Laboratories of Democracy (3). Advanced topics in state government and politics, including political behavior and processes, governmental institutions, public policies. Emphasis on how states serve as the laboratories of democracy in a federal system.

409 Mock Constitutional Convention (3). Students employ their understanding of political philosophy and practical politics to write a new constitution for the United States. Emphasis is on creative blending of theory and practice.

410 The Constitution of the United States (3). A study of the fundamental principles of constitutional interpretation and practice in the United States by means of lectures, textbooks, and cases. Emphasis will be on the political context surrounding and the impact following Supreme Court decisions.

411 Civil Liberties under the Constitution (3). An analysis of the complex political problems created by the expansion of protection for individual liberties in the United States. Emphasis will be on contemporary problems with some supplemental historical background.

412 United States National Elections (3). Course studies United States presidential and congressional elections. Emphasis on individual vote, changing party strengths, and the relation of outcomes to policy.

414 The Adversary System (3). An overview of the theories, problems, and practices of police, courts, and corrections, and the values underlying our adversary system, especially with relation to constitutional principles, judicial integrity, and racial discrimination.

415 Criminal Law (3). This course is concerned with traditional substantive criminal law: crime, defenses and excuses to criminal liability, issues of morality attached to criminal law, constitutional limitations on punishments.

416 Constitutional Policies and the Judicial Process (PWAD 416) (3). Analysis of the structure and functions of judicial systems emphasizing the organization, administration, and politics of judicial bureaucracies and roles of judges, juries, counsel, litigants, and interested groups in adjudication processes.

417 Advanced Political Psychology (3). Examines in greater depth issues in the field of political psychology, including conflict and conflict resolution, socialization, attitude formation, mass movements, leader–follower relationships, and psychobiography.

418 Mass Media and American Politics (3). Junior-senior standing required. Examination of the role, behavior, and influence of the mass media in American politics.

419 Race and Politics in the Contemporary United States (3). Restricted to juniors and seniors. Surveys the vast literature on race and politics in the contemporary United States and examines the complex relationship between racial and ethnic identity and political outcomes. It explores broad political science concepts in the context of racial and ethnic groups.

420 Legislative Politics (3). Examines the politics of the United States Congress. Emphasis on representation, the legislative process, and policy making.

423 Peace Settlements in Ethnically Divided Societies (PWAD 423) (3). Examines political peace settlements as components of conflict resolution in ethnically or regionally divided societies. The course identifies the aspects of negotiated settlements which seek to manage civil conflict.

424 Legislative Procedure in Congress (3). Examines legislative procedure in Congress. Requires active participation in a Model Congress.

430 European Politics (3). Active participation of students in a research project on career motives and ethical principles in European countries.

431 African Politics and Societies (3). The problems of race, class, and ideology are explored in the countries south of the Zambezi River, along with the political and economic ties that bind these countries.

432 Tolerance in Liberal States (3). This course will compare the theory and practice of tolerance in the United States and Europe, with particular attention to Great Britain and France.

433 Politics of the European Union (3). Examines the politics and political economy of institutional change and policy making in the European Union in comparative perspective.

434 Politics of Mexico, Central America, and the Caribbean (3). The analysis of politics in Mexico, Central America, and the Caribbean.

435 Democracy and Development in Latin America (3). The analysis of central issues of democracy and development in Latin America.

436 Democracy and Development in Latin America (Spanish) (3). The analysis of central issues of democracy and development in Latin America.

437 Political Change in Asia (3). This course will address how various nations in Asia are handling the pressures of democratization, the globalization of "democratic norms," and internal challenges to authoritarian regimes.

438 Democracy and International Institutions in an Undivided Europe (3). Explores the collapse of communist rule in 1989 and the reaction of international institutions to the challenges of democratization, economic transition, ethnic conflict, and European integration in an undivided Europe.

439 Comparative European Societies (SOCI 439) (3). Examination of commonalities and differences of European societies and of the tensions and difficulties attending the European integration process.

441 Israeli Politics and Society (3). This course will explore Israeli society, Israeli politics, and the Arab-Israeli conflict.

442 International Political Economy (EURO 442) (3). Prerequisites, ECON 101 and POLI 150. Theories of international political economy, major trends in international economic relations, selected contemporary policy issues.

443 American Foreign Policy: Formulation and Conduct (PWAD 443) (3). Prerequisite, POLI 150. Permission of the instructor for students lacking the prerequisite. The role of Congress, the press, public opinion, the president, the secretary and the Department of State, the military, and the intelligence community in making American foreign policy. Emphasizes the impact of the bureaucratic process on the content of foreign policy.

444 Seminar on Terrorism (3). This course explores the causes of terrorist behavior. The course also examines the government's response to terrorism, the internal implications of terrorists' campaigns, and prospects for conflict resolution.

446 Defense Policy and National Security (AERO 446, PWAD 446) (3). Prerequisite, POLI 150. Permission of the instructor for students lacking the prerequisite. A study of national defense policy as affected by the constitutional and political setting, as well as its relation to foreign policy. Some attention to strategic doctrine.

449 Human Rights and International Criminal Law (3). This course examines international efforts to punish genocide, crimes against humanity, and war crimes. The evolution of international criminal law, jurisdiction, remedies, problems, alternatives, and recent case studies is included.

450 Contemporary Inter-American Relations (3). A comprehensive analysis of hemispheric international relations and foreign policies of individual Latin American nations.

452 Africa and International Conflict (3). The purpose of this course is to examine Africa's conflicts using an historical examination and advances in international relations theory. We will examine European colonial intervention, the wars of independence, the Cold War, and the use of proxies, insurgencies, the African World War, the Sudanese War, and the "war of terrorism."

457 International Conflict Processes (PWAD 457) (3). Analysis of international conflict and the causal mechanisms that drive or prevent conflict. Emphasis is on the conditions and processes of conflict and cooperation between nations.

458 International Conflict Management and Resolution (3). Prerequisite, POLI 150. Examines the management and resolution of international and civil wars.

469 Conflict and Intervention in the Former Yugoslavia (PWAD 469) (3). Focuses on ethnic and political conflicts in the former Yugoslavia and efforts by the international community to end conflict and promote peace and reconstruction.

470 Social and Political Philosophy (3). An examination of the logic of social and political thought with an analysis of such concepts as society, state, power, authority, freedom, social and political obligation, law, rights.

471 Recent Contemporary Political Thought (3). Survey of the historical foundations, central tenets, and political consequences of prominent 20th-century political theories. Topics include contemporary liberalism and Marxism, fascism, theories of development, populism, feminism.

472 Problems of Modern Democratic Theory (3). Major problem areas in democratic theory including definitions, presuppositions, and justifications of democracy, liberty, equality, minority rights, public interest, participation, dissent, and civil disobedience.

473 Politics and Literature (3). Identifies and interprets political ideas using historical and contemporary literary sources. Examines literature as political practice.

474 Religion and Politics (3). Examines the relationship between religion and politics, with emphasis on the United States. Topics include church–state issues, religious-political movements, religion and public policy, religion and voting.

475 Marxism and Socialism (3). A consideration of the political thought of major Marxist and socialist schools—including Marxism, Leninism, contemporary democratic and revolutionary socialism—with reference to utopian socialism and recent controversies on the left.

477 Advanced Feminist Political Theory (WMST 477) (3). Examines in greater depth and complexity current issues in feminist political theory. Topics: theories of subjectivity and solidarity, feminist poststructuralist and post-Marxist thinking, gender in the public sphere.

490 Advanced Undergraduate Seminar (3). A detailed examination of advanced special topics in political science.

630 Political Contestation in Europe (3). Permission of the instructor for undergraduates. Examines recent developments in the European integration process by exploring the potential for political contestation concerning European Union matters in national politics. Familiarizes students with the main theoretical approaches and the extensive empirical work dealing with the effects of European integration.

631 European Security: The Enlarging European Union and the Trans-Atlantic Relationship (3). Permission of the instructor for undergraduates. Since the collapse of communism from 1989 to 1991, the European Union has faced a fundamentally different geopolitical neighborhood and an evolving relationship with the United States. We will explore how Europe has addressed new challenges to its security in its neighborhood and beyond.

632 The European Union as a Global Actor (3). Permission of the instructor for undergraduates. This seminar introduces students to basic theoretical approaches to both international relations and the European Union by focusing on the European Union's external relations and foreign policies.

633 Tolerance and Liberal States (3). Permission of the instructor for undergraduates. This course examines tolerance and citizenship in the European Union and North America, with particular attention to the United States, Britain, France, Spain, Italy, Germany, and The Netherlands.

691H Honors Seminar in Research Design (3). Required of all students in the honors program in political science.

692H Honors Thesis Research (3). Required of all students in the honors program in political science.

698 Philosophy, Politics, and Economics II: Capstone Course (ECON 698, PHIL 698) (3). See PHIL 698 for description.

Courses for Graduate Students

POLI

700 Core Seminar on American Politics (3). An overview of research on American politics that introduces students to a wide range of sustentative understandings and theoretical perspectives.

701 American Political Institutions (PLCY 710) (3). Theory and practice of political institutions in the American context.

702 Legislative Systems (3). Institutions and processes in the United States Congress with some cross-national comparisons.

703 Congress and Theory Building (3). This course examines diverse theoretical perspectives on national institutional change and stability, using as our institutional focus the United States Congress between 1789 and 1989.

704 American Presidency (3). Survey of the substantial literature and research on the American Presidency.

705 Judicial Politics (3). Survey of recent literature on the politics of judicial institutions and the behavior of judges, lawyers, litigants, and other actors in the judicial process, emphasizing relationships between judicial and other policy-making processes.

706 Problems in Constitutional Law (3). A survey of issues in American constitutional law, with a special emphasis on the politics of constitutional interpretation.

707 Government and Politics in Metropolitan Areas (3). Changing patterns of political cooperation and conflict in metropolitan areas; political behavior in central and suburban areas; the large metropolis as a political system; and national policies toward metropolitan problems.

708 Seminar in Subnational Politics and Policy (3). This course surveys the major topics and research programs in subnational American politics and policy, with special attention to the vertical and horizontal intergovernmental interactions inherent within federal political systems.

709 Research Topics in Contemporary Southern Politics (3). Topics vary, but include minority politics in the region, the counter-mobilization of whites during the 1960s, party realignment and the decline of one-party politics, and the impact of the region on national politics.

710 Political Parties (3). Selected problems and issues in the study of American and comparative parties and party systems.

711 American Political Behavior (3). Theoretical study of mass behavior (i.e., participation, voting, protest) in the American context.

712 Public Opinion (3). A study of public opinion, its formation, expression, and impact on political systems and public policy.

713 Dynamics of Electoral Politics (3). Change within mass electorates. Topics include issue and attitude change, political realignments, and models of electoral competition.

714 Political Socialization (3). The learning process by which individuals acquire values, attitudes, and norms affecting their behavior in the political community, with emphasis on major agencies of socialization: family, schools, peer groups, and media.

715 Seminar on Political Psychology (3). Prerequisite, POLI 711. This course surveys and evaluates current and past research in political psychology. Topics may include: personality, attitudes and values, socialization, political reasoning, information processing, decision making, political identity, and political affect.

716 New Institutionalism: Politics, Institutions, and Public Policy (PLCY 716) (3). See PLCY 716 for description.

717 Potential for Democratic Stability in Deeply Divided Societies (3). The theory of power sharing tries to explain how stable democracy is possible in deeply divided societies.

718 Agenda-Setting (3). This class will focus on theoretical and empirical approaches to the study of agenda-setting in both American and comparative settings. Begins in the 1950s through current literature, covering a wide range of methodological approaches. Assignments include participation in seminar discussion, short papers on readings, and substantial original research paper.

719 Planning and Government (3). A survey of the nature and scope of government planning, its relation to other governmental activities, and its administrative and organizational problems.

720 Managing Public Policy (3). Prerequisite, POLI 700, 745, or PUBA 723. The role(s), function(s) and strategy of public administrators in the formulation, adoption, and implementation of public policies. Policy from the perspective of the policymaker; cases exploring the relationship of theories to actual policy processes.

721 Public Policy and Administration (3). Alternative explanation of public policies and policymaking processes; introduction to policy analysis as a way to inform choices among policy options; policy implementation through administrative practices and procedures.

722 Politics of the Administrative Process (PUBA 722) (3). See PUBA 722 for description.

723 Conflict Management for International Peacemakers (3). Focus on skill-building useful in managing international conflicts. Students engage in mock negotiations—systematically preparing, conducting, and reviewing their own actions. Number of conflict situations around world are analyzed.

724 Organization Design (3). Prerequisite, POLI 700. Permission of the instructor for students lacking the prerequisite. Field theory, motivation, communication, and systems perspectives as theoretical bases for organization design.

725 Public Administration Analysis and Evaluation II (3). Prerequisite PUBA 719. Second course in a two-course sequence introducing students to applied research design, data collection, data management, data analysis, and analytical reporting to allow students to conduct original research, be informed consumers of other research, and ultimately improve public program planning and evaluation decisions.

726 Intergovernmental Relations (PUBA 778) (3). Conflict and cooperation among governmental officials representing national, state, and local governments in the United States; changing roles of governments and new mechanisms for intergovernmental collaboration.

727 Framing (3). This class will focus on the theoretical and empirical studies of individual and collective framing. Readings will be from journalism, sociology, psychology, and political science and will include both US-based and comparative studies. Assignments include participation in seminar discussion, short papers on readings, and substantial original research paper.

728 Policy Workshop (3). Application of theories and techniques of policy analysis and planning to current public problems for actual clients. Focus on design and execution of policy research, and interpretation and presentation of results.

729 The Psychology of Collective Politics (3). Explores the psychological underpinnings of collective politics from the perspective of both individuals and groups. Political behaviors examined include deliberation, protest, nationalism, and intergroup conflict.

730 Comparative Political Research and Analysis (3). The seminar introduces the beginning graduate student to the central issues and major developments in the field of comparative government and politics.

731 The Politics of Development and Change (3). The theories, concepts and mechanisms of political change, with particular attention to processes of development and modernization in the new nations of Africa, Asia, and Latin America.

733 Comparative Political Economy (3). Examines topics in the comparative political economy of Western Europe such as neocorporatism, postindustrialism, the politics of industrial relations, and the European community.

734 Comparative Political Behavior (3). Political behavior of the public in cross-national or non-American settings. Political culture, belief systems, participation, protest, revolution, voting behavior, civic behavior, socialization, and media.

735 Comparative Bureaucracy (3). A cross-national examination of functions, career patterns, role behavior, and relationships of bureaucratic elites within the context of national political systems. Research on particular countries is emphasized.

736 Political Transitions and Democratization in Comparative Perspective (3). Examination of contrasting theoretical approaches to understanding democracy. Comparative study of Africa, Eastern Europe, and Latin America elucidates challenges and opportunities that affect possibilities for democratization and consolidation.

737 Psychology of Elite Decision Making (3). Political thinking of politicians and civil servants in domestic and foreign policy. Perception, cognition, learning, attitude change and persuasion, aging, motivation, emotions, and personality.

738 Power and Morality in Politics (3). Motives of power and morality in rational choice theories and theories of power sharing. Empirical findings and normative evaluations.

739 Communist Political Systems (3). An examination of the political evolution and process in societies governed by communist parties.

740 Issues in Latin American Politics (3). Explores the central issues of Latin American politics and analyzes major theoretical debates.

741 Latin American Politics: Research and Analysis (3). Reviews major works and theoretical perspectives in the literature, assesses contemporary political science research on Latin America, and examines problems of field research.

742 Political Economy of Latin American Development (3). Examines effects of state, regime-type, and political processes on agricultural and industrial policy in Latin America. Also considers the informal economy, international debt, and relationship between policy and politicization.

743 Seminar on United States–Latin American Relations (3). Analysis of the central conceptual concerns and major theoretical approaches to the study of inter-American relations, with a focus on United States foreign policy toward the region.

744 African Politics: Challenges of Democratization and Development (3). Study of the politics of development in contemporary Africa, with emphasis on changing state society relations, the roles of peasants and women in politics, and prospects for democratization.

745 Varieties of Democratic Capitalism in Europe and North America (3). This course will examine the development of different types of welfare states in Europe and North America.

746 Identities and Transitions (RUES 730) (3). See RUES 730 for description.

750 Theories of International Relations I (3). Introduction to the central issues and major theoretical developments in the field of international relations, focusing on system structure, political and security issues, and decision making.

751 Theories of International Relations II (3). Introduction to the central issues and major theoretical developments in the field of international relations, focusing on the politics of international economic relations, law and organization, and fundamental system change.

752 International Organization (3). Theories and approaches to the study of international organizations and regimes, plus selected noneconomic case studies.

753 International Conflict and Cooperation (3). An examination of international conflict and cooperative processes in the context of the evolution of the international system.

754 Introduction to Mathematical International Relations (3). Surveys research in mathematical models of international decision making, bargaining, systemic change, arms races, coalitions, and perception. Philosophic and historical considerations about this field are also discussed.

755 Power, Morality and International Society (3). Thucydides, Machiavelli, Hobbes, Kant, twentieth-century Realists (Niebuhr, Morgenthau), Idealists, Neo-Realists, the British School (Wight, Bull), and selected topics (e.g., just war, human rights, food policy).

756 Politics of the International Economy (3). Positive theories of political choice in trade, monetary relations, foreign investment, and regional integration.

757 Political Economy of the Nation State in the World System (3). Prerequisite, ECON 460 or 465. Permission of the instructor for students lacking the prerequisite. Analysis of the interaction between the external sector of the economy and domestic politics in weak capitalist states.

758 Theories of Foreign Policy (3). This course is an introduction to the field of foreign policy analysis. Its primary goal is to expose students to the theories and methods of foreign policy research and analysis.

759 U.S. Foreign Policy (3). This course provides an overview of United States foreign policy and exposes students to the major themes and controversies in the field.

760 Topics in National Security and Foreign Policy (3). This research seminar examines contemporary substantive issues in national security and foreign policy in light of research, organizational, and administrative topics.

761 Seminar in Problems of U.S. Military Policy and Civil-Military Politics (3). Research seminar in problems of United States military policy and civil-military problems, focused chiefly on deterrence, arms control, and disarmament.

762 Security Studies (3). This course introduces students to the major theoretical approaches to the study of national security.

763 Divided Societies (3). When a society is deeply divided along racial, ethnic, religious, or linguistic lines, this classical model brings the risk that the majoritarian segment of society always stays in power.

768 Feminist Political Theory (WMST 768) (3). A survey of feminist approaches to politics and political inquiry.

770 Community Economic Development: Strategies and Choices (PUBA 770) (3). The goal of this course is to acquire a command of the fundamentals of economic development from the community's perspective. This is done by reading and absorbing the theoretical literature on economic development from the fields of urban politics, planning, sociology, economics, political science, and sociology.

771 Modern Political Theory I (3). An introduction to modern political thought, its major thinkers and issues.

772 Modern Political Theory II (3). An introduction to recent and contemporary political thought, its major thinkers and issues. Emphasis on Continental thought. Topics include post-Marx Marxism, critical theory, existentialism, structuralism, poststructuralism.

773 Major Issues in Political Theory (3). An introduction to the major issues of political theory, with emphasis on the major thinkers in the history of Western political thought.

774 Classical Political Theory (3). An introduction to ancient and medieval political thought, its major thinkers and issues.

775 American Political Theory (3). Survey of issues and problems in American political thought, with analysis of major thinkers and selected topics and emphasis on the role of family, society, and economy in political theory.

776 Recent and Contemporary Political Theory (3). An introduction to recent and contemporary political thought, its major thinkers and issues. Emphasis on Continental thought.

777 Major Figures in Political Theory (3). An in-depth study of the primary and secondary literature on one or two major figures in the history of political thought (e.g., Plato, Machiavelli, Hobbes, Marx).

778 The Formal Theory of Institutions (3). This course is a comprehensive introduction to the burgeoning literature on the formal theory of institutions.

780 Scope and Methods of Political Research (3). Permission of the instructor . A discussion of the theory and process of political analysis, including philosophy of science, research design, the methods of drawing causal inferences, and of generating data.

781 Interviewing in Social Science Research (3). This seminar deals with the theoretical underpinnings and practical execution of interview techniques ranging from the short survey instrument to the adaptation of prolonged clinical interviews. Most of the work emphasizes different varieties of in-depth interviewing.

782 Logic of Political Inquiry (3). A critical examination of models of political inquiry. Empirical (naturalist), interpretive, and critical metatheories are considered in terms of each model's ontological, epistemological, and practical/political consequences and presuppositions.

783 Statistics (3). Elementary descriptive statistics and basic principles of statistical inference including estimation and tests of hypotheses.

784 Intermediate Statistics (3). This course extends the coverage of POLI 281. Topics to be covered include analysis of variance, multiple and partials correlation, and multiple regression.

785 Introduction to Structural Equation Models (3). Prerequisite, POLI 784. Introduces structural equation models with observed variables and econometric estimation methods. Some attention to models with unobserved variables and LISREL-type analyses.

786 Time Series Analysis of Political Data (3). Prerequisite, POLI 784. Permission of the instructor for students lacking the prerequisite. Discusses the problems that arise when regression methodologies are applied to time series and pooled time series data.

787 Maximum Likelihood Methods (3). Prerequisites, POLI 783 and 784. Introduction to maximum likelihood estimation with applications to political science. Topics include discrete choice analysis, censored and truncated variables, event history analysis, sample selection models, and multilevel inference.

788 Statistics and Data Analysis for Political Science and Policy Research (3). This course focuses on the application of statistical analysis to quantitative data in order to study theoretically and substantively interesting questions about politics and policy.

789 Game Theory (3). This class provides graduate students with an introduction to game theoretic modeling, focusing on noncooperative game theory. Topics covered include normal form games, extensive-form games, and games of incomplete information.

790 Positive Political Theory (3). This seminar surveys applications of rational choice models across the subfields of political science. It also considers critiques of national choice approaches and alternative theoretical approaches to modeling human behavior.

802 Research in Public Administration (PUBA 900) (1–21).

803 Seminar on Application of Political Behavior Research to Public Problems (3). Exploration and examination of the ways in which political behavior research can be applied to understanding and ameliorating public problems.

811 Seminar in Political Sociology (SOCI 811) (3). See SOCI 811 for description.

813 Comparative Welfare States (SOCI 813) (3). This course examines the development, achievements, present crisis, and future of welfare states in advanced industrial democracies.

816 Influential Works in Democracy (SOCI 816) (3). See SOCI 816 for description.

846 Seminar in International Communication (JOMC 846) (3). See JOMC 846 for description.

850 Theories of International Politics (3). Topics relating to the development of theory in the realm of international politics.

851 Seminar in International Relations (3). Special topics in international relations, such as alliances, bargaining, decision making, economic interdependence, and international human rights.

852 U.S.-E.U. Lecture Series (1). One credit course designed to enhance students' understanding of transatlantic studies through lectures from and discussion with experts in the field. Topics will focus on European Union and/or United States foreign and domestic politics as well as on contemporary transatlantic relations.

870 Seminar in Political Theory (3). Special topics in political theory such as Marxism and Socialism, Democratic theory, contemporary political thought, or related topics.

880 Design and Analysis of Experiments and Surveys (3). Prerequisites, POLI 780 and 783. Introduction to the use of experimental and survey research methods in political science. Topics include factorial designs, repeated measures design, ANOVA, sampling theory, survey errors and costs, and questionnaire design.

881 Teaching Political Science (3). The director of graduate studies assigns each teacher to a faculty supervisor, who provides advice on course design, teaching, and related matters.

890 Directed Readings in Political Science (1–21). Permission of the department. Directed readings in a special field under the direction of a member of the graduate faculty.

891 Special Topics in Political Science (1–3). Permission of the instructor. Seminar in selected areas of political science. Topics vary from year to year. May be repeated for credit.

993 Master's Thesis (3).

994 Doctoral Dissertation (3).

Department of Psychology

psychology.unc.edu
DONALD T. LYSLE, *Chair*
JONATHAN ABRAMOWITZ, *Associate Chair*

Professors

Jonathan Abramowitz (231) Psychopathology, Prevention and Treatment of Anxiety and Related Problems, Especially Obsessive-Compulsive Disorder
Donald H. Baucom (104) Couple Therapy, Individual Psychopathology and Couple Functioning, Health Concerns in a Couple/Family Context
Daniel Bauer (224) Structural Equation Models, Multilevel Models, Mixture Models, Analysis of Change
Regina M. Carelli (187) Neurobiology of Reward, Drug Abuse, Behavioral Neurophysiology
Martha Cox (206) Family Processes and Child Social and Emotional Development; Poverty; Family and Child Transitions
Patrick J. Curran (195) Structural Equation Modeling, Longitudinal Data Analysis, High-Risk Adolescent Development
Linda A. Dykstra (9) Behavioral Pharmacology, Opioid Analgesia, Drugs of Abuse
Barbara Fredrickson (229) Emotions; Positive Emotions; Social, Cognitive and Physical Effects of Pleasant Emotional States; Flourishing Mental Health
Karen M. Gil (181) Health Psychology, Chronic Illness, Stress and Coping, Pain Management, Cancer Survivorship
Peter C. Gordon (170) Psychology of Language, Cognitive Neuroscience
Mark Hollins (17) Sensory and Perceptual Aspects of Pain and Touch
Joseph B. Hopfinger (198) Neural Mechanisms of Visual Attention; Electrophysiological, Neuroimaging and Eye-Tracking Studies of Attentional Control, Effects of Memory on Attention
Andrea M. Hussong (188) Adolescent Substance Use; Models of Peer, Family, and Affective Risk
Deborah Jones (223) Family Transmission of Mental and Physical Health in Underserved and At-Risk Families, and the Development and Implementation of Family-Based Prevention and Intervention Programs for These Groups
Beth E. Kurtz-Costes (142) Development of Motivational Beliefs in Childhood and Adolescence; Family and Cultural Influences on Development
Joseph C. Lowman (24) Qualities of Exemplary College Instructors, Personality Measurement, Evolutionary Personality
Donald T. Lysle (155) Neuroimmunology, Neurobiology of Drug Abuse, Evolutionary Theory
Neil Mulligan (211) Cognitive Psychology, Human Memory, Implicit vs. Explicit Memory, Episodic Memory, Attention and Memory
Peter A. Ornstein (28) Cognitive Development, Development of Learning and Memory
Abigail T. Panter (144) Evaluation, Measurement, Advanced Quantitative Methods, Survey Methodology, Personality, Educational Diversity in Higher Education
David L. Penn (196) Social Cognition and Social Impairment in Schizophrenia, Stigma, Cognitive-Behavior Therapy for Severe Mental Illness
Mitchell J. Picker (131) Discriminative Stimulus Properties of Drugs, Tolerance and Cross-Tolerance, Behavioral Effects of Opioid and Neuroleptic Drugs
Mitch Prinstein (222) Developmental Psychopathology, Interpersonal Models of Adolescent Depression and Suicide, Peer Contagion of Health Risk Behaviors
J. Steven Reznick (192) Infant Memory and Mental Ability, Influence of Nutrition on Development, Early Detection of Autism
Todd Thiele (203) Neurobiology and Genetics of Alcoholism, Conditioned Taste Aversion Learning, Food Intake and Body Weight Regulation
David M. Thissen (157) Psychometrics, Item Response Theory, Statistical Models for Developmental Data, Graphical Data Analysis
Eric Youngstrom (230) Bipolar Disorder Across the Life Cycle; Emotions, Clinical Assessment, Developmental Psychopathology

Associate Professors

Jennifer Arnold (221) Psychological Processes Underlying Language Production and Comprehension in Both Adults and Children
Anna Bardone-Cone (239) Etiology and Maintenance of Bulimia Nervosa with Particular Interests in the Roles of Perfectionism, Self-Efficacy, and Stress; Sociocultural Factors (Race/Ethnicity, Family, Media) in Relation to Body Image and Eating Disorders; Defining "Recovery" from an Eating Disorder
Stacey Daughters (263) Addictive Disorders, Etiologic Predictors of Disorder Onset and Predictors of Treatment Failure or Relapse; Distress Tolerance as an Individual Predictor
Rita Fuchs Lokensgard (227) Neurobiological Mechanisms of Drug Addiction with an Emphasis on Drug-Seeking Behavior, Drug-Induced Impulsive and Compulsive Behaviors, the Reconsolidation of Drug-Associated Memories, and Drug-Conditioned Immunomodulatory Responses
Jean-Louis Gariepy (153) Development and Evolution of Social Behavior, Early Social Development in Children, Quantification of Social Networks
Kelly Giovanello (232) Cognitive Neuroscience of Human Learning and Memory; Behavioral, Neuropsychological, and Functional Neuroimaging Studies of Relational Memory
Keith Payne (227) Social Cognition, Stereotyping, Prejudice, Emotions

Assistant Professors

Sara Algoe (250) Role of Emotions in Social Interactions; Cumulative Influence of Positive Emotions
Charlotte Boettiger (234) Cognitive Neuroscience of Addiction, Executive Function, Functional Neuroimaging, Behavioral Pharmacology, Brain Mechanisms of Substance Abuse Treatments, Modulation of Decision-Making by Genetics, Hormones and Late Adolescent Development
Laura Castro-Schilo (264) Quantitative Methods Including Structural Equation Modeling, Application of Multitrait-Multimethod (MTMM) Models to Capture How Culture and Personality Interact to Influence Latino and Non-Latino People Groups.
Carol Cheatham, Nutrition Individuality and its Effects on the Development of Cognitive and Social Behaviors
Kathleen Gates (265) Development and Application of Advanced Statistical Models for the Analysis of Individual-Level Human Behavior and Processing; Novel Methodologies for Detecting Signal From Noise in Time-Series Functional MRI Data.
Kurt Gray (256) Moral Psychology and Mind Perception, Structure of Morality, Emotional Experiences Relative to the Intentions of Others
Melanie Green (225) Attitude Change and Persuasion through Narratives; Health Communication; Effect of Technology on Interpersonal Interactions
Kristen Lindquist (257) Emotions and Affective Neuroscience, Basis of Human Emotion
Enrique Neblett (237) Racism-Related Stress Experiences, Coping, Cardiovascular Psychophysiology, and African American Child and Adolescent Mental Health

Kathryn Reissner (266) Modifications of Cellular Dynamics and Synaptic Strength and Control of Behavior; Brain Changes Stemming From Chronic Exposure to Drugs of Abuse.
Eleanor Seaton (236) Examining the Influence of Perceived Discrimination on Adolescent Development among Black Youth; Understanding the Role of Racial Identity in Well-Being among Black Youth
Lilly Shanahan (255) Risk and Protective Factors in the Development of Mental (and Physical) Health from Childhood to Young Adulthood

Clinical Professors

Arlane Margolis (134) Psychopathology and Treatment of Adolescents and Cognitive Assessment
Erica Wise (214) Psychotherapy with Adolescents and Adults, Legal and Ethical Issues in Clinical Psychology, Training Clinic Outcomes Research
Jennifer Youngstrom (233) Empirically Supported Treatments and Effectiveness Research with Children and Adolescents, Transporting Treatments into the Community, Assessment, and Treatment of Childhood Mood Disorders, Supervision, and Training

Professors Emeriti

David A. Eckerman
Samuel Fillenbaum
Chester A. Insko
Edward S. Johnson
Lyle V. Jones
Richard A. King
Robert C. MacCallum
Barclay Martin
Mesibov, Gary
Paul Shinkman
Vaida D. Thompson

The Department of Psychology offers training for the doctor of philosophy degree in six areas of psychology: behavioral neuroscience, clinical, cognitive, developmental, quantitative, and social. Each program is designed to acquaint students thoroughly with the theoretical and research content of a particular specialty and to train them in the research skills needed to become competent and creative investigators in their specialty area. In addition, the programs focus on the development of competence in appropriate professional skills.

While many of the requirements for a Ph.D. degree vary with the specialty program, certain requirements apply to all psychology graduate students. Each student must 1) engage in research during each year of enrollment, 2) pass a Ph.D. written examination, 3) pass a Ph.D. oral examination, 4) submit an acceptable dissertation and pass a final oral examination, and 5) in most cases, serve as a teaching assistant or teach a course for at least one academic year.

Additional information about graduate training in these areas may be obtained from the department's Web site, psychology.unc.edu. New students are accepted for admission in the fall semester only. Individuals seeking the M.A. degree only are not accepted.

Courses for Graduate and Advanced Undergraduate Students

PSYC

400 Conditioning and Learning (NBIO 400) (3). Prerequisites, PSYC 101 and 222. A comprehensive survey of the methods, findings, and theories of classical and operant conditioning. Skills necessary to evaluate, integrate, and summarize significant original literature will be developed.

401 Animal Behavior (NBIO 401) (3). Prerequisites, PSYC 101, and BIOL 101 or PSYC 222. PSYC 270 recommended. Ethological, genetic, and physiological variables will be studied in relation to their behavioral effects.

402 Advanced Biopsychology (NBIO 402) (3). Prerequisites, PSYC 101 and 220. Elements of neurophysiology, neuroanatomy, and neurochemistry as they apply to the understanding of brain–behavior relationships.

403 Advanced Biopsychology Laboratory (3). Prerequisites, PSYC 101, and 220 or 402. "Hands on" laboratory course designed to introduce students to experimental protocols emphasizing "brain–behavior" relationships. Topics include gross neuroanatomy, stereotaxic surgery, and the effects of drugs on behavior.

404 Clinical Psychopharmacology (3). Prerequisite, PSYC 101. This course will investigate the pharmacological effects and the clinical efficacy of drugs used to treat behavior disorders.

425 Advanced Perceptual Processes (3). Prerequisites, PSYC 101, and one of PSYC 220, 225, or 230. The perception of objects and events; the role of cognitive factors in perception.

430 Human Memory (3). Prerequisites, PSYC 101, and 222 or 230. This course explores classic and current issues in the study of human memory. Topics include working memory, encoding and retrieval processes, implicit memory, reconstructive processes in memory, eyewitness memory, developmental changes in memory, neuropsychology and neuroscience of memory and memory disorders, memory improvement, and the repressed/recovered memory controversy.

431 Introduction to Cognitive Science (3). Prerequisites, PSYC 101, and 210 or 215. An introduction to the interdisciplinary study of the mind, intelligent behavior, information processing, and communication in living organisms and computers.

432 Psychology of Language (3). Prerequisites, PSYC 101 and 230, or LING 101, or 400. This course examines the mental representations and cognitive processes that underlie the human ability to use language. Covers what people know about language, how they process it, and how people make inferences about the speaker's meaning based on context. Recent work in experimental psycholinguistics is discussed.

433 Behavioral Decision Theory (3). Prerequisite, PSYC 101. Simple mathematical and psychological models of judgment and choice, and related experiments, are treated, as are applications to real world problems in medical, environmental, policy, business, and related domains.

434 Cognitive Neuroscience (3). Prerequisites, PSYC 101, and 210 or 215; and one of PSYC 220, 222, 225, 230, or BIOL 450, 455. Introduction to cognitive neuroscience. Higher mental processes including attention, memory, language, and consciousness will be covered, with an emphasis on the neural mechanisms that form the substrates of human cognition.

436 Cognitive Science and the Novel (3). Prerequisite, PSYC 220, 222, 225, 230, 260, 431, 432, 433, or 469. Introduces topics in cognitive science by reviewing their use in recent novels. Explores their influence on the novel, and how the novelist might offer relevant insights.

461 Cognitive Development (3). Prerequisites, PSYC 101 and 250. An examination of the development of attention, perception, learning, memory, and thinking in normal children.

463 Development of Social Behavior and Personality (3). Prerequisites, PSYC 101 and 250, and 210 or 215. Developmental processes during early childhood as these relate to social behavior and personality.

465 Poverty and Development (3). Prerequisites, PSYC 101 and 250. Poverty is one of the most consistent and influential risk factors for problematic development. This course focuses on the scientific study of how poverty affects development across the human life span.

467 The Development of Black Children (3). Prerequisites, PSYC 101 and 250. PSYC 210 or 215 recommended. A survey of the literature on the development of black children. Topics include peer and social relations, self-esteem, identity development, cognitive development, school achievement, parenting, family management, and neighborhood influences.

468 Family as a Context for Development (3). Prerequisites, PSYC 101 and 250, and 210 or 215. Explores how the family influences children's development. Topics include family theories, genetics, family structure (e.g., single parents, working mothers, divorce), discipline, parent behavior and values and beliefs, fathers and ethnic diversity.

469 Evolution and Development of Biobehavioral Systems (3). Prerequisites, BIOL 101 and PSYC 101, and 210 or 215. Examines the evolution and development of behavior patterns and their physiological substrates.

470 Developmental Research on the Family (3). Prerequisites, PSYC 101 and 250, and 210 or 215. Child and adolescent development within the context of family is examined. Course topics include family theory, cognitive development, divorce, poverty, and gender. Each student will complete a research project.

471 The Study of Adolescent Issues and Development (3). Prerequisites, PSYC 101, 210 or 215, and 250. The developmental period of adolescence is studied from a multidisciplinary perspective. The course will distinguish among early, middle, and late adolescence and will cover several theoretical perspectives.

490 Current Topics in Psychology (3). Various special areas of psychological study, offered as needed. Course may be repeated for credit.

500 Developmental Psychopathology (3). Prerequisites, PSYC 101, 245, and 250. A survey of theories bearing on atypical development and disordered behavior, and an examination of major child and adolescent behavior problems and clinical syndromes.

501 Theoretical, Empirical Perspectives on Personality (3). Prerequisite, PSYC 101. An in-depth coverage of the traditional clinically based personality theories of the early 20th century contrasted with more recent empirically based perspectives.

502 Psychology of Adulthood and Aging (3). Prerequisites, PSYC 101 and 250. A developmental approach to the study of adulthood, from young adulthood through death. Topics include adult issues in personality, family dynamics, work, leisure and retirement, biological and intellectual aspects of aging, dying, and bereavement.

503 African American Psychology (3). Prerequisite, PSYC 101. This course examines race and culture in the psychological processes and behavior of African Americans.

504 Health Psychology (3). Prerequisites, PSYC 101 and 245. An in-depth coverage of psychological, biological, and social factors that may be involved with health.

505 Introduction to Clinical Psychology (3). Prerequisites, PSYC 101 and 245, and 210 or 215. Overview of clinical psychology: history, scientific basis, and major activities and concerns including assessment, psychotherapy, and other psychological interventions, community psychology, ethics, and professional practice.

506 Assessment and Treatment of Older Persons (3). Prerequisites, PSYC 101 and 245. Addresses methods to assess, treat, and rehabilitate older persons with serious mental health disorders.

507 Autism (3). Prerequisites, PSYC 101, 245, and 250. Intensive service-learning seminar on autism includes a supervised community placement. Topics include historical diagnostic issues, etiological theories, assessing patterns of functioning, developmental/life span issues, family concerns, and intervention approaches.

509 Applied Behavioral Analysis (3). Prerequisites, PSYC 101 and 245. PSYC 222 recommended. A survey of applications of learning theory in solving clinical, educational, and societal problems. Practicum experience included.

512 Popularity, Friendship, and Peer Relations (3). Prerequisite, PSYC 101. This course will review literature regarding peer relations among children and adolescents, including peer acceptance/rejection, popularity, bases of friendship selection, peer crowds, romantic relationships, and theories of peer influence.

514 Mania and Depression (3). Prerequisites, PSYC 101 and 245. The social, developmental, and biological contributions to mania and depression are examined, as well as the impact of these moods on the brain, creativity, relationships, quality of life, and health.

515 Psychological Approaches to Prevention Science (3). Prerequisite, PSYC 270. Permission of the instructor required. Prevention science is an interdisciplinary field between research and practice, with the goal of developing prevention programs for people's lives. Course will emphasize psychological approaches to preventing substance use as a motivating example. Discussions, lectures, a research project, and an experiential learning component.

516 Child Maltreatment, Trauma, and Trauma-Focused Treatment (3). Prerequisite, PSYC 101. This course offers a multidisciplinary perspective on child maltreatment, including the types of maltreatment to which children are exposed, the prevalence of child maltreatment, and the impact of maltreatment on individual, familial, and societal functioning.

530 Design and Interpretation of Psychological Research (3). Prerequisites, PSYC 101 and 270. Emphasis on the methodological principles underlying experimental and correlational research. Interaction of theory and practice in the design and interpretation of psychological studies.

531 Tests and Measurement (3). Prerequisites, PSYC 101, and 210 or 215. Basic psychometric theory underlying test construction and utilization. Detailed study of issues and instruments used in assessing intellectual functioning, educational progress, personality, and personnel selection.

532 Quantitative Psychology (3). Prerequisite, PSYC 210 or 215 or SOCI 252 or STOR 155. This course examines the science of quantitative psychology. Topics include the analysis of data, the design of questionnaires, and the assessment of psychological attributes, among others.

533 The General Linear Model in Psychology (3). Prerequisite, ECON 400 or PSYC 210 or 215 or SOCI 252 or STOR 155. Consideration of multiple regression and the general linear model in psychological research, including hypothesis testing, model formulation, and the analysis of observational and experimental data.

560 Self and Society (3). Prerequisites, PSYC 101 and 260, and 210 or 215. PSYC 270 recommended. Content, structure, and functions of the self-concept. How the self-concept is shaped by society and developmental processes; ways in which the self-concept affects perception of others; self-esteem. Class participation and presentations required.

561 Social Cognition (3). Prerequisites, PSYC 101 and 260, and 210 or 215. Theory and research in social psychology, which explores the cognitive processes underlying social phenomena. Specific topics covered include attributions, emotions, automaticity, heuristics, self, goals, stereotyping, expectancies, social motives, and others.

563 Small Groups (3). Prerequisites, PSYC 101 and 260, and 210 or 215. Intensive survey of research and theory on behavior in small groups combined with appropriate experience in studying various structured groups.

564 Interpersonal Processes (3). Prerequisites, PSYC 101 and 260, and 210 or 215. Intensive coverage of normal interpersonal processes, focusing on the dyad.

565 Stereotyping, Prejudice, and Discrimination (3). Prerequisites, PSYC 101 and 260, and 210 or 215. PSYC 270 recommended. Examines the determinants, functions, processes, and consequences of stereotyping, prejudice, and discrimination. Prospects for change are considered. Class presentations and participation required.

566 Attitude Change (3). Prerequisites, PSYC 101 and 260, and 210 or 215. A detailed consideration of the theoretical issues in attitude and belief change.

567 Research in Positive Psychology (3). Prerequisites, PSYC 101 and 270, and 210 or 215. Majors only. This advanced course in positive psychology is research intensive and intended as a capstone for majors in psychology.

568 Emotion (3). Prerequisite, PSYC 101. This course will provide a comprehensive overview of the scientific study of emotion. Topics will include theoretical models of emotion process and structure. A range of perspectives, including social, cultural, developmental, clinical, and cognitive psychology, as well as behavioral neuroscience, will be considered.

569 Practical Wisdom from Advanced Social Psychology (3). Prerequisites, PSYC 101, 260, and 270. Surveys cutting-edge research across the field of social psychology and how it matters for everyday life. Topics include morality, mind perception, judgment and decision making, happiness, affective forecasting, emotion, relationships, negotiation, personality, free will, stress/health, and religion. Clear communication of research also emphasized through figures, presentations, and papers.

600 Historical Trends in Psychology (3). Prerequisite, PSYC 101. Limited to senior majors or to graduate students in psychology; others by permission of the instructor. Overview of the origins of psychological concepts, movements, and fields of study.

601 Psychology and Law (3). Prerequisites, PSYC 101, and 210 or 215. Examines the legal system from the perspective of psychology methods and research, with a focus on criminal law. Discusses dilemmas within the law and between the legal system and psychology.

602 Evolutionary Psychology (3). Prerequisite, PSYC 101. Major topics of general psychology are examined from an evolutionary perspective with an emphasis on empirical studies asking why much current human behavior and experience would have been adaptive for our early ancestors.

693H Honors in Psychology I (3). By application to the psychology honors committee and enrollment in the honors program. To be taken as the first course in the two-semester honors sequence. Students conduct research under the direction of a faculty advisor and receive classroom instruction in research-related topics.

694H Honors in Psychology II (3). Prerequisite, PSYC 693H. Admission to the psychology honors program required. To be taken as the second course in the two-semester honors sequence. Students conduct research under the direction of a faculty advisor and receive classroom instruction in research-related topics.

Courses for Graduate Students

PSYC

701 Behavior and Its Biological Bases I (NBIO 701A) (3). Graduate standing required. A survey of psychological and biological approaches to the study of sensory and perceptual information processing, with an emphasis on touch and pain.

702 Behavior and Its Biological Bases II (NBIO 702A) (3). A survey of psychological and biological approaches to the study of basic learning and higher integrative processing.

703 Advanced Biological Psychology: Central Nervous System (NBIO 703) (3). Prerequisite, PSYC 402. Each fall one special topic will be covered in depth (e.g., neural bases of memory storage, homeostasis and perception). Format includes lectures and seminar meetings with student presentations.

704 Applications of Experimental Psychology to Health Research (NBIO 704) (3). This course provides a critical analysis of interdisciplinary research within experimental psychology, including such topics as psychopharmacology, psychoneuroimmunology, psychophysiology and animal models of brain/behavior disorders.

705 Behavioral Pharmacology (NBIO 705, PHCO 705) (3). Prerequisite, PSYC 404. Permission of the instructor for students lacking the prerequisite. Basic principles of pharmacology and behavior analysis are considered in relation to drugs that affect the central nervous system.

707 Clinical Psychopharmacology (3). Examinations of the clinical efficacy, side effects and neuropharmacological actions of drugs used in the treatment of behavioral disorders. Additional topics include the behavioral and neuropharmacological actions of drugs of abuse.

708 Seminar in the Biological Foundations of Psychology (NBIO 708) (3). Permission of the instructor. Limited to graduate students in psychology and neurobiology. Lectures and seminar presentations on a wide range of topics in the area of physiological psychology.

709 Seminar in Theoretical-Experimental Psychology (1–3). Lectures, discussions, and seminar presentations on current topics in experimental psychology.

719 Seminar in Experimental Health Psychology (3). An in-depth treatment of research topics in behavioral and biological aspects of health psychology.

720 Research Seminar in Experimental Psychology (3). Graduate standing in psychology required. Students design and conduct a supervised research project and engage in critical discussion of research performed by other students and faculty.

721 Research Seminar in Experimental Psychology (3). Graduate standing in psychology required. Students design and conduct a supervised research project and engage in critical discussion of research performed by other students and faculty.

739 Cognitive Neuroscience (3). This course will highlight recent research regarding the cognitive and neural architecture of human memory or attention, with the emphasis placed on studies using cognitive neuroscience methods (e.g. fMRI, EPRs).

740 Seminar in Cognitive Psychology (1–3). Permission of the instructor. Discussion and critical evaluation of various theories of thinking; theories of concept formation, problem solving and reasoning.

741 Professional Development for Careers in Research (3). Graduate standing required. This course covers: research strategies, research collaboration, giving talks, writing review papers, writing research reports, the peer-review editorial process, the grant-proposal process, the academic job search process, and nonacademic career.

742 Attention (3). Graduate standing in psychology required. This course will introduce the major issues in attention research and highlight recent work examining the neural mechanisms of attention and its interactions with other cognitive and social-cognitive processes.

744 Psycholinguistics (3). Graduate standing in psychology required. This seminar addresses the mental processes underlying human's ability to use language at a number of levels. Specific topics vary.

746 Seminar in Cognitive Psychology—Human Memory (3). Selective overview of topics in the study of human memory. Course will examine the findings from laboratory research to gain a better understanding of memory structure and organization.

750 Research Seminar in Cognitive Psychology (3). Graduate standing in psychology required. Students conduct a supervised research project in cognitive psychology, and participate in discussion of current research and related ethical and methodological issues.

751 Research Seminar in Cognitive Psychology (3). Graduate standing in psychology required. Students conduct a supervised research project in cognitive psychology, and participate in discussion of current research and related ethical and methodological issues.

760 Advanced Cognitive Development (3). This course covers the development of attention, perception, learning, memory, thinking and language, beginning in infancy and covering the life span from both information processing and Baldwin-Piaget approaches.

761 Advanced Social Development (3). Current thinking and research relevant to social, emotional, and personality development across the life span. Topics include parent-child interaction, peer relations, aggression, competence, sex roles, and gender differences.

762 Developmental Psychology: Methodology I (3). Philosophical and sociological perspectives on research in developmental psychology, with specific applications to ongoing projects.

763 Developmental Psychology: Methodology II (3). Techniques and research designs appropriate for the study of the development of behavior. Supervised experience in the planning of experiments and data analysis.

764 Developmental Assessment (3). Introduction to instruments used for the assessment of development and cognition in infants, preschoolers, and school-aged children, with primary focus on research issues. Practice administration of instruments in field settings.

765 Developmental Psychology: History and Theory (3). Drawing upon materials presented in the previous content and method courses, this class examines in-depth various types of developmental theories.

766 Developmental Psychobiology (3). Provides an introduction to psychobiological research, focusing on early development in animals. Topics include embryology, developmental neurobiology, the development of sensory and communication systems and social behavior. As announced.

767 Advanced Family Theory and Research (3). Research related to family processes, especially regarding the developmental consequences of varying family environments on children. Topics include divorce, cognitive development, single parents, parental employment, discipline, cultural context.

768 Seminar in Developmental Psychology (3). Permission of the instructor. Intensive study of selected topics in developmental psychology.

780 Developmental Psychology Forum. Permission of the instructor. Presentations of research by faculty, students and visitors; discussion of professional topics.

781 Proseminar in Developmental Science (3). Permission of the instructor. Intensive study of selected topics in human development that are being explored by members of the Carolina Consortium on Human Development staff.

790 History of Psychology (3). Review of the history of major areas of psychology, with special emphasis on the conceptual and methodological underpinnings of the discipline.

791 Special Readings in Psychology (3). Permission of the instructor. Intended for advanced graduate students.

792 Professional Problems in Psychology (1). Permission of the instructor. Consideration of problems facing academic psychologists.

793 Laboratory in College Teaching (1). Specific training in presentational and interpersonal skills needed by college teachers, such as planning, lecturing, discussing, motivating and evaluating.

803 Empirically Validated Approaches to Child and Family Psychotherapy (3). Graduate standing in clinical psychology required. This course covers the research bases and clinical application of psychotherapeutic interventions that have demonstrated empirical validity for assisting children and families.

804 Empirically Validated Approaches to Adult Psychotherapy (3). Graduate standing in clinical psychology required. This course covers the research bases and clinical application of psychotherapeutic interventions that have demonstrated empirical validity for assisting adult clients.

805 Personality: Theory and Research (3). Permission of the instructor. Review and critical analysis of major theoretical and empirical approaches to the study of personality.

806 Clinical Research Methods (3). Graduate standing in clinical psychology required. Analysis of clinical and personality research in terms of their contribution to knowledge, their limitations, possibilities for their improvement, further research they suggest, etc. Preparation of individual research proposals for class presentation and critical evaluation. Three hours a week.

807 Clinical Research Seminar (1). Prerequisite, PSYC 806. Graduate standing in clinical psychology required. Designing and presenting research proposals in individual students' research areas in oral and written form. Critiquing research proposals. Research ethics and preparing and evaluating protocols for ethical review.

809 Adult Psychopathology (3). First-year graduate status in clinical psychology required. The major forms of psychopathology are examined within a development framework.

810 Developmental Psychopathology (3). First-year graduate status in clinical psychology required. The major forms of psychopathology are examined within a development framework.

811 Adult Practicum (3). Second-year graduate status in clinical psychology required. Supervised experience in psychological assessment and psychotherapy. Six to eight laboratory hours a week.

812 Child and Adolescent Practicum (3). Second-year graduate status in clinical psychology required. Supervised experience in psychological assessment and psychotherapy. Six to eight laboratory hours a week.

813 Advanced Adult Assessment (3). Graduate standing in clinical psychology required. Consideration of how various forms of assessment data can be utilized in understanding the structure and dynamics of adult personalities; problems of differential diagnosis, brain damage, etc., are also considered. Two lecture and two laboratory hours a week.

814 Advanced Child Assessment (3). Prerequisite, PSYC 808. Theory, research, and application of objective and projective techniques for behavioral, emotional, psychiatric, interpersonal, and social cognitive assessment of children and adolescents. Two lecture and two laboratory hours a week.

815 Ethics and Practice in Clinical Psychology (3). Graduate standing in clinical psychology required. A survey and discussion of the ethical and legal issues that clinical psychologists confront in a variety of professional settings.

816 Advanced Clinical Practicum and Professional Ethics (3). Prerequisites, PSYC 811 and 812. Supervised clinical work in an area of particular interest to the student. Clinical activity is coordinated with reading and discussion of literature or professional ethics.

817 Advanced Adult Practicum and Professional Ethics (3). Prerequisites, PSYC 811 and 812. Supervised clinical work in an area of particular interest to the student. Clinical activity is coordinated with reading and discussion of literature or professional ethics.

818 Advanced Child/Adolescent Practicum and Professional Ethics (3). Prerequisite, PSYC 817. Individualized clinical practicum for advanced doctoral students in clinical psychology. Supervised experience in psychotherapy, psychological assessment, and consultation. May be repeated for credit.

822 Seminar in Clinical Psychology (1–3). Lectures, discussions, and seminar presentations on current topics in clinical psychology.

825 Advanced Clinical Practicum (3). Prerequisite, PSYC 817. Individualized clinical practicum for advanced doctoral students in clinical psychology. Supervised experience in psychotherapy, psychological assessment, and consultation.

827 Multiculturalism and Clinical Psychology (3). Graduate standing in psychology and permission of the instructor. The development and format of this course is guided by current "best practice" in multicultural education in emphasizing three overriding goals: awareness and changes in attitudes and beliefs.

828 Child/Adolescent Assessment Practicum (1). Graduate standing in psychology and permission of the instructor. This course provides students with an opportunity to integrate their academic foundation in clinical psychology assessment knowledge skills, ethics, and values in an applied practice setting with diverse clients.

829 Clinical Psychological Assessment (3). Introduction to the principles and practices of evidence-based assessment for clinical psychology.

830 Statistical Methods in Psychology I (4). Required preparation, a course in introductory statistics. Data analysis, sampling, applied probability, elementary distribution theory, principles of statistical inference.

831 Statistical Methods in Psychology II (4). Prerequisite, PSYC 830. Statistical estimation and hypothesis testing for linear models (ANOVA, ANCOVA, regression analysis); statistical models in the design and analysis of experiments.

840 Computational Statistics (3). Prerequisite, PSYC 831. Permission of the instructor for students lacking the prerequisite. Current computational environments for data analysis and visualization are taught and used as a basis for understanding current (and creating new) methods of computational statistics and dynamic statistical graphics.

841 Introduction to Multivariate Techniques for the Behavioral Sciences (3). Prerequisite, PSYC 831. Permission of the instructor for students lacking the prerequisite. An introduction to linear regression and multivariate statistical techniques as employed in the behavioral sciences, with particular emphasis on analytic techniques and interpretation of results.

842 Test Theory and Analysis (3). Prerequisite, PSYC 831. Survey of classical test theory and more recent developments in item analysis and test construction.

843 Factor Analysis (3). Prerequisite, PSYC 831. Permission of the instructor for students lacking the prerequisite. Advanced topics in factor analytic models, multivariate correlational models and analysis of covariance structures as applied in behavioral research.

844 Structural Equation Models with Latent Variables (3). Prerequisite, PSYC 831. Permission of the instructor for students lacking the prerequisite. Examination of a wide range of topics in covariance structure models, including their history, underlying theory, controversies and practical use with major computer packages.

845 Latent Curve Modeling (3). Prerequisite, PSYC 844. Permission of the instructor for students lacking the prerequisite. Latent curve modeling is a structural equations-based method for analyzing longitudinal data. Equal emphasis is placed on the statistical model and applications to real data.

846 Multilevel Modeling (3). Prerequisites, PSYC 830 and 831. This course demonstrates how multilevel models (or hierarchical linear models) can be used to appropriately analyze clustered data (i.e. persons within groups) and/or repeated measures data in psychological research.

850 Quantitative Psychology Forum (1). Presentations of research by faculty, students, and visitors; discussion of professional topics such as ethics, the publication process, research funding, and the reviewing of articles.

851 Multidimensional Scaling (3). Prerequisites, PSYC 831 and 854. Survey, with application to dissimilarity data, of the algebraic, geometric, and computational bases of multidimensional scaling methods, with emphasis on individual differences models and nonlinear transformation.

852 Mathematical Psychology (3). Permission of the instructor. Development and applications of mathematical models in theoretical and experimental psychology. Topics selected from learning, memory, perception, thinking, attention, decision making.

853 Analysis of Frequency Tables in Behavioral Research (3). Prerequisite, PSYC 831. Permission of the instructor for students lacking the prerequisite. An introduction to the analysis of frequency data (including measures of association) and the use of log-linear models and logit models in the behavioral sciences.

854 Quantitative Research Synthesis (3). Prerequisite, PSYC 831. Permission of the instructor for students lacking the prerequisite. Survey of research synthesis including history, problem formulation, statistical concerns, describing and combining studies, combining p-values, testing for heterogeneity, accounting for moderator variables, fixed, mixed, and random effects models, publication bias.

859 Seminar in Quantitative Psychology (3). Lectures, discussions, and seminar presentations on current topics in quantitative psychology.

860 Directed Research Seminar in Social Psychology (3). Graduate status in social psychology or permission of the instructor. Directed research problems and seminar discussion of related issues.

861 Directed Research Seminar in Social Psychology (3). First-year graduate status in social psychology or permission of the instructor. Directed research problems and seminar discussion of related issues.

862 Advanced Social Psychology (3). Prerequisite, PSYC 867. Permission of the instructor for students lacking the prerequisite. Intensive study of interdependence theory and research of interpersonal relationships.

863 Methods of Social Psychology (3). Prerequisite, PSYC 867. Permission of the instructor for students lacking the prerequisite. Methods of investigation in social psychology, with primary emphasis upon experimental design and the nature of the experimental situation.

864 Topics in Attitude Research (3). Prerequisite, PSYC 867. Permission of the instructor for students lacking the prerequisite. A critical examination of selected topics in attitude theory and change.

865 Methods of Applied Social Psychology (3). Graduate standing required. Supervised research experience in an applied setting and accompanying methods of non-laboratory research, including nonquantitative methods of social psychology and evaluation of quasi-experimental and nonexperimental designs.

866 Interpersonal Processes and Close Relationships (3). Prerequisite, PSYC 867Permission of the instructor for students lacking the prerequisite. Intensive study of the processes by which adult close relationships are initiated and developed.

867 Advanced Survey of Social Psychology (3). Graduate standing or permission of the instructor. Survey of research and theories of attitude change, interpersonal relations and small groups.

868 [328] Seminar in Social Psychology (3). Prerequisite, PSYC 867. Permission of the instructor for students lacking the prerequisite.

869 Advanced Social Cognition (3). Prerequisite, PSYC 867. Permission of the instructor for students lacking the prerequisite. Advanced theory and research in social psychology that explores the cognitive processes underlying social phenomena. Specific topics include attributions, emotions, heuristics, self, goals, motives, and others.

870 Psychology of Emotions (3). Graduate standing required. Seminar featuring research and theory on emotions. It stretches across traditional psychological subdisciplines because emotions are complex, multiply determined phenomena.

871 Advanced Group Processes (3). Prerequisite, PSYC 867. Permission of the instructor for students lacking the prerequisite. Discusses both classic and contemporary theory and research related to group processes, including group performance, motivation, decision making, social dilemmas, social justice, and other intragroup and intergroup phenomena.

872 Seminar in Political Psychology (3). Graduate standing required. This course surveys research in political psychology. Topics may include personality and politics, political values and attitudes, voter behavior, candidate evaluation, and the role of emotion in political decision making.

873 Seminar on Prejudice and Stereotyping (3). Graduate standing required. Seminar reviews classic and current literature on the psychology of stereotyping and prejudice. Focus is on causes, consequences, and mental processes that maintain social biases.

874 Social Judgment and Decision Making (3). Prerequisite, PSYC 863. Permission of the instructor for students lacking the prerequisite. Discusses both classic and contemporary theory and research related to social judgment and decision making, including basic psychological processes, heuristics and biases, models of decision making, and social influences.

875 Advanced Seminar in Positive Psychology (3). Prerequisite, PSYC 870. Discusses both classic and contemporary theory and research related to social judgment and decision making, including basic psychological processes, heuristics and biases, models of decision making, and social influences.

876 Graduate Seminar in Social and Affective Neuroscience (3). Prerequisite, PSYC 869 or PSYC 870. Permission of the instructor for students lacking the prerequisite. This course will provide students with an understanding of the more basic biological (and psychological) mechanisms that contribute to social processes such as stereotypes, person perception, moral judgments, and emotions. The course will prepare students to be informed consumers of contemporary neuroscience research.

888 Moral Psychology (3). Prerequisites, PSYC 869 or PSYC 870. Permission of the instructor for students lacking the prerequisite. Course explores moral judgments and behavior; examines morality and cognition, emotion, mind perception, and religion; covers debates between reason vs. intuition, utilitarianism vs. deontology, and single vs. multiple domain theories. Discusses real world applications (courtroom, torture) and related concepts (free will).

890 Case Formulation and Psychotherapy Integration (3). Required preparation, third year or beyond in clinical psychology doctoral program. This advanced seminar provides clinical psychology graduate students with case formulation skills in the context of exposure to psychotherapy integration and contemporary evidence-based treatment models.

891 Dialectical Behavior Therapy (3). Prerequisite, PSYC 803 or 804. Graduate standing in clinical psychology required. This course will introduce advanced clinical psychology graduate students to dialectical behavior therapy, a cognitive-behavioral treatment for borderline personality disorder, including DBT's theoretical basis, empirical support, and treatment strategies.

904I Aging and Health (DENT 604I, EPID 620I, HMSC 904I, MEDI 604I, NURS 782I, PHCY 604I, PHYT 904I, SOCI 824, SOWO 604I) (3). See SOWO 604I for description.

907I Aging and Public Policy (DENT 607I, FMME 607I, HMSC 951I, HPM 961I, MEDI 607I, NURS 783I, PHCY 607I, SOWO 607I) (3). See SOWO 607I for description.

991 Advanced Research (3). Six laboratory hours a week.

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Gillings School of Global Public Health

www.sph.unc.edu
BARBARA K. RIMER, *Dean and Alumni Distinguished Professor*
Anna Maria Siega-Riz, *Associate Dean for Academic Affairs*
Charletta Sims Evans, *Assistant Dean for Student Affairs*

The Gillings School of Global Public Health provides exceptional teaching, conducts groundbreaking research, and delivers dedicated service to people across North Carolina, the United States, and around the world. According to *U.S. News and World Report*'s 2012 rankings, the school is #2 of all public health schools in the U.S. and the top *public* school of public health. The school's mission is to improve public health, promote individual well-being and eliminate health disparities across North Carolina and around the world.

Accredited by the Council on Education for Public Health (CEPH), the public health school offers undergraduate and graduate programs on campus near UNC's schools of medicine, nursing, dentistry and pharmacy, and through its state-of-the-art onlineeducation programs. The school's Michael Hooker Research Center and many renovated labs and classrooms provide an environment highly conducive to the dissemination and development of public health knowledge. (See www.sph.unc.edu/rooms.)

Beyond campus, members of the Gillings School of Global Public Health faculty teach, conduct research, and serve communities across the state and nation and around the world. The Office of Global Health oversees efforts in more than fifty-five countries. The North Carolina Institute for Public Health, the school's service and outreach arm, brings public health scholarship and practice communities together. Research and Innovation Solutions (www.sph.unc.edu/accelerate), an initiative funded by a generous gift from Dennis Gillings and Joan Gillings, aids in the anticipation of new public health challenges and the acceleration of solutions and delivery of best practices to improve people's lives.

To learn more about the field, visit www.whatispublichealth.org. Developed by the Association of Schools of Public Health, the site describes public health, its effect on people's lives locally and globally, and the variety of public health careers.

Departments and curricula in the Gillings School of Global Public Health are:

- Biostatistics*
- Environmental Sciences and Engineering*
- Epidemiology
- Health Behavior
- Health Policy and Management*
- Maternal and Child Health
- Nutrition*
- Public Health Leadership Program

All departments have graduate degree programs, and four (marked with *) offer degrees for undergraduates.

Interdisciplinary programs that provide additional opportunities for students in public health-related education, service, and research include: the Carolina Population Center, the Cecil G. Sheps Center for Health Services Research, the Center for Environmental Health and Susceptibility, the Center for Health Promotion and Disease Prevention, the Clinical Nutrition Research Center, the Injury Prevention Research Center, the UNC Lineberger Comprehensive Cancer Center, the North Carolina Institute for Public Health, the North Carolina Occupational Safety and Health Education Resource Center, and the North Carolina Center for Public Health Preparedness.

Graduate academic degrees offered by the school are the master of science (M.S.) and the doctor of philosophy (Ph.D.). Graduate professional degrees include the master of science in public health (M.S.P.H.), master of science in environmental engineering (M.S.E.E.), master of public health (M.P.H.), master of healthcare administration (M.H.A.), master of science in clinical research (M.S.C.R.) and doctor of public health (Dr.P.H.). All degree requirements are administered by the faculty of the Gillings School of Global Public Health with approval from The Graduate School's Administrative Board.

M.P.H. Degree

The master of public health degree is designed to prepare students for positions requiring a considerable breadth of knowledge in the field of public health and a lesser degree of specialization in one area. Students in this degree program may take nearly half of their courses outside of the major department or curriculum and undergo extensive field training (if previous experience is not deemed sufficient by criteria set by the student's department or curriculum). Typically, master of public health students already have acquired education in a health or health-related profession, or have at least three years' experience in a field related to public health. The paster of public health is often a terminal degree, and qualified students may proceed in the Gillings School of Global Public Health to a Dr.P.H. or Ph.D. program for further study.

M.S.P.H. Degree

The master of science in public health is designed to prepare students for professional careers in specialized areas of public health and health policy. Students in this degree program typically take courses primarily in one major department or curriculum in the Gillings School of Global Public Health. Core requirements provide for orientation to a broader view of public health. The master of science in public health is usually a terminal degree; however, students may use this degree or the master of science (more so than the master of public health) as a precursor to a doctoral program. Programs of study leading to the M.S.P.H. degree are offered by the following departments: environmental sciences and engineering, health policy and management, and maternal and child health.

M.H.A. Degree

The master of healthcare administration, offered by the health policy and management department, is designed to prepare students for management careers in health-care organizations. Graduates will be prepared to take positions as staff members, managers or consultants for hospitals, health-maintenance organizations, clinics, public health departments and other health-care settings. Courses focusing on health-care services are supplemented with core courses offering a broader view of public health.

M.S. Degree

The master of science degree is offered in the departments of biostatistics, environmental sciences and engineering, and nutrition, and in the public health leadership program.

M.S.E.E. Degree

The curriculum leading to the M.S.E.E. is designed to prepare graduates for careers in the environmental engineering profession with special emphasis on water resources and air and industrial hygiene. Specifically, students awarded this degree are prepared for professional work with private firms of consulting engineers; with public agencies at the

national, state, regional, and local levels of government; and with a variety of industrial organizations.

M.S.C.R. Degree

The master of science in clinical research is offered through the epidemiology department. It is intended to complement the substantive training in medicine, dentistry, pharmacy and other health affairs disciplines by enhancing the student's ability to apply appropriate research methodologies to his or her chosen or established field of research. Applicants will be required to demonstrate a clear relationship with a mentor in this field of research to provide content-area guidance during the program.

Dr.P.H. Degree

The doctor of public health provides professional training to prepare students effectively to conduct or supervise research, usually of an applied nature. Graduates also are prepared to integrate new knowledge and techniques into community and/or public health practice. Graduates typically are employed by operating community or public health programs at the local, state, national or international level. Programs of study leading to the Dr.P.H. degree are offered by the following departments: biostatistics, health policy and management (distance learning format), maternal and child health, and nutrition.

Ph.D. Degree

The doctor of philosophy prepares students for leadership in academic and related settings involving teaching and research. Students learn how to develop and apply theories for understanding public health, health care services, and policy. Graduates typically are employed by universities or other organizations conducting research. This degree is offered in the departments of biostatistics, environmental sciences and engineering, epidemiology, health behavior, health policy and management, maternal and child health, and nutrition. The precursor to the Ph.D. degree is typically (although not exclusively) an M.S.P.H. degree, if the research is oriented to public health, or an M.S. degree.

Dual-Degree Programs

A number of dual-degree programs are offered in select departments. Under the dual-degree arrangement, a student may earn two professional degrees in a period of time less than the total required by the two degrees separately. Medical students may pursue a dual degree through the departments of epidemiology, health policy and management, maternal and child health or nutrition, or through the public health leadership. Dentistry, business, law, city and regional planning, and information and library science students may enroll in dual-degree programs through the Department of Health Policy and Management. A dual degree also is offered through the Department of Maternal and Child Health, in conjunction with the School of Social Work, and between the Department of Health Behavior and Health Education and the Department of City and Regional Planning.

Online Education

Executive Master's Program: The Department of Health Policy and Management provides graduate-level education to employed health professionals and health administrators through its executive master's program. This national program provides master's degree study to full-time health professionals throughout the United States and beyond. This program is comprised of intensive summer institutes on the Chapel Hill campus, faculty-guided distance learning and credit transfer from approved programs at other universities.

The leadership M.P.H. is offered through the public health leadership program. This degree is designed for individuals who already have a professional identity. Applicants will have three to five years' health-related experience and will desire to broaden knowledge and skills in public health philosophy and sciences. Applicants come from a variety of professional disciplines and have a range of experiences.

Online master of science in public health (M.S.P.H.) and master of public health (M.P.H.) degrees in maternal and child health leadership will be offered through the Department of Maternal and Child Health. Both online degree programs are designed for individuals with work experience who want more graduate-level training in the field of maternal and child health. All course work is conducted online, except a required three-day intensive workshop on the Chapel Hill campus.

The doctoral program in health leadership (Dr.P.H.) is available through the Department of Health Policy and Management. This program, the only one of its kind in the U.S.,prepares working health-care professionals to become top leaders. This highly competitive, online learning program uses the latest Internet technology to connect distinguished faculty members and students in an unparalleled educational environment.

Department of Biostatistics (BIOS)

www.sph.unc.edu/bios
MICHAEL R. KOSOROK, *Chair*
Jianwen Cai, *Vice Chair*
Amy Herring, *Associate Chair*

Professors

Michael R. Kosorok (88)
Jianwen Cai (93) Survival Analysis and Regression Models, Clinical Trials, Analysis of Correlated Responses
Jason P. Fine (54)
Joseph G. Ibrahim (11) Bayesian Inference, Missing Data Problems, Bayesian Survival Analysis, Generalized Linear Models, Genomics
Amy H. Herring (87) Survival Analysis, Missing Data Methods, Environmental Statistics
William D. Kalsbeek (55) Sample Design, Survey Analysis, Nonsampling Errors
Alan F. Karr, Inference for Stochastic Processes, Image Analysis (Joint with Statistics and Operations Research)
Gary G. Koch (14) Categorical Data Analysis, Nonparametric Methods
Danyu Lin (89) Survival Analysis, Semiparametric Statistical Methods, Clinical Trials
James Stephen Marron, High Dimension Low Sample Size (HDLSS) Data and/or Data, Exotic Data Types Such as Manifold and Tree-Structural Data (joint with Statistics and Operations Research)
Andrew Nobel, Data Mining, Statistical Data of Genomic Data, Machine Learning (joint with Statistics and Operations Research)
Pranab K. Sen (10) Statistical Inference, Clinical Trials, Multivariate Analysis (Joint with Statistics)
Richard Smith, Spatial Statistics, Time Series Analysis, Extreme Value Theory, Bayesian Statistics (joint with Statistics and Operations Research)
Chirayath M. Suchindran (29) Statistical Demography
Kinh N. Truong (90) Time Series Analysis, Nonparametric Regression, Bootstrap Methods, Hazard Regression, Splines
Fred A. Wright (7) Statistical Genetics (until 7/31/13)
Donglin Zeng (5) High Dimensional Data, Survival Analysis
Haibo Zhou (40) Missing/Auxiliary Data, Survival Analysis, Human Fertility
Hongtu Zhu (48)
Fei Zou (4) Statistical Genetics

Associate Professors
Lloyd J. Edwards (95) Longitudinal Data Analysis, Measurement Error Models, Clinical Trials
Michael Hudgens (42) Nonparametric Estimation, Group Testing, Causal Inference, Infectious Diseases
Anastasia Ivanova (83) Clinical Trials Design, Sequential Design of Binary Response Experiments, Statistical Methodology in Biostatistics
Bahjat Qaqish (94) Generalized Linear Models, Survival Analysis, Statistical Computing
Wei Sun (53)

Assistant Professors
Yun Li (59) (joint with Genetics)
Michael Wu (60)

Research Professors
Richard E. Bilsborrow (30) Economic Demography, Demography, Economic Development, Environment
Shrikant I. Bangdiwala (80) Nonparametric Methods, Clinical Trials Methodology, International Health, Injury Prevention
Robert M. Hamer (28) Linear Models, Mixed Models, Clinical Trials (joint with Psychiatry)
John S. Preisser Jr. (89) Categorical Data, Longitudinal Data Analysis
Paul W. Stewart (84) Linear Models, Distribution Theory, Statistical Inference, Longitudinal Data

Professor of the Practice
Sonia M. Davis (70)

Clinical Professor
David J. Couper (77) Epidemiological Methods, Longitudinal Data, Data Quality

Research Associate Professors
Rosalie Dominik (58)
Ethan Lange (44) (joint with Genetics)

Research Assistant Professors
Eric Bair (61) (joint with School of Dentistry)
Jamie B. Crandell (64) (joint with School of Nursing)
Denise Esserman (87) (joint with Medicine)
Pei-Fen Kuan (66)
Todd A. Schwartz (13) Categorical Data, Clinical Trials
Daniela T. Sotres-Alvarez

Clinical Assistant Professors
Jane Monaco (43) Survival Analysis, Correlated Failure Time Data
Lisa M. Wruck

Research Instructor
Katherine J. Roggenkamp (3) Statistical Computing

Adjunct Professors
Herman E. Mitchell, Clinical Trials, Health Care Research, Clinical Epidemiology
Shyamal D. Peddada
Ibrahim A. Salama (38) Nonparametric Statistics, Order Statistics, Ergodic Theory
Clarice R. Weinberg, Statistical Methods in Epidemiology and in Environmental Health, Reproductive Epidemiology
Robert L. Obenchain

Adjunct Associate Professors
Georgiy Bobashev
Haitao Chu
Matthew R. Nelson
Maura E. Stokes, Categorical Data Analysis

Adjunct Assistant Professors
Jacqueline L. Johnson (67)
Karen L. Kesler
Jean Orelien
William Valdar
Mark A. Weaver (46)

Professors Emeriti
Clarence E. Davis (27)
James E. Grizzle
Ronald W. Helms (15)
Lawrence L. Kupper (19) Regression Analysis, Statistical Applications in Epidemiology and in Environmental Health
Keith E. Muller (76) Linear and Nonlinear Repeated Measures Models, Study Design
Dana E. Quade (6)
Michael J. Symons (17) Consulting, Bayesian Applications, Statistical Education
Craig D. Turnbull (26) Public Health Statistics, Research on Perinatal Outcomes and Behavioral Sciences

Courses for Graduate and Advanced Undergraduate Students
BIOS

500H Introduction to Biostatistics (3). Prerequisites, MATH 231 and 232; corequisite, BIOS 511. Access to SAS, Excel required. Permission of instructor for nonmajors. Introductory course in probability, data analysis, and statistical inference designed for BSPH biostatistics students. Topics include sampling, descriptive statistics, probability, confidence intervals, tests of hypotheses, chi-square distribution, two-way tables, power, sample size, ANOVA, nonparametric tests, correlation, regression, survival analysis.

511 Introduction to Statistical Computing and Data Management (4). Required preparation, previous or concurrent course in applied statistics. Permission of instructor for nonmajors. Introduction to use of computers to process and analyze data, concepts and techniques of research data management, and use of statistical programming packages and interpretation. Focus is on use of SAS for data management and reporting.

540 Problems in Biostatistics (1–21). Arrangements to be made with the faculty in each case. A course for students of public health who wish to make a study of some special problem in the statistics of the life sciences and public health.

543 Biostatistical Seminar for Clinical and Translational Investigators (1). Prerequisites, BIOS 541 and 542. Permission of the instructor for students lacking the prerequisites. This seminar provides clinical and translational researchers who have basic quantitative training in biostatistics with a more in-depth understanding of selected topics and introduces them to more advanced methods. Pass/Fail only.

545 Principles of Experimental Analysis (3). Permission of the instructor for nonmajors. Required preparation, basic familiarity with statistical software (preferably SAS able to do multiple linear regression) and introductory biostatistics, such as BIOS 600. Continuation of BIOS 600. Analysis of experimental and observational data, including multiple regression and analysis of variance and covariance.

550 Basic Elements of Probability and Statistical Inference I (GNET 636) (4). Required preparation, two semesters of calculus (such as MATH 231, 232). Fundamentals of probability; discrete and continuous distributions; functions of random variables; descriptive statistics; fundamentals of statistical inference, including estimation and hypothesis testing.

551 Basic Elements of Probability and Statistical Inference II (3).

Prerequisite, BIOS 550. Permission of the instructor for students lacking the prerequisite. Required preparation, basic familiarity with statistical software (preferably SAS able to do multiple linear regression) or permission of the instructor. The theory and application of multiple linear regression and related analysis of variance including logistic regression and Poisson regression.

600 Principles of Statistical Inference (3). Required preparation, knowledge of basic descriptive statistics. Major topics include elementary probability theory, probability distributions, estimation, tests of hypotheses, chi-squared procedures, regression, and correlation.

610 Biostatistics for Laboratory Scientists (3). Required preparation, elementary calculus. This course introduces the basic concepts and methods of statistics, focusing on applications in the experimental biological sciences.

613 Data Management in Clinical and Public Health Research (3). Familiarity with basic health research designs (For example, BIOS 664 or 668, EPID 726 or 733, MHCH 713, INLS 780) or permission of the instructor required. This course introduces theoretical and practical aspects of data management architecture, processes and applications in clinical and public health research.

660 Probability and Statistical Inference I (3). Required preparation, three semesters of calculus (such as MATH 231, 232, 233). Introduction to probability; discrete and continuous random variables; expectation theory; bivariate and multivariate distribution theory; regression and correlation; linear functions of random variables; theory of sampling; introduction to estimation and hypothesis testing.

661 Probability and Statistical Inference II (3). Prerequisite, BIOS 660. Permission of the instructor for students lacking the prerequisite. Distribution of functions of random variables; Helmert transformation theory; central limit theorem and other asymptotic theory; estimation theory; maximum likelihood methods; hypothesis testing; power; Neyman-Pearson Theorem, likelihood ratio, score, and Wald tests; noncentral distributions.

662 Intermediate Statistical Methods (4). Pre- or corequisites, BIOS 511 and 550. Principles of study design, descriptive statistics, sampling from finite and infinite populations, inferences about location and scale. Both distribution-free and parametric approaches are considered. Gaussian, binomial, and Poisson models, one-way and two-way contingency tables.

663 Intermediate Linear Models (4). Required preparation, BIOS 662. Matrix-based treatment of regression, one-way and two-way ANOVA, and ANCOVA, emphasizing the general linear model and hypothesis, as well as diagnostics and model building. Reviews matrix algebra. Includes statistical power for linear models and binary response regression methods.

664 Sample Survey Methodology (STOR 358) (4). Prerequisite, BIOS 550. Permission of the instructor for students lacking the prerequisite. Fundamental principles and methods of sampling populations, with emphasis on simple, random, stratified, and cluster sampling. Sample weights, nonsampling error, and analysis of data from complex designs are covered. Practical experience through participation in the design, execution, and analysis of a sampling project.

665 Analysis of Categorical Data (3). Prerequisites, BIOS 545, 550, and 662. Permission of the instructor for students lacking the prerequisites. Introduction to the analysis of categorized data: rates, ratios, and proportions; relative risk and odds ratio; Cochran-Mantel-Haenszel procedure; survivorship and life table methods; linear models for categorical data. Applications in demography, epidemiology, and medicine.

666 Applied Multivariate Analysis (3). Prerequisite, BIOS 663. Application of multivariate techniques, with emphasis on the use of computer programs. Multivariate analysis of variance, multivariate multiple regression, weighted least squares, principal component analysis, canonical correlation, and related techniques.

667 Applied Longitudinal Data Analysis (3). Analysis of variance and multiple linear regression course at the level of BIOS 545 or 663 required. Familiarity with matrix algebra recommended. Univariate and multivariate repeated measures ANOVA, GLM for longitudinal data, linear mixed models. Estimation and inference, maximum and restricted maximum likelihood, fixed and random effects.

668 Design of Public Health Studies (3). Prerequisites, BIOS 545 and 550. Statistical concepts in basic public health study designs: cross-sectional, case-control, prospective, and experimental (including clinical trials). Validity, measurement of response, sample size determination, matching and random allocation methods.

670 Demographic Techniques I (3). Source and interpretation of demographic data; rates and ratios, standardization, complete and abridged life tables; estimation and projection of fertility, mortality, migration, and population composition.

680 Introductory Survivorship Analysis (3). Prerequisite, BIOS 661. Permission of the instructor for students lacking the prerequisite. Introduction to concepts and techniques used in the analysis of time to event data, including censoring, hazard rates, estimation of survival curves, regression techniques, applications to clinical trials.

691 Field Observations in Biostatistics (1). Field visits to, and evaluation of, major nonacademic biostatistical programs in the Research Triangle area. Field fee: $25.

693H Honors Research in Biostatistics (3). Directed research. Written and oral reports required.

694H Honors Research in Biostatistics (3). Directed research. Written and oral reports required.

Courses for Graduate Students

BIOS

700 Research Skills in Biostatistics (1). Prerequisites, BIOS 760, 761 or 758, 762, 763, and 767. Permission of the department for students with passing grade of either doctoral qualifying examination in biostatistics. BIOS 700 will introduce doctoral students in biostatistics to research skills necessary for writing a dissertation and for a career in research.

735 Statistical Computing—Basic Principles and Applications (3). Prerequisite, BIOS 661. Required preparation, familiarity with one computer system and either a computer language or computer package. Basic theory and application of computing as a tool in statistical research and practice. Topics include algorithms and data structures, linear and nonlinear systems, function approximation, numerical integration, the EM algorithm, simulation, and document preparation.

740 Specialized Methods in Health Statistics (1–21). Permission of the instructor. Statistical theory applied to special problem areas of timely importance in the life sciences and public health. Lectures, seminars, and/or laboratory work, according to the nature of the special area under study.

750 Advanced Techniques in Biometry (1–21). Prerequisites,

BIOS 661 and 663. Permission of the instructor. Up to three or four separate one-semester-hour modules presenting advanced techniques in biometry (topics covered usually vary at each offering). A knowledge of elementary computer programming is assumed.

752 Design and Analysis of Clinical Trials (3). Prerequisites, BIOS 600 and 661. This course will introduce the methods used in clinical. Topics include dose-finding trials, allocation to treatments in randomized trials, sample size calculation, interim monitoring, and non-inferiority trials.

756 Advanced Nonparametric Methods in Biometric Research (3). Prerequisite, BIOS 661. Theory and application of nonparametric methods for various problems in statistical analysis. Includes procedures based on randomization, ranks and U-statistics. A knowledge of elementary computer programming is assumed.

758 Advanced Statistical Methods in Biometric and Public Health (4). Prerequisites, BIOS 660 and 661. Introduction to probability theory, statistics, stochastic processes, and martingales. Finite sample methods. Basic statistical estimator properties. Stochastic convergence and central limit theorems. Transformation of variables and variance stabilization. Neyman-Pearson hypothesis testing methodology. Large sample inference methods, likelihood ratio, Rao's score, and Wald tests. Categorical data and regression models. Resampling plans.

759 Applied Time Series Analysis (3). Prerequisites, BIOS 661 and 663. Permission of the instructor. Topics include correlograms, periodograms, fast Fourier transforms, power spectra, cross-spectra, coherences, ARMA and transfer-function models, spectral-domain regression. Real and simulated data sets are discussed and analyzed using popular computer software packages.

760 Advanced Probability and Statistical Inference I (4). Prerequisite, BIOS 661. Permission of the instructor for students lacking the prerequisite. Measure space, sigma-field, measurable functions, integration, conditional probability, distribution functions, characteristic functions, convergence modes, SLLN, CLT, Cramer-Wold device, delta method, U-statistics, martingale central limit theorem, UMVUE, estimating function, MLE, Cramer-Rao lower bound, information bounds, LeCam's lemmas, consistency, efficiency, EM algorithm.

761 Advanced Probability and Statistical Inference II (4). Prerequisite, BIOS 760. Permission of the instructor for students lacking the prerequisite. Elementary decision theory: admissibility, minimaxity, loss functions, Bayesian approaches. Hypothesis testing: Neyman-Pearson theory, UMP and unbiased tests, invariance, confidence sets, contiguous alternatives. Elements of stochastic processes: Poisson processes, renewal theory, Markov chains, martingales, Brownian motion.

762 Advanced Linear Models I (4). Prerequisites, BIOS 661 and 663, MATH 547, and 416 or 577. Theory and methods for continuous responses. Matrix theory, multivariate normal distribution, multivariate quadratic forms, estimability, reparameterization, linear restrictions and splines, estimation theory, weighted least squares, multivariate tests of linear hypotheses, multiple comparisons, confidence regions, prediction intervals, statistical power, mixed models, transformations and diagnostics, growth curve models, dose-response models, missing data.

763 Generalized Linear Model Theory and Applications (4). Permission of the instructor for nonmajors. Introduction to the theory and applications of generalized linear models, quasi-likelihoods and generalized estimating equations. Topics include logistic regression, overdispersion, Poisson regression, log-linear models, conditional likelihoods, multivariate regression models, generalized mixed models, and regression diagnostics.

764 Advanced Survey Sampling Methods (3). Prerequisite, BIOS 664. Continuation of BIOS 664 for advanced students: stratification, special designs, multistage sampling, cost studies, nonsampling errors, complex survey designs, employing auxiliary information, and other miscellaneous topics.

765 Models and Methodology in Categorical Data (3). Prerequisites, BIOS 661, 663, 665, and 666. Theory of statistical methods for analyzing categorical data by means of linear models; multifactor and multiresponse situations; interpretation of interactions.

767 Longitudinal Data Analysis (4). Prerequisite, BIOS 762. Permission of the instructor for nonmajors. Presents modern approaches to the analysis of longitudinal data. Topics include linear mixed effects models, generalized linear models for correlated data (including generalized estimating equations), computational issues and methods for fitting models, and dropout or other missing data.

771 Demographic Techniques II (3). Prerequisite, BIOS 670. Required preparation, integral calculus. Life table techniques; methods of analysis when data are deficient; population projection methods; interrelations among demographic variables; migration analysis; uses of population models.

772 Statistical Analysis of MRI Images (3). The course will review major statistical methods for the analysis of MRI and its applications in various studies.

773 Statistical Analysis with Missing Data (3). Prerequisites, BIOS 761 and 762. Fundamental concepts, including classifications of missing data, missing covariate and/or response data in linear models, generalized linear models, longitudinal data models, and survival models. Maximum likelihood methods, multiple imputation, fully Bayesian methods, and weighted estimating equations. Focus on biomedical sciences case studies. Software packages include WinBUGS, SAS, and R.

774 Statistical Learning and High Dimensional Data (3). Prerequisite, BIOS 661. Permission of the instructor for students lacking the prerequisite. Introductory overview of statistical learning methods and high-dimensional data analysis. Involves three major components: supervised or unsupervised learning methods, statistical learning theory, and statistical methods for high-dimensional data including variable selection and multiple testing. Real examples are used.

777 Mathematical Models in Demography (3). Permission of the instructor. A detailed presentation of natality models, including necessary mathematical methods, and applications; deterministic and stochastic models for population growth, migration.

779 Bayesian Statistics (4). Prerequisite, BIOS 762. Bayes' theorem, likelihood principle, prior distributions, posterior distributions, and predictive distributions. Bayesian analysis of linear models, generalized linear models, random effects models, spatial models, and survival models. Informative prior elicitation, model comparisons, Bayesian diagnostic methods, and variable subset selection. Markov Chain Monte Carlo computations methods. Clinical trials design and analysis.

780 Theory and Methods for Survival Analysis (3). Prerequisites, BIOS 760 and 761. Permission of the instructor for students lacking the prerequisites. Counting process-martingale theory, Kaplan-Meier estimator, weighted log-rank statistics, Cox proportional hazards model, nonproportional hazards models, multivariate failure time data.

781 Statistical Methods in Human Genetics (4). Prerequisites, BIOS 661 and 663. Permission of the instructor for students lacking the prerequisites. An introduction to statistical procedures in human genetics, Hardy-Weinberg equilibrium, linkage analysis (including use of genetic software packages), linkage disequilibrium and allelic association.

782 Statistical Methods in Genetic Association Studies (3). Prerequisite, BIOS 760. This course provides a comprehensive survey of the statistical methods for the designs and analysis of genetic association studies, including genome-wide association studies and next-generation sequencing studies. The students will learn the theoretical justifications for the methods as well as the skills to apply them to real studies.

783 Statistical Methods in Quantitative Genetics (3). Prerequisites, BIOS 661 and 663. Permission of the instructor for students lacking the prerequisites. An introduction to the statistical basis of variation in quantitative traits, with focus on experimental crosses and decomposition of trait variation, linkage map construction, statistical methodologies, and computer software for mapping quantitative trait loci. Issues involving whole-genome analysis will be highlighted.

784 Introduction to Computational Biology (3). Prerequisites, BIOS 661 and 663. Permission of the instructor for students lacking the prerequisites. Molecular biology, sequence alignment, sequence motifs identification by Monte Carlo Bayesian approaches, dynamic programming, hidden Markov models, computational algorithms, statistical software, high-throughput sequencing data and its application in computational biology.

785 Analysis of Microarray Data (3). Prerequisites, BIOS 661 and 663. Permission of the instructor for students lacking the prerequisites. Clustering algorithms, classification techniques, statistical techniques for analyzing multivariate data, analysis of high dimensional data, parametric and semiparametric models for DNA microarray data, measurement error models, Bayesian methods, statistical software, sample size determination in microarray studies, applications to cancer.

791 Empirical Processes and Semiparametric Inference (3). Prerequisite, BIOS 761. Permission of the instructor for students lacking the prerequisite. Theory and applications of empirical process methods to semiparametric estimation and inference for statistical models with both finite and infinite dimensional parameters. Topics include bootstrap, Z-estimators, M-estimators, semiparametric efficiency.

841 Principles of Statistical Consulting (3). Prerequisites, BIOS 545. Permission of the instructor for nonmajors. An introduction to the statistical consulting process, emphasizing its nontechnical aspects.

842 Practice in Statistical Consulting (1–21). Prerequisites, BIOS 511, 545, 550, and 841. Permission of the instructor. Under supervision of a faculty member, the student interacts with research workers in the health sciences, learning to abstract the statistical aspects of substantive problems, to provide appropriate technical assistance, and to communicate statistical results.

843 Seminar in Biostatistics (1). This seminar course is intended to give students exposure to cutting edge research topics and hopefully help them in their choice of a thesis topic. It also allows the student to meet and learn from major researchers in the field.

844 Leadership in Biostatistics (3). Prerequisite, BIOS 841. Using lectures and group exercises, students are taught where and how biostatisticians can offer leadership in both academic and nonacademic public health settings.

850 Training in Statistical Teaching in the Health Sciences (1–21). Required preparation, a minimum of one year of graduate work in statistics. Principles of statistical pedagogy. Students assist with teaching elementary statistics to students in the health sciences. Students work under the supervision of the faculty, with whom they have regular discussions of methods, content, and evaluation of performance.

889 Research Seminar in Biostatistics (0.5–21). Permission of the instructor. Seminar on new research developments in selected biostatistical topics.

990 Research in Biostatistics (1–21). Individual arrangements may be made by the advanced student to spend part or all of his or her time in supervised investigation of selected problems in statistics.

992 Master's Paper (3–6).

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Department of Environmental Sciences and Engineering

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MICHAEL D. AITKEN, *Chair*
Stephen C. Whalen, *Director of Graduate Studies*

Professors

Michael D. Aitken (66) Applied Biotechnology, Bioremediation, Waste Treatment
Richard N. L. (Pete) Andrews (50) Environmental Policy
Louise M. Ball (62) Metabolism, Toxicology and Genotoxicity of Xenobiotics
John M. Bane Jr., Marine Sciences, Physical Oceanography
James K. Bartram (12) Water, Sanitation and Hygiene in Development, Global Health
Gregory W. Characklis (98) Water Resources Engineering, Economics and Management
Michael R. Flynn (61) Exposure Assessment, Industrial Hygiene, Ventilation Systems
Avram Gold (43) Environmental Chemistry
William G. Gray (104) Environmental Modeling, Porous Media Transport
Richard A. Luettich Jr., (68) Marine Sciences, Coastal Physics, Hurricane Storm Surge Modeling
Christopher S. Martens (92) Marine Sciences, Biogeochemistry
Cass T. Miller (59) Porous Medium Systems, Environmental Physics, Environmental Modeling
Rachel T. Noble (110) Marine Microbial Ecology, Water Quality Microbiology, Non-Point Source (e.g., Stormwater) Contamination of Receiving Waters
Leena A. Nylander-French (95) Skin and Inhalation Exposures to Toxicants, Exposure Modeling
Hans W. Paerl (65) Aquatic Microbial Ecology, Marine and Freshwater Nutrient Cycling
Ivan I. Rusyn (103) Environmental Genomics, Mechanistic Toxicology, Computational Toxicology
Mark D. Sobsey (38) Environmental Health Microbiology; Virology; Water, Sanitation and Hygiene
James A. Swenberg (77) Environmental Toxicology, Chemical Carcinogenesis
Paul B. Watkins, Director, General Clinical Research Center, UNC Hospitals
Stephen C. Whalen (93) Biogeochemistry, Limnology, Greenhouse Gases
Dale Whittington (70) Water Resources Economics, International Development

Professor of the Practice

Pete Kolsky

Associate Professors
Rebecca C. Fry (7) Toxicogenomics, Genetic Toxicology
Ilona Jaspers (99) Health Effects of Air Pollution in the Lung, Associate Director UNC–Chapel Hill Center for Environmental Medicine, Asthma, and Lung Biology
Michael C. Piehler (33) Marine Environmental Sciences, Environmental Microbial EcologyMarc L. Serre (100) Space/Time Statistics, Exposure Assessment, Environmental Modeling, Hydrology, Geostatistics, GIS, Environmental Epidemiology, Risk Assessment, Medical Geography
William Vizuete (6) Atmospheric Modeling, Air Pollution, Environmental Engineering, Atmospheric Chemistry
Howard S. Weinberg (96) Aquatic Chemistry, Environmental Analytical Chemistry, Drinking Water Treatment, Occurrence, Fate, and Transport of Chemical Pollutants

Assistant Professors
Orlando Coronell (10) Physico-Chemical Processes for Water Treatment; Characterization, Modeling, and Application of Membrane Technologies
Jacqueline A. MacDonald Gibson (15) Environmental Risk Assessment, Environmental Decision Analysis
Jill R. Stewart (26) Water Quality Microbiology, Ecological Assessment and Prediction
Jason Surratt (030) Atmospheric Chemistry, Secondary Organic Aerosols, Heterogeneous Chemistry, Air Pollution
J. Jason West (16) Air Pollution, Climate Change, Atmospheric Modeling, Global Health, Environmental Policy, Environmental Engineering

Research Professors
Richard M. Kamens Atmospheric Gas-Particle Partitioning, Modeling
David McNelis (102) Conventional, Alternative and Nuclear Energy Systems and Technology; Nuclear Fuel Cycle; Nuclear Nonproliferation and Transmutation; Director, Center For Sustainable Energy, Environment, and Economic Development

Research Assistant Professors
Wanda M. Bodnar (85) Analytical Chemistry, Mass Spectrometry
David Singleton, Microbial Ecology, Molecular Microbiology
Zhenfa Zhang, Synthetic Organic Chemistry

Research Associate Professor
Jun Nakamura (108) Genetic Toxicology, DNA Repair

Lecturer
Courtney Woods

Adjunct Professors
Tar-Ching Aw, Occupational Health
Francis S. Binkowski, Air Quality, Meteorology
Linda S. Birnbaum (86) Xenobiotic Metabolism, Biochemical Toxicology
Daniel L. Costa (97) Pulmonary Toxicology
David M. DeMarini (81) Genetic Toxicology
John M. Dement
Alfred D. Eisner, Aerosol Science
David S. Ensor (80) Aerosol Science
Shabbir Gheewala
M. Ian Gilmour, Immunotoxicology
Chong Kim, Aerosol Science and Health Effects
David H. Leith (56) Air Pollution Control Engineering, Aerosol Technology
David Peden
Joseph Pinto (82) Atmospheric Modeling
Joachim Pleil (106) Exposure Assessment
Dr. James Samet
Woodhall Stopford (76) Occupational Medicine Physics

Adjunct Associate Professors
Sarav Arunachalam
Gaylen R. Brubaker, Remediation
David Dix, Computational Toxicology
H. Kenneth Hudnell
R. Wayne Litaker, Coastal Estuaries
Michael Madden (101 Toxicology
Terrence K. Pierson, Environmental Risk Assessment
Thomas B. Starr, Risk Assessment
Miroslav Stýblo (79) Nutritional Biochemistry and Biochemical Toxicology

Adjunct Assistant Professors
Bruce A. Cohen, Occupational Medicine
Jacky Rosati (29) Exposure Assessment
Roger Sit, Radiation Physics
Russell W. Wiener (83) Indoor Air Quality, Aerosol Monitoring

Adjunct Lecturer
Raymond W. Hackney, Industrial Hygiene

Professors Emeriti
Russell F. Christman
Douglas Crawford-Brown
Francis A. DiGiano
Donald L. Fox
William H. Glaze
Harvey E. Jeffries
Donald T. Lauria
David H. Moreau
Frederic Pfaender
Morris A. Shiffman
Mark S. Shuman
Philip C. Singer
Charles M. Weiss
Donald Willhoit

Clinical Professor Emeritus
Donald E. Francisco

Courses for Graduate and Advanced Undergraduate Students
ENVR

400 Seminar Series (1). Presents the results of ongoing research projects in the Department of Environmental Sciences and Engineering. Topics and presenters are selected from among the departmental graduate students and faculty.

401 Unifying Concepts (3). Unifying concepts of environmental systems, including conservation principles, modeling, economics, and policy with applications from throughout natural, engineered, human systems. Interfaces among scientific, engineering, and policy aspects of the field.

402 Problem-Based Learning (2). Permission of the instructor. A problem common to the field of environmental science will be studied in detail through the use of small groups of students from the various disciplinary areas in the department.

403 Environmental Chemistry Processes (ENST 403) (3). Required preparation, a background in chemistry and mathematics, including ordinary differential equations. Chemical processes occurring in natural and engineered systems: chemical cycles; transport and transformation processes of chemicals in air, water, and multimedia environments; chemical dynamics; thermodynamics; structure/activity relationships.

411 Laboratory Techniques and Field Measurements (3). Students learn laboratory, field, and analytical skills. Provides a solid introduction to experimental research in environmental sciences and engineering. Students are provided with applications in limnology, aquatic chemistry, and industrial hygiene.

412 Ecological Microbiology (3). Required preparation, one course in general microbiology. A description of microbial populations and communities, the environmental processes they influence, and how they can be controlled to the benefit of humankind.

413 Limnology (3). Required preparation, introductory biology, chemistry, and physics. Basic aspects of freshwater ecosystem function. Emphasis on trophic level interactions and integration of physical, chemical, and biological principles for a holistic view of lake ecosystem dynamics.

415 Biogeochemical Processes (ENST 450, GEOL 450, MASC 450) (4). See ENST 450 for description.

416 Aerosol Physics and Chemistry (4). Permission of the instructor for nonmajors. Physical and chemical principles underlying behavior of particles suspended in air. Topics include rectilinear and curvilinear motion of the particles in a force field, diffusion, evaporation, and condensation, electrical and optical properties, and particle coagulation. Three lecture hours a week and two laboratory sessions.

417 Oceanography (BIOL 350, GEOL 403, MASC 401) (3). See MASC 401 for description.

419 Chemical Equilibria in Natural Waters (3). Principles and applications of chemical equilibria to natural waters. Acid-base, solubility, complex formation, and redox reactions are discussed. This course uses a problem-solving approach to illustrate chemical speciation and environmental implications. Three lecture hours per week.

421 Environmental Health Microbiology (3). Required preparation, introductory course in microbiology or permission of the instructor. Presentation of the microbes of public health importance in water, food, and air, including their detection, occurrence, transport, and survival in the environment; epidemiology and risks from environmental exposure. Two lecture and two laboratory hours per week.

422 Air and Industrial Hygiene (3). Problem definition, sources of information, health effects, legislative framework, and control methods for chemical, physical, and biological hazards. Recognition, evaluation, and remediation of hazards associated with community and industrial environments. Three lecture hours per week.

423 Industrial Toxicology (PHNU 423) (3). See PHNU 423 for description.

430 Health Effects of Environmental Agents (3). Required preparation, basic biology, chemistry through organic, calculus. Permission of the instructor for students lacking this preparation. Interactions of environmental agents (chemicals, infectious organisms, radiation) with biological systems including humans, with attention to routes of entry, distribution, metabolism, elimination, and mechanisms of adverse effects. Three lecture hours per week.

431 Techniques in Environmental Health Sciences (2). Required preparation, basic biology, chemistry through organic, math through calculus; permission of the instructor for students lacking this preparation. A practical introduction to the measurement of biological end-points, emphasizing adverse effects of environmental agents, using laboratory and field techniques. Two laboratory hours per week.

432 Occupational Safety and Ergonomics (PHNU 786, PUBH 786) (3). Fundamentals of occupational safety and ergonomics with emphasis on legislation and organization of industrial safety and ergonomic programs, including hazard recognition, analysis, control, and motivational factors pertaining to industrial accident and cumulative trauma disorder prevention.

433 Health Hazards of Industrial Operation (3). Prerequisite, ENVR 422. An introduction to the health hazards associated with the various unit operations of industry. Field trips to local industries planned.

434 Theory and Practice of Exposure Evaluation (3). Prerequisite, ENVR 416. Methodology and philosophy of evaluating exposures to air contaminants in the workplace. Course is divided into lectures, case-study analyses, and a hands-on term project. Three lecture hours per week.

442 Biochemical Toxicology (BIOC 442, TOXC 442) (3). Prerequisite, CHEM 430. Required preparation, one course in biochemistry. Permission of the instructor for students lacking the prerequisites. Biochemical actions of toxicants and assessment of cellular damage by biochemical measurements. Three lecture hours per week.

449 Ecology of Wetlands (MASC 449) (4). Required preparation, one year of biology, one year of chemistry, one semester of ecology, and permission of the instructor. An introduction to the functioning of freshwater and estuarine marsh and swamp ecosystems, with emphasis on systems of the southeastern United States.

450 Principles and Applications of Environmental Engineering (3). Principles that govern the behavior of contaminants in air and water. Application of these principles to engineered processes that control air and water quality. Three lecture hours per week.

451 Elements of Chemical Reactor Engineering (3). Required preparation, elementary differential equations course such as MATH 524. Focuses on chemical reaction rates and reaction mechanisms. Covers mole balances, rate laws, chemical kinetics, and reactor design. Principles are applied to any environmental system where chemical transformations must be described. Three lecture hours per week.

452 Fluid Dynamics (GEOL 560, MASC 560, PHYS 660) (3). See MASC 560 for description.

453 Groundwater Hydrology (3). Required preparation, math through differential equations and some familiarity with fluid mechanics. Conservation principles for mass, momentum, and energy developed and applied to groundwater systems. Scope includes the movement of water, gas, and organic liquid phases, the transport and reaction of contaminants. Three lecture hours per week.

461 Environmental Systems Modeling (ENST 415, GEOL 415, MASC 415) (3). See ENST 415 for description.

462 Geostatistics for Spatial/Temporal Environmental Phenomena (3). Required preparation, statistics. Stochastic analysis of space–time environmental phenomena. Random field modeling of physical laws. Geostatistical estimation and simulation. Natural heterogeneity. Stochastic PDE of groundwater flow and solute transport.

463 Random Field Modeling of Physical Processes (3). Recommended preparation, calculus through differential equations is desirable. Science of the probable. Random fields. Physical significance and methodological theses. Spatial and spatiotemporal variability. Ordinary and generalized fields of natural processes. Transport-type models. Bayesian/Maximum maximum entropy estimation. Three lecture hours per week.

468 Advanced Functions of Temporal GIS (ENST 468) (3). Overview of geographical information systems (GIS) using the Arc GIS software, and introduction to advanced geostatistical functions for temporal GIS describing environmental and health phenomena distributed across space and time. Application to the spatiotemporal mapping of environmental water quality.

470 Environmental Risk Assessment (ENST 470) (3). Required preparation, one course in probability and statistics. Use of mathematical models and computer simulation tools to estimate the human health impacts of exposure to environmental pollutants. Three lecture hours per week.

471 Global Water Sanitation and Hygiene (3). Required preparation, coursework in chemistry, biology, epidemiology and statistics including infectious and toxic hazards, disease causation and environmental transmission. Graduate and advanced undergraduates. Interventions and health impacts of water, sanitation and hygiene (WaSH), including those on different populations and applications in different settings. Three lecture and recitation hours per week.

472 Quantitative Risk Assessment in Environmental Health Microbiology (3). Recommended preparation, microbiology, epidemiology, and infectious diseases. Survey of alternative approaches, frameworks, and decision-making tools for quantitative risk assessment of microbial pathogens that infect humans and cause disease by the exposure routes of water, food, air, and other vehicles.

480 Marine Systems Modeling (GEOL 480, MASC 480) (1–3). See MASC 480 for description.

505 Chemical Oceanography (GEOL 505, MASC 505) (4). See MASC 505 for description.

514 Measurement of NOx, O3, and Volatile Organic Compounds (3). This course is intended to develop a student's ability to operate the primary instruments for measuring these important pollutants, collect and process samples where necessary, record data, and process instrument data into final air concentration data.

520 Biological Oceanography (BIOL 657, MASC 504) (4). See MASC 504 for description.

522 Environmental Change and Human Health (ENST 522) (3). See ENST 522 for description.

552 Organic Geochemistry (GEOL 552, MASC 552) (3). See MASC 552 for description.

570 Methods of Environmental Decision Analysis (3). Required preparation, one course in probability and statistics. Use of quantitative tools for balancing conflicting priorities (such as costs versus human health protection) and evaluating uncertainties when making environmental decisions.

585 American Environmental Policy (ENST 585, PLAN 585, PLCY 585) (3). Intensive introduction to environmental management and policy, including environmental and health risks, policy institutions, processes, and instruments, policy analysis, and major elements of American environmental policy. Lectures and case studies. Three lecture hours per week.

593 Undergraduate Practicum in Environmental Health Sciences (1–3). A practical experience in a setting relevant to environmental health.

600 Environmental Health (3). This course examines the relationship between environmental quality, human health and welfare, with particular attention to contamination in human environment; physical, biological, and social factors; trade-offs regarding prevention and remediation measures. Satisfies core School of Public Health requirement. Three lecture hours per week.

601 Epidemiology for Environmental Scientists (3). An introduction to relevant epidemiologic concepts that inform environmental science research. Learning objectives include discussing basic epidemiologic concepts and measures of disease occurrence in populations, explaining epidemiological study designs for studying associations between risk factors or exposures in populations, evaluating epidemiologic evidence, and comprehending basic ethical principles.

630 Systems Biology in Environmental Health (3). Required preparation, one year of biology. Environmental systems biology examines how environmental stressors influence the components of a biological system, and how the interactions between these components result in changes in the function and behavior of that system.

640 Environmental Exposure Assessment (3). Permission of the instructor for nonmajors. The course material introduces the general concepts of assessing environmental exposures to chemicals in human populations. This includes the design of ecologic and personal monitoring studies, the techniques and equipment used for sampling and analysis, and interpretation of data.

661 Scientific Computation I (MATH 661) (3). See MATH 661 for description.

662 Scientific Computation II (COMP 662, MATH 662) (3). See MATH 662 for description.

666 Numerical Methods (3). Prerequisites, COMP 116 and MATH 383. Numerical methods for solving problems arising in sciences and engineering. Solution of linear equations using direct and iterative approaches, solution of nonlinear systems of algebraic equations, solution of ordinary differential equations including single and multistep methods, and methods for stiff systems of ODEs and collocation methods for linear and nonlinear PDEs.

668 Methods of Applied Mathematics I (MATH 668) (3). See MATH 668 for description.

669 Methods of Applied Mathematics II (MATH 669) (3). See MATH 669 for description.

671 Environmental Physics I (3). Prerequisite, ENVR 461. A first graduate-level course in physical principles relevant to environmental systems. Topics include dimensional analysis, tensor calculus, conservation of mass and momentum. Applications are considered from natural and engineered systems and across all relevant media. Focus is on the development of mechanistic representation of environmental systems.

672 Environmental Physics II (3). Prerequisite, ENVR 671. Second part of a graduate-level sequence in physical principles relevant to environmental systems. Topics include turbulence, conservation of energy, multiscale methods, and thermodynamics. Applications are considered from natural and engineered systems and across all relevant media. Focus is on development of mechanistic representation of environmental systems.

675 Air Pollution, Chemistry, and Physics (3). This class is designed for graduate students planning for research in air pollution, emphasizing chemical kinetics and engineering approaches to problem solving in addition to atmospheric structure, meteorology, and modeling. We address problems of stratospheric and tropospheric ozone, particulate matter, and acid rain. We emphasize quantitative problem solving in homework.

685 Water and Sanitation Planning and Policy in Developing Countries (PLAN 685) (3). See PLAN 685 for description.

686 Policy Instruments for Environmental Management (ENST 686, PLAN 686, PLCY 686) (3). See PLCY 686 for description.

691H Honors Research (3). Permission of the instructor. Directed readings or laboratory study of a selected topic. A written report is required in the form of an honors thesis (ENVR 692H).

692H Honors Thesis (3). Students complete honors research projects.

695 Undergraduate Research (1–3). Directed readings or laboratory study. Written reports are required. May be taken more than once for credit. Three to nine hours per week.

698 Capstone: Analysis and Solution of Environmental Decisions (ENST 698) (3). See ENST 698 for description.

Courses for Graduate Students

ENVR

701 Ecology of Aquatic Plants and Wetland Ecosystems (3). Prerequisites, BIOL 101, CHEM 101, 102. Permission of the instructor for students lacking the prerequisites. Adaptations of aquatic plants and microorganisms of land-water interface regions of lakes and rivers, their nutrition, growth, population dynamics, competition, herbivory, productivity, physiological control measures. Wetlands functions, values to humans. Three lecture hours per week.

707 Advanced Toxicology (PHCO/TOXC 707) (3). See TOXC 707 for description.

710 Environmental Process Biotechnology (3). Required preparation, a previous or concurrent course in microbiology. Theory and practice of biological processes used to remove contaminants from environmental media, including water, wastewater, soil, and air.

722 Toxicology Seminar III (TOXC 722) (1). See TOXC 722 for description.

724 Current Topics in Environmental Analytical Chemistry (1). Students will select, critically review, and discuss current research papers for content, relevance, innovation, and clarity. Papers can be from any aspect of the environmental sciences. Two lecture hours per week, every other week.

725 Environmental Physical-Organic Chemistry (3). The physical chemistry of the partitioning, exchange, and chemical transformation of organic contaminants in the water, air, and soil environments.

726 Instrumental Methods for the Chemical Analysis of Environmental Samples (3). Required preparation, basic or general chemistry. Emphasis on acquiring laboratory skills and hands-on experience with instrumentation including chromatography and mass spectrometry; sample handling and preparation; quality assurance and control. Three lecture hours or one lecture hour and four laboratory hours per week.

727 Chemistry of Humic Substances (3). Required preparation, organic or physical chemistry. Permission of the instructor. Critical analysis for Ph.D. students of the chemistry, role, and function of refractory organic matter in aquatic environments. Three lecture hours per week.

728 Analysis of Trace Organics (3). Prerequisites, CHEM 261, 262, 481, 482; PHYS 104 and 105. Permission of the instructor for students lacking the prerequisites. Basic principles of isolation, separation, and identification of trace organic chemicals in environmental and/or biological samples, including solvent extraction, liquid and gas chromatography, and mass spectrometry. Three lecture hours per week.

729 Redox Processes (3). Required preparation, physical chemistry. Redox processes in the aquatic environment. Includes thermodynamics and kinetics; photochemical process in aquatic systems; oxidation processes for treatment of natural and anthropogenic organics, using ozone, peroxides, and UV radiation. Three lecture hours per week.

732 Health Effects of Outdoor and Indoor Air Pollution (3). Required preparation, knowledge of basic human physiology and biochemistry helpful. Assessing health effects of air pollutants on normal and diseased human populations, including children. Physiology, cellular and molecular biology, immunology, genetics, dosimetry will be integrated. Three lecture hours per week.

740 Principles of Chemical Carcinogenesis (2). Required preparation, organic chemistry. Bioactivation of carcinogens; interaction of activated metabolites with DNA, and their effects on DNA structure, replication, repair, and the control of these processes during development of chemically induced carcinogenesis. Two lecture hours per week.

742 Theory and Practice of Evaluating Human Health Risks of Chemicals (2). Prerequisites, ENVR/TOXC/BIOC 442 or ENVR 430. ENVR/TOXC 707 and ENVR 470 are highly recommended. This course will provide students who already have good knowledge of the basic principles of toxicology and environmental health with real-life examples of how the information is integrated for the purpose of judging what chemical exposures may pose risk to human health.

750 Principles of Industrial Ventilation (3). Required preparation, calculus and physics. Permission of the instructor. Principles of industrial ventilation for contaminant control and design of such systems. Basic laboratory exercises. Two lecture and one laboratory hour per week.

751 Ventilation Design Problem (1). Corequisite, ENVR 750. Permission of the instructor. Design problem for industrial operation. One seminar hour per week.

755 Analysis of Water Resource Systems (3). Permission of the instructor for nonmajors. Use of mathematical models to design and evaluate regional water supply and treatment systems. Engineering and economic methods are incorporated into quantitative analyses of regional scenarios. Social and political aspects also discussed. Three lecture hours per week.

756 Physical/Chemical Treatment Processes (3). Prerequisites, ENVR 419 and 451. Principles of disinfection, oxidation, coagulation, precipitation, sedimentation, filtration, adsorption, ion exchange, and membrane processes; applications to water and wastewater treatment. Three lecture hours per week.

757 Water and Wastewater Treatment Plant Design (3). Prerequisites, ENVR 710 and 756. The application of the theory of water and wastewater treatment to the design of municipal facilities. The course includes the principles of design and modern design practices. Design and analysis of design of specific works for water and wastewater treatment.

758 Environmental Engineering Project (3). Permission of the instructor. Ad hoc project designed for a student team in addressing a current problem in environmental engineering. Projects may include laboratory or pilot-scale studies, collection and analysis of data from full-scale systems, or comprehensive analysis of relevant problems in environmental engineering practice. Three lecture hours per week.

759 Multiphase Transport Phenomena (3). Prerequisite, ENVR 453. Continuum mechanical approach to formulating mass, momentum, energy, and entropy equations to describe multiphase transport phenomena. Three lecture hours per week.

761 Numerical ODE/PDE I (MASC 781, MATH 761) (3). See MATH 761 for description.

762 Numerical ODE/PDE II (MASC 782, MATH 762) (3). See MATH 762 for description.

763 Mathematical Modeling I (MASC 783, MATH 768) (3). See MATH 763 for description.

764 Mathematical Modeling II (MASC 784, MATH 769) (3). See MATH 764 for description.

765 Space/time Exposure Mapping and Risk Assessment (3). Prerequisite, MATH 233. Permission of the instructor for students lacking the prerequisite. Theory and numerical implementation of linear geostatistics (simple/ordinary/universal kriging) and modern geostatistics (Bayesian Maximum Entropy) to map environmental and health processes varying across space and time. Applications in exposure assessment, environmental epidemiology, medical geography, and risk assessment.

766 Stochastic Environmental Health Modeling (3). Required preparation, statistics. A holistic/stochastic perspective, spatiotemporal random field modeling of environmental exposure and biological variabilities. Uncertainty in environmental exposure. Biomarkers and population damage indicators for epidemiological analysis. Cell-based stochastic differential equations. Three lecture hours per week.

767 Modeling for Environmental Risk Analysis (3). Prerequisite, ENVR 470. Mathematical methods for development of advanced models in environmental risk assessment, including exposure assessment and exposure-response assessment, are developed and applied. Three lecture hours per week.

768 Microenvironmental Air Flow Modeling (3). Required preparation, fluid mechanics. Permission of the instructor. Applications of finite element and vortex methods for modeling air flows of significance in industrial hygiene applications. Three lecture hours per week.

769 Quantitative Methods for Exposure Science (3). Prerequisite, BIOS 511. SAS regression and statistics, two ENVR courses (e.g. 430, 470, 707, 740, 770, 890), or permission of the instructor. Mathematical approaches for assessing environmental and/or occupational exposures to chemicals in human populations using stochastic (group) statistics, regression analysis and modeling, and pharmacokinetic modeling; focus on human biomarker data.

770 Biological Monitoring (3). Prerequisite, ENVR 430. This course provides both practical and theoretical information on biological monitoring of chemical exposures and how to evaluate and interpret exposure data. Three lecture hours per week and a term paper (three credit hours).

771 Exposure Analysis (3). This course is intended for students interested in research involving exposure to environmental contaminants. The course focuses on the integration of engineering principles, with statistical tools to enhance inference. Statistical models based on the Johnson system of distributions are explored for the analysis data including exposure-biomarker relationships.

773 Modeling Atmospheric Chemistry (3). Air pollution is formed through thousands of chemical reactions. Computer models are used to simulate this complex chemistry and used to make policy. Current computational restraints force a simplified representation of atmospheric chemistry in these models, and the focus of this course is the implications of this on predictions.

781 Water Resources Planning and Policy Analysis (PLAN 781) (3). See PLAN 781 for description.

783 Setting Environmental Priorities (3). This course is intended to develop a student's ability to estimate the relative merits of research and policy actions in several broad environmental areas, with attention to the associated uncertainty. Criteria to be included are both quantitative and qualitative, with an emphasis on public health, environmental, and economic metrics.

784 Environmental Law (PLAN 784) (3). Permission of the instructor. An examination of the law of resource use and development, its administration, and underlying policies. Particular attention to water resources law, regulatory law, and natural resource administration. Regulatory aspects of pollution control programs are covered. Three lecture hours per week.

785 Public Investment Theory (PLAN 785, PLCY 785) (3). See PLAN 785 for description.

786 Environmental Quality Planning (PLAN 786) (3). See PLAN 786 for description.

850 Systems Analysis in Environmental Planning (3). Required preparation, calculus. Applications of systems analysis techniques to the management of environmental quality.

885 Current Applications in Environmental Management (4). Interdisciplinary group project. Analysis of a current environmental management problem. Topic changes each year. Three lecture hours and one laboratory hour per week.

890 Problems in Environmental Sciences and Engineering (1–21). Permission of the department. For students outside the department who wish to undertake individual study of a specific problem in environmental sciences and engineering. The subject and requirements of the project are arranged with the faculty in each individual instance. One or more hours per week.

892 Ph.D. Seminar in Environmental Management and Policy (PLAN 892, PLCY 892) (1). See PLCY 892 for description.

899 Seminar in Environmental Sciences and Engineering (1–21). Permission of the instructor for nonmajors. Readings and discussions to provide opportunity to develop new concepts and topics in various aspects of environmental sciences and engineering.

981 Environmental Sciences Practicum (1–9). A practical experience in public health/environmental health sciences.

990 Practicum in Environmental Management and Policy (3). Students are organized into research teams to work on a year-long project with an external client providing research and professional experience in environmental management and policy.

991 Research in Environmental Sciences and Engineering (1–9). Consultation with the faculty and approval of subject and proposed program required. Permission of the instructor. May be repeated. Hours and credits to be arranged.

992 Master's Technical Report (3–6). The technical report requirement for M.S.P.H., M.P.H., and M.S.E.E. candidates is satisfied by the extensive study of a problem in environmental sciences and engineering.

993 Master's Thesis (3–9).

994 Doctoral Dissertation (3–9).

Department of Epidemiology

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ANDREW F. OLSHAN, *Chair*

Distinguished Professor

Gerardo Heiss (41) Cardiovascular Epidemiology

Professors

Ralph S. Baric (142) Public Health Virology, Molecular Virology
Wilfrida Behets (210) Infectious Disease Epidemiology

Myron "Mike" Cohen, Infectious Disease Epidemiology
Stephen R. Cole (225) Methodology, Infectious Disease Epidemiology
Michael Emch (234) Spatial Epidemiology, Medical Geography, Infectious Diseases, Neighborhoods and Health
Marilie D. Gammon (195) Cancer Epidemiology
David M. Margolis (220) Infectious Disease Epidemiology
Stephen W. Marshall (199) Injury Epidemiology, Methodology
Steven R. Meshnick (200) Infectious Disease Epidemiology
Andrew F. Olshan (147) Cancer Epidemiology, Reproductive/Perinatal Epidemiology
Wayne D. Rosamond (162) Cardiovascular Epidemiology
Robert S. Sandler (73) Cancer Epidemiology
Anna Maria Siega-Riz (218) Nutritional Epidemiology, Reproductive/Perinatal/Pediatric Epidemiology
H. June Stevens (172) Nutritional Epidemiology, Obesity Epidemiology
Til Hans Robert Stürmer (224) Pharmacoepidemiology, Methodology
David J. Weber (96) Infectious Disease Epidemiology

Associate Professors

Maurice Alan Brookhart (228) Pharmacoepidemiology, Methodology
Julie Daniels (206) Environmental Epidemiology, Reproductive/Perinatal/Pediatric Epidemiology
Larry Engel (232) Environmental Epidemiology, Cancer Epidemiology
Stephanie Engel (231) Reproductive/Perinatal Epidemiology, Environmental Epidemiology
William C. Miller (191) Infectious Disease and Clinical Epidemiology
Kari North (205) Cardiovascular Epidemiology, Genetic Epidemiology
Audrey Pettifor (215) Infectious Disease Epidemiology
Charles L. Poole (193) Methodology
David B. Richardson (213) Environmental Epidemiology, Occupational Epidemiology
Victor J. Schoenbach (64) Behavioral Epidemiology, Infectious Disease Epidemiology (Primarily STDs), Cancer Control (Primarily Smoking Cessation)
Lola V. Stamm (145) Public Health Bacteriology, Molecular Cloning, Pathogenics of Infectious Disease
James C. Thomas (127) Infectious Disease Epidemiology
Melissa A. Troester (226) Cancer Epidemiology
Annelies Van Rie (202) Infectious Disease Epidemiology
Steven B. Wing (99) Cardiovascular Epidemiology, Occupational/Environmental Epidemiology

Assistant Professors

Christy L. Avery (233) Cardiovascular Epidemiology, Genetic Epidemiology
Brian W. Pence (236) Infectious Disease Epidemiology, Mental Health Epidemiology, Implementation Science Research, Quantitative Epidemiologic Methods
Kimberly A. Powers (237) Infectious Disease Epidemiology
Whitney Robinson (229) Social Epidemiology, Cancer Epidemiology, Nutrition, Methodology
Daniel J. Westreich (235) Infectious Disease Epidemiology, Methodology, Reproductive and Perinatal Epidemiology, Pharmacoepidemiology

Research Professor

John Baron, Cancer Etiology and Prevention, Clinical Epidemiology
Kelly R. Evenson (209) Cardiovascular Epidemiology, Physical Activity

Research Associate Professors

Debra E. Irwin (176) Cancer Epidemiology, Reproductive Epidemiology
Jennifer S. Smith (212) Infectious Disease Epidemiology
Eric A. Whitsel (221) Cardiovascular Epidemiology

Research Assistant Professors

Jeannette Bensen, Cancer Epidemiology, Molecular Epidemiology
Kathleen C. Dorsey, Cancer Epidemiology
Nora Franceschini, Cardiovascular Epidemiology
Yvonne Golightly, Injury Epidemiology, Osteoarthritis
Carla Hand, Infectious Disease Epidemiology
Jennifer A. Horney (230) Applied Epidemiology
Michele Jönsson Funk (216) Infectious Disease Epidemiology, Pharmacoepidemiology
Anna Kucharska-Newton, Cardiovascular Epidemiology
Laura R. Loehr (227) Cardiovascular Epidemiology, Clinical Epidemiology
Sonia Napravnik (223) Infectious Disease Epidemiology
Amy Sims, Infectious Disease Epidemiology
Anissa Vines, Social Epidemiology, Health Care Epidemiology
Sharon S. Weir, Infectious Disease Epidemiology
Karin Yeatts, Environmental Epidemiology
Marcel Yotebieng, Infectious Disease Epidemiology

Research Instructor

Andrew Edmonds, Infectious Disease Epidemiology

Clinical Professors

Timothy S. Carey (138) Clinical Epidemiology
David F. Ransohoff (160) Health Care Epidemiology
Ross Simpson Jr., Cardiovascular Epidemiology, Clinical Epidemiology
Ronald Strauss, Dental Epidemiology, Social Impacts

Clinical Associate Professors

Lorraine Alexander, Public Health Preparedness, Distance Education
Mary "Bonnie" Rogers (187) Occupational Epidemiology

Adjunct Professors

Adaora Adimora, Infectious Disease Epidemiology
Naomar Almeida-Filho, Psychosocial Epidemiology
Donna D. Baird (104) Reproductive Epidemiology
Edward Baker Jr., Occupational Epidemiology, Environmental Epidemiology
James D. Beck (167) Dental Epidemiology
Douglas Bell, Cancer Epidemiology
Dan German Blazer (108) Psychosocial and Aging Epidemiology
Gregory L. Burke, Cardiovascular Epidemiology
Willard Cates (188) Reproductive and Infectious Disease Epidemiology
Dennis A. Clements (152) Infectious Disease Epidemiology
Joseph Cook, Infectious Disease Epidemiology, Parasitology
Glinda S. Cooper (196) Chronic Disease Epidemiology, Reproductive Epidemiology
Joan Cornoni-Huntley (04) Aging, Physical, Cognitive, and Social Functioning
John Dement, Environmental Epidemiology, Occupational Epidemiology
Jeffrey Engel, Infectious Disease Epidemiology
Joseph Eron Jr., Infectious Disease Epidemiology
Robert Fletcher (45) Health Care Epidemiology
Suzanne Fletcher (46) Health Care Epidemiology
Judith A. Fortney (116) Reproductive Epidemiology
Joanne M. Garrett (156) Health Services Research
Bradley Gaynes, Psychiatric Epidemiology
Larry Glickman, Biosurveillance, Cardiovascular Epidemiology
Paul A. Godley (181) Cancer Epidemiology
Raymond S. Greenberg (86) Cancer Epidemiology
Laura Hanson, Clinical Epidemiology, Geriatrics
Russell P. Harris (125) Cancer Epidemiology, Clinical Epidemiology
Sherman A. James (07) Psychosocial Epidemiology, Cardiovascular Epidemiology

C. David Jenkins, Social Epidemiology
Joanne Jordan, Chronic Disease Epidemiology
Jay Kaufman, Methodology, Social Epidemiology
Ulrich Keil (169) Cardiovascular Epidemiology, Occupational Epidemiology
Stephen Kritchevsky, Aging Epidemiology
Peter Leone, Infectious Disease Epidemiology
Jay Levine, Veterinary Epidemiology
Stephanie London, Cancer Epidemiology
Matthew Longnecker, Environmental and Occupational Epidemiology
Dana P. Loomis, Environmental and Occupational Epidemiology
Timothy Mastro, Infectious Disease Epidemiology
Melinda S. Meade (58) Medical Geography
Pauline Mendola, Environmental Epidemiology, Reproductive Epidemiology
Kenneth A. Mundt, Occupational Epidemiology
Warren P. Newton, Health Care Epidemiology
David Peden, Environmental and Occupational Epidemiology
Miquel Porta, Cancer Epidemiology, Clinical Epidemiology, Pharmacoepidemiology
Walter J. Rogan (39) Environmental Epidemiology
Michael Rosenberg, Reproductive Epidemiology
Dale Sandler (90) Environmental Epidemiology
David A. Savitz (101) Reproductive Epidemiology
Nicholas Shaheen, Health Care Epidemiology
Ilene C. Siegler (148) Aging
Gary Slade, Oral Epidemiology
Betsy Sleath, Pharmacoepidemiology, Outcomes Research
John W. Stamm (92) Dental Epidemiology
Jeffrey S. A. Stringer, Global Women's Health, HIV/AIDS in Women and Child Health
Patrick F. Sullivan, Genetic Epidemiology
Jack A. Taylor, Environmental and Occupational Epidemiology
John Thorp Jr., Reproductive Epidemiology
Hugh H. Tilson (87) Pharmacoepidemiology
Edward Wagner, Health Services Research
Clarice Weinberg, Environmental and Reproductive Epidemiology
Allen J. Wilcox (61) Reproductive Epidemiology
Redford Williams (141) Cardiovascular Epidemiology
Bonnie C. Yankaskas (82) Diagnostic Radiology/Cancer Epidemiology
Sheryl Zimmerman, Aging

Adjunct Associate Professors

Timothy E. Aldrich, Environmental Epidemiology
Elizabeth B. Andrews (140) Pharmacoepidemiology
Ronald E. Aubert, Chronic Disease Epidemiology
John Barefoot (151) Cardiovascular Epidemiology, Psychosocial Epidemiology
Wendy Brewster, Women's Health
Leigh Callahan, Chronic Disease Epidemiology, Health Care Epidemiology
Patricia Chang, Cardiovascular Epidemiology
Honglei Chen, Nutritional Epidemiology
Benjamin H. Chi, Clinical Epidemiology, Global Health, Reproductive Health
Joe Steven Cline, Infectious Disease Epidemiology, Environmental and Occupational Epidemiology
Thomas B. Cole, Public Health, Violence, Medical Editing
Martin Crane, Chronic Disease Epidemiology, Reproductive Epidemiology
Nancy Dole, Reproductive Epidemiology
Bruce Duncan, Cardiovascular Epidemiology
Sara Ephross, Chronic Disease Epidemiology
Paul J. Feldblum (186) Infectious Disease Epidemiology
Cynthia Girman, Pharmacoepidemiology
Katherine E. Hartmann (196) Reproductive Epidemiology, Women's Health
Duanping Liao (189) Cardiovascular Epidemiology
Hester Lipscomb, Environmental and Occupational Epidemiology
Mark Massing, Cardiovascular Epidemiology
Margaret F. McCann (100) Reproductive Epidemiology
William F. McDonnell III (170) Environmental Epidemiology
Patricia Moorman, Cancer Epidemiology
Dexter L. Morris (113) Cancer Epidemiology
Lucas Neas, Environmental Epidemiology
Daniel Rodriguez, Built Environment, Physical Activity
Kathryn M. Rose, Cardiovascular Epidemiology, Women's Health
Joellen M. Schildkraut (126) Cancer Epidemiology
Maria Schmidt, Chronic Disease Epidemiology
Arlene Sena-Soberano, Infectious Disease Epidemiology
C. Gregory Smith (83) Environmental and Occupational Epidemiology
David C. Sokal (178) Reproductive Epidemiology
Paul E. Stang (163) Chronic Disease Epidemiology
Anthony J. Viera, Hypertension, Cardiovascular Disease Prevention
Emmanuel Walter, Infectious Disease Epidemiology
Suzanne West (207) Health Care Epidemiology, Pharmacoepidemiology
Alice D. White (117) Cardiovascular Epidemiology
Timothy C. Wilcosky (98) Cancer Epidemiology
David Wohl, Infectious Disease Epidemiology

Adjunct Assistant Professors

Rukmini B. Balu, HIV, STDs, Clinical Research, Biorepositories, Pharmacogenomics
Sylvia Becker-Dreps, Evaluation of Immunization Programs, Rotavirus Vaccines, Pneumococcal Vaccines
Jane H. Brice, Clinical Epidemiology, Cardiovascular Epidemiology
Lori Carter Edwards (192) Cardiovascular Epidemiology
Remy Coeytaux, Health Care Epidemiology
Kourtney Davis, Pharmacoepidemiology
Evan Dellon, Health Care Epidemiology
Lisa DeRoo, Envionmental Epidemiology, Genetic Epidemiology, Reproductive Outcomes
Eric Donaldson, Viral Metagenomics, Viral Evolution, Structural Bioinformatics
Mohamed El Hag Ahmed, Environmental/Occupational Epidemiology, Injury Epidemiology
Aaron Fleischauer, Applied Epidemiology, Surveillance, Preparedness and Response
Dionne Gesink, Reproductive Epidemiology, Infectious Disease Epidemiology
Louise Henderson, Health Services Research, Cancer Epidemiology
Jane Hoppin, Environmental Epidemiology
Esther C. Janowsky, Cancer Epidemiology
Jonathan Juliano, Molecular Epidemiology and Genetics of Malaria
Barbara Kowalcyk, Foodborne Illness
Thomas Luben, Environmental Epidemiology, Adverse Reproductive Outcomes
William C. Maier, Pharmacoepidemiology
Ann M. McNeill, Cardiovascular Epidemiology
Prema Menezes, Infectious Disease Epidemiology
Lynne Messer, Social Epidemiology
David Miller, Pharmacoepidemiology, Molecular Epidemiology
Keri Monda, Genetics, Obesity Epidemiology
Miriam Morey, Health Care Epidemiology, Aging Epidemiology
Matthew E. Nielsen, Clinical Epidemiology and Health Services, Cancer Outcomes

Padmaja "Piku" Patnaik, Infectious Disease Epidemiology, International Health
Scott Proescholdbell, Injury Epidemiology
Vilma Santana, Occupational Epidemiology
Williams Saunders, Psychosocial Epidemiology
Jane C. Schroeder, Cancer Epidemiology, Health Services Epidemiology
Pamela Schwingl, Chronic Disease Epidemiology, Reproductive Epidemiology
Markus Steiner, Methodology
Steve M. Taylor, Malaria, Tropical Disease Epidemiology, Hemoglobin Disorders
Vani Vannappagari, Infectious Disease Epidemiology
Emily Vavalle, Infectious Disease Epidemiology
Timothy Wade, Environmental Epidemiology
Rachel E. Williams, Health Care Epidemiology
Christopher Woods, Infectious Disease Epidemiology

Adjunct Instructor

Amy Ising, Public Health Informatics, Public Health Surveillance, Syndromic Surveillance

Professors Emeriti

Barbara S. Hulka
Michel A. Ibrahim
Berton H. Kaplan
J. Richard Seed
Carl M. Shy

Courses for Graduate and Advanced Undergraduate Students

EPID

600 Principles of Epidemiology (3). An introductory course that considers the meaning, scope, and applications of epidemiology to public health practice and the uses of vital statistics data in the scientific appraisal of community health. One lecture and two lab hours per week.

620I Aging and Health (DENT 604I, HMSC 904I, MEDI 604I, NURS 782I, PHCY 604I, PHYT 904I, PSYC 904I, SOCI 824, SOWO 604I) (3). See SOWO 604I for description.

625 Injury as a Public Health Problem (1). Pre- or corequisite, EPID 600. This course considers the causes and consequences of traumatic injury and dilemmas in injury research and prevention. This one-credit course consists of 10 class sessions of 75 minutes each over the first five weeks of the semester.

626 Intentional Injury as a Public Health Problem (1). Corequisite, EPID 625. This one-credit course considers the causes and consequences of intentional injury and dilemmas in injury research and prevention. The course meets once a week for 75 minutes starting the sixth week of the semester. Students may enroll concurrently in EPID 627.

627 Unintentional Injury as a Public Health Problem (1). Corequisite, EPID 625. This one-credit course considers the causes and consequences of unintentional injury and dilemmas in injury research and prevention. The course meets once a week for 75 minutes starting the sixth week of the semester.

689 Resources for International Students (1). Structured opportunities for international students to become informed about U.S. academic and cultural issues as they pertain to their training in epidemiology. Not for degree credit.

695 Research in Epidemiology (1-3). Permission of the instructor. A course for undergraduate students who wish to conduct research as part of an ongoing epidemiology project or as an independent activity.

696 Problems in Epidemiology (1-3). A course for undergraduate students who wish to make an intensive study of some special problems in epidemiology.

Courses for Graduate Students

EPID

700 SAS and Data Management (3). An introduction to statistical analysis, programming, and data management, using the SAS programming language. Two lecture hours and two lab hours per week.

705 Introduction to Deductive and Probability Logic in Epidemiology (2). Permission of the instructor for nonmajors. Covers properties of logical relations, truth tables and Euler diagrams, valid and fallacious arguments, cognitive heuristics and biases, interpretations of probability, the probability calculus, Bayes' theorem, binomial and normal distributions, applications of probability logic and probabilistic fallacies, all in an epidemiologic context.

710 Fundamentals of Epidemiology (4). Corequisite, BIOS 600. Permission of the instructor for nonmajors. Intensive introduction to epidemiological concepts and methods for students intending to engage in, collaborate in, or interpret the results of epidemiologic studies. An alternate to EPID 600 for satisfying the SPH core requirements. Three lecture and two seminar hours a week.

711 Clinical Measurement/Evaluation (PUBH 760) (3). See PUBH 760 for description.

715 Theory and Quantitative Methods in Epidemiology (4). Prerequisites, EPID 705, EPID 710 or 711. Corequisite, BIOS 545. Required preparation, competence in SAS. Permission of the instructor required for nonmajors. An in-depth treatment of basic concepts and skills in epidemiologic research, including problem conceptualization, study design, research conduct, data analysis, and interpretation. Four lecture hours per week.

716 Epidemiologic Data Analysis (2). Prerequisites, EPID 705, 710 or 711. Corequisite, EPID 715. Required preparation, documented SAS proficiency. This course is a combined lecture/lab format where students get hands-on experience in the analysis and interpretation of data from cohort and case-control studies.

718 Epidemiologic Analysis of Binary Data (3). Prerequisite, EPID 715. Permission of the instructor for nonmajors. Concepts and applications, including logistic regression, binomial regression, model building strategy, additive and multiplicative interaction, and graphical exploration. Includes computer-based experience with real data. Two lecture hours and one lab hour per week.

719 Readings in Epidemiologic Methods (1). Corequisite, EPID 718 (fall); EPID 722 (spring). A discussion in journal-club format of readings in general epidemiologic methods, from problem conceptualization to application of results.

722 Epidemiologic Analysis of Time-to-Event Data (4). Prerequisite, EPID 718. Required preparation, SAS software expertise. Course covers epidemiologic analysis of time-to-event data and emphasizes weighing threats to the accuracy of inferences. Class time is spent discussing weekly readings and homeworks..

725 Research Planning Workshop (0.5). Open to second-year Ph.D. students (majors only). This course is designed to guide students through the initial stage of formulating an epidemiologic research topic and plan, leading towards the development of a full research proposal.

726 Epidemiologic Research Methods (3). Prerequisites, EPID 715 and 725. Minimum second- year standing in doctoral program or permission of the instructor. Majors only. A second-level course in the design and conduct of epidemiologic research. Each student will comprehensively address the conceptual and practical aspects of developing a high-quality, detailed research proposal.

730 Advanced Methods for Epidemiology (1). Prerequisites, BIOS 545, EPID 715 and 718. A seminar for advanced students exploring methodological issues in epidemiology, including measurement error, missing data, intermediate variables, complex study designs, meta-analysis, splines, and other topics.

731 Systematic Review and Meta-Analysis (1). This seminar provides training in systematic review and meta-analysis. Topics include problem definition, literature search, extraction of results and study characteristics, publication bias and funnel plot analysis, analysis overall heterogeneity, and stratified and meta-regression analysis of study and population characteristics.

733 Clinical Trials in Epidemiology (3). Required preparation, introductory epidemiology and biostatistics. Systematic overview of principles in design, implementation, and analysis of clinical trials. Emphasis on applications in chronic disease epidemiology. In-depth discussion of case examples from cardiovascular disease epidemiology emphasized. Three lecture hours a week.

735 Cardiovascular Disease Epidemiology (3). Required preparation, introductory epidemiology and biostatistics taken concurrently. Review of the main causes of cardiovascular disease morbidity and mortality, and their population determinants. Topics include epidemiologic methods, risk factors, strategies for prevention, and a student research project. Three lecture hours a week.

737 Advanced Cardiovascular Disease Epidemiology (3). Prerequisites, EPID 710 and 735. Permission of the instructor for students lacking the prerequisite. Contemporary findings, methodological issues, and research recommendations in cardiovascular epidemiology. Topics include risk factors, trends, interventions, and health care. Students critique research and participate in a field experience.

742 Biomarkers in Population-Based Research (2). This course surveys the major issues relevant to the application of biomarkers in epidemiological research, including the logistical hurdles in biospecimen collection and storage, assessments of biomarker quality, analytic issues, and the interpretation of quantitative estimates.

743 Genetic Epidemiology: Methods and Applications (3). Prerequisites, BIOS 545 and EPID 715. Permission of the instructor for students lacking the prerequisites. Concepts and methods of genetic epidemiology relevant to the study of complex human diseases, including segregation analysis, linkage analysis, and gene-environment interaction. Includes whole genome approaches, as well as nonhuman systems. Three lecture hours a week.

744 Advanced Genetic Epidemiology (3). Prerequisites, EPID 715 and 743. This course will provide students who already possess a foundation in genetic epidemiology with practical knowledge required to use software tools for gene structure/function and disease association analysis.

745 Molecular Techniques for Public Health Research (2). Required preparation, undergraduate-level biology and genetics course(s). Theory and application of selected nucleic acid and protein based techniques for public health research, including topics of sample preparation, PCR, DNA sequencing, genotyping, microarrays, immunoblotting, and immunohistochemistry. Two lecture hours per week.

750 Fundamentals of Public Health Surveillance (3). This course provides the conceptual foundations and practical skills for designing and implementing surveillance systems, for using surveillance data for the conduct and evaluation of public health programs and research.

751 Emerging and Re-Emerging Infectious Diseases (3). Basic principles of infectious diseases, focusing on emerging and re-emerging disease agents that affect public health. Includes an introduction to the biology of viruses, bacteria, and eukaryotic parasites.

753 Prevention and Control of Infectious Diseases at the Level of the Community (3). Primary focus at county/state level; surveillance/control of acute infectious diseases; public health vs. individual rights. Bridging epidemiological concepts with community activities and real world health department issues. Three lecture hours per week.

754 Mathematical Modeling of Infectious Diseases (3). Prerequisite, EPID 600. Introduction to basic methods for analysis and interpretation of epidemiological data on infectious diseases, and for predicting the impact of control programs such as HIV prevention programs and vaccination strategies. Two lecture hours and two lab hours per week.

755 Introduction to Infectious Disease Epidemiology (3). Permission required for non-majors. Objectives of the course are to: (1) understand the general principles of infectious disease epidemiology; (2) understand surveillance, prevention and control of infectious diseases; and (3) apply principles to specific infectious diseases. Course is part lecture and part group projects/discussion period per week.

756 Control of Infectious Diseases in Developing Countries (3). Prerequisite, EPID 600. Epidemiology and control of selected infectious diseases prevalent in developing countries. Course involves lectures, critical discussions of published articles, and a final group project. Three lecture hours per week.

757 Epidemiology of HIV/AIDS in Developing Countries (3). Prerequisite, EPID 600. This course examines the epidemiology of AIDS from an international perspective. It considers the AIDS pandemic in a broad epidemiologic perspective, including key aspects of basic, clinical, and social science. Three lecture hours per week.

758 Methods and Principles of Applied Infectious Disease Epidemiology (3). Prerequisite, EPID 600. This course will cover the interaction between an infectious agent, host, and environment; modes and dynamics of transmission; the role of immunity in infectious disease epidemiology; and disease elimination strategies. Three lecture hours per week.

759 Methods in Field Epidemiology (3). Course will focus on epidemiological methods required to investigate urgent public health problems. Course covers the skills and tools needed to conduct outbreak investigations and communicate findings to the public. Three lecture hours per week.

764 Hospital Epidemiology (1–2). Prerequisites, EPID 710 and 752. Permission of the instructor. Comprehensive seminar in hospital infection control. Topics include issues in employee health, surveillance, outbreak investigation, environmental sampling, and policy formation. May be repeated for credit. Two to four seminar hours.

765 Methods and Issues in Pharmacoepidemiology (3). Required preparation, introductory-level epidemiology and biostatistics. Application of the epidemiologic knowledge, methodology, and reasoning to the study of the effects (beneficial and adverse) and uses of drugs in human populations.

770 Cancer Epidemiology and Pathogenesis (3). Prerequisites, BIOS 600 and EPID 710. Undergraduate major or strong preparation in the biological sciences required. Permission of the instructor for nonmajors. Emphasis on integration of epidemiologic data with laboratory and clinical research findings. Issues in epidemiologic research design, analysis, and interpretation are presented within the context of substantive epidemiology. Three lecture hours a week.

771 Cancer Epidemiology Methods (3). Cancer statistics, lead time/length time bias, screening, causation, multistage models, study designs. Applications include cancer and infectious disease, risk assessment, genetic and molecular epidemiology of cancer, and public policy issues. Three lecture hours per week.

772 Cancer Prevention and Control Seminar (HBEH 765, HPM 765) (3). See HPM 765 for description.

775 Advanced Cancer Epidemiology: Classic and Contemporary Controversies in Cancer Causation (2). Prerequisites, EPID 715, 718, and 770 or 771. Permission of the instructor. Readings and discussions on classic and contemporary controversies in cancer causation. Two seminar hours per week.

780 Occupational Epidemiology (3). Required preparation, introductory epidemiology and biostatistics. This course provides a background in the epidemiology of work-related illness and injury and the application of epidemiologic concepts and methods in protecting workers' health and safety.

783 Injury as a Public Health Problem (HBEH 725, MHCH 725) (3). See HBEH 725 for description.

785 Environmental Epidemiology (3). Prerequisites, BIOS 600 and EPID 710. Epidemiologic ideas and methods applied to evaluation and control of human health consequences of environmental hazards. Pollution of environmental media and global change are considered from a human-ecological perspective, with local and international examples. Three lecture hours per week.

786 Community-Driven Epidemiology and Environmental Justice (2). Principles for conducting research within communities unduly burdened by environmental health threats are presented. Topics include research ethics, community presentations, study design and implementation, and student research projects.

790 Intervention Epidemiology (2). Corequisites, EPID 705 and 710. Epidemiologic methods for evaluating interventions, primarily in infectious disease epidemiology and injury epidemiology. Covers randomized designs, such as community trials, and evaluation of non-randomized interventions, such as policies and laws.

795 Introduction to Public Health Informatics (1). This course provides students with an overview of public health informatics and includes in-depth discussions on informatics approaches used in developing the public health information systems in use today.

799A Special Studies in Epidemiology I (1). Experimental course to be offered by faculty to determine the need and demand for the subject. Topics will be chosen by faculty based on current public health issues. One credit option.

799B Special Studies in Epidemiology II (2). Experimental course to be offered by faculty to determine the need and demand for the subject. Topics will be chosen by faculty based on current public health issues. Two credits option.

799C Special Studies in Epidemiology III (3). Experimental course to be offered by faculty to determine the need and demand for the subject. Topics will be chosen by faculty based on current public health issues. Three credits option.

800 Epidemiology of Medical Care (2). Prerequisite, EPID 600. Epidemiology applied to issues in health care, variations in disease and medical care, quality of care measures, role of health care in determination of trends, epidemiological approaches in planning/policy. Three lecture hours a week.

801 Data Analysis in Oral Epidemiology (2–3). Required preparation, basic knowledge of SAS. Permission of the instructor. Data analysis project in oral epidemiology: data cleanup, file construction, analysis. For three credit hours, student also completes multivariate analysis with linear, logistic regression. Project to result in publishable paper. Two to three seminar hours a week.

802 Clinical Research Skills I: Basics (2). Corequisite, EPID 711 or PUBH760. Includes basic development of research ideas, manuscript writing, manuscript review.

803 Clinical Research Skills II -- Measurement in Clinical Research (2). Prerequisites, EPID 711, PUBH 741. Permission of the instructor for students lacking the prerequisites. This course addresses measurement in clinical research including reliability and validity, scale development, use of scales, and bias associated with measurement error.

804 Design of Clinical Research (3). Prerequisite, EPID 711. Clinical research majors only. The goal of this course is to develop a strong fundamental understanding of the design of clinical research studies, excluding traditional (Phase III) randomized clinical trials.

805 Clinical Research Skills III: Proposal Development - Part 1 (2). Corequisites, EPID 711 and PUBH 741 or permission of instructor. This course will address the process for proposal development for clinicians with an emphasis on the initial stages including development of the research questions, specific aims, and significance.

806 Clinical Research Skills IV -- Proposal Development (2). Prerequisites, EPID 805, EPID 711, PUBH 741. Permission of the instructor for students lacking the prerequisites. Proposal writing and study implementation skills. Emphasis is given to NIH style proposals for clinical and translational research.

810 Physical Activity Epidemiology and Public Health (NUTR 810) (3). Prerequisite, EPID 600. This course provides an overview of major issues in physical activity measurements, population distribution, correlates, impacts (physically and economically), and public health recommendations. Interventions, including relevant theories, will be reviewed. Three lecture hours per week.

813 Nutritional Epidemiology (NUTR 813) (3). See NUTR 813 for description.

814 Obesity Epidemiology (NUTR 814) (3). See NUTR 814 for description.

815 Diet and Cancer (NUTR 815) (3). See NUTR 815 for description.

818 Advanced Nutritional Epidemiology (NUTR 818) (3). See NUTR 818 for description.

825 Social Determinants of Health: Theory, Method, and Intervention (HBEH 802) (3). See HBEH 802 for description.

826 Social Epidemiology: Concepts and Measures (3). Prerequisite, EPID 600. Social forces affecting community health and how to measure them for epidemiologic analysis. Topics range from social networks to racism and ethics. Three lecture hours per week.

827 Social Epidemiology: Analysis and Interpretation (2). Prerequisites, BIOS 545 and EPID 715. Approaches to social epidemiologic data and application/interpretation of various analytic methods. Topics include multilevel models, econometric and psychometric techniques, and issues in causal inference.

851 Reproductive and Perinatal Epidemiology (MHCH 851) (3). Corequisites, BIOS 600 and EPID 600. Epidemiology of reproductive and perinatal health outcomes, including infertility, fetal loss, preterm birth, birthweight, congenital malformations, and infant mortality. Includes current knowledge regarding epidemiology of these outcomes and discussion of methodologic issues. Three lecture hours per week.

853 Advanced Topics in Perinatal and Pediatric Epidemiology (MHCH 853) (2). Prerequisites, EPID 710 and 851. Permission of the instructor for master's level students. Critical review of current topics in, and methods for, perinatal and pediatric epidemiology.

883 Teaching Experience in Epidemiology (1–4). Open to EPID majors, second-year or above. Provides epidemiology majors with supervised experience in teaching and course preparation. Students act as assistants in departmental courses. Two to eight seminar hours a week.

886 Readings in Epidemiology (1-3). Permission of the instructor required. Independent reading and tutorial guidance in special areas of epidemiology.

889 Topics in Epidemiology Seminar (1). Prerequisite, EPID 710. EPID majors only. Topics are chosen to reflect emerging issues in the field, as well as those that meet the interests of the students and faculty in the department.

890 Seminar for M.S.P.H. Students (1). A workshop for addressing special topics related to M.S.P.H. program including, but not limited to, research topic development, career planning, and public health ethics.

891 Epidemiology Doctoral Seminar (2). Exposes students to issues and debates in the philosophy of science, the object of knowledge in epidemiology, and the place of epidemiology in public health.

892 Interdisciplinary Seminar in Health Disparities (MHCH 892) (1). Prerequisite, MHCH 756. This seminar will provide an opportunity for students to synthesize knowledge across disciplines and to develop an interdisciplinary approach to addressing their identified health disparities research topic.

893 Pharmacoepidemiology Seminar (1). Required preparation, basic knowledge of epidemiology and biostatistics. This is a weekly seminar to explore current problems in pharmacoepidemiology. It supplements the introductory course, EPID 765. May be repeated. Two seminar hours a week.

894 Infectious Disease Seminar (1). Required preparation, introductory epidemiology and biostatistics. Detailed review of selected topics in infectious disease epidemiology. May be repeated for credit.

895 Seminar in Oral Epidemiology (1). Prerequisite, EPID 710. Explores conceptual and methods issues in conducting epidemiologic investigations of oral conditions, specifically caries, periodontal disease, and oral cancer (topics rotate semesters).

896 Clinical Research and Professional Development Seminar (1). Clinical and Translational Science Curriculum Fellows or permission of the instructor. Practical clinical research and professional development topics presented by faculty, local experts, and CTSC Fellows.

897 Advanced Seminar in Cardiovascular Research (1–3). Permission of the instructor. Review of substantive and methodological research in cardiovascular and cerebrovascular diseases. May be repeated for credit. Two to six seminar hours a week.

898 Global Health Ethics Seminar (2). Required preparation, basic knowledge of epidemiology or permission of the instructor. This seminar aims to introduce students to the myriad of complex ethical issues that arise from health research, health policy, and health care practice in both domestic and international contexts.

900 Epidemiology Practice (4). Designed to give epidemiology majors a supervised field experience in population health research.

905L Epidemiology Laboratory Practice (0.5–9). Permission of the instructor. Students work individually with a faculty member on supervised laboratory research and skills development. May be repeated for credit. Two to 18 laboratory hours a week.

910 Research in Epidemiology (1–21). Permission of the instructor. Independent investigation in consultation with an instructor who must assign or approve the subject of research. Credits vary according to the effort and rigor of the research.

992 Master's Paper (3–6).

994 Doctoral Dissertation (3–9).

Department of Health Behavior (HBEH)

www.sph.unc.edu/hb
Leslie A. Lytle, *Chair*

Professors

Jo Anne L. Earp, Health Education Evaluation, Women's Health, Cancer Control
Eugenia Eng, International Health, Community Health Education, Lay Health Advisor Interventions
Susan T. Ennett, Social Networks, Adolescent Health Risk Behaviors, Research Methods
Edwin Fisher, Diabetes, Community and Peer Interventions, Chronic Disease Management, Smoking and Smoking Cessation
Vangie Foshee, Dating Violence, Adolescent Health, Program Evaluation
Laura Linnan, Applied Research in Worksites and Other Community-Based Settings, Multiple Risk Factor Behaviors, Organizational Change
Leslie A. Lytle, Obesity, Nutrition, Cardiovascular Disease, Child development, Evidence-Based Public Health
Kurt Ribisl, Mass Media and Policy-Based Health Promotion Interventions, Tobacco Control
Barbara Rimer, Cancer Control and Prevention, Tailored Print Communications

Associate Professors

Noel Brewer, Biases in Health Decisions, Health Communication, Decision Making
Carol Golin, Adherence to Chronic Medical Therapy, Patient-Provider Communication, Medical Decision Making for HIV Therapy and Prevention
Suzanne Maman, HIV/AIDS, International Health, Associations between HIV and Violence
Deborah Tate, Obesity, Computer/Internet Interventions, Health Communication

Assistant Professors

Clare Barrington, Global Health, Infectious Diseases, Minority Health, Sexually Transmitted Diseases

Wizdom Powell-Hammond, Men's Health, Health Disparities, Social and Health Behavior Theory
Angela Thrasher, Aging, Health Care Delivery, Minority Health, Sexually Transmitted Diseases, Health Behavior

Research Associate Professors

James Michael Bowling, Injury Prevention, Statistics and Methods, Program Evaluation
Carolyn Crump, Worksite Health Promotion and Evaluation, Program Planning, Management
Kathryn Elizabeth (Beth) Moracco, Women's Health, Violence against Women, Evaluation Research
Christine Rini, Applied Social Psychology, Close Relationships, Health, Helping/Pro-Social Behavior, Interpersonal Processes, Judgment/Decision Making, Persuasion/Social Influence

Research Assistant Professor

Heathe Luz McNaughton Reyes, Adolescent Health, Reproductive Health, Global Health

Clinical Associate Professors

Jason B. Smith, Women's Health, Global Health, Sexual Health
Lynn White Blanchard, Research around Public Service (Including Community Partnerships and Collaborations), Program Evaluation, Service Learning

Lecturers

Elizabeth French
Shelley Golden
Megan Ellenson Landfried

Adjunct Professors

Susan Blalock Patient Education, Musculoskeletal Disorders, Medication Use
Robert Foss, Alcohol and Transportation-Related Injury, Adolescent Injury, Social Policy Approaches to Injury Prevention
Daniel Halperin, HIV Epidemiology and Prevention, Behavior Change Approaches, Family Planning/Population, Public Health Research in Developing Countries
Michael Pignone, Literacy and Health, Shared Decision Making, Colon Cancer Prevention
Christopher Ringwalt, Drug Prevention, Survey Research, Program Evaluation
Carol Runyan, Injury Control, Violence Prevention, Worksite Injury Prevention
Michael Schulman, Occupational Injury; Injury Prevention and Control; Work, Violence and Health among Adolescents

Adjunct Associate Professors

Susan Gaylord, Alternative Therapies and Integrative Health Care, Aging, Health Beliefs and Care Pathways
Christine Jackson, Parenting and Family-Based Public Health, Health Communication, and Community-Based Intervention
David Jolly, Tobacco, HIV/STDs, Health Policy
Linda Kinsinger, Behavioral Change for Weight Management, Behavioral Counseling Interventions in Primary Care Practice, Patient Education about Shared Decision Making
Kristie Long, Cancer Disparities, Tobacco Use, Access to Health Care
Kathleen MacQueen, Qualitative Research Methods and Approaches in Research Design, Ethics in Public Health and Research (Including Applied Ethics Research), Social and Behavioral Dimensions of Clinical Trials Research (Especially HIV Prevention Trials)
Krista Perreira, Child Development and Adolescence, Mental Health and Substance Abuse, Latino Health, Education, and Employment, Demography of Immigration
Kathryn Pollak, Patient-Physician Communication, Smoking Cessation, Health Disparities
Scott Rhodes, Sexual Health, HIV and Sexually Transmitted Disease Prevention, Health Disparities among Vulnerable Communities
Celette Skinner, Cancer Screening, Cancer Genetics, Tailored Interventions
Paige Hall Smith, Violence against Women, Women's Health, Breastfeeding
Anna Waller, Injury Prevention and Control, Data System Users (Especially Database Design), Emergency Department Data and Surveillance
Godfrey Woelk, Project Design, Execution, and Analysis in HIV Prevention and Care, Maternal Health, Hypertensive Diseases of Pregnancy, Child Health, Community-Based HIV and Sexually Transmitted Disease Prevention
Michael Yonas, Social and Contextual Factors Associated with Youth Violence and Dating Violence, Community-Based Participatory Research

Adjunct Assistant Professors

Mary Altpeter, Health Promotion and Older Adults, Particularly Older Women; Community-Based Research and Health Promotion with Older Adults; Community-Based Research with Rural Populations
Delesha Miller Carpenter, Chronic Disease Self-Management, Patient-Provider Communication, Social Support
Mary Davis, Prevention Education, Program Evaluation, Program Planning
Robert Flewelling, Substance Abuse Prevention, Community-Based Intervention, Adolescent Health Risk Behaviors
Jennifer Gierisch, Cancer Prevention/Control, Health Communication, Chronic Disease Management, Mental Health, Tobacco Use Prevention/Control, Women's Health
Lisa Gilbert, Sexual and Reproductive Health, STD/HIV Prevention and Sex Education, Health Communication, Behavior Change Theory and Practice, Adolescent and Women's Health
Moses Goldmon, Adolescent Health and Development, Leadership, Role of Faith in Promoting Health and Preventing Disease, Action Research in Ministry/Community-Based Participatory Research
Megan Lewis, Social Relationships and Health, Cardiovascular Disease, Social Ecology
Alexandra Lightfoot, Community-Based Participatory Research, Health Disparities, Healthy Choices and Behaviors to Support the Growth and Development of Youth, Educational Inequities
David McCoy, American Indian Health, Health Care of Rural and Minority Populations, Budgetary and Policy Aspects of the Delivery of Health Care
Margaret Molloy, Prevention, Health Behavior Change, Health Policy
Melva Fager Okun, Tobacco Cessation, Nutrition, Physical Activity
Elizabeth Randall-David, Women's Health, Empowerment Education
Arjumand Siddiqi, Social Epidemiology, Children's Health and Development, Social Policy and Health
Karl Umble, Management and Leadership Development in Public Health, Continuing Professional Education and Training, Program Planning and Program Evaluation
Maihan Vu, Qualitative Research, Adolescent Health, Obesity and Physical Activity

Adjunct Instructors

Margaret (Molly) Cannon, International Health, Diabetes Prevention/Control, Health Care Delivery, Injury Prevention/Control
Denise Dickinson, Intervention Design and Program Management, Home-Based Interventions for Families
Mariana Garrettson, Injury Prevention/Control, Violence Prevention/Control, Community-Based Participatory Research, Health Behavior Change, Health Policy

Bernard Glassman, Emerging Technologies for Health Communication, Communication about Emerging Health Technologies, Writing about Science for Results
Deborah (Debbie) Grammer
Sally Herndon, Health Policy, Tobacco Use Prevention/Control
Alexis Moore, Community-Based and Rural Health Promotion, Lay Health Advisors, Breast and Cervical Cancer
Carol Patterson, Obesity Prevention, Coping Mechanisms for Chronic Illness, Community Networking in Research Endeavors
Regina Young Petteway, Program Planning, Strategic Planning, Program Administration, Community Capacity Building, Working with Faith-Based Organizations
Elizabeth Stern, Intimate Partner Violence, Training and Education, Latino Health, Sexual Violence
Karen Strazza, Community-Based Public Health, Community-Based Participatory Research, Minority Health, International Health
Katherine Turner, International Women's Health, Education and Training, Sexual and Reproductive Health Education and Counseling, Cultural Competency (Especially on Lesbian, Gay, Bisexual, and Transgender Health)
Gina Upchurch, Health Policy, Aging, Pharmaceutical Care
Amy Vincus
Karen Webb, Mental Health, Substance Abuse Prevention, Coalition-Building

Professors Emeriti

Karl Bauman, Professor Emeritus
John Hatch, Kenan Professor Emeritus
Ethel J. Jackson, Clinical Assistant Professor Emeritus
Elizabeth Mutran, Professor Emeritus
James R. Sorenson, Professor Emeritus
Allan Stecker

Courses for Graduate and Advanced Undergraduate Students

HBEH

561 Medical Reporting for Electronic Media (,HPM 551, JOMC 561) (3). See JOMC 561 for description.

562 Science Documentary Television (HPM 552, JOMC 562,) (3). See JOMC 562 for description.

600 Social and Behavioral Sciences in Public Health (3). This course focuses on social and behavioral science theories, research and interventions aimed at promoting health of individuals, groups, communities and populations. Two lecture hours per week.

601 Principles of Statistical Inference for Health Behavior (3). Required preparation, knowledge of basic descriptive statistics. Majors only. Major topics include elementary probability theory, probability distributions, estimation, tests of hypotheses, paired and independent samples t-tests, ANOVA, linear and logistic regression, correlation and chi-squared procedures. SAS, a statistical software package, is used in the course.

610 Alternative Spring Break (2). This course will explore issues, theories and experiences relevant to social action, coalition building, and social change. The content of this course will be examined by confronting the possibilities and limitations of service and service-learning as it relates to APPLES Alternative Spring Break experiences.

611 Philanthropy as a Tool for Social Change (3). In this course students learn about and experience the process of awarding grants to local agencies. In addition to participating in the grant-making process, students learn about the nonprofit sector and the philosophy and practice of philanthropy through readings, class exercises, and guest speakers.

625 Injury as a Public Health Problem (1). Pre- or corequisite, EPID 600. This course considers the causes and consequences of traumatic injury and dilemmas in injury research and prevention. This one-credit course consists of 10 class sessions of 75 minutes each over the first five weeks of the semester.

626 Intentional Injury as a Public Health Problem (1). Corequisite, HBEH 625. This one-credit course considers the causes and consequences of intentional injury and dilemmas in injury research and prevention. The course meets once a week for 75 minutes starting the sixth week of the semester. Students may enroll concurrently in HBEH 627.

627 Unintentional Injury as a Public Health Problem (1). Corequisite, HBEH 625. This one-credit course considers the causes and consequences of unintentional injury and dilemmas in injury research and prevention. The course meets once a week for 75 minutes starting the sixth week of the semester.

660 Medical Journalism (HPM 550, JOMC 560) (3). See JOMC 560 for description.

690 Special Topics in Health Behavior (1-3). Special topics in health behavior. An experimental course designed for faculty who wish to offer a new course. Content will vary from semester to semester.

Courses for Graduate Students

HBEH

700 Introduction to Public Health and Public Health Education (2). This course offers an introduction to public health, a history of public health and public health education, and an overview of population health/social determinants of health.

703 Program Management Part I (1). Topics included in the fall semester focus on knowledge and skills to manage programs. Specific topics include leadership, followership, emotional intelligence, communication, conflict management, negotiation, and participatory decision making. The primary assignment involves a self-assessment and identification of a self-development plan.

704 Program Management Part II (1). The spring semester will focus on knowledge and skills to manage programs with an emphasis on personnel and resources management. Specific topics include: supervision, interviewing, salary negotiation, non-profit management, organizational culture, budgeting, and proposal development.

705 Lesbian, Gay, Bisexual, and Transgender Health: A Population Perspective (1–3). This seminar course explores health challenges faced by LGBT populations. Discussions will span a variety of health behaviors and outcomes, determinants of health, developmental stages, identities, and settings. Students will be able to identify conceptual frameworks and considerations relevant in LGBT health research and practice.

706 Effective Training for Global Health (1–3). Students are introduced to adult learning principles, effective training methods, course design and evaluation for international audiences and settings, and characteristics of culturally-competent trainers. Students work in teams to: design a course and activity; facilitate the activity; and provide and incorporate feedback to foster peer sharing and learning.

709 U.S. Populations of Color (3). This course explores the various structural forces that impact the health status and health behaviors of populations of color in the United States.

710 Community Capacity, Competence, and Power (3). The nature and delineation of participatory action research and its relevance to concepts, principles, and practices of community empowerment. Students learn methods (such as photovoice) through learning projects.

715 Communication for Health-Related Decision Making (1–3). Course provides foundation and skills to understand and improve decision making that affects people's health. It teaches theoretical basis and evidence-based applications of health-related decision making.

725 Injury as a Public Health Problem (EPID 783, MHCH 725) (3). Prerequisite, EPID 600. This course considers the causes and consequences of traumatic injury within developmental, social, and economic contexts, and dilemma in injury prevention. Injuries associated with transportation, violence, and the home and occupational environments are included. Three lecture hours per week.

726 Adolescent Health (MHCH 726) (3). See MHCH 726 for description.

727 Patient Advocacy (3). Explore competing definitions of patient advocacy. Topics related to ethics, policy, and law will be covered in the context of what have often been termed patient rights and responsibilities. Three lectures hours per week.

730 Theoretical Foundations of Behavior and Social Science (3). This course covers selected social and behavioral science theories and concepts that apply to the analysis of health-related behaviors and intervention strategies.

733 Introduction to Program Management (3). An introductory overview of health education program management. A practical study of personnel and financial management issues including staff development, recruitment, performance appraisal, budget preparation and monitoring. Three lecture hours per week.

740 Health Behavior Practice I (3). This is the first part of year-long course covering key principles of health education practice. The coursework will be conducted in modules. HBEH Practice I will cover community engagement/assessment and intervention, development, adaptation, and implementation. The course will draw from the expertise of a wide range of faculty and practitioners.

741 Health Behavior Practice II (3). This is the second part of a year-long course covering key principles of health education practice. Coursework will be conducted in modules. HBEH Practice II will cover evaluation, as well as sustainability, dissemination, and translation. The course will draw from the expertise of a wide range of faculty and practitioners.

742 MPH Practicum I (1–4). Majors only. Individual field training opportunity that serves as a bridge between a student's academic training and applied public health practice..

743 Program Intervention, Implementation, and Monitoring II (1–4). Prerequisite, HBEH 742. Application of methods to analyze and interpret data regarding the effectiveness of health education interventions. Students work under faculty advisors to assess the effectiveness of interventions implementation in HBEH742.

744 Research Practicum I (2). Students must complete a mentored research practicum. The mentor and student will develop a contract to achieve the research. The practicum requires a total of two hundred hours of work starting in the second year of the program.

745 Research Practicum II (2). Prerequisite, HBEH 744. Students must complete a publishable manuscript based on the Research Practicum I course.

746 MPH Capstone I (2). Capstone class sessions are opportunities for students to prepare for, reflect upon, synthesize, and generalize from their Capstone projects.

750 Applied Research Methods (3). Permission of the instructor for nonmajors. Research methods of relevance to planned change in health-related behavior and program planning. Research designs include quantitative and qualitative methods and focus on application to public health practice. Four lecture hours per week.

751 The Role of Evaluation in Health Education (2). Emphasis on methods to show the importance of evaluation in health education program planning and developing skills in formative evaluation design, emphasizing analysis that contributed to decision making regarding programs. Two lecture hours per week.

752 Intervention Methods in Health Education (4). Critical examination of major intervention methods used in health promotion and disease prevention programs, and ways to tailor these methods to different settings and populations in which health educators work. Four seminar hours per week.

753 Qualitative Research Methods (NUTR 753) (3). Prerequisite, HBEH 750. Approaches to designing qualitative research studies for the development and evaluation of public health programs. Emphasis is on the practice of collecting and analyzing data from individual interviews, focus group discussions, and observations.

754 Advanced Qualitative Research Methods in Health Behavior and Health Research (3). Prerequisite, HBEH 753. This course provides advanced graduate students in public health and related fields the opportunity to explore different analytic approaches and techniques and develop analysis and writing skills. Students will apply methods they learn to analyze, interpret and write-up the results of their own qualitative research.

755 Popular and Empowerment Education for Health Educators (3). Explore empowerment education and popular learning methodologies within the context of health education, creating opportunities for dialogue between theory and practice. Examine adult learning theories, participatory learning concepts, and community development techniques. Will also discuss issues of power between practitioners, health educators, and the community.

756 Social and Peer Support in Health: An Ecological and Global Perspective (3). Course will survey social support in health, including the nature and key processes of social support, cultural influences in different countries, and approaches to promoting peer support in health promotion around the world. Term assignment will entail planning a peer support program or research project of the student's choice.

760 Advanced Research Methods I (3). Permission of the instructor for nonmajors. Doctoral seminar on fundamentals of research in health behavior, including conceptualization of research questions and hypotheses, measurement, sampling, and observational research designs.

761 Advanced Research Methods II (3). Prerequisite, HBEH 760. Permission of the instructor for nonmajors. Doctoral seminar on sampling and selected topics in statistical analysis; continuation of HBEH

760..

765 Cancer Prevention and Control Seminar (EPID 772, HPM 765) (3). See HPM 765 for course description.

772 Planning Public Health Interventions (3). In this course, students use a comprehensive planning model to plan, implement, and evaluate an evidence-based intervention that addresses a public health problem within a defined population.

795 E-Health (3). An overview of the positive and negative impacts of the Internet on public health. Covers research, evaluation sites, ethics, and use of theory that addresses key public health problems.

799 Special Studies in Behavior Change (1–6). Experimental course to be offered by faculty to determine the need and demand for the subject. Topics will be chosen by faculty based on current public health issues.

800 Social Psychological Theories of Individual Health Behavior (3). Prerequisite, HBEH 730. Permission of the instructor for students lacking the prerequisite. Selected social psychological theories and their relationship to health promotion, disease prevention, and patient education. Three lecture hours per week.

802 Social Determinants of Health: Theory, Method, and Intervention (EPID 825)(3). Prerequisite, EPID 600. Discussion and readings will focus on population vs. individual perspectives on health, risk conditions vs. risk factors, concepts of causation, and knowledge development as a historic and social process. Course will also examine macro-level determinants of population health.

811 Development and Evaluation of Health Promotion and Disease Prevention Interventions (NUTR 811) (3). Permission of the instructor for nonmajors. Second year doctoral students only. Doctoral seminar on application of theory and empirical evidence to intervention development, evaluation paradigms, and methods of process and outcome evaluations.

812 Professional Issues (3). Topics related to optimal functioning as a doctorally-prepared professional, including writing and reviewing grants, manuscripts, abstracts; consulting; credentialing; teaching; job search; scholarly and research ethics; and collaboration.

815 Foundations of Health Behavior I (3). Permission of the instructor for nonmajors. A critical examination of the conceptual, theoretical, and empirical bases of public health and health education, health transitions, globalization, and issues around social justice.

816 Foundations of Health Behavior II (3). Permission of the instructor for nonmajors. A critical examination of the social determinants of health, health disparities, principles of individual and collective behavior and behavior change, and the role of health behavior in emerging public health issues.

825 Seminar in Interdisciplinary Health Communication (JOMC 825) (3). Prerequisite, HBEH 730. Permission of the instructor for nonmajors. Interdisciplinary overview of communication theory and research and critical analysis of applications of theory to interventions using communication for health. Three hours per week.

826 Interdisciplinary Health Communication Colloquium (JOMC 826) (1). See JOMC 826 for description.

840 Advanced Field Training in Health Education (1–3). Open to doctoral students in the department. Under guidance by faculty and field counselors, students assume major responsibility for planning, executing, and evaluating community health education projects. Field fee: $125.

841 Advanced Field Training (.5–21). Open to doctoral students in the department. Under guidance by faculty and field counselors, students assume major responsibility for planning, executing, and evaluating community health education projects. Field fee: $125.

842 Primary Practicum for Doctoral Students (1–4). Designed to fulfill the research practicum for doctoral students, which may involve designing and implementing a research project, carrying out data analyses, writing manuscripts, or assuming responsibility for a project.

843 Secondary Practicum for Doctoral Students (1–4). Practicum is designed to enhance knowledge and skills in teaching. Student must be involved in teaching a two- or three-credit course. Co-teaching a course may satisfy this requirement.

850 Research Manuscript Development (3). Prerequisite, HBEH 751 or 860. This seminar is designed to help advanced students refine conceptual and writing skills essential to the production of a manuscript based on already collected qualitative and quantitative data. Three hours per week.

851 Causal Modeling and Structural Equations (3). Prerequisite, BIOS 545. Permission of the instructor. This seminar is designed to refine a wide range of research skills in health behavior by using data collected by others. Three seminar hours per week.

852 Scale Development Methods (3). Prerequisite, HBEH 750. Permission of the instructor. Covers theory and application of scale development techniques for measuring latent constructs in health research; classical measurement theory and factor analytic methods are emphasized. Three seminar hours per week.

860 Research Proposal Development (3). Restricted to doctoral students in department. Integration and application of detailed components of research methods to preparation and writing of a research grant proposal. Introduction to proposal submission and review process for various funding agencies.

891 Special Studies in Behavior Change (1–6). An independent course designed for study areas of natural or planned change; personal and nonpersonal methods, in health related fields. To be arranged with faculty in each case.

892 Special Topics in Program Design and Evaluation (1–6). Required preparation, to be arranged with the faculty in each case. An independent course of study designed for students who wish to pursue advanced studies in program design and evaluation. Repeatable within degree (for six hours).

893 Special Studies in Behavior Change (1–6). An independent course of study for students who wish to pursue studies in social class and variations in planned change. To be arranged with faculty in each case.

897 Advanced Topics in Health Behavior (1–6). For doctoral students who wish to pursue an independent study or research in a selected area. Student will work with a faculty member in designing the study.

960 Principles and Practices of Alternative and Complementary Medicine (3). This course is designed to introduce medical students and other health professionals to the underlying philosophies, practitioners, techniques, and evidence of efficacy of alternative therapeutics currently in use in the United States, including chiropractic, dietary, mind-body, acupuncture, homeopathy, and healing.

992 MPH Capstone Project (3). Capstone is a year-long, group-based, mentored, service-learning, field experience. The course focuses on building skills specific to these service-learning projects and provides students with opportunities to discuss and generalize learning from their Capstone project experiences. The products produced are a substitute for the required Master's thesis.

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Department of Health Policy and Management (HPM)

www.sph.unc.edu/hpaa
SANDRA B. GREENE, *Interim Chair*

Professors
Peggye Dilworth-Anderson (308)
Marisa E. Domino (279) Health Economics
Peggy Leatt (310) Organizational Strategy and Design, Health System Reform, Patient Safety
Jessica Lee (312) Access to Care for Children, Evidence-Based Practice of Dentistry
Joseph P. Morrissey (138) Health Services Research, Administrative Medicine, Community Mental Health
Jonathan Oberlander
George Pink (309) Integrated Health Care, Health Services Accounting and Finance, Financial Performance Measurement, Executive Compensation, Nursing Cost Analyses
Thomas C. Ricketts (139) Rural Health Care, Primary Care, Regionalization of Services, Political Philosophy, Policy Implementation and Policy Development
Richard Gary Rozier (29) Dental Public Health
Sally Stearns (150) Health Economics, Health Policy
Morris Weinberger (300) Quality Management, Health Outcomes Research, Health Services Research
Bryan Weiner (277) Organization and Management of Community Health Partnerships
William N. Zelman (62) Health Care Financial Management, Activity-Based Costing, Cost of Quality, Instructional Design, Quality Improvement

Professors of the Practice
Leah Devlin
Sandra Greene

Associate Professors
Andrea K. Biddle (175) Health Care Access and Reform, Childhood Vaccination, Pharmaceutical Economics
Laurel A. Files (28) Organization Design and Change, Strategic Planning
Bruce J. Fried (172) Human Resources Management in Health Care, Mental Health Services Research, Health Services Management and Education, Canadian Health Systems
Bryce Reeve
Kristin Reiter

Assistant Professors
William Carpenter
George Holmes
Chris Shea
Harsha Thirumurthy
Stephanie Wheeler

Clinical Instructor
Melanie Studer

Clinical Professors
Thomas Bacon
Edward F. Brooks (128) Research Management, Rural Health Care Delivery, Health Manpower
Pam Silberman (249) Public Health Legal Issues

Clinical Associate Professors
Dean M. Harris (195) Health Law and Ethics for Health Administration
Suzanne Hobbs (330) Public Health Policy, Food and Nutrition Policy
John Paul (320) Health Policy, Health Economics, Outcomes Related to Pharmaceutical Products

Clinical Assistant Professors
Norris Gunby Jr.
James V. Porto (134) Management and Information Systems, Public Budgeting and Finance
Jeffrey Simms
Margaret Thomas
J. Bennett Waters (334)

Research Professors
Edward L. Baker Jr.
Sheila Leatherman (286) Quality of Care, Health Systems Performance, International Health Policy

Research Assistant Professors
Antonia Bennett
Stacie Dusetzina
Kristen Hassmiller Lich

Research Associate
Leslie Zeldin

Adjunct Professors
Stuart Altman
William K. Atkinson II (255) Health Care Administration
Dan Beauchamp
Deborah Bender
Hayden B. Bosworth
Fred T. Brown Jr. (282) Managed Care Networks
Young Moon Chae
Fred Cox
Edward Dauer
John Peter Figueroa
Steven Garfinkel
Robert Greczyn
Paul Halverson
Emery Wayne Holden
Donald A. Holzworth
Lily Kelly-Radford
Joan Krause
Kathleen Lohr
Matthew Maciejewski
Barbara Mark (318)
Edward Norton
Carmen Odom
John O'Donnell
Richard Saver
Jeffrey Swanson
Betsy Sleath (254) Pharmacy Administration
Judith Tintinalli (323)
James E. Veney (18) International Health, Research and Evaluation Methodology, Statistical Applications, Family Planning and Maternal and Child Health, Health Planning
Wendee Wechsberg (291) Clinical Addiction and Drug Treatment, HIV Projects
Jane Weintraub
Rebecca Wells

Adjunct Associate Professors
Amy Abernethy
Mary A. Beck (164) Health Care Administration
Paul Brown
Patricia Deverka

Nancy Henley
Clara Lee
Shoou-Yih Daniel Lee (301) Medical Care Organization
Patricia MacTaggart (324)
Michael Markowitz
Michael S. O'Malley (235) Health Services/Oncology Research
Janet E. Porter
Arjun Rajaratnam (326)
Steven G. Sloate (228) Health Policy and Management
Daryl Wansink
Hugh Waters

Adjunct Assistant Professors
Oscar Aylor (268)
Diane Bloom
Carolyn Carpenter (329)
Rachel Caspar
Dorothy Cilenti
Charles Coleman
Kathleen Dalton (297) Health Care Financing, Health Services Research, Academic Medical Centers
Young Kyung Do
Erin Fraher
Susan Helm-Murtagh
Susan L. Hogue (290) Health Outcomes Research
Frederick K. Homan (236) Health Policy and Management
Marco Huesch
George L. Jackson
Melissa Kaluzny (331)
Michel D. Landry
Egil Marstein
Lukasz Mazur
Aaron McKethan
Felicia Mebane
Benjamin Meier
Larry Melton
Gary S. Nestler
Stephanie Poley
David D. Potenziani (298) Management Information Systems in Health Care
Andrea Radford
Stuart M. Rennie
Richard P. Scoville (272) Management Information Systems in Health Care
Adam Searing
Ashley Skinner
Scott Stewart
Karen Stitzenberg
Michael Stobbe
Kathleen Thomas
Laurel Trantham
Debbie Travers
Karl E. Umble
Gary R. West
John Wiesman
Christopher Woods

Adjunct Instructors
Margaret Cannon
Dawn Carter (281) Strategic Planning and Marketing
J. Mike Collins
Nelson Couch (299)
Robert Crawford
Donna Dinkin
Randall J. Egseqian
Franklin Farmer
Peggy Glenn
Eric Griffin
John Grinnell
Kay Grinnell
Douglas A. Johnston (174) Health Law
Lawrence K. Mandelkehr (244) Database Design for Health Care
Donald R. Markle
Ervin Maynard
Anne McGeorge
Paul Morlock
Gary Palmer
Michael Patterson
Robert Patterson
William F. Pilkington
Eugene Pinder
Patricia M. Pozella
Erica D. Rentz
Harry Reynolds
Lucy Savitz
Frederick Sexton
Robert Stevens (333)
Franklin Walker
Cameron Wolfe

Lecturers
William B. Gentry (321)
Jay Levy
Danielle Remmy
Sanford D. West

Professors Emeriti
James P. Dixon
Patricia Z. Fischer
William S. Flash
William T. Herzog
Sagar Jain
Arnold Kaluzny
Kerry Kilpatrick
Robert A. Loddengaard
Curtis P. McLaughlin
Harry T. Phillips
Morris Schaefer

The Department of Health Policy and Management offers three master's degrees, two doctoral degrees, and one graduate-level certificate program.

Master of Public Health (M.P.H.) (Residential)
The M.P.H. is a professional degree intended for those students who hold a doctoral-level professional degree (J.D., M.D., D.D.S., etc.) or a Ph.D. Students gain an understanding of public health philosophy, methods, and values and are provided with an orientation to management and policy-related careers in the health field. The degree is suitable for individuals who have an interest in either healthcare management or health policy.

Master of Healthcare Administration (M.H.A.)
The M.H.A. is a professional degree for students wishing to pursue management careers in health systems, hospitals, consulting firms, managed care organizations, insurance firms, medical group practices, government agencies, and other healthcare settings. The M.H.A. degree is designed to provide strong preparation in the management disciplines,

a comprehensive understanding of the healthcare sector, and an opportunity to pursue an area of concentration.

Master of Science in Public Health (M.S.P.H.)

The M.S.P.H. is a professional degree designed to prepare students for careers in health policy analysis, planning, development, evaluation, and advocacy at local, state, federal, and international levels as well as in the private sector. Students obtain a comprehensive understanding of the healthcare system, master methods for the analysis of healthcare policy options and program evaluation, and pursue an area of concentration.

The Executive Master's Program (Distance Education)

The Department of Health Policy and Management provides graduate-level education to employed health professionals and healthcare administrators, offering the M.H.A. and the M.P.H. degrees through its Executive Master's Program. This national program provides master's degree study to full-time health professionals throughout the United States and beyond. The program comprises brief, but intensive sessions on the Chapel Hill campus, faculty-guided, Internet-based distance learning using real time conferencing, and applied leadership integrative modules to test concepts learned.

Doctor of Philosophy (Ph.D.)

The Ph.D. program in Health Policy and Management is designed to provide students with the competencies, academic foundation, and research experience to become independent and creative health services/health policy researchers. All students take required courses in health services research, research design, quantitative methods, and health policy. In addition, students develop expertise in a minor area. Current minors include decision sciences, economics, financial management, health policy and politics, quality/access, and sociology and organization studies. Students must pass written comprehensive examinations after completing course work, then present and defend a dissertation proposal and the final dissertation based on original research. The Ph.D. program is designed to be completed in four years.

Doctoral Program in Health Leadership (Dr.P.H.)

UNC's doctoral program in health policy and management prepares mid-career professionals for senior-level positions in organizations working domestically and internationally to improve the public's health. The three-year, cohort-based distance program targets individuals working full-time with substantial leadership responsibilities in communities, organizations, and institutions. Students must have a master's or a doctoral degree before matriculating into the Dr.P.H. With the exception of three short visits to Chapel Hill (or an alternate site outside North Carolina or overseas) in each of years one and two, learning takes place in participants' homes and offices, away from the UNC campus. Students connect to the faculty and their peers mainly via computer, making substantial use of technology that allows students and faculty to share data and interact productively via live video and audio. The distance format allows working professionals to complete doctoral leadership training while continuing full-time employment, remaining in-country throughout the duration of their education.

Certificate Program in Community Preparedness and Disaster Management

The professional certificate program in community preparedness and disaster management is designed to provide students, as well as community leaders in emergency services (fire, law enforcement, EMS, 911 communications), public health, emergency management, health services, veterinary services, and all who prepare for and respond to disasters with the opportunity to enhance their knowledge of disaster management systems used to combat natural and man-made disasters, including terrorism. Students may take just one course, or opt for all 3 courses to complete the certificate.

Courses for Graduate and Advanced Undergraduate Students

HPM

420 Community and Public Health Security: Disasters, Terrorism, and Emergency Management (3). Permission of the instructor. This course examines systems for emergency management at federal, state, and local levels. The roles of emergency management, health services, and public health in disaster management are examined. Offered to students in CPDM program only.

421 Community and Public Health Disasters: Agents of Action and Public Health Hazards (3). Permission of the instructor. This course covers biological, chemical, nuclear, and environmental agents that threaten public health. Offered to students in CPDM program only.

422 Emergency Management I (3). Permission of the instructor. Introduction of analytical tools to assess, evaluate, map, and investigate disasters (including biological outbreaks). These tools will be used to improve planning for disaster management. Offered to students in CPDM program only.

423 Emergency Management II (3). Permission of the instructor. Explores issues of preparedness, response, recovery, mitigation, and research in disaster management. Students will participate in the development of a plan and a simulation to evaluate the plan. Offered to students in CPDM program only.

435 Marketing for Not-for-Profit Organizations (3). Permission of the instructor. Application of basic principles of marketing and marketing decision models to problems in health care and other not-for-profit organizations.

440 Introduction to Management Information Systems in Health Care (3). Conceptual and practical aspects in the analysis, development, and utilization of computer-based information and control systems with emphasis on application to the health care environment.

466 Competition, Regulation, and Insurance (3). Examines alternative approaches to containing health care costs adapted by public and private payers.

470 Statistical Methods for Health Policy and Management (3). Introduction of linear model approach to analysis of data in health care settings. Topics include probability distributions, estimation tests of hypotheses, methods in multiple regression, and analysis of variance and covariance.

472 Program Evaluation (3). Concepts and methods of the program evaluation paradigm as applied in health administration.

496 Readings in Health Policy and Management (1–3). Directed readings or research. Written reports are required.

510 Global Perspectives on Ethical Issues in Health Policy and Management (3). This course will address the ethical issues of health policy and management, with particular attention to the global perspectives on these issues. These global perspectives are both comparative and transnational.

522 Aging, Family, and Long-Term Care: Cultural, Ethnic, and Racial Issues (3). Current issues pertaining to the health and well-being of older Americans, and how such issues influence family dynamics and choices about long-term care. Critical topics on chronic illness, family and community caregiving, ethnicity/culture, and socioeconomic status will be covered in the course.

531 Physician Practice Management (3). Permission of the instructor. Restricted to seniors. Course targets students interested in a health care career. Topics include structure of group practices, governance/ownership, risk management, malpractice, physician compensation, operational and financial management.

532 Health Care Consulting (3). This course will provide students with a working knowledge of the various forms of health care consulting, including internal consulting. Students will enhance their analytical, presentation, teamwork, and project management skills.

550 Medical Journalism (HBEH 660, JOMC 560) (3). See JOMC 560 for description.

551 Medical Reporting for the Electronic Media (HBEH 561, JOMC 561) (3). See JOMC 561 for description.

552 Science Documentary (HBEH 562, JOMC 562) (3). See JOMC 562 for description.

560 Media and Health Policy (3). Introduces students to news media organizations and their role in health policy development. Students will learn how to evaluate media content and strategies and to communicate effectively via mass media.

564 Health Care in the United States: Administrative and Policy Issues (3). Restricted to HPM majors. An overview of key health services issues including quality, access, financing, insurance, ethics, and delivery systems plus an introduction to health care policy and politics.

600 Introduction to Health Policy and Management (2). Permission of the instructor. Restricted to seniors. Does not qualify as a core course or elective for HPM undergraduate majors. Provides an overview of the United States health system, emphasizing role of policy development and administrative decision making through case examples.

601 Issues in Health Care (1). Lectures on current topics in health care.

602 Concurrent Practice (1–3). Permission of the program director. Supervised activities in an approved health organization, to include one or more specific projects, approved by HPM faculty member and directed by an approved preceptor/mentor in the organization.

605 Practice Application Journaling I (0.5). This course is the first of six field-based journal practica in which students monitor their learning processes, identify where knowledge and skills learned in courses are helpful and relevant to areas of their professional responsibility, and apply that knowledge and those skills to actual work situations.

606 Practice Application Journaling II (0.5). Prerequisite, HPM 605. This course is the second of six field-based journal practica in which students monitor their learning processes, identify where knowledge and skills learned in courses are helpful and relevant to areas of their professional responsibility, and apply that knowledge and those skills to actual work situations.

607 Practice Application Journaling III (0.5). This course is the third of six field-based journal practica in which students monitor their learning processes, identify where knowledge and skills learned in courses are helpful and relevant to areas of their professional responsibility, and apply that knowledge and those skills to actual work situations.

608 Practice Application Journaling IV (0.5). This course is the fourth of six field-based journal practica in which students monitor their learning processes, identify where knowledge and skills learned in courses are helpful and relevant to areas of their professional responsibility, and apply that knowledge and those skills to actual work situations.

609 Practice Application Journaling V (0.5). This course is the fifth of six field-based journal practica in which students monitor their learning processes, identify where knowledge and skills learned in courses are helpful and relevant to areas of their professional responsibility, and apply that knowledge and those skills to actual work situations.

610 Practice Application Journaling VI (0.5). This course is the sixth and final of six field-based journal practica in which students monitor their learning processes, identify where knowledge and skills learned in courses are helpful and relevant to areas of their professional responsibility, and apply that knowledge and those skills to actual work situations.

611 Public Health Concepts in a Systems Context (3). This course develops systems reasoning in health policy and management students through the application of systems techniques and systems thinking to core public health concepts in health policy and management, environmental health, epidemiology, and health behavior.

634 Public Health Issues in Community Preparedness and Disaster Management (PWAD 634) (3). Examines conventional public health constructs of community preparedness and disaster management. Includes a review of traditional and emerging literature. Emphasizes conceptual development and application of adaptive leadership strategies.

652 Economic Evaluation of Health Care Technology (DPOP 802) (3). Focus is on determination of costs and benefits associated with alternative resource allocation schemes. Crucial economic concepts (e.g., utility valuation of health states and marginal analysis) are presented.

653 Pharmacoeconomics (DPOP 801) (3). See DPOP 801 for description.

660 International and Comparative Health Systems (3). Methods of comparing health systems, examinations of related national health systems, and analysis of related high prevalence health issues.

664 Globalization and Health (MHCH 664) (3). Globalization—its economic, environmental, political, technological, institutional, and sociocultural dimensions—historically and currently contributes to beneficial and adverse effects on population, community, and family and individual health.

670 Systems Simulation for Health Services (3). Course will prepare students to simulate health services using the MedModel simulation software. Basic concepts of discrete event simulation.

690 Special Topics in Health Policy and Management (0.5–3). Special topics course for health policy and management undergraduate students.

691H Honors Research (3). Required preparation, overall grade point average of 3.2 by end of junior year in all UNC–Chapel Hill courses. Readings and seminars for undergraduates showing potential and talent for research. Students will design an independent research project, write a proposal, and complete an IRB application as partial completion of an honors thesis.

692H Independent Honors Research (3). Prerequisite, HPM 691H. Permission of the instructor. Students collect data, analyze and report findings, and make recommendations to complete an honor thesis and present findings in presentation/poster format.

697 BSPH Capstone (3). The capstone course is an "integrative exercise" for BSPH students prior to graduation. It is intended to simulate the integration of various disciplines—finance, human resources, ethics, policy, operations, and information technology—into a comprehensive and practical framework. Students work with healthcare organizations to solve financial or operational problems.

Courses for Graduate Students

HPM

701 Professional Training I (1). Restricted to HPM majors. Supervised professional training (fee is $550).

702 Professional Training II (1). Restricted to HPM majors. Supervised professional training (fee is $500).

703 Professional Training III (1–21). Restricted to HPM majors. Supervised professional training (fee is $500).

705 Healthcare Management Skills Development Workshop I (0.5). This course is the first of two workshops for students in the Executive Master's Program. These workshops are designed to provide students exposure to key cross cutting skills that will be used in the program. These skills also are essential for effective healthcare management.

706 Healthcare Management Skills Development Workshop II (0.5). Prerequisite, HPM 705. This course is the second of two workshops for students in the Executive Master's Program. These workshops are designed to provide students exposure to key cross cutting skills that will be used in the program. These skills also are essential for effective healthcare management.

707 Lesbian, Gay, Bisexual, and Transgender (LGBT) Health: A Population Perspective (3). This seminar course explores health challenges faced by LGBT populations. Discussions will span a variety of health behaviors and outcomes, determinants of health, developmental stages, identities, and settings. Students will be able to identify conceptual frameworks and considerations relevant in LGBT health research and practice.

710 Health Law (3). An introduction to law and the legal system as it relates to the delivery and financing of health care.

711 Research Management and Ethics in Health Policy (1). This course is aimed at doctoral and M.S.P.H. students with interests in research management and ethics. Using cases and examples, the first part of the course focuses on major management and leadership issues, while the second part deals with ethically relevant matters.

712 Leadership and Ethics (2). This course is based on the notions that leadership and ethics are intertwined and that good leaders behave ethically. There is often no one right way to lead effectively. Also, there are few firm rules or principles that guide ethical decision making, and there is much room for debate.

715 Health Economics for Policy and Management (3). Prerequisite, BIOS 600. Permission of the instructor for nonmajors. Provides training in the theory of health economics and applies this theory to important issues in health policy and management.

715L Microeconomics Lab (1). Corequisite, HPM 715. Permission of the instructor for nonmajors. Applications of health economics theory to current health care policy.

720 Management of Human Resources in Health Organizations (3). Prerequisite, HPM 730. Permission of the instructor for students lacking the prerequisite. Emphasis is on clarifying concepts of human resources management and identifying the importance of human resources in health organizations.

725 Health Care Strategy and Marketing (3). This course introduces students to strategic planning and marketing in health services organizations. Students develop practical skills such as assessing the internal and external environment, competitor analysis, and evaluating strategic alternatives in different health care settings. It also explores the role the governing board plays in strategy development and management.

728 Leadership and Workforce Management Strategies in Healthcare Organizations (4). This course provides an introduction to leadership and management in healthcare organizations, with a particular focus on strategic human resources management. Modules include: self-development; organizational design and governance; power, politics and conflict; human resource processes; and organizational change and innovation.

730 Leadership and Management of Health Care Organizations (3). Overview of organizational theory and empirical findings appropriate to the design and behavior of health care organizations. Topics include the design of the organization, its performance, and its relationship to the environment.

734 Approaches to Business Plan Development (1). Approaches to Business Plan Development ('Capstone Prep') is a one-credit course to introduce and jumpstart the Spring Semester Capstone business plan process necessary for HPM 735.

735 Advanced Concepts and Applications in Health Policy and Management (3). Prerequisite, HPM 734. Required preparation, completion of master's core (can be concurrent). Restricted to HPM graduate students. Integrating and building upon the HPM master's core, this comprehensive course focuses on organization policymaking and administration from the perspective of the CEO and top management.

738 Health Operations Management (3). Operations management (OM) involves the day-to-day management of an organization, by focusing on the analysis, design, planning and control of work processes in order to create value for clients. All organizations must manage their work processes, however surprisingly many do not have a systematic or rigorous approach to managing them.

740 Introduction to Health Care Financial Management (3). Permission of the instructor for nonmajors. A broad introduction to financial concepts, issues, tools, and vocabulary. Topics include financial statement analysis, working capital management, budgeting, cost finding, and rate setting. Minimal accounting proficiency expected.

741 Management Accounting for Health Administrators (3). Prerequisite, HPM 740. Permission of the instructor for students lacking the prerequisite. Covers selected topics in managerial accounting applied to health care. It is intended to provide in-depth coverage of managerial topics introduced in HPM 250.

742 Health Care Finance I (3). Prerequisite, HPM 740. Topics include basic financial management concepts, capital acquisition, cost of capital and capital structure, and capital allocation.

743 Health Care Finance II (3). Prerequisite, HPM 742. Topics include financial analysis and forecasting, working capital distributions to owners, mergers, capitation, and financial risk.

746 Introduction to Financial and Managerial Accounting for Healthcare (5). Focuses on learning and applying key financial and managerial accounting tools and concepts to healthcare problems. Provides a broad introduction to key concepts, issues, tools, and vocabulary useful for policymakers and administrators. Topics include: reading and analyzing healthcare financial statements, recording transactions, budgeting, full costing, incremental costing and responsibility accounting.

747 Finance and Economic Analytics (4). This course provides students in the Executive Master's Program with an opportunity to investigate topics of healthcare finance and economics in greater depth, and to extend their scope of facility with technical tools for financial and economic analysis.

748 Healthcare Policy and Economics of Healthcare Insurance (4). This course provides students with an opportunity to investigate topics of healthcare policy and insurance from a finance and economics perspective. The course covers contemporary health policy topics in great depth and with a focus on economic and financial analysis as a tool to evaluate healthcare policies and proposed new legislation.

750 Introduction to Dental Public Health (3). Permission of the instructor. Survey of the theory and practice of dental public health, with an emphasis on basic knowledge and skills necessary for planning and evaluating dental public health programs.

751 Dental Public Health Practice (3). Permission of the instructor. Emphasis on knowledge of community measures for prevention and control of oral diseases, understanding the scientific basis for their use, and designing and evaluating prevention programs for a specific population.

752 Oral Epidemiology for Health Policy and Management (3). Prerequisite, EPID 600 or HPM 750. Permission of the instructor for students lacking the prerequisite. Focuses on the epidemiology of oral diseases and the implications and uses of this knowledge for dental health policymaking and administration of dental programs.

754 Health Care in the United States Structure and Policy (4). This core course is designed to provide students with an overview of the structure, systems, and policies of health care delivery in the United States. The goal is to increase students' knowledge and abilities to analyze and address health care issues from both management and policy perspectives.

755 Introduction to Health Policy and Politics (3). Prerequisite, HPM 564. Permission of the instructor for students lacking the prerequisite. This course addresses the major political institutions and policy processes that shape health policy, principally at the federal level.

757 Health Reform: Political Dynamics and Policy Dilemmas (3). This course focuses on the political and policy dynamics of health care reform.

758 Underserved Populations and Health Reform (3). Students will gain an understanding of how the changes in the health care market affect care for underserved populations and will develop strategies to ensure that the needs of these populations are met.

759 Issues in Health Policy and Reform (2). The course will familiarize students with the history of health reform in the U.S., explore issues in health policy, analyze the impact of health politics on policymaking.

760 Healthcare Quality and Information Management (3). Integrates essential methods and principles in healthcare quality and information management. Emphasis on use of information to measure and improve quality. Will include presentations, individual/group projects, exercises, and group discussion.

761 Quality and Utilization Management (3). Prerequisite, HPM 564 or 754. Evolution and current status of health care quality management systems and programs for utilization control. Includes discussion of alternative quality assurance methods, hospital accreditation, and government programs.

762 Quality of Care (3). Prerequisite, HPM 564 or 754. Methods and practices for quality control and assurance in health care organizations.

765 Cancer Prevention and Control Seminar (EPID 772, HBEH 765) (3). An interdisciplinary overview of cancer prevention and control. Emphasis on projects and activities from perspectives of epidemiology, health behavior and education, and health policy and management. Appropriate research design and methodologies are covered.

766 Cancer Care Quality (3). Geared toward researchers, the course examines the overuse, underuse, and misuse of care across the cancer care continuum, focusing on recent work defining, measuring, and improving cancer care quality.

767 Disseminating Evidence and Innovation in Cancer Care (3). This course introduces the concepts, theories, and methods of disseminating research evidence and innovations to improve quality in cancer care.

768 Informed Decision-Making in Cancer Care (3). This course will examine clinical decision-making in cancer care from the perspectives of providers, patients, and families.

770 Operations Research for Health Care Systems (3). Prerequisite, BIOS 600. Permission of the instructor. Review of the systems analysis process in health care systems. Deterministic and random models, mathematical programming, queuing, simulation, forecasting, and measurement. Emphasis on model formulation and computer solution of decision models.

772 Techniques for the Economic Evaluation of Health Care (3). Prerequisite, EPID 600. This course provides an investigation of the theory, methods, and application of economic evaluation to health care. Topics include methods used to structure an economic evaluation, measure and summarize health outcomes and estimate their value to patients or to the public, and identify resources used and estimate their costs.

773 Introduction to Program Evaluation for Public Health and Health Care Settings (1.5). This course is a fundamental introduction to the field of program evaluation in public health and health care. We discuss key concepts in planning, conducting, and reporting evaluations. We focus on evaluating programs, policies, products, services, or organizational processes. Through a project, students apply the concepts to their work.

775 Analytic Techniques in Health Policy and Management (3). This course covers a variety of analytic techniques and methodologies basic to more advanced analysis of decision problems in health administration.

776 Healthcare Quality and Information Management (1.5). The HPM 776/777 and 776/778 course sequences integrate essential methods and principles in healthcare quality and information management, emphasizing use of information to measure and improve quality.

777 Health Information and Quality Applications (2). The HPM 776/777 and 776/778 course sequences integrate essential methods and principles in healthcare quality and information management, emphasizing use of information to measure and improve quality.

778 Public Health Information and Quality Application (1.5). The HPM 776/777 and 776/778 course sequences integrate essential methods and principles in healthcare quality and information management, emphasizing use of information to measure and improve quality.

779 Advanced Analytics and Operations Research (4). Healthcare administrators face a range of decisions: some strategic, some financial, others operational. Through your program of study, you are developing analytical and conceptual skills that will help you to make better decisions when the time comes.

780 Public Health Entrepreneurship (NUTR 780) (3). See NUTR 780 for description.

781 Seminar in Comparative Effectiveness Research (1). The course provides an overview of substantive and methodological issues in CER, including randomized controlled trials; inferences from observational studies; literature syntheses; decision sciences/decision modeling; dissemination and implementation science; cross-cutting skills (e.g., strengths and limitations of administrative and clinical databases and electronic health records for CER).

779 Advanced Analytics and Operations Research (4). Healthcare administrators face a range of decisions: some strategic, some financial, others operational. Through your program of study, you are developing analytical and conceptual skills that will help you to make better decisions when the time comes.

789 Master's Paper Development (1). Second-year M.S.P.H. or first-year M.P.H. students only. Broad topics related to the development and management of a research project are covered. The major goal is the development and completion of a proposal to be submitted for an independent master's paper.

793 Health Policy and Management Internship (1-2). Restricted to HPM majors. Supervised field experience in approved health agencies. (Internship fee: $450.)

810 Leadership in Health Law and Ethics (2). Course is designed to provide learners with an introduction and overview of critical issues relating to law, ethics, and public health.

815 Graduate Health Economics Seminar (1). Permission of the instructor. Discussion of recent papers in health economics. Students must have solid knowledge of graduate microeconomics theory and econometrics.

820 Organizational Leadership Theory and Practice (2). Focus is on the behavioral, power-influence, trait, and situational approaches to leadership. Addresses core leadership principles plus leadership-followership theory, transformational and strategic leadership, and creating change.

821 Current Topics in Health Leadership (2). This course is the second in a series of executive Dr.P.H. leadership core courses. Guest discussants will introduce students to timely issues relating to health leadership to foster understanding and mastery of what successful top organizational leaders do to create change.

860 Population Perspectives for Health (1). A review of how the population perspective is used to create programs and social change for health in the United States.

871 Seminar in Teaching Health Policy and Management (1). Problems and processes of teaching health policy and management, including supervised practicum experience.

872 Selected Topics in Health Policy and Management: Advanced Seminar (3). Permission of the instructor. Integrated study of selected theory and research as it relates to the organization and delivery of health services. Separate seminars are developed to correspond to the doctoral student's specific interests and needs.

873 Policy Seminar in Health Policy and Management (1). Seminar on policy issues in health policy and management.

874 Advanced Research Seminar in HPM (1). This seminar will develop core competencies through a: (1) journal club to develop competencies in research design and expose students to diverse content and methodologies; and (2) professional development series.

880 HPM Mathematical and Statistical Tutorial (1). Review of mathematical and statistical concepts used in HPM 881-883. Introduction to statistical programming language.

881 Linear Regression Models (3). Prerequisite, HPM 882. This course is an introduction to the analysis of categorical data using maximum likelihood. Topics covered: econometric models in which the dependent variable is not continuous, including Logit, Probit, Tobit, two-part, and duration models.

882 Advanced Methodology in Health Policy and Management (3). Prerequisites, HPM 496 and 796. This course is an introduction to linear regression models. Topics include linear algebra, least squares regression, multicollinearity, heteroscedasticity, autocorrelation, and hypothesis testing.

883 Analysis of Categorical Data (3). Prerequisites, HPM 881 and 882. Permission of the instructor for students lacking the prerequisites. Research methodology as applied to understanding problems in health care delivery. Topics include simultaneous equation models, factor analysis, limited dependent variables, and an introduction to event history analysis.

884 Health Services/Health Policy Research Methods I (3). Doctoral standing or permission of the instructor. This two-semester course provides an overview of the field of health services research and introduction to basic components of the research process, including literature synthesis, development of a research question and hypothesis, and use of conceptual and logic models to clarify research questions.

885 Health Services/Health Policy Research Methods II (3). Prerequisite, HPM 884. This continuation of HPM 884 examines basic components of the research process, including research designs, analytical issues, qualitative research methods, primary data collection, and secondary data analysis, and provides in-depth analysis of research applications that are relevant to health services and health policy researchers.

886 Advanced Applications in Research Methods (3). Prerequisites, HPM 884 and 885. This course will focus on advanced applications of research methods developed in HPM 884 and HPM 885. Examples and applications are relevant to health services and health policy researchers.

890 Special Topics in HPM (0.5-3). Course reserved for special topics in HPM for graduate-level students only.

930 Doctoral Seminar in Organization Theory and Health Service Organizations (3). Permission of the instructor for nondoctoral students. Review and application of selected developments in organization theory to health services research.

950 The Research Process (1). The course introduces doctoral students to the world of scientific and policy inquiry. It emphasizes the goal, structure, and content of the dissertation that will be written in the latter part of the program.

951 Literature Review and Appraisal (2). This course is the second in a sequence of courses in research design and methods in the executive Dr.P.H. program. The course explores the nature and process of scientific inquiry in the field of public health, establishing a foundation for methodological exploration, and focusing on the process of developing researchable questions.

952 Community Involvement in Research (1). Relevant literature and guest speakers will highlight cases depicting different levels of community involvement in public health research.

953 Practice Based Research (2). Designed to provide Dr.P.H. students with grounding in basic quantitative and qualitative research techniques used in health services research. Topics include types of research designs, measurement scales and coding nomenclatures, analytical techniques for quantitative data, research techniques for primary data collection, research opportunities with secondary data, and qualitative research methods.

954 Dissertation Planning and Preparation (2). Part of a sequence to guide students in planning, development, and implementation of Dr.P.H. dissertations. Designed to prepare students to identify appropriate research topics, plan the approach, organize, and write.

955 Health Strategy (2). The purpose of this class is to enhance participants' behavioral complexity as leaders. Examines several major approaches to organizational strategy. Topics include diversification, transaction cost economics, agency theory, the resource-based view of the firm, and processes of strategic decision making.

956 Fundamentals of Research Analysis (3). This course will provide students with "hands-on" experience in qualitative, quantitative, and policy analytical techniques.

957 Leading Sustainable Change: Operating Beyond the Board Room (3). The course will help students understand and master what successful top organizational leaders must do to create change, both within and outside their organizations.

958 Financial Leadership in the Era of Sarbanes–Oxley (2). Dr.P.H. students only. Understand the major concepts of the Sarbanes–Oxley Act and be able to apply them to their own organizations whether public or nonpublic, for profit or not-for-profit.

959 Strategic Management in Health Leadership (2). The purpose of this class is to enhance participants' competence in leading within complex and dynamic systems.

961I Aging and Public Policy (DENT 607I, FMME 607I, HMSC 951I, MEDI 607I, NURS 783I, PHCY 607I, PSYC 907I, SOWO 607I) (3). See SOWO 607I for description.

962 Marketing and Public Relations for Health Leaders (3). This course is one of a series of leadership courses in the executive Dr.P.H. Its main purpose is to help students understand public health from the perspective of external audiences.

963 Program Evaluation for Health Leaders (3). This course is one of a series of research courses in the executive Dr.P.H. Its main purpose is to help students understand the purposes of evaluation.

992 Master's Paper (3).

994 Doctoral Dissertation (3–21).

Department of Maternal and Child Health (MHCH)

www.sph.unc.edu/mhch
HERBERT PETERSON, *Chair*

Professors

Carolyn Halpern (32) Adolescent Health and Development, Sexual Health and Research, Methodology
Jonathan Kotch (17) Injury Prevention, Child Abuse and Neglect, Health and Safety in Child Care
Sandra L. Martin (40) Violence, Behavioral and Emotional Health of Children and Families, Substance Use, Prison Health
Herbert Peterson (01) International Health, Reproductive Health
John Thorp Jr., Preterm Birth, Birth Asphyxia, Episiotomy, Community Child Health

Associate Professors

Trude A. Bennett (48) Women's Health and Maternal Morbidity; Intersection of Race, Class, and Gender in Maternal and Child Health (MCH); Reproductive Health and Social Welfare Policy
Julie Daniels (71) Epidemiology of Reproductive Health, Infant and Child Growth and Development, Autism and Developmental Disabilities, Environmental Exposures Related to Reproductive and Developmental Outcomes
Lewis Margolis (43) Child Health Policy, Injury Epidemiology, Community-Based Public Health

Clinical Professors

Anita M. Farel (33) Program and Policy Development for Children with Special Health Care Needs, Public Health Practice, Professor of the Practice

Research Associate Professors

Sian Curtis (49) Contraceptive Use Dynamics, International Reproductive and Maternal Health, Monitoring and Evaluation Methods for Population and Health Programs, Multilevel Models, Statistical Demography
Ilene Speizer (15) Unintended Pregnancy Prevention, Evaluation of Reproductive Health Programs in Developing Countries, Adolescent Health, Male/Couple Involvement, Gender-Based Violence

Clinical Associate Professors

Claudia Fernandez (31) Leadership Development, Leadership Issues in Healthcare and Related Fields
Vijaya Hogan (76) Perinatal Epidemiology, Preterm Delivery, Infant Mortality, Health Disparities

Clinical Assistant Professor

Dorothy Cilenti (36) Public Health Departments, Systems Development

Professors of the Practice of Public Health

Miriam Labbok (13) Breastfeeding, Global Health, Health Policy, Maternal Health, Minority Health, Nutrition, Public Health Practice, Reproductive Health, Women's Health
Diane Rowley (45) Health Disparities

Research Assistant Professors

Shelah Bloom (73) HIV/AIDS, Reproductive Health, Maternal Mortality and Morbidity, Gender Context of Reproductive Health
Dalia Brahmi, Family Planning and Reproductive Health
Doris Chou
Sherri Green (25) Maternal Health, Public Health Leadership, Substance Abuse, Violence Prevention
Jon M. Hussey (34) Child Abuse and Neglect, Child and Adolescent Health, Injury Prevention, Population
Emily Jackson, Family Planning
Tamar Ringel-Kulka (41) Functional Foods, Probiotics, Obesity, Breastfeeding, Children and Adolescents Health Promotion and Disease Prevention
Kavita Singh Ongechi (10) Child Survival, Displaced Populations and HIV/AIDS Orphans

Adjunct Professors

Bruce Barron
Jose Belizan, International Maternal and Child Health, Maternal Mortality and Morbidity
Pouru Bhiwandi, Obstetrics and Gynecology, International Women's Health, Maternal and Child Health
Gerard L. Breart, Perinatal Epidemiology, Epidemiology of Osteoporosis, Evaluation of Preventive Interventions, Clinical Epidemiology
Dorothy Browne, High-Risk Behaviors (Drugs, HIV/AIDS, Sexual Behavior, etc.) among African-American Adolescents and Adults
Paul A. Buescher, MCH Infant Health, Poverty and Health, MCH Program Evaluation

Barton Burkhalter
Judith Fortney, Maternal Morbidity and Mortality in Developing Countries
Robert Foss, Health Behavior, Health Communication, Health Policy, Injury Prevention, Public Health Practice
Denise Hallfors, Adolescent Health, Community Prevention Programs, Substance Abuse Prevention, Child and Adolescent Mental Health
Marcia Herman-Giddens, Child Abuse, Child Fatalities, Alternative Healing
Roy Jacobstein
Marian Johnson-Thompson
Michael Kafrissen, Clinical Reproductive Health
Lynn Knauff, International Family Planning (FP) and Maternal Health, Training of FP/MCH Health Personnel, MCH/FP Program Development and Evaluation
Baker Maggwa
Robert Meyer, Reproductive and Perinatal Epidemiology, Birth Defects Surveillance, Program Evaluations
Roland E. Mhlanga, Obstetrics and Gynecology
Kevin J. Ryan, Statewide Delivery of Women's Health Services, Prenatal Health, Health Care Ethics
Katherine Shea
Joseph Telfair
Amy O. Tsui, International Family Planning, Reproductive Health, Research Methods
Thomas Vitaglione, Early Childhood Programming, Health Care Financing

Adjunct Associate Professors

Patsy Bailey, International Maternal and Child Health
Mary Jane Benson
Deborah Billings, International Family Health
Dorothy C. Browne
Jennifer Culhane
Joseph DeGraft-Johnson, International Reproductive Health
Abigail English, Adolescent Health Law
Alfredo Fort, International Reproductive Health in Latin America, Program Research and Evaluation
Priscilla Guild, MCH and Primary Care Health Services Planning and Evaluation
Kathryn E. (Beth) Moracco, Women's Health, Violence against Women, Program Planning and Evaluation
Robert Murphy
Krista Perreira
Lucy Siegel
Paige Smith
Susan Spalt, School Health, Adolescent Substance Abuse, HIV
John Stanback, International Family Health
Jane Stein, Women's Health in Developing Countries, Social Determinants of Health, Evaluation
Nancy Williamson, Operations Research: Planning, Implementing, and Evaluating Reproductive Health Programs; Evidence-Based Public Health; Research to Practice, Integration of HIV and Contraceptive Services, Gender Sensitivity of Development Programs

Adjunct Assistant Professors

Asli Ashkir, International Women's and Children's Health
Joy Baumgartner, Family Planning, HIV Prevention, Adolescent Health, Mental Health
Colleen Bridger, Global Health, Health Administration, Health Care Delivery, Health Communication, Maternal Health, Public Health Leadership, Public Health Practice, Reproductive Health, Women's Health
Martha Carlough, Maternal Health, Women's Health
Cecilia Casanueva
Paula Collins
Caroline Whitehead Doherty, Primary Health Care for Farm Workers, Health, Hispanic Health, Reproductive Health
Sandra Echeverria
Cyril Engmann
Jean Fotso
Deborah Gibbs
Rodolfo Gomez Ponce De Leon
Phillip Graham
Elaine Hart-Brothers, Women's Health, Cardiovascular Epidemiology, Education and Prevention
Linda Ippoliti
Heidi Bart Johnston, Reproductive Health
Eileen Kugler, Community Health Programs
Anu Kumar, Executive Vice President, Ipas
Wendy Lam
Li-Ching Lee
Jack Leiss, MCH Research
Gerri Mattson, Title V, Medical Home, Transition
Kara McGee
Stephen Mills
Savithri Nageswaren, CSHCN, National Survey Analysis
Heidi Reynolds
Susan Rogers, Demography, Sexually Transmitted Disease (STD)
Catherine Rohweder
Lucille Siegel, Pregnant Women and Infants
Stephanie Triantafillou
Sarah Verbiest
George Wehby

Lecturers

Kathryn Clark, Biostatistics
Jacqueline Resnick, Research Training, Proposal Development
Professors Emeriti
Jan Dodds
Jaroslav Fabian Hulka
Howard Jacobson
C. Arden Miller
Earl Schaefer
J. Richard Udry (14) Population, Demography, Sexual Behavior, Gender Roles, Program Evaluation
Elizabeth Watkins

Courses for Graduate and Advanced Undergraduate Students

MHCH

605 Survey Course on Breastfeeding and Public Health (3). This survey course will briefly cover the principal topics in this broad field of knowledge, including domestic and global issues.

610 Issues in Maternal and Child Health (3). Permission of the instructor. For students outside the department of MCH who desire a survey of current issues and programs in maternal and child health. Three lecture hours per week.

611 Nutrition of Children and Mothers (NUTR 611) (3). See NUTR 611 for description.

625 Injury as a Public Health Problem (1). Pre- or corequisite, EPID 600. This course considers the causes and consequences of traumatic injury and dilemmas in injury research and prevention. This one-credit course consists of 10 class sessions of 75 minutes each over the first five weeks of the semester.

626 Intentional Injury as a Public Health Problem (1). Corequisite, MHCH 625. This one-credit course considers the causes and consequences of intentional injury and dilemmas in injury research and prevention. The course meets once a week for 75 minutes starting the sixth week of the semester. Students may enroll concurrently in MHCH 627.

627Unintentional Injury as a Public Health Problem (1). Corequisite, MHCH 625. This one-credit course considers the causes and consequences of unintentional injury and dilemmas in injury research and prevention. The course meets once a week for 75 minutes starting the sixth week of the semester.

664 Globalization and Health (HPM 664) (3). See HPM 664 for description.

665 Introduction to Racial and Ethnic Health Disparities (1). Eliminating health disparities is a national goal for improving the health of Americans. Little to no progress has been made on eliminating disparities among racial/ethnic subpopulations compared to the population of the United States. This course treats basic concepts about the origins of and contributing factors for health disparities.

680 Global Sexual and Reproductive Health (1). Featuring international experts from UNC-Chapel Hill and Triangle-based nongovernmental organizations, this course will offer a series of lectures, panel discussions, and debates to inform students' critical thinking on key public health issues in global sexual and reproductive health.

685 Human Sexuality (1). Through lectures and panel discussions this course will use a life span framework to examine selected aspects of sexual development, including perspectives on sexuality; the physical self; sexual attraction, behavior, and relationships; and the implications of these factors for physical and mental health. No prerequisites; all students are welcome.

Courses for Graduate Students

MHCH

700 MHCH Planning and Evaluation (3). (PUBH 700). See PUBH 700 for description.

701 Foundations of Maternal and Child Health (4). Permission of the instructor for nonmajors. This course introduces the major issues affecting the health and well-being of women during the reproductive years, infants, children, and adolescents in domestic and international settings. First semester of a two-semester course.

702 Foundations of Maternal and Child Health (4). Permission of the instructor for nonmajors. Second part of a two-part course that introduces the major issues affecting the health and well-being of women during the reproductive years, infants, children and adolescents in domestic and international settings. Second semester of a two-semester course.

704 Critical Review of an Infant Feeding Issue (3). This independent study will include selection of a research area that would allow preparation of a coauthored paper for peer-review publication on an approved subject related to infant and young child feeding and care and associated maternal health and nutrition issues.

705 International Family Planning (3). Required preparation, graduate study in MHCH. Permission of the instructor. Analysis of the family planning movement, its policies, operations and research, with emphasis on developing countries. Three lecture hours a week.

712 Program Assessment in Maternal and Child Health (3). Permission of the instructor for nonmajors. Offers an opportunity for students to explore in greater depth a selected MCH practice topic. Students will learn how to provide consultation about a selected program activity.

713 Research Methods in Maternal and Child Health (3). Permission of the instructor for nonmajors. The art and science of MCH research, with an emphasis on applied survey research. Student groups will design and carry out a small survey, and present their findings in a poster presentation. Focuses on assessment of MCH population characteristics, secondary data analysis, and the evaluation of MCH programs. A practicum-based course. Three lecture hours per week.

713L Research and Evaluation Methods in Maternal and Child Health Lab (1). Corequisite, MHCH 713. Permission of the instructor for nonmajors. The MHCH 713 lab, which is a companion course to MHCH 713, introduces students to statistical analysis using SPSS-PC and microcomputers. Two lab hours per week.

715 Maternal and Child Health Management (3). Permission of the instructor for nonmajors. Students become familiar with organizational processes, management principles and tools required for effective management of health programs and facilities. A variety of learning techniques will be used. Three lecture hours a week.

716 International Family Planning and Reproductive Health (3). Permission of the instructor for nonmajors. Course provides overview of critical issues including major theoretical frameworks, patterns, and trends over time, and overview of history of family planning and reproductive health policy development. Three lecture hours per week.

717 Field Training in Maternal and Child Health (2–8). A faculty-supervised field experience in maternal and child health research, community practice, program planning, and evaluation. Students are supervised on-site by department-approved field instructor. An additional field fee of $350 is assessed. Minimum of six weeks.

718 Concurrent Field Training in Maternal and Child Health (1–4). MHCH majors only. An elective, faculty-supervised field experience in maternal and child health research, community practice, program planning, and evaluation. Students are supervised on-site by department-approved field instructor. Students choosing this elective are not exempt from MHCH 717. Variable number of hours.

720 Services for Children with Chronic Conditions (3). Permission of the instructor. This course focuses on the design, organization, and delivery of services for children with special needs and their families, and examines current program development and public policies. Participants analyze the range of services needed by these children.

722 Global Maternal and Child Health (3). This course covers the main causes of maternal and under-five morbidity and mortality in developing countries and also the interventions, policies, and research which address these causes. Emphasis is placed on both distal and proximate determinants, measurement and indicators, and conceptual frameworks.

723 Introduction to Monitoring and Evaluation of MCH Programs (3). This course provides the students with the basic concepts and methodologies needed to monitor and evaluate programs in maternal and child health both domestically and internationally.

725 Injury as a Public Health Problem (EPID 783, HBEH 725) (3). See HBEH 725 for description.

726 Adolescent Health (HBEH 726) (3). Topics covered include the epidemiology of health problems, developmental issues, health services, and psychosocial influences on adolescent problem behaviors. Course materials are useful for research generation and practical application. Three seminar hours per week.

730 Reproductive Health Policy (3). Permission of the instructor. Participants examine forces that shape social policy relating to reproduction and differential impact of policy based on age and other factors. Focus on global controversies in reproduction/reproductive health services in context of human/women's rights. Three lecture hours a week.

735 Clinical Support for Breastfeeding (3). Required preparation, students must have a masters or clinical four-year degree, or be in such a degree program to be enrolled in this course. This clinical course is structured to provide supervised breastfeeding support education in the context of clinical lactation services and public health practice.

740 Problems in Maternal and Child Health (1–3). Prerequisites to be arranged with departmental faculty in each individual case. Two to six hours a week.

753 Violence Against Women (3). Permission of the instructor for nonmajors. Violence against women is examined as a public health problem. Areas investigated include definitional issues, prevalence of the problem, risk factors and outcomes, and community and medical interventions.

756 Understanding and Addressing Health Inequalities in the U.S. (PUBH 756) (3). Disparities in morbidity/mortality in subpopulations continue compared to other U.S. populations. Explore contributors to inequalities and identify strategies to counterbalance contributors to correct inequalities using public health resources. Three lecture hours per week.

757 Special Child Populations (3). Course focuses on two populations that warrant special attention. By examining these populations in one course, students are exposed to a range of contemporary issues that cut across childhood development.

765 Clinical Support for Breastfeeding (3). Masters or clinical four-year degree required. This two-semester clinical course is structured to provide supervised breastfeeding support education in the context of clinical lactation services and public health practice.

790 The Leadership Assessment Workshop (2). Intensive retreat program that introduces students to leadership theory as applied to MCH-public health issues. Course will focus on understanding self and others, building organizational culture, and applying leadership theory to MCH issues, among other issues.

801 Doctoral Seminar in Maternal and Child Health (3). Prerequisites, MHCH 701 and 702. This seminar explores the origins of and developments in major maternal and child health policies and programs in order to understand their effects on the health of mothers and children.

802 Doctoral Teaching Skills Seminar (1). The goal of this 1-credit hour seminar is for participants to examine and apply the strategies and concepts underlying effective teaching in small groups and the lecture hall. Doctoral students will consider the characteristics of effective teaching and explore how to incorporate these characteristics into their own pedagogy.

803 Doctoral Research Skills Colloquium (1). Enrollment in the MCH doctoral program or permission of the instructor for nonmajors and master's students. This seminar is the second semester of a one-year research skills colloquium for all new doctoral students. The course addresses research, problem definition, proposal design, and development. One-hour seminar a week.

840 Maternal and Child Health Doctoral Internship (1). Enrollment in MCH doctoral program required. MCH internship to enhance doctoral training in areas of Section 1: Teaching; Section 2: Practice; and Section 3: Research.

851 Reproductive and Perinatal Epidemiology (EPID 851) (3). See EPID 851 for description.

853 Advanced Topics in Perinatal and Pediatric Epidemiology (EPID 853) (2). See EPID 853 for description.

859 Theoretical Perspectives on Maternal and Child Health (3). Permission of the instructor. Doctoral students only. PA survey of theoretical models used in MCH research and program development, and how those models are used to guide the formulation of questions, hypothesis testing, and evaluation.

860 Conceptualization, Design, and Measurement (3). Prerequisite, MHCH 859. Permission of the instructor for nonmajors and master's students. The course follows the research process from the formulation of a research question and the design of a research methodology to the addressing of the question through the design of an appropriate analysis strategy. Three lecture hours a week.

862 Maternal and Child Health Program Evaluation (3). Knowledge of Stata or similar statistical package required. Analytic skills seminar on the theory and practice of program impact evaluation. Topics: what is impact evaluation; key issues to consider when evaluating program impact; selectivity and other problems when evaluating program impact; research designs and estimation strategies; interpretation of results.

885 Health Services/Health Policy Research Methods II (3). An introduction to basic research methods central to maternal and child health policy, including an introduction to basic components of the research process such as developing research questions and conceptual models, and overviews of research designs, quantitative and qualitative analytical methods, primary data collection, and secondary data analysis.

886 Health Services/Health Policy Research Methods III (3). Prerequisites, MHCH 884 and 885. A modular course covering applications of selected methods covered in 885. Illustrative applications include implementation science, comparative effectiveness research, issues in mixed-method research, feasibility studies, and the translation of research to policy and practice. Applications are framed in terms of issues related to the MCH population.

890 Special Topics in Maternal and Child Health (1-3). Special topics in Maternal and Child Health for graduate students only. Content will vary semester to semester.

892 Interdisciplinary Seminar in Health Disparities (EPID 892) (1). See EPID 892 for description.

992 Master's Paper (3–6).

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Department of Nutrition (NUTR)

www.sph.unc.edu/nutr
ELIZABETH J. MAYER-DAVIS, *Interim Chair*

Professors

Linda S. Adair (34) Maternal and Child Nutrition, International Nutrition, Child Growth, Long-Term Effects of Early Childhood Nutritional Exposures

Alice S. Ammerman (41) Community-Based Nutrition and Physical Activity Intervention and Policy/Environmental Change for Chronic Disease Prevention (Obesity, Cancer, Heart Disease, Diabetes) Addressing Health Disparities; Healthy Food Access through Local, Sustainable Food Systems

Melinda Beck (70) Antioxidant Nutrition and Infectious Disease, Obesity and Infectious Disease, Nutritional Status and Immune Function

Margaret Bentley (67) Nutritional Anthropology, Infant and Young Child Feeding, Growth, and Development, HIV/AIDS and Breastfeeding, Pediatric Obesity

Cynthia M. Bulik (98) Twin and Molecular Genetic Studies of Eating Disorders and Weight Regulation, Information Technology-Aided Approaches to Treatment of Eating Disorders and Overweight, Eating Disorders and Reproduction, Parenting Assistance for Women with Eating Disorders, Eating Disorders Clinical Trials

Stephen G. Chaney (43) Mechanism of Action of Platinum Anticancer Agents, DNA Repair, HPLC Methodology

Rosalind A. Coleman (39) Diabetes: Lipid and Carbohydrate Metabolism, Obesity, Partitioning of Energy between Triacylglycerol Storage and Fatty Acid Oxidation, Regulation of Triacylglycerol Synthesis, Fatty Acid Metabolism and Cardiac Function

Penny Gordon-Larsen (78) Obesity Epidemiology, Obesity, Diabetes and Cardiovascular Risk, Longitudinal Studies, Gene by Environment Interactions

Anthony C. Hackney (50) Endocrine and Metabolic Responses to Physical Stress, Physiology of Exercise

Mark Koruda, Surgery, Parenteral and External Nutrition

Pauline K. Lund (69) Insulin-Like Growth Factors, Intestinal Development, Nutrient and Cytokine Interactions in Intestinal Inflammation, Injury and Repair, Intestinal Stem Cells

Leslie Lytle

Nobuyo Maeda (77) Animal Models of Hyperlipidemia, Atherosclerosis and Cardiomyopathy

Elizabeth J. Mayer-Davis (33) Nutrition and the Etiology and Treatment of Type 1 and Type 2 Diabetes in Children and Adults, Epidemiology of Diabetes, Diabetes Self-Management for Individuals Living in Medically Underserved Communities, and Type 2 Diabetes Prevention for High-Risk YouthDaniel Pomp (90) Obesity: Genetic Predisposition for Components of Energy Balance, Gene x Diet Interactions, Fat as a Risk Factor for Cancer

Barry M. Popkin (17) The Nutrition Transition: Patterns and Determinants of Dietary Trends and Body Composition Trends (United States and Low Income Countries), Obesity Dynamics and Their Environment Causes, Dietary and Physical Activity Patterns, Trends and Determinants, Creation of Large-Scale Program and Policy Initiatives to Address Nutrition-Related Noncommunicable Diseases

Anna Maria Siega-Riz (62) Maternal Nutrition and Birth Outcomes, Infant and Child Dietary Habits, Obesity Development in Women of Reproductive Age, Infants and Children, Gestational Diabetes, Diet Methodology and Reproductive Epidemiology

June Stevens (56) Epidemiologic Studies of the Causes and Consequences of Obesity, Intervention Trials to Prevent Obesity, Obesity Trends, Risk Factors and Consequences among Ethnic Groups, Long-Term and Short-Term Effects of Obesity and Weight Change on Health, Impact of State Level Obesity Policies

James Swenberg (55), Chemical Carcinogenesis and Toxicology, DNA Damage and Repair, Oxidative Stress, Biomarkers and Mass Spectrometry

Dianne Ward, (79) Child- and Family-Based Interventions to Prevent Obesity; Assessment of Child Care and Home Environments; Assessment of Physical Activity and Diet

Steven H. Zeisel (38) Nutrients and Brain Development, Choline Metabolism and Requirements in the Human, Nutrigenomics, Computer-Assisted Instruction

Associate Professors

Ramon Bataller, Molecular Mechanisms of Alcoholic and Nonalcoholic Steatohepatitis, Translational Research to Identify New Targets for Therapy

Myles Faith (75) Familial Influences on the Development of Child Eating Patterns and Obesity

Miroslav Styblo (72) Biochemistry and Molecular Toxicology of Essential and Toxic Trace Metals and Metalloids

Andrew Swick (65) Obesity and Diabetes, Gut Regulation of Body Weight, Energy Expenditure and Metabolism, Effects of Functional Foods and Nutraceuticals on Body Weight and Metabolic Health

Deborah F. Tate (95) Obesity Prevention and Treatment in Adults and Adolescents, Application of New Technology and the Internet to Behavioral Treatments for Overweight, Obesity Treatment in Worksites and Community Settings

Assistant Professors

Liza Makowski Hayes (64) Glucose and Fatty Acid Transport, Metabolism, and Inflammation in Immune Cells in Obesity, Insulin Resistance, and Cancer

Michelle Mendez, Dietary Exposures and Health Outcomes such as Obesity and Related Disorders, Neurodevelopment, and Cancer

Mihai Niculescu (97) Epigenetics in Nutrition, Transgenerational Inheritance, Role of Maternal Diet in the Epigenetic Regulation of Development in the Offspring

Research Professor

Martin Kohlmeier (53) Nutritional Genetics, Personal nutrition, Online Nutrition Guidance, Biomarkers in Nutritional Epidemiology, Lipoprotein Metabolism, Vitamin K Transport and Function, Nutrition Education in Medical Schools, Computer-Assisted Instruction

Philip May, The Prevalence and Characteristics of Fetal Alcohol Spectrum Disorders (FASD), Maternal Risk Factors for FASD, Prevention of FASD and Other Alcohol-Related Problems, and Epidemiology Research on Public Health Problems with Major Behavioral Components

Research Associate Professor

Wenhong Cao, Hepatic Gluconeogenesis, Hepatic Lipogenesis, Insulin Resistance, and Their Associations with Obesity, Diabetes, and Cardiovascular Disorders.

Research Assistant Professors

Patrick Bradshaw (92) Identification of Lifestyle Characteristics such as Diet, Body Size, and Physical Activity that Influence the Risk of Developing Breast Cancer and, Once Diagnosed, Survival

Karen Corbin, Understanding Nutrition Requirements in Common Chronic Disorders including Diabetes, Cardiovascular Disease, and Obesity

Zuzana Drobna (68), Epigenetics of Nutrient-Carcinogens Interaction, Isoflavonoids and Food Components, Leukemia, Metabolism of Metalloids

Shufu Du, How Underlying Factors (such as Education, Income, and other SES) Affect Dietary Behaviors and Physical Activity/Inactivity and Then Health Outcomes (Cancer, Cardiovascular Diseases, Diabetes, and Obesity)

Kiyah Duffey (76) Determinants and Consequences of Overweight in U.S. Adults, International Dietary Intake Patterns and Trends

Temitope Erinosho, The Role Nutrition, Physical Activity, and Obesity in Cancer Prevention, with Special Emphasis on Children, Racial and Ethnic Minorities, and Socioeconomically Disadvantaged Populations

Leslie Fischer (87) Human Choline Requirements and Sequelae of Choline Deficiency, Choline and Brain Development

Valerie Flax, The Design and Evaluation of Interventions Intended to Improve the Health and Nutritional Status of Mothers and Children in Low-Income Countries
Derek Hales (61) Measurement, Physical Activity, and Determinants of Physical Activity Behavior
Xuesong Han, Impact of Dietary Factors on Cancer Etiology and Survivorship, As Well As Gene-Environment Interaction
Archana Lamichhane, Research Focuses on Epidemiology of Diabetes, Obesity and Cardiovascular Disease (CVD), with a Particular Interest in Exploring How Individual and Environmental/Contextual Factors Contribute to Specific Health Outcomes and Health Disparities
Mihai Mehedint, Choline Metabolism, Genetic and Epigenetic Mechanisms Altering in Utero Development
Katie Meyer
Shu Wen Ng (74) Economic and Socio-Demographic Determinants of Diet, Physical Activity and Weight Gain, Nutrition Epidemiology, Food and Nutrition Policy, International and US Nutrition Transition
Carmen Samuel-Hodge (86) Interventions in Diabetes Self-Management Education, Weight Loss and Lifestyle Behavior Change Interventions, Peer Counselors/Lay Advisors in Community-Based Nutrition Interventions
Patricia Sheridan (52) Nutrition and Neuroimmunology; Obesity and Neuroinflammation; Nutrition and Infectious Diseases
Kimberly Truesdale (73) Obesity Epidemiology, Causes and Consequences of Obesity, Effect of Weight Maintenance on Health, Minority Health
Shucha Zhang

Clinical Associate Professor

Suzanne Havala Hobbs (40) Health Management Education, Distance Education, Health Care Leadership, Dietary Guidance Policy, Food and Nutrition Policy (Domestic and International), Cultural Proficiency in Health Services Delivery, Health Journalism and Communication

Clinical Assistant Professors

Amanda S. Holliday (99) Professional Development, Clinical Nutrition, Clinical Nutrition Management, Nutrition and Aging
Janice Sommers (44) Interested in Bridging the Gap between Research and Practice in the Areas of Nutrition, Physical Activity, Obesity, and Chronic Disease Prevention

Adjunct Professors

John J. B. Anderson, Calcium, Isoflavones, Other Nutrients and Bone Indices in Women, Osteoporosis, Physical Activity and Body Composition, Diet and Aging
Temitope Keku, Nutritional Epidemiology, Diet and Cancer, Microbiome and Cancer, Health Disparities, Cancer Biomarkers
Robert McMurray, Effect of Exercise on Cardiovascular Disease Risk Factors, Insulin, Adipokines, and Physical Activity in Children
Susan Sumner, RTI International, Eastern Regional Comprehensive Metabolomics Research Center, Center for Estimating Human Health Risks from Exposure to Nanoparticles, Metabolism, Translational Sciences, Biomarkers

Adjunct Associate Professors

Boyd Switzer, Nutrition and Cancer
Melicia Whitt-Glover, Identify Effective Strategies to Increase Weight Loss and Weight Gain Prevention among African Americans

Adjunct Assistant Professors

Melissa Bauserman, Infant Nutrition, International Nutrition, Micronutrient Deficiences and Child Growth
Melissa Daniels, International Maternal and Child Nutrition, Dietary Assessment Methods, Screening of Malnutrition Risk
Juhaeri Juhaeri, Obesity Epidemiology, Cardiovascular Epidemiology, Pharmacoepidemiology and Epidemiology Methods
Amy Ries, Nutrition and Physical Activity Behavior Change in Primarily Minority and Low Income Populations

Adjunct Research Assistant Professor

Marlyn Allicock (66) Cancer Prevention and Control, Dissemination Research and Evaluation, Health Disparities

Adjunct Instructors

Angelo Mojica (94) Food Service Management
Susan Wyler, Dietary Interventions to Prevent and Control Chronic Diseases, Weight Loss, Diabetes, Acid Reflux, Food Allergies

Professors Emeriti

Rebecca B. Bryan
Janice M. Dodds
Joseph C. Edozien
MaryAnn C. Farthing
Mildred Kaufman

Associate Professor Emeritus

Pamela S. Haines

Courses for Graduate and Advanced Undergraduate Students

NUTR

400 Introduction to Nutritional Biochemistry (3). Prerequisites, BIOL 101, CHEM 101 and 102, and NUTR 240. Permission of the instructor for students lacking the prerequisites. Function of the human body focusing on nutrient interaction. Review of structure and function of cells and organs. For advanced undergraduates and graduate students needing to enhance background prior to NUTR 600.

600 Human Metabolism: Macronutrients (3). Prerequisite, NUTR 400. Permission of the instructor for students lacking the prerequisite. Cell biochemistry and physiology emphasizing integration of proteins, carbohydrates, and lipids in whole-body metabolism; regulation of energy expenditure, food intake, metabolic adaptations, and gene expression; and macronutrient-related diseases (atherosclerosis, obesity).

611 Nutrition of Children and Mothers (MHCH 611) (3). Prerequisite, NUTR 400. Permission of the instructor for students lacking the prerequisite. Biologic bases for nutrient requirements and dietary recommendations as they vary throughout the life cycle. Covers the nutritional needs of women during childbearing years, infants, children, and adolescents.

615 Nutrition in the Elderly (1). Prerequisite, NUTR 400. Permission of the instructor for students lacking the prerequisite. Special dietary and nutritional needs and conditions of the elderly. Includes overview of biology and demography of aging, discussion of nutritional requirements, and assessment of the elderly as well as nutrition in health and various disease states of the elderly.

620 Human Metabolism: Micronutrients (3). Prerequisites, NUTR 400 and 600. Permission of the instructor for students lacking the prerequisites. Cell biochemistry and physiology emphasizing metabolism of vitamins and minerals including antioxidant protection, immune function, nutrient control of gene expression, and disease states induced by deficiencies (e.g., iron-deficient anemia).

630 Nutrition Assessment and Counseling Skills (3). Prerequisite, NUTR 240. Permission of the instructor for students lacking the prerequisite. Functions of a nutritionist working with individuals, emphasizing interviewing, assessment, nutrition care planning, counseling, and service documentation in prevention and therapeutic situations. Practice in the use of current dietary analysis software programs and development of educational materials included.

640 Medical Nutrition Therapy I: Chronic Disease Management (3). Prerequisite, NUTR 630. Course designed to examine the rationale and implementation of diet therapy and nutrition support in the prevention or treatment of chronic disease.

642 Medical Nutrition Therapy II: Acute Disease Management (3). Prerequisite, NUTR 640. Course designed to examine the rationale and implementation of diet therapy and nutrition support in the prevention or treatment of acute diseases.

644 Medical Nutrition Therapy Case Seminar (1). Prerequisite, NUTR 642. Course designed to introduce the student to clinical nutrition practice. Students learn case-based medical nutrition therapy, professional interdisciplinary communication and documentation skills.

650 Food Science, Production and Meal Preparation (2). Prerequisite, NUTR 400. Introduction to foods, food composition and properties; factors affecting selection, handling, and prep of foods; food safety; basic food industry knowledge; meal planning. NUTR 650 laboratory required.

650L Food Science, Production and Meal Preparation Laboratory (1). Concurrent with NUTR 650. This is the laboratory that accompanies NUTR 650. This laboratory applies the basic concepts of meal preparation, food production, and food science. Laboratory fee required. Three laboratory hours per week.

660 Food Service Systems Management (2). Permission of the instructor for nonmajors. Basic concepts of institutional food service systems management applied to small and medium-sized health care facilities in the community.

660L Food Service Systems Management Experience (1). Corequisite, NUTR 660. This is a food service management practicum that applies the basic concepts of institutional food service systems. Two laboratory hours per week.

692H Honors Research in Nutrition (3). Permission of the instructor. Directed readings or laboratory study of a selected topic. Requires a written proposal to be submitted to and approved by the B.S.P.H. Committee and faculty research director. A written report is required. May be taken more than once for credit. Six laboratory hours per week.

695 Nutrition Research (1–9). Permission of the instructor. Individual arrangements with faculty for bachelor and master students to participate in ongoing research.

696 Readings in Nutrition (1–9). Permission of the instructor. Reading and tutorial guidance in special areas of nutrition.

Courses for Graduate Students

NUTR

700 Nutrition in Medicine (2). Prerequisites, BIOL 252 and NUTR 600. Comprehensive review of nutrition basics with strong clinical perspective. Integrates nutrient biochemistry and metabolism into a framework of nutritional assessment and dietary intervention.

710 Clinical Nutrition Experience (6). Prerequisite, NUTR 644. Students are assigned to medical facilities where, under the supervision of registered dietitians, they participate in the nutritional care of patients. Field fee required. 40 hours per week for 12 weeks.

715 Dietary Change Interventions (2–3). Permission of the instructor for nonmajors. Focus on developing theory-based nutrition interventions at the population level. Addresses levels of interventions such as individual, social network, organizational (e.g., schools and work sites), methods of implementation (including social marketing and mass media), and principles of assessing change.

720 Public Health Nutrition Management I (2–5). Prerequisites, NUTR 630, 640, and 715. Allows student to focus on the roles and functions of the health care team and nutritionist in providing nutrition services at the community level. Includes community assessment and organization, quality assurance and program evaluation, and basic personnel management. Three to five lecture hours and 24-32 hours of field experience per week.

725 Public Health Nutrition Management II (3). Prerequisite, NUTR 720. An overview of the planning and management of local, state, federal, and voluntary public health nutrition programs. Examines legislative and administrative structures.

728 Nutrition Translational Research and Application (2). Prerequisites, EPID, 600, NUTR 725. Permission of instructor for nonmajors. Designed to focus on translational nutrition research and application including grant writing in order to better prepare students to apply evidence-based nutrition interventions (education, counseling, and research) in the clinical, public health, and policy arenas.

730 Advanced Nutrition Field Experience (6). Prerequisites, NUTR 710 and NUTR 720. During a consecutive ten-week block of time, students are assigned to a) hospital or b) state, local, or district health agency or other appropriate agency for their supervised field experience. Field fee required.

735 National Nutrition Issues (1). Prerequisite, NUTR 725. Permission of the instructor for students lacking the prerequisite. Three-day in-depth seminar held in Washington, DC on national nutrition issues, policy formulation, and program development with key congressional staff, federal agencies staff, and pertinent public interest/consumer advocacy groups. Paper required. Field fee required.

740 Block Field Research (4). Prerequisites, NUTR 700 and 813. During a consecutive ten-week block of time, students conduct nutrition-related research on topics including cancer, diabetes, hypertension, obesity, and cardiovascular disease. Supervised by an approved faculty and mentor. Field fee required.

745 International Nutrition (3). Provides a broad overview of international nutrition research issues, programs, and policies. Topics will include micronutrient deficiencies, child feeding and growth, determinants of under- and over-nutrition, chronic disease and nutrition, food fortification and supplementation, and nutrition intervention programs and policy.

750 International Nutrition: Special Topics (1). Prerequisite, NUTR 745. Follow-up in greater detail of selected issues discussed in NUTR 745. Two seminar hours per week.

753 Qualitative Research Methods (HBEH 753) (3). See HBEH 753 for description.

780 Public Health Entrepreneurship (HPM 780) (3). Permission of the instructor (complete application: www.unc.edu/cei/grad). Basic concept underlying commercial and social entrepreneurship applied to public health, including guest lectures by individuals with proven success in these areas.

785 Graduate Teaching Experience (1). Permission of the instructor. Individual arrangements with faculty for a graduate student to serve as a teaching assistant for a nutrition course.

801 Advanced Nutrition Intervention and Research Methods I (2). Fundamentals of nutrition intervention and policy research, including conceptualization of research questions, hypothesis writing, and design of clinical and community trials. Applied focus on historical and innovative trials' design and implementation.

802 Advanced Nutrition Intervention and Research Methods II (2). Continuation of NUTR 801 focused on topics in nutrition intervention and policy research design and evaluation.

803 Nutrition Intervention Advanced Research Seminar (2). Prerequisites, NUTR 801 and 802. Development of critical thinking skills in the analysis of important nutrition and policy interventions. The course will examine conceptual models, research designs, intervention strategies, and measures of effectiveness. Course may be repeated once.

809 Applied Qualitative Research Methods (2). Introduces students to qualitative research methods with an emphasis on their use in nutrition-related programmatic research. Uses a combination of didactic, interactive, and applied techniques to teach qualitative research knowledge and skills. Introductory course; subsequent courses in qualitative methods, particularly for data analysis, is strongly recommended.

810 Physical Activity Epidemiology and Public Health (EPID 810) (3). See EPID 810 for description.

811 Development and Evaluation of Health Promotion and Disease Prevention Interventions (HBEH 811) (3). See HBEH for description.

812 Introduction to Obesity: Cell to Society (3). Permission of the instructor. Provides a broad survey of obesity research including measurement issues, biological, social and economic etiologies, health and economic consequences, and prevention and treatment of obesity.

813 Nutritional Epidemiology (EPID 813) (3). Prerequisites, BIOS 600, and EPID 600 or 710. This course introduces basic methods of dietary assessment, reviews various topics in nutrition epidemiology, and teaches the skills needed for critical evaluation of the nutritional epidemiologic literature.

814 Obesity Epidemiology (EPID 814) (3). Prerequisites, BIOS 600, EPID 710, 715, and NUTR/EPID 813. Examines epidemiology research on the causes, consequences, and prevention of obesity. Emphasis on methodological issues pertinent to obesity research.

815 Diet and Cancer (EPID 815) (3). Prerequisites, BIOS 600, EPID 600 or 710, 771, and NUTR 813. Examines and critically evaluates epidemiologic research on relationships of diet-related exposures with cancer etiology, prevention, and survivorship. Emphasis on skills for conducting, analyzing, and interpreting diet and cancer epidemiologic studies.

818 Analytical Methods in Nutritional Epidemiology (EPID 818) (3). Prerequisites, BIOS 545, EPID 600 or 710, and NUTR 813. Skills and techniques to study how dietary exposures, physical activity, and anthropometric status relate to disease outcomes. Focus is hands on data analysis using STATA, and interpretation of results from statistical analysis.

820 Advanced Public Health Nutrition Management (3). M.P.H. degree or permission of the instructor. Analysis of policy development and management techniques used in the public and private sectors with relevance to the development and management of nutrition policy and programs.

845 Nutritional Metabolism (3). Prerequisite, NUTR 600. A problem-based approach to examine current topics in biochemistry relevant to nutrition and metabolism. Students interpret data and design experiments related to recent advances in nutritional biochemistry.

851 Advanced Nutritional Biochemistry: Obesity and Body Weight Regulation (2). Prerequisites, NUTR 600 and 620. Permission of the instructor for students lacking the prerequisites. Develop a basic understanding of obesity and body weight regulation based on recent scientific advances and concepts. Topics covered will include the regulation of food intake and energy expenditure as well as pharmacological and surgical treatments for obesity.

861 Advanced Nutritional Biochemistry: Nutrition and Immunology (2). Prerequisites, NUTR 600 and 620. Presents an understanding of basic immunology and the role of nutrition in modifying the immune response.

862 Advanced Nutritional Biochemistry: Epigenetics in Nutrition (2). Permission of the instructor for nonmajors. Introduction to epigenetic mechanisms regulating gene expression. Emphasis on the relationship between nutrition and epigenetics, and on related health outcomes.

863 Adv Nutr Biochemistry: Microenvironments-Inflammation in Obesity, Atherolsclerosis, and Cancer (2). Prerequisite, NUTR 600. Permission of the instructor for students lacking the prerequisite. Will examine the interaction of cells in the microenvironment and recent advances in the role of metabolism and inflammation.

864 Adv Nutr Biochemistry: Oxidative Stress and Nutritional Antioxidants in Human Health and Disease (2). BIOL 101, CHEM 102, and NUTR 400. Permission of instructor for non-majors. Course provides basic information about the cellular and molecular mechanisms that are responsible for generation of reactive oxygen and nitrogen species, about key cellular structures targeted by these species, and about the role of oxidative stress and antioxidants in etiology and prevention of human diseases.

868 Nutrients and Disease: Brain Function and Development (2). Prerequisites, NUTR 600 and 620. Seminar on nutrients that influence brain and neuron development and function.

875 Nutrition Policy Seminar (1–2). Permission of the instructor. Doctoral seminar to introduce federal policy strategies for monitoring and improving nutritional status of populations. Five policy areas will be covered: national nutrition objectives/planning strategies, dietary guidance, nutrition surveillance/monitoring, economic policy as related to federal feed programs, and policy analysis.

880 Elements of Being a Scientist (3). Permission of the instructor. For doctoral students prepared with Ph.D. aims/focus. Focuses on key elements that contribute to a successful career as a scientific researcher. These include scientific presentations, NIH proposal grant writing, evaluating published manuscripts, sources of funding, peer review, use of animals and humans in research, and scientific ethics.

885 Doctoral Seminar (1). This course is designed for doctoral and master of science students only. Critical review of current literature in nutritional biochemistry, intervention and policy, and population-based nutrition science. Focuses on the development of skills in reviewing and criticizing articles.

910 Nutrition Research (1–9). Individual arrangements with faculty for doctoral students to participate in ongoing research.

920 Research Rotations for Nutritional Biochemistry Doctoral Students (1–3). Two laboratory or research group rotations supervised by nutritional biochemistry faculty. Provides a breadth of research experience for students prior to selecting dissertation adviser. Up to six laboratory hours per week.

992 Master's Paper (3–6).

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Public Health Leadership Program (PUBH)

www.sph.unc.edu/phlp
ANNA P. SCHENCK, *Director*

Bonnie Rogers, Occupational Health Nursing, Concentration Director (Residential and Distance), Director North Carolina Occupational Safety and Health Research Center
David Steffen, Leadership, Concentration Director (Residential and Distance)
Anthony Viera, Health Care and Prevention, Concentration Director

Professor of the Practice

Anna P. Schenck, Health Outcomes, Quality of Care, Cancer Prevention and Treatment, Research Methods for Public Health Practice

Associate Professor

Bonnie Rogers, Occupational Health Nursing, Public Health Nursing, Distance Education

Clinical Professor

William A. Sollecito, Leadership, Global Health, Continuous Quality Improvement, Project Management, Clinical Research, Distance Education

Clinical Associate Professors

Diane Calleson, Program Planning and Evaluation, Scientific Writing, Distance Education
Rohit Ramaswamy, Global Health, Continuous Quality Improvement, Distance Education

Clinical Assistant Professors

Lori A. Evarts, Project Management, Team Effectiveness, Clinical Research, Distance Education
Cheryll Lesneski, Continuous Quality Improvement, Community Assessment, Public Health Practice, Distance Education
Susan A. Randolph, Occupational Health Nursing, Distance Education
David Steffen, Leadership, Public Health Practice, Public Health Nursing, Distance Education

Adjunct Professors

Russ Harris, Health Care and Prevention
Ernest Schoenfeld, Public Health Leadership
Hugh H. Tilson, Public Health Practice, Leadership, Epidemiology

Adjunct Professor of the Practice

Matthew S. Brody, Public Health Leadership, Human Resource and Project Management

Adjunct Associate Professors

Martha Carlough, Health Care and Prevention
Joy Reed, Public Health Nursing
Greg Randolph, Health Care and Prevention, Quality Improvement
Stacey Sheridan, Health Care and Prevention
Sue Tolleson-Rinehart, Health Care and Prevention, Health Polities and Policy, Quality of Care
Anthony Viera, Health Care and Prevention

Adjunct Assistant Professors

Kathryn Andolsek, Health Care and Prevention
James Bowles, Public Health Practice
Ian Buchanan, Health Care and Prevention
Kay Campbell, Occupational Health Nursing
Anthony Charles, Health Care and Prevention
Dorothy Cilenti, Public Health Practice
Cynthia Feltner, Health Care and PreventionGerald Gartlehner, Health Care and Prevention
Margaret Gourlay, Health Care and Prevention
John Graham, Public Health Practice
Gary Greenberg, Public Health Nursing
Jennifer Griffin, Epidemiology, Global Health, Distance Education
Mary Harrison, Public Health Leadership
Steve Hicks, Public Health Practice
Sheila Higgins, Public Health Nursing
Judith Holder-Cooper, Public Health Nursing
Daniel Jonas, Health Services Research, Comparative Effectiveness
Diane Kelly, Leadership, Continuous Quality Improvement
Donna King, Public Health Leadership
Katherine Kirkland, Public Health Nursing
Mellanye Lackey, Emerging Technologies, Distance Education
Beth Lamanna, Public Health Nursing
Charles Mike Newton Ward, Public Health Marketing
Judy Ostendorf, Public Health Nursing
Deborah Porterfield, Health Care and Prevention
Mamie Sackey Harris, Public Health Leadership, Global Health
Ghazaleh Samandari, Monitoring and Evaluation, Global Health, Distance EducationRichard Scoville, Public Health Practice
Adam Searing, Public Health Policy
Kevin Sowers, Public Health Nursing
Michael Stalker, Public Health Leadership
Erica Taylor, Social Marketing
Gretchen Van Vliet, Public Health Leadership, Global Health
Jon Wallace, Occupational Health and Safety
Louise Winstanly, Public Health Leadership, Ethics, Global Health

Adjunct Instructors

Ruth Barlow Lawhorn, Occupational Health Nursing
Kathleen Buckheit, Public Health Nursing
Elizabeth Lawhorn, Public Health Nursing
Karen Mastroianni, Public Health Nursing
Leyla McCurdy, Public Health Nursing
Angela Zabel, Public Health Nursing

Professors Emeriti

Nora F. Cline
Marion E. Highriter
Arnold D. Kaluzny
Rachel Stevens
Dorothy M. Talbot
Julia D. Watkins

The Public Health Leadership Program offers a master's in public health degree (M.P.H.) in three different concentrations: health care and prevention (HC&P); leadership (LMC); and Occupational Health Nursing (OHN). The public health leadership M.P.H. is a 42-credit-hour interdisciplinary and practice-based curriculum addressing the core functions and competencies of public health.

The health care and prevention concentration is designed for medical students and practicing physicians who are interested in combining their clinical training with a population-based perspective to better serve the public. This concentration is available only in full-time, residential format.

The leadership concentration offers a customized curriculum to meet the demands of busy practitioners in public health, including six focus areas: public health practice, program development, field epidemiology,

global health, maternal child health, and public health nursing. This curriculum is available in residential or distance format, as a full-time or part-time course of study.

The occupational health nursing concentration provides occupational health nurses with population-based practice skills to assess workers and the work environments and develop programs for risk reduction, health promotion, and illness and injury prevention. This curriculum is available in residential or distance format, as a full-time or part-time course of study.

The Public Health Leadership Program also offers five graduate-level academic certificate programs: the certificate in core public health concepts, the certificate in field epidemiology, the online global health certificate, the public health leadership certificate, and the occupational health nursing certificate. Each of these certificate programs are offered in a distance format.

The public health leadership M.P.H. is accredited by the Council on Education for Public Health (CEPH). The public health nursing (M.P.H.), which includes the public health nursing focus area and the occupational health nursing concentration, in the Public Health Leadership Program, Gillings School of Global Public Health, is accredited by the National League for Nursing Accrediting Commission, Inc. (NLNAC), 3343 Peachtree Road, NE, Suite 500, Atlanta, GA 30326; (404) 975-5000.

Courses

The Public Health Leadership Program uses both PUBH and PHNU abbreviations for course listings. PUBH courses are open to any student unless the individual course indicates permission of instructor is required. PHNU courses are open only to registered nurses or by permission of the instructor. Visit the Web site for additional information: www.sph.unc.edu/phlp.

Courses for Graduate and Advanced Undergraduate Students *PHNU*

423 Industrial Toxicology (3). Toxicological assessment of and a case presentation of related exposure is given. A conceptual approach is utilized to design appropriate programs to prevent worker ill health due to toxicant exposure.

496 Readings in Public Health Nursing (1–21). Permission of the instructor. Reading and tutorial guidance in a selected area of public health nursing or occupational health nursing. Two or more hours per week.

690 Delivery of Community Nursing Services (1–21). Permission of the instructor. Analysis of patterns of organization of community nursing services and their relationships to the health care delivery system. Special emphasis on basic management skills and their application.

Courses for Graduate and Advanced Undergraduate Students *PUBH*

420 AIDS: Principles and Policy (1). Elective course jointly given by the schools of Dentistry, Public Health, Nursing, Pharmacy, and Medicine, designed to provide a multifaceted understanding of social, clinical, and biological aspects of the AIDS epidemic.

423 AIDS Service (3). Permission of the instructor. This course will integrate community service into the campus-wide AIDS course. Students will work as volunteer interns three to five hours per week for ten weeks during the semester with Triangle-area community service organizations.

450 Data Skills Online (1). This online, asynchronous class presents a series of discrete tools designed to teach skills to health professionals for using technology and data management/analysis. Online course.

496 Readings in Public Health Practice (1–3). Permission of the instructor. Intensive study of a special problem in public health practice.

500 Global Health Discussion Series (0.5). Provides opportunities for students to get to know each other through an exchange and discussion. Students exchange points of view with globally experienced faculty at UNC-Chapel Hill.

510 Interdisciplinary Perspectives in Global Health (3). Explores issues, problems, and controversies in global health through an interdisciplinary perspective; examines the complex tapestry of social, economic, political, and environmental factors that affect global health; analyzes global health disparities through a social justice and human rights lens; and exposes students to opportunities in global health work and research.

600 Health Care in the United States (3). An introduction to the fundamental organization, behavior, financing, and challenges of the health system of the United States. The course treats the entire edifice of American health care as "the American health system," and intends to examine it in toto, including by comparing it to other national health systems, and in part, by examining critical components of the system.

610 Introductory Spanish for Health Professionals (3). This course is intended for students who know no Spanish or so little that they feel the need to start over. Students with more than two semesters of college Spanish are not eligible. The course covers the curriculum of first-semester Spanish taught within a health context, with a focus on speaking.

613I Intermediate Spanish for Health Care 1 (AHSC 613I, NURS 613I, PHCY 613I, SOWO 613I) (3). This intermediate course is the equivalent of the third semester of college Spanish. Students will hone their listening and speaking skills in class primarily through role-playing activities and class discussion. Activities center on an original film set in a health clinic in rural North Carolina.

614I Intermediate Spanish for Health Care II (AHSC 614I, NURS 614I, PHCY 614I, SOWO 614I) (3). Prerequisite, PUBH 613I. Permission of the instructor. This primarily e-learning course provides public health students with the opportunity to improve their oral communication skills in Spanish at the intermediate level via DVD, Web, and workbook. Instructor-led. Online course.

615I Advanced Spanish for Health Care I (AHSC 615I, DENT 615I, MEDI 615I, NURS 615I, PHCY 615I, SOWO 615I) (3). Required preparation, third semester Spanish or equivalent. This advanced course reviews the grammar of the third and fourth semester of college Spanish. Students hone their listening and speaking skills through role-playing activities and class discussion. Activities center on an original film set in a Latino-run health clinic.

616I Health Care Informatics (PHCY 616I) (2). Course designed to provide a multimodal learning experience that prepares health sciences students to learn to become proficient at selecting/using technology for organizing, analyzing and managing information in health care settings.

670 Clinical Research Methods (3). This course explores contemporary issues, problems, and controversies in global health through an interdisciplinary perspective. It examines the tapestry of social, economic, political, and environmental factors that affect global health.

671 Writing Scientific Research (3). This course, Introduction to Clinical Research, is designed to give the undergraduate student an overview of clinical research methods. During the semester we will carry actual research projects.

680 Public Health Practice (3). A comprehensive introduction to public health concepts and practice through an examination of the philosophy, purpose, history, organization, functions, tools, activities, and results of public health practice at the national, state, and community levels. Online course.

690 Special Studies (1–3). Permission of the instructor. Sections will focus on specific topics of current interest to health workers. Fliers describing the section offering will be distributed prior to registration each semester. Lecture hours per week dependent upon credit.

Courses for Graduate Students

PHNU

744 Roles and Functions in Public Health Nursing (3). Emerging roles and responsibilities of public health nurses and health departments. Emphasis on program areas in health departments and public health under health care reform. Three lecture hours per week.

745 Community Interaction and Assessment (PUBH 745) (3). See PUBH 745 for description.

746 Public Health Program Planning and Evaluation (PUBH 746) (3). See PUBH 746 for description.

781 Occupational Health Nursing I: Occupational Health Assessment (3). Permission of the instructor. Concerns factors influencing the development and operation of occupational health programs. General and special health services contingent on work environment and inherent health problems in the employed populations are considered.

782 Occupational Health Nursing II: Occupational Health Programming (3). Prerequisite, PHNU 781. Permission of the instructor. Continuation of PHNU 781. Role components of occupational health nursing with emphasis on designing, implementing, and evaluating occupational health programs. Emphasis on analysis of factors influencing the delivery of health care at the worksite.

783 Occupational Health Nursing: Field Practicum I (2). Pre- or corequisite, PHNU 781. Permission of the instructor. Students have the opportunity to discuss and apply concepts of OHN practice and the work environment. Concepts related to workplace hazards, interdisciplinary activities, and nursing interventions with worker aggregates are emphasized. Three to nine laboratory hours per week.

784 Occupational Health Nursing: Field Practicum II (2). Prerequisites, PHNU 781 and 783. Corequisite, PHNU 782. Permission of the instructor. Students have the opportunity to learn about the managerial and administrative role of the OHN. Emphasis is placed on analysis of the organizational structure, external influencing factors, and evaluation mechanisms.

785 Interdisciplinary Approaches to Occupational Health (PUBH 785) (3). See PUBH 785 for description.

786 Occupational Safety and Ergonomics (ENVR 432, PUBH 786) (3). See ENVR 432 for description.

787 Fundamentals of Industrial Hygiene (2). Provides broad understanding of industrial hygiene. Major emphasis is recognition of hazards in the workplace, evaluation of measurement of those hazards, and application of control strategies.

886 Field Practice in Community Health Nursing (3–6). Permission of the instructor. Field experience in public health nursing or occupational health nursing practice. Study and observation of selected areas related to students' program of study. Field fee, $450.

993 Master's Thesis (3–6).

Courses for Graduate Students

PUBH

700 MHCH Planning and Evaluation (3). Permission of the instructor for nonmajors. Limited to residential students in public health. This course will familiarize students with basic concepts and methodologies required for effective public health program planning and evaluation in a variety of settings, both domestic and global. The majority of this course is taught online.

701 Cost-Effectiveness in Health and Medicine (1). This course will offer a relatively in-depth look at cost-effectiveness and the kinds of analyses that use cost-effectiveness methods in assessing interventions to improve health.

702 Systematic Review (1). Course gives students background in assessing and conducting systematic reviews. Focuses on 1) reading, discussing, and critiquing systematic reviews on various topics; 2) reading background and methods articles on systematic reviews; 3) developing a focused question for systematic review; and 4) working on the systematic review over the semester.

703 Quality Improvement in Health Care and Public Health (3). Designed to equip medical students with knowledge and skills needed to provide quality primary care though incorporation of population health and quality improvement methods into their clinical practice.

704 Foundations of Global Health (2-3). Students will gain a broader understanding of population-based global health issues and social determinants of health. Critically examines global health topics with learning from on-line modules, readings, interactions with faculty and staff, and practical experience in a clinical or community health-oriented experience (minimum 2 weeks) outside of the US.

705 One Health Intellectual Exchange Group (2-3). This interdisciplinary course will introduce the concept of One Health as an increasingly important approach to a holistic understanding of the prevention of disease and the maintenance of both human and animal health. Based at the NC Biotechnology Center.

711 Critical Issues in Global Public Health (3). This course teaches systems thinking by exploring how social, political, economic and environmental factors around the world affect the health of populations. Each lesson covers one critical global health issue.

712 Global Health Ethics (3). The course draws a distinction between public health ethics and medical ethics while also placing American public health and ethics in the context of global health and the variation in perspectives and systems among countries.

713 Infectious Disease Epidemiology (3). This course presents an overview of basic principles of infectious diseases that affect public health in the U.S. and worldwide. Topics include: biology of infectious agents, factors affecting emergence/re-emergence, mechanisms of pathogenesis, immunology of infection, epidemiology, and strategies for diagnosis, prevention, and control.

714 Introduction to Monitoring and Evaluation of Global Health Programs (3). This course provides students with basic concepts and methodologies to monitor and evaluate programs in maternal and child health domestically and internationally. Topics include: needs assessments, conceptual frameworks, program monitoring, indicators, information sources, evaluation designs, and survey development. The course focus is on practical issues for program monitoring and evaluation.

715 Communication for Health-Related Decision Making (2). Course provides foundation and skills to understand and improved decision making that affects people health. It teachs theoretical bases and evidence based application of health-related decision making.

730 Quality Improvement and Leadership (3). Course designed to provide students with an understanding of use of continuous quality improvement methods in community health settings, drawing heavily on actual experiences of the students in their professional lives. Online course.

731 Social Marketing (3). Course will orient students to market-based strategies, models, and tactics for improving individual and community health status within the framework of marketing, strategic communication, and advocacy. Online course.

732 Cultural Competencies of Health Organizations (3). Course will provide health care professionals with a framework for the implementation of National Standards for Culturally and Linguistically Appropriate Services in Health Care (CLAS). Online course.

733 Introduction to Public Health Preparedness for Disasters and Emergencies (3). Introduction to topics related to public health preparedness for intentional and natural outbreaks and natural disasters, including food and water safety, mental health impacts, and risk communication. Online course.

735 Policy Development (3). SPH students or permission of the instructor. Focus is on institutional policy development, regulation and enforcement, and field observation. Online course.

741 Quantitative Methods for Health Care Professionals I (4). Permission of the instructor. Course is designed to meet the needs of health care professionals to appraise the design and analysis of medical and health care studies and who intend to pursue academic research careers. Covers basics of statistical inference, analysis of variance, multiple regression, categorical data analysis.

742 Quantitative Methods for Health Care Professionals II (2). Prerequisite, PUBH 741. Permission of the instructor. Continuation of PUBH 741. Main emphasis is on logistic regression; other topics include exploratory data analysis and survival analysis.

745 Community Interaction and Assessment (3). Course focuses on development of knowledge and skills for interaction and assessment of population, advocacy, collaboration, partnerships, coalition building, and constituency development. Online course.

746 Public Health Program Planning and Evaluation (3). SPH majors or permission of the instructor. Fundamentals of public health program planning and monitoring, with emphasis on applications in community settings and proposal development for program funding. Online course.

747 Project Management Principles and Practices (3). Graduate students only. Provides an overview of knowledge and skills required for effective project/team leadership and management. Includes modules on leadership, management techniques, application of continuous quality improvement, and organizational designs that complement team-based organizations. Online course.

748 Policy Development (2-3). SPH students or permission of the instructor. Designed to provide students with an opportunity to focus on the fundamental aspects of policy development, with an emphasis on local, state, and federal levels within a community setting. Online course.

749 MPH Year & Career (1). Designed for students in the Health Care and Prevention concentration in the M.P.H. program who are actively working on their master's paper. Five required evening sessions in the fall and the regularly scheduled course in the spring.

750 Strategies of Prevention for Clinicians (3). Designed for those interested in the clinical arena. Establishes a framework for examining prevention activities for clinicians, and then considers a number of important health problems and the evidence for applying prevention strategies to these health problems. Encourages active student participation and involves a multidisciplinary faculty. Limited to thirty students.

751 Critical Appraisal of Medical Literature I (2). Emphasizes the process of critical appraisal of existing medical research literature, with examples from a variety of subject areas.

752 Seminar in Critical Appraisal of Medical Literature (2). Emphasizes the process of critical appraisal of existing medical research literature, with examples from a variety of subject areas. Student presentations of structured critical appraisals constitute about 50 percent of sessions.

754 Research Frameworks and Methods for Assessing and Improving Population Health (3). This course is designed to provide students with the fundamental research and analytic methods needed by public health leaders to assess the effectiveness, efficiency, and equity of healthcare in order to improve population health. The focus will be on research skills needed by practitioners with the objective of improving health outcomes.

756 Addressing Health Inequalities in the U.S. (MHCH 756) (3). Disparities in morbidity/mortality in sub-populations continue compared to other U.S. populations. Course explores contributors to inequalities and identifies strategies to counterbalance contributors to correct inequalities using public health resources.

760 Clinical Measurement/Evaluation (EPID 711) (3). Introduction to clinical epidemiology. Provides a broad-based introduction to the concepts and methods of epidemiology with particular emphasis on their application to clinical research, clinical practice, and health care policy.

763 The Politics of Health Reform, Quality, Outcomes, and Effectiveness (3). Systematic analysis of recent reforms to the U.S. health care system, including passage and initial implementation of the Affordable Care Act, with particular attention to how reform is intended to improve access, quality, equity, and effectiveness and whether reform can accomplish this while controlling cost.

767 Team Leadership in Research Navigation (3). This course presents an overview of team leadership and management principles and how to employ practices that promote successful team leadership in multidisciplinary health research settings. Weekly face to face sessions are supplemented by online lectures and required readings describing the management and leadership techniques that have proven successful in multidisciplinary clinical research.

784 Project Management Strategy and Application (3). This course presents classic project management concepts and methods, applicable to information and library science, public health, healthcare and team projects, with an aim to develop a toolbox of strategies to effectively manage projects based on globally accepted theoretical frameworks; practice is gained via assignments, cases and lectures.

785 Interdisciplinary Approaches to Occupational Health (3). Focuses on work, workplace exposures and hazards, and their effect on health. Interdisciplinary approaches to risk identification, reduction, and communication will be emphasized within regulatory and ethical contexts.

786 Occupational Safety and Ergonomics (ENVR 432, PHNU 786) (3). See ENVR 432 for description.

790 Leadership Assessment (2). Course is structured as a highly interactive, intensive, three-day workshop that focuses on helping participants understand their own and others' leadership styles. Self-assessment instruments and readings required in advance.

791 Core Principles of Public Health (3). Course will introduce students to leadership theories and research, provide a context for leadership in public health, and help students learn core leadership skills. Online course.

804 Issues in Public Health Leadership (1). This course will provide a case-based approach to the approaches different public health leaders have used to deal with a variety of public health issues. The course will focus on identifying the public health competencies used in real-world situations and how students can apply those competencies to their own work in public health.

886 Field Practicum in Public Health (3–6). The practicum or field experience is intended to provide the student an opportunity to integrate course work in a new or different type of health-related setting. This experience will be completed after most regular course work. The practicum cannot be only an observational experience.

992 Master's Paper (3). Permission of the instructor. A major paper on a problem relevant to public health practice. This study may extend over more than one semester. Credit is assigned accordingly.

Department of Public Policy

publicpolicy.unc.edu
SUDHANSHU HANDA, *Chair*
DANIEL P. GITTERMAN, Director of Graduate Studies

Professors

Richard N. L. Andrews, Environmental Policy
Maryann P. Feldman, Innovation, Entrepreneurship, Higher Education and the Commercialization of Academic Research, and the Factors that Promote Technological Change and Economic Growth
Sudhanshu Handa, Human Resource Economics, Poverty, Program Evaluation, Development Economics
Krista M. Perreira, Family, Health and Social Policy, Racial and Gender Disparities, Immigration

Associate Professors

Daniel P. Gitterman, American Politics and Public Policy, Social and Health Policy

Assistant Professors

Christine P. Durrance, Public and Applied Microeconomics, Health Economics and Policy, Industrial Organization/Anti-Trust Policy
Steven Hemelt, Economics of Education, Education Policy, Labor Economics, Policy Design and Evaluation
Pamela Jagger, Environmental and Development Policy, Forests and Livelihoods, Research Design and Methods, Institutions and Governance
Douglas L. Lauen, Education Policy, Organizational Theory, Stratification
Benjamin Mason Meier, Global Health Policy, Justice and Policy
Douglas MacKay, Social and Political Philosophy, Ethics and Public Policy, Bioethics, Philosophy of Law, Environmental Ethics
Jeremy Moulton, Public Economics
John C. Scott, Lobbying Organizations, Social Networks, Aging and Retirement Policy
Patricia Sullivan, International Relations, Comparative Politics, U.S. Security Policy

Doctor of Philosophy

The Department of Public Policy offers the Ph.D. degree to students who aim to contribute new knowledge and solve major domestic and global challenges or policy problems. Graduates of the program are prepared to conduct sophisticated policy research that provides useful information to decision makers and to advance the bodies of knowledge about public policy making in general and about their specific policy field. Doctoral graduates of the Department of Public Policy hold academic positions in major universities, research positions in policy research organizations, and senior policy staff positions in government agencies and other policy development organizations.

The Ph.D. in public policy combines core foundations in theory, empirical and normative analysis, political institutions and the policy-making process, and research methods with a policy field area that is chosen and developed by the student with the approval of an individualized doctoral program committee. The curriculum is designed to help each doctoral student develop and use appropriate analytical approaches to solve problems in public policy areas such as education, innovation and entrepreneurship, labor markets, health and social policy, immigration, environment, national security, international development and global health and environment.

Admission

Students are admitted to the doctoral program in public policy from diverse backgrounds in both academic preparation and experience, and such diversity is welcomed. In preparation for doctoral study, applicants should have completed preparatory courses in intermediate microeconomics, basic statistics, and quantitative analysis (including calculus); a master's degree and some public policy-related work experience are desirable. All entering students are also required to take a course in basic quantitative techniques in economics during the August prior to the beginning of their first semester.

Applications for admission in the fall semester must be received no later than the posted deadlines for the following fall semester. However, applications must be received by the December deadline to receive full consideration for Graduate School competitive awards. All prospective students must take the Graduate Record Examination (GRE), and applicants from non-English-speaking countries who do not have a degree from a U.S. institution must also submit results of the Test of English as a Foreign Language (TOEFL). Factors considered in the application review include the academic transcript, GRE scores, class rank, references, statements of interest, fit with faculty research expertise, and professional experience.

Applicants are encouraged to visit the campus for a personal interview with the faculty and to meet current students in the program.

Degree Requirements

Core courses. Once enrolled, each student completes a set of doctoral-level core courses in applications of interdisciplinary social science theory to public policy issues, as well as research design, appropriate research methods, including econometrics, and a specialization in a particular subject area of public policy. Doctoral students are required to complete 47 hours of course work, including 29 hours in core courses common to all students and 18 hours in a self-defined policy specialization field. Core courses include PLCY 700, 710, 716, 717, 780, 788, 789, 801, 810, 881, and 882. Students who have successfully completed graduate courses elsewhere that approximate these required courses may petition to have up to nine such hours counted toward the Ph.D. in public policy. Courses proposed for transfer must be approved as part of the student's program within the department, and material from those courses may be included as part of the comprehensive doctoral examinations. Students normally spend two years in full-time course work, and somewhat longer if they enter the program without key prerequisite courses or a master's degree in a related field. A dissertation is required.

Policy field. Each student designs an individual course of study for a policy field. The 18-credit-hour requirement gives students rigorous training in the theory, methods, and subject matter within a substantive policy field. The field area course of study must include both doctoral-level understanding of the subject matter of the policy area and at least six hours of research methods, in addition to the econometrics sequence (881 and 882) and research design course (801) required for the core. Students take no less than nine credit hours of courses related to the theory and subject matter of their policy field; up to six hours of credits may be taken as independent studies. The remaining six hours of the required policy field credits are normally completed as PLCY 992 and 994 during masters and dissertation research. The student's additional research methods course should provide the student with the ability to design and carry out dissertation research and to continue making scholarly contributions in his or her chosen field. Each student is assisted by an individualized program committee in identifying courses, independent readings, and other sources of information to acquire both the substantive knowledge and the quantitative and other analytical skills appropriate for the student's policy field specialization.

Public Policy Math Camp (PLCY 700). The department requires that incoming Ph.D. students participate in a two-week math and statistics camp during the beginning of August prior to their first year of study. This is a three-credit course.

Public Policy Research Seminar (PLCY 810). The department offers a weekly seminar course in which faculty, public policy scholars, government officials, and public policy doctoral students present their research and share their perspectives on policy issues. Each student is expected to enroll in this one-credit seminar for two semesters.

Graduate Minor

Doctoral and master's students not enrolled in the Department of Public Policy may elect to minor in public policy. Requirements for the minor include 15 hours of approved course work in public policy for doctoral students, or 9 credits for master's students, approved by the Department of Public Policy and the student's major department (These may not include double-counting of courses required for the student's major degree).

Research and Faculty Expertise

Students can tap the considerable resources of the UNC community to support a wide range of policy interests. The Department of Public Policy has developed particular strengths in five broad areas of policy research and application:

Education and Child Policy. The department has a strong and highly productive cluster of faculty research expertise in the area of education policy, including evaluation of federal and state policies for K–12 education, pre-kindergarten education, and higher education. In addition, the faculty is interested in questions concerning the returns to education and the impacts of external events on educational achievement and attainment. The State of North Carolina provides an excellent laboratory for studying education policy, and our faculty and students also have opportunities for interaction with UNC's Frank Porter Graham Child Development Institute, the James B. Hunt Jr. Institute for Educational Leadership and Policy, and other nearby educational research and policymaking organizations. (Related faculty: Gitterman, Handa, Hemelt, Lauen, Perreira)

Environmental Policy (Domestic and International). Recent faculty and doctoral student research includes particular emphasis on climate change, energy policy, environment and human welfare, and environmental and natural resource management policies in state, national and developing country contexts, and on environmental management policies and procedures in business supply chains. The Department of Public Policy cooperates in environmental research and public service activities as well as teaching with the Curriculum for Environment and Ecology, the UNC Institute for the Environment, the Department of Environmental Sciences and Engineering, the Department of City and Regional Planning, the UNC Environmental Finance Center, the Center for Sustainable Enterprise in the Kenan–Flagler Business School, and numerous other academic units with environmental interests. Chapel Hill and the Research Triangle area are two of the premier regions in the world for environmental research and policy, including multiple EPA laboratories, the National Institute for Environmental Health Sciences, Research Triangle Institute, and active collaboration with state agencies as well as complementary strengths at Duke University and North Carolina State University (Related faculty: Andrews, Jagger, MacKay).

Innovation and Entrepreneurship, Economic Development, and Science and Technology Policy. The department's faculty includes particular research expertise in the regional clustering of scientific knowledge, innovation and entrepreneurship, the commercialization of academic research, and factors that promote technological change and economic growth. The Research Triangle region is itself internationally recognized as a premier example of knowledge-based economic development. The department also works closely with other key units on campus with strengths in economic development, innovation and entrepreneurship, and science and technology policy, including the Frank Hawkins Kenan Institute of Private Enterprise, the departments of City and Regional Planning, Economics, and Sociology, and the schools of Business, Government, Law, and Public Health. Students have ample opportunities to work with economic development and science and technology organizations located in the region, including the Research Triangle Institute, Southern Growth Policies Board, the Rural Economic Development Center, the North Carolina Board of Science and Technology, and others. (Related faculty: Feldman; Gitterman)

Social Policy, Including Social Safety Net Policies and Low-Income Communities. The department's faculty includes particular research expertise on U.S. social safety-net policies for low-income families and retirees, needs and outcomes for immigrant youth and their families, and innovative policy incentives such as contingent cash transfer incentives in developing countries. This area of research also includes collaborative activities with the Carolina Population Center, the UNC Center for Community Capitalism, the Institute on Aging, and the Jordan Institute of Family Policy in the School of Social Work. (Related faculty: Gitterman, Handa, Hemelt, Moulton, Perreira, Scott)

Health Policy. Faculty in Public Policy study issues relating to mental health and substance abuse, AIDS, environmental health, health insurance and managed care, and health issues in developing countries, all with a focus on achieving better health outcomes, health as a human right, and on the economic and institutional basis of effective policies. Public Policy faculty and doctoral students also collaborate with considerable expertise and resources in the School of Public Health, the Department of Social Medicine, the Carolina Population Center, the Cecil Sheps Center for Health Services Research, neighboring universities, contract research organizations, and international donor organizations. (Related faculty: Durrance, Gitterman, Handa, MacKay, Meier, Perreira)

Global Policy Issues. Many of our faculty members study issues whose causes and consequences extend across borders. Because these issues do not respect political boundaries, they can be the source of conflict between countries. At the same time, they are often most effectively addressed by policy responses that require international cooperation. Members of our faculty use rigorous social science methods to

examine the effects of foreign policy initiatives, as well as the unique opportunities and challenges that arise in the context of problems that require cooperation among nations and between nations and nongovernmental organizations. Specific areas of expertise include the impact of international economic integration on labor standards, the utility of military force as a foreign policy instrument, the effects of foreign aid on national policies and outcomes, how international law affects public health, and international cooperation to address critical environmental issues. Students interested in global policy issues benefit from opportunities for to connect with the Triangle Institute for Security Studies, the UNC Institute for the Environment, the Curriculum in Peace, War, and Defense, the UNC Center for Global Initiatives, and the Curriculum in Global Studies. (Related core faculty: Andrews, Gitterman, Handa, Jagger, MacKay, Meier, Sullivan)

Financial Assistance

Students who apply by the December 15 deadline, who are admitted will automatically be considered for a range of financial support, including Graduate School fellowships, teaching assistantships, and research assistantships. Many awards grant full tuition privileges and medical insurance coverage, substantially increasing their value to the student. Prospective students are encouraged to contact faculty members whose research is in areas of their potential interest and experience.

Resources

The University of North Carolina at Chapel Hill has a distinguished tradition in public policy. A charter member of the Association for Public Policy Analysis and Management, the Department of Public Policy currently has a 14-member core faculty including nationally and internationally recognized expertise in policies for education, environment, health, immigrant populations, innovation and economic development, entrepreneurship, institutional design, and other policy areas. Many combine scholarship with governmental experience and direct engagement in public leadership, and many also hold joint appointments in related academic units. In addition to the Ph.D., the department offers a strong undergraduate major in public policy, a graduate minor for interested students in other academic units, and close cooperation with other policy-related graduate programs at both the master's and doctoral levels offered by the departments of City and Regional Planning, Environmental Sciences and Engineering, Health Policy and Management, the Public Administration program, and the schools of Business, Education, Law, Social Work, and Medicine. Doctoral students in the department may also enroll in classes at Duke University (to which there is a regular free bus service) as well as nearby North Carolina State University without additional cost.

Visiting Scholars

The University of North Carolina at Chapel Hill hosts visiting public policy scholars and postdoctoral research fellows from around the world and exchanges students and faculty with several universities in Europe and Asia.

Research Centers and Institutes

A wide range of University of North Carolina research centers and institutes, many of which conduct nationally and internationally distinguished policy-related research, also extend research opportunities. Examples include:

The Carolina Institute for Public Policy
Established in 2007, the Carolina Institute for Public Policy facilitates interdisciplinary collaborations on policy-relevant research among faculty and graduate students from multiple academic units, promotes opportunities for faculty and students to interact with policymakers and other public leaders on public policy questions, and serves as a broker for public policy research opportunities at the state, regional, national, and international levels. The institute is located and staffed jointly with the department.

The Institute for the Environment
Organizes and supports interdisciplinary environmental science and decision making research across and beyond the campus on global, national, and North Carolina environmental problems.

Carolina Population Center
Conducts internationally distinguished research to benefit world populations, train the next generation of population scholars, build skills, capacity, and improved methodologies, and disseminate data and findings to population professionals, policymakers, and the public.

Cecil G. Sheps Center for Health Services Research
Conducts interdisciplinary research to improve the health of individuals, families, and populations by understanding the problems, issues, and alternatives in the design and delivery of health care services.

Center for Urban and Regional Studies
Conducts research on urban issues and processes of urbanization, such as new community development, housing market dynamics, and national home ownership policies, models of urban growth, residential preferences, coastal zone management, and planning for natural hazards.

Frank Hawkins Kenan Institute of Private Enterprise
Conducts research and technical assistance on projects to help businesses turn obstacles into opportunities and to help countries and communities identify their competitive strengths and develop innovative strategies and partnerships to achieve their goals.

Center for Community Capitalism
Conducts research to help reduce poverty and inequality by creating more effective strategies to reintegrate America's disadvantaged communities and their residents into the market economy.

Carolina Center for Competitive Economies
Conducts applied research and policy analysis to help address problems of economic competitiveness, primarily within the state of North Carolina. C3E is a pan-University activity and is housed in the Kenan Institute for Private Enterprise.

Howard W. Odum Institute for Research in Social Science (IRSS)
The oldest institute in the United States for the cooperative study of problems in the general field of social sciences; maintains extensive survey and census archives and assists in design and analysis of social research.

Frank Porter Graham Child Development Institute
Pursues research to create new knowledge to enhance the lives of children and their families.

Jordan Institute for Families
Created in 1996 in the School of Social Work, the Jordan Institute promotes research and development efforts to improve the quality of services delivered to communities across the state and nation. It maintains four basic missions: 1) to facilitate faculty research, 2) to provide opportunities for students to work on research and development projects in the areas of human services, 3) to build professional relationships with research laboratories and centers across the campus, and 4) to serve as a resource to human service departments and programs in North Carolina.

Water Resources Research Institute
Formulates research programs responsive to state water resource problems. Provides local, state, and federal agencies with research to make better decisions in managing water resources.

For more information, contact Admissions, Department of Public Policy, CB #3435, Chapel Hill, NC 27599-3435. Telephone: (919) 962-1600. E-mail: llmary@email.unc.edu. Web site: publicpolicy.unc.edu.

Courses for Graduate and Advanced Undergraduate Students

PLCY

410 Microeconomic Foundations of Public Policy (3). Prerequisite, ECON 101. This course allows students to enhance their working knowledge of microeconomic theory, explore microeconomic theory as a methodology to solve policy problems, understand market failures and the role of collective action in markets, apply economic models to a variety of policy situations, and evaluate and critique economic analyses.

420 Taxation and Public Policy (3). This course examines United States tax policy in terms of the historical and institutional development of tax systems; theories of consent; the use of tax-based instruments such as tax credits and subsidies for social policy; and outcomes associated with taxation, particularly from racial and gendered perspectives.

425 Risks, Shocks, and the Safety Net (3). Many risks and shocks can make individuals and families vulnerable to economic hardship. This course examines America's social policy regime through a wide-ranging investigation of the origins, development, and future of critical features of our social safety net. We pay particular attention to challenges emerging in the era of globalization.

430 Analysis of National Security Policy (3). Course explores contemporary threats to national security, approaches to national security strategy, policy instruments, the role of military force, and the policymaking process.

455 9/11 and Its Aftermath (PWAD 455) (3). Examines the nature of Islamic fundamentalist terrorism and strategies for addressing it, including analysis of post-9/11 changes to United States national security strategy, law enforcement and intelligence, and homeland security.

460 Quantitative Analysis for Public Policy (4). Prerequisite, ECON 400, PSYC 210, or STOR 155. Application of statistical techniques, including regression analysis, in public policy program evaluation, research design, and data collection and management.

470 Business, Competition, and Public Policy (3). This course focuses on competition policy in the United States using relevant Supreme Court decisions as well as economic and policy-related motivation for specific business behavior.

475 Political Economy of Food (3). This course examines the political and economic dimensions of the food we eat, how it's produced, who eats what, and the related social and environmental issues, both domestic and international, affecting the production, pricing, trade, distribution, and consumption of food.

480 Environmental Decision Making (ENST 480) (3). Introduces factors shaping environmental decision making by individuals, businesses, governments, advocacy groups, and international institutions. Explores public policy incentives and action strategies for influencing them.

485 Poverty, Health, and Human Development in Low Income Countries (3). Prerequisite, ECON 101. This course provides an understanding of how poverty is defined, the consequences of poverty, and policies to reduce poverty. It explores the determinants of human development outcomes from an interdisciplinary perspective (with a heavy economics focus).

490 Special Topics in Public Policy (3). Special topics in public policy for undergraduate and graduate students.

496 Independent Study/Reading in Public Policy (1–6). Permission of the instructor. Independent reading in public policy.

520 Environment and Development (ENST 520) (3). Reviews environmental problems in developing countries. Analyzes proposed solutions, such as legal remedies, market instruments, corporate voluntary approaches, international agreements, and development policies. Discusses the link between trade and environment, environmental cases from the World Trade Organization, and sustainable development.

527 Principles of Public Finance for Public Policy (3). Prerequisite, ECON 310 or 410, or PLCY 410 or 788. This course provides a foundation in public finance theory and applications. Students learn to analyze taxation policies and expenditures on income redistribution, programs for the poor (e.g., TANF), and social insurance programs (e.g., Social Security).

530 Educational Problems and Policy Solutions (3). Reviews current debates and policy solutions in education. Topics analyzed through three of the most commonly used evaluative criteria: equity, efficiency, and effectiveness. Topics: equality of educational opportunity, racial segregation, the black-white test score gap, school choice, and the use of incentives to promote increased performance. Lecture, case studies, discussion.

565 Global Health Policy (3). Coursework will focus on public policy approaches to global health, employing interdisciplinary methodologies to understand selected public health policies, programs, and interventions. For students who have a basic understanding of public health.

570 Health and Human Rights (3). Course focuses on rights-based approaches to health, applying a human rights perspective to selected public health policies, programs, and interventions. Students will apply a formalistic human rights framework to critical public health issues, exploring human rights as both a safeguard against harm and a catalyst for health promotion.

575 Science and Public Policy: The Social, Economic, and Political Context of Science (3). Introduction to analysis of science policy. Course explores how events transformed science's role in American life and how science relates to industry and economic development. Topics include the mechanisms of allocating scientific resources, the commercialization of academic discoveries, regulating emerging technology, and achieving consensus on controversial scientific issues.

580 Implementing Change: Barriers and Opportunities in Policy, Government, and the Nonprofit Sector (3). An introduction to some of the sectors within which social change work occurs: education, healthcare, local policy, philanthropy and nonprofit direct-service. Students will learn the fundamental systems of governance and accountability that guide them, and the opportunities or barriers that motivate and de-motivate people working within them.

585 American Environmental Policy (ENST 585, ENVR 585, PLAN 585) (3). See ENVR 585 for description.

590 Special Topics in Public Policy (3). Special topics for undergraduate and graduate students.

596 Independent Study/Reading in Public Policy (1–6). Permission of the instructor. Independent reading in public policy.

650 Robertson Scholars Capstone (1). The central focus of the capstone course will be that the scholars will learn from and about each other.

681 Research Design for Public Policy (3). Pre- or corequisite, PLCY 460. Students will explore the scientific method as applied to policy research. They will formulate testable policy research questions, become familiar with methods for conducting policy research, and learn to think critically about causal inference.

686 Policy Instruments for Environmental Management (ENST 686, ENVR 686, PLAN 686) (3). Prerequisite, ECON 410 or PLAN 710. Design of public policy instruments as incentives for sustainable management of environmental resources and ecosystems, and comparison of the effects and effectiveness of alternative policies.

690 Special Topics in Public Policy (3). Special topics for graduate or undergraduate students.

691H Honors in Public Policy (3). Prerequisites, PLCY 460 and 681. Permission of the instructor. In preparing their honors theses, students will formulate a testable policy research question, design a study to answer this research question, and learn to think critically about causal inference.

692H Honors in Public Policy (3). Prerequisite, PLCY 691H. Permission of the instructor. For senior public policy majors. Directed research for the honors thesis. Students may only receive credit for one semester of this course. An application for enrollment must be completed by the student and approved by the director of the public policy honors program.

696 Independent Study/Reading in Public Policy (1–6). Permission of the instructor. Independent reading in public policy.

698 Senior Capstone in Public Policy (3). Prerequisites, PLCY 460, and 681 or 691H. Students apply knowledge and skills gained in the major to a real-world policy problem. Students work in small teams to conduct research on an important policy issue and identify policy opportunities on behalf of their client. The capstone allows majors to polish their skills while producing actionable public policy analysis.

Courses for Graduate Students

PLCY

700 Mathematical Preparation for Public Policy and Economics (3). An intensive preparation course in mathematical and statistical analysis for public policy and economics. Reviews and introduces topics in linear algebra, calculus, optimization and mathematical statistics, and prepares students for PLCY 788 and PLCY 789. Also serves as a prerequisite for HPM 881, which satisfies one methods requirement in the Ph.D. program.

710 Public Policy Analysis (3). This course examines the history and development of the field of public policy and several theoretical frameworks that contribute to public policy analysis including welfare economics, theories of distributive justice, political science, and organizational theory. Using these frameworks, students will have an opportunity to analyze issues in public policy.

716 New Institutionalism: Politics, Institutions and Public policy (POLI 716) (3). Examines leading theoretical approaches to study institutions and public policy. Draws on "new institutionalism" scholarship from political science, economics, and sociology to analyze public policy in historical and comparative perspectives. Emphasis on applying these theoretical insights to substantive public policy issues.

717 Political Institutions: Macro-Level Processes, Nesting, and Institutional Dynamics (3). This course analyzes the politics of public policy with an emphasis on the role of political institutions. The course combines theory, empirical research, methodological approaches to institutions, and case studies in substantive areas of policy with a global dimension. This is a required core course for the Public Policy Ph.D.

760 Migration and Health (3). With a focus on Latin American migration to the U.S., this course introduces students to the inter-relationships between migration and health. Students will gain an understanding of the theories of migration and the ways in which immigration and settlement policies influence the health and well-being of immigrant populations.

775 Science and Public Policy: The Social, Economic, and Political Context of Science (3). Explores transformations in the role of science in America and how science relates to industry and economic development. Topics include mechanisms (and politics) of allocating scientific resources, commercialization of academic discoveries, evolving university-industry relationships, regulation of emerging technology, decision making and scientific uncertainty, and building consensus about controversial scientific issues.

780 Normative Dimensions of Policy Analysis and Research: Theories, Methods, and Ethical Foundations (3). Covers theories of distributive justice and how ethical arguments can be used as a basis for public policy decision-making.

788 Advanced Economic Analysis for Public Policy I (PLAN 788) (3). Topics covered include theory of utility and demand, theory of the producer, organization, and operation of product and factor markets, market equilibrium, and regulation.

789 Advanced Economic Analysis for Public Policy II (PLAN 789) (3). Prerequisite, PLCY 788. Further applications of ecenomic theory to public policy including risk and uncertainty, general equilibrium and welfare policy, market failure, public goods and taxation, and game theory.

799 Selected Topics in Public Policy (3).

801 Design of Policy-Oriented Research (PLAN 801) (3). See PLAN 801 for description.

802 Advanced Seminar in Research Design: Data, Methods, and Evaluation (PLAN 802) (3). Three main objectives: to deepen students' understanding of important issues and topics in the design of empirical research, to further develop students' ability to critically evaluate research designs and policy-related products and to aid in developing a research paper, dissertation, or other product.

805 Public Policy Workshop (1–3). For graduate students in public policy analysis who are undertaking team projects under faculty supervision. Projects vary from year to year. All will relate to public policy and will involve interaction with real clients. The intent is to provide students with an opportunity to apply theory and techniques of policy analysis in actual problem situations.

810 Public Policy Seminar (1). Weekly forum for public policy scholars and officials to discuss the relationships between policy research and policy outcomes. Presentations by invited speakers and doctoral students.

820 American Welfare State (3). This course will examine the American welfare state through a wide-ranging investigation of the origins, development, and future of the most critical features of U.S. politics, social policy, and law.

830 Seminar in Education Policy I (3). Covers economic and sociological theories on the determinants of learning and the demand for schooling. Topics include stratification, school effects, schooling process and socialization, family, peer, and contextual effects, and the education production function.

831 Seminar in Education Policy II (3). Explores educational policy problems and the evidence and methods used to assess such problems. Topics include racial social gap, school choice, educational accountability, assessment, standard setting, teacher effects, resource allocation, and early childhood education.

882 Advanced Panel Data Methodology for Public Policy (3). Students will apply models and statistical techniques to original PLCY research; understand major techniques used to estimate causal relationships in quasi-experimental designs, including panel data and simultaneous equations models; and gain intuition and skills about the art of econometrics, including techniques for using complex survey data and handling missing data.

892 Ph.D. Seminar in Environmental Management and Policy (ENVR 892, PLAN 892) (3). Doctoral standing required. Permission of the instructor. Ph.D. seminar on theory, methods, and current research and literature in environmental management and policy. One to two seminar hours per week.

895 Topics in Poverty and Human Resources (3). Topics covered include poverty, welfare, and human resources from an economic perspective. For students wanting to specialize in social and behavioral approaches to the study of population and demographic phenomena.

901 Independent Study (1–21). This course allows graduate students in public policy analysis to receive credit for work on individual projects, designed in conjunction with a faculty supervisor. It is intended for students who are interested in pursuing academic topics not covered in scheduled courses.

992 Master's Thesis Substitute (3).

994 Doctoral Dissertation (3–9).

Division of Rehabilitation Counseling and Psychology

www.alliedhealth.unc.edu/rcp
EILEEN J. BURKER, *Director*

Professor

Eileen J. Burker (22) Quality of Life Associated with Heart and Lung Transplantation and Ventricular Assist Device (VAD); Psychological Aspects of Cardiac and Pulmonary Rehabilitation; Knowledge of and Attitude about Organ Donation and Transplantation; Vocational Functioning in Individuals with Chronic Medical Conditions.

Associate Professor

Mark R. Klinger, Learning and Cognition in Autism Spectrum Disorder and other Developmental Disabilities, Adult Outcomes in Persons with Autism, Predictors of College Success in Persons with Autism, Implicit Learning and Unconscious Aspects of Thinking

Assistant Professor

Eniko C. Rak, Employment Outcomes in Individuals with Diabetes; The Benefits of Health Literacy on Quality of Life in Individuals with Chronic Illness and Disability; International Rehabilitation; Professional Identity Development in Graduate Students

Clinical Assistant Professor

Judy Schmidt, Counseling Supervision; Supported Employment and Supported Education for People with Psychiatric Disabilities; Anti-Stigma and Anti-Bullying Interventions for Children with Mental Illness; Aging with a Disability

Adjunct Faculty

W. Leigh Atherton, Substance Abuse, Dual Diagnosis and Motivational Interviewing

Greg Olley, Developmental Disability, and Intellectual Competency

The Division of Rehabilitation Counseling and Psychology (DRCP) of the Department of Allied Health Sciences offers a two-year graduate program leading to the master of science degree.

The graduate courses offered in rehabilitation counseling and psychology (RCP) present and discuss theoretical constructs and their application to clinical practice; study the bio-psychosocial complexity of disability within rehabilitation contexts; examine professional role and identity within ethical guidelines of practice; stimulate critical, analytical, and creative thought; and prepare students for professional rehabilitation counseling practice including specialty settings for people with developmental and/or psychiatric disabilities.

Mission

The mission of the DRCP is to serve the people of North Carolina by educating rehabilitation counselors with the knowledge and expertise to provide services to our citizens with disabilities with an emphasis on those with psychiatric and/or developmental disabilities. The mission is based on the fundamental belief in the dignity and worth of all people and the rights of people with disabilities to live self-determined lives in inclusive communities of their choice. The DRCP seeks to educate rehabilitation counselors who use the counseling relationship and skills to work collaboratively with individuals to maximize functional capacity, productive and independent living skills, and quality of life, and to provide access to and manage personalized services to support the unique needs and preferences of each individual, his or her family, and community. Fundamental to this is a focus on the whole person—psychological, vocational, spiritual, and physical aspects—as well as family, social, work, and community relationships. The division seeks to educate rehabilitation counselors who possess the knowledge, critical thinking abilities, commitment to independent learning and scholarship, vision, and courage required to forge new models of community practice to address the diverse needs of the individuals with disabilities now and in the future.

In carrying out this mission the faculty of the division has the obligation to acquire, discover, preserve, synthesize, and transmit knowledge, to be models of professional leadership and to create a culture of educational excellence that will nurture students' intellectual and ethical development. Students have the responsibility to fully engage in an educational process of research, free inquiry and personal responsibility and to become foremost practitioners, scholars, researchers, and leaders in the profession of rehabilitation counseling.

The University of North Carolina at Chapel Hill is recognized nationally and internationally as a leading center of scholarship, research, and creative work with a mission to serve the people of North Carolina and the nation. The mission of the University's Division of Rehabilitation Counseling and Psychology is to contribute actively and substantively to this tradition.

Objectives

Graduates of the rehabilitation counseling psychology program will

1. Effectively apply current best practices in rehabilitation counseling within a community-inclusion model
2. Accurately assess the rehabilitation preferences and needs of people with disabilities and work in partnership with consumers to provide the appropriate rehabilitation counseling, services, and supports needed
3. Acquire specific knowledge and skills to address the counseling and case management needs of people with disabilities, with particular emphasis on strategies and techniques for serving people with psychiatric and developmental disabilities

4. Work collaboratively with professionals, family members, community providers, employers, and agency policy and decision makers to achieve optimal rehabilitation outcomes for people with disabilities
5. Engage in a process of lifelong learning, collaboration, and collegiality as part of ongoing professional development as rehabilitation counselors
6. Have the necessary leadership, business, and management and public policy skills to assume leadership roles in the practice and the profession of rehabilitation counseling and
7. Promote and support consumer empowerment and self-advocacy of people with disabilities

Students must successfully complete 60-plus semester hours of required course work, submit and defend an approved master's thesis, paper or project, and complete an approved practicum and internship (within the chosen specialization).

Requirements for Admission

- A bachelor's degree from an accredited college or university
- A grade point average of B (3.0 on a 4.0 scale) or better in the area of the major
- Submission of Graduate Record Examination (GRE) scores combined of 1000 or greater (or two areas of quantitative, verbal, or writing scores @ 50th percentile)
- Three letters of recommendation
- Completion of application supplement for RCP within graduate school application

Courses for Graduate Students

RPSY

700 Introduction to Rehabilitation Counseling and Psychology (3). This course will cover topics germane to the history and philosophy of rehabilitation. Students will obtain an overview of the field, its consumers, and methods of service delivery.

702 Theories of Counseling Applied to Rehabilitation (3). An introduction to the traditional theories of individual and family counseling. Emphasis on application of theories to persons with disabilities, ethics, and multicultural awareness.

704 Medical Aspects of Rehabilitation (3). Functional, psychological, vocational, familial, social, and sexual aspects of medical disabilities. Includes the human body system and medical terminology. Focus on assistive technology and functional capacity.

706 Tests and Measurement in Rehabilitation Counseling Psychology (3). This course is an overview of the selection, administration, and interpretation of major assessment tools. Emphasis is on persons with mental illness or developmental disabilities.

708 Community Integration for Individuals with Disabilities: Work, Home and Leisure (3). This course will cover career development and counseling with emphasis on community integration in vocational and leisure pursuits of persons with disabilities, particularly those with mental illness and developmental disabilities.

710 Developmental Counseling Through the Life Span (3). Developmental theories and counseling through the life span will be covered with overall themes of positive development, resiliency, and healthy life transitions of persons with disabilities.

712 Fundamentals of Rehabilitation Counseling and Psychology: Diagnosis and Practice (3). Prerequisites, RPSY 700 and 702. An introduction to diagnosing clients with mental illness and developmental disabilities. Focus is on best practice treatment and the vocational, social, and familial implications of living with a DSM disorder.

714 Principles of Group Counseling in Rehabilitation Psychology and Counseling (3). Strategies and techniques in developing and implementing groups in counseling. Attention to group counseling with persons with disabilities, specifically those with mental illness and developmental disabilities.

716 Case Management, Rehabilitation Services and Resources (3). Emphasis on leadership in all aspects of person-centered service coordination to include transdisciplinary and multi-agency effectiveness, knowledge of community organization and resources, service and support options.

718 Co-Occurring Disorders in Rehabilitation Counseling and Psychology (3). Introduces occurrence of both psychiatric conditions and substance abuse prevalence examining history including traditional recovery models, contradictory practices, bio-physiological effects, and shift from separate to parallel to integrated treatment approaches.

800 Rehabilitation Counseling and Psychology Research and Program Evaluation (3). Prerequisites, RPSY 700 and 702. Research methods, evidence-based practice, and ethical, legal, and cultural issues related to research and evaluation. Covers basic statistics, library research for rehabilitation-related information, proposal development, and grant writing.

802 Rehabilitation Counseling and Psychology Practicum (5). Required preparation, all rehabilitation counseling and psychology first-year didactic courses. Direct experience with clients/patients in varied service delivery settings.

805 Evidence-based Practices in Psychiatric Rehabilitation (3). Prerequisite, RPSY 818. Introduces the range of evidence-based practice and new effective models for treating individuals with severe and persistent mental illness demonstrated through levels of evidence empirically.

806 Applied Counseling Skills in Rehabilitation Counseling and Psychology (5). Designed to teach foundational counseling skills that will enable students to begin counseling. Focus on counseling individuals with mental illness and developmental disabilities. Includes ethics and multicultural awareness.

810 Internship in Rehabilitation Counseling and Psychology (5). Required preparation, all rehabilitation counseling and psychology didactic courses including RPSY 802 and 992. Direct experience with clients/patients in either developmental disability or mental illness settings. Parts 1 and 2.

814 Introduction to People with Psychiatric and Developmental Disabilities (3). Historical perspective, description, diagnoses, classification, etiology, patterns of functioning, current best practices with focus on RCP service delivery and community support; day-in-the-life component included.

816 Advanced Practice with People with Developmental Disabilities (3). Prerequisites, RPSY 700, 702, and 814. Prepares students for RCP practice with persons with developmental disabilities; covers a wide range of intervention and coordination strategies focusing on achievement of a participatory, person-centered, independent, and productive community life.

817 Substance Abuse and Addiction in Rehabilitation Counseling (3). Course provides an overview of drugs of abuse/addiction in the context of rehabilitation counseling. Additionally, theories of addiction, prevention, rehabilitation strategies, and research within a multi-cultural context are included.

818 Advanced Practice with People with Psychiatric Disabilities (3). Prerequisites, RPSY 700, 702, and 814. Prepares students for RCP practice with persons with mental illness; covers a wide range of intervention and coordination strategies focusing on support of recovery and achievement of a healthy, independent and productive life.

890 Special Topics in Rehabilitation Counseling and Psychology (1–3). Faculty-mentored independent study to pursue specific interests and topics.

992 Master's Paper/Project in Rehabilitation Counseling and Psychology (3–6). Individual work by a student (supervised by faculty) to explore an area of interest in a research paper, program development, or a professional project.

993 Master's Thesis in Rehabilitation Counseling and Psychology (3–6). Individual research supervised by a faculty member in a special field of study.

Department of Religious Studies

religion.unc.edu
RANDALL STYERS, *Chair*

Professors

Yaakov S. Ariel (48), Judaism and Evangelical Christianity in America, Messianic Movements and Missions, Christian-Jewish Relations
Bart D. Ehrman (19), New Testament Interpretation and Textual Criticism, Early Christianity
Carl W. Ernst (42), Islamic Studies, Sufism, Religions of West and South Asia
Jodi Magness (54), Archaeology of Palestine, Qumran and the Dead Sea Scrolls, Ancient Synagogues, Early Judaism
Omid Safi (60), Islamic Studies, Contemporary Islamic Thought, Religions of Asia

Associate Professors

Barbara Ambros (57), Japanese Religions, East Asian Religions, Buddhism, Religion in Asian Diaspora Communities
Juliane Hammer (53), Islamic Studies, Gender in American Muslim Communities, Modern Muslim Approaches to the Qur'an
Lauren Leve (56), Buddhism in South and Southeast Asia, Ethnography of Religion, Globalism and Postcoloniality
Zlatko Plese (49), Religion in Late Antiquity, Greco-Roman Philosophy and Religion, Gnosticism and Manichaeism
Randall Styers (52), Cultural History of the Study of Religion, Modern Western Religious Thought, Critical Cultural Theory

Assistant Professors

Brandon Bayne (61), Religion in the Americas, Global Christianity
Jessica A. Boon (55), Medieval and Early Modern Christian Thought, Mystical Traditions, Spain and the New World
David Lambert (15), Hebrew Bible, Ancient Mediterranean Religions
Evyatar Marienberg (17), Rabbinic Judaism and Jewish Law, Medieval and Early Modern Studies, Contemporary Catholicism
Todd Ramón Ochoa (65), Religion in Latin America and the Caribbean, Ethnography of Religion, Critical Cultural Theory
Brendan Thornton (40), Religion in Latin American and the Caribbean, Evangelical Christianity, Ethnography of Religion

Adjunct Professors

Philip Gura, Religion and American Literature
Jonathan Hess, Modern Judaism
Charles Kurzman, Islamic Movements
Bruce Lawrence, Islamic Studies, Sufism
Albert Rabil, Renaissance and Early Modern History, Women's Studies
James Rives, Ancient Mediterranean Religions

Adjunct Associate Professors

Anna Barry Bigelow, Islamic Studies, Religions of South Asia, Religion and Conflict
Jason Bivins, Religion in the United States, Critical Cultural Theory
Christian O. Lundberg, Critical Cultural Theory, Rhetoric, Cultural Studies
Fred Naiden, Ancient Mediterranean Religions
Barry Saunders, Ritual Studies and Biomedicine
Margaret Wiener, Indonesian Religions

Professors Emeriti

David Halperin
Peter I. Kaufman
William J. Peck
James H. Sanford
Jack M. Sasson
John H. Schutz
Ruel W. Tyson
John Van Seters

The graduate program in religious studies at the University of North Carolina at Chapel Hill deals with religion both as a distinctive human experience and as a mode of culture and history. Both orientations define religion as a broad area of human existence, and students are encouraged to explore the tension between those two general approaches. The interests of the department's faculty express the variety of methodological orientations in such study, and faculty members in other departments of the University offer strong interdisciplinary support.

The Graduate School of the University offers two degrees in religious studies: the master of arts and the doctor of philosophy. The Department of Religious Studies also sponsors the joint Duke-UNC Graduate Certificate in Middle East Studies. The M.A. program introduces students to the general problems and methods in the study of religion. Specific requirements include:

- Thirty hours of course credit, including RELI 700 and one "gateway" graduate seminar
- A written comprehensive examination in the student's specific field of study
- A thesis of three to six credits and an oral defense of the thesis, and
- Demonstrated competence in a modern foreign research language

The Ph.D. program is primarily intended to prepare students for a career in university and college teaching and research in religious studies. It currently offers specialization in ancient Mediterranean religions, Islamic studies, medieval and early modern studies, religion in the Americas, religion and culture, and religions of Asia.

Ph.D. students should expect to take at least 18 hours of course work beyond the M.A. level. Other requirements in the doctoral program include:

- Completion of requirements specific to one of the specialty fields of study noted above
- A set of written and oral doctoral examinations specific to the student's field of study

- Demonstrated reading competence in a second modern foreign research language, and
- A doctoral dissertation and an oral defense of the dissertation

Additional information about the graduate program in religious studies is available at the department's Web site: religion.unc.edu.

Details on the joint Duke-UNC Graduate Certificate in Middle East Studies are available at this Web site: mideast.unc.edu/gradcertificate.shtml.

Courses for Graduate and Advanced Undergraduate Students *RELI*

401 Introductory Biblical Hebrew I (3). The first part of a two-semester introduction to the grammar of biblical Hebrew.

402 Introductory Biblical Hebrew II (3). Prerequisite, RELI 401. Permission of the instructor for students lacking the prerequisite. The second part of a two-semester introduction to the grammar of biblical Hebrew.

403 Intermediate Classical Hebrew I (3). Prerequisite, RELI 402. Permission of the instructor for students lacking the prerequisite. A consolidation of the fundamentals of classical Hebrew grammar via readings of biblical texts of various genres (including both prose and poetry).

404 Intermediate Classical Hebrew II (3). Prerequisite, RELI 403. Permission of the instructor for students lacking the prerequisite. Further readings of classical Hebrew texts, focusing on biblical poetry as well as early postbiblical material (e.g., nonbiblical texts from Qumran, Mishnah/Tosefta).

409 Greek New Testament (GREK 409) (3). Prerequisite, GREK 222. Permission of the instructor for students lacking the prerequisite.

410 Aramaic/Rabbinic Hebrew (3). Prerequisites, RELI 403 and 404. Permission of the instructor for students lacking the prerequisites. Reading texts in rabbinic Hebrew or in biblical and/or talmudic Aramaic, with appropriate grammatical instruction.

411 Advanced Akkadian (3). Prerequisites, RELI 403 and 404. Readings in literary, epistolary, and juridical texts.

412 Ugaritic (3). Prerequisites, RELI 403 and 404. Readings in the alphabetic texts of Ras Shamra and a study of the elements of Ugaritic grammar.

413 Biblical Coptic and Early Egyptian Monasticism (3). Coptic, the last stage of Egyptian, a living language in the Roman and Byzantine period. Thorough grounding in the grammar of the Sahidic dialect as a basis for reading biblical monastic and Gnostic texts.

421 Religion and Science (3). This course explores the complex relation between religion and science in the modern world. Public disputes over teaching evolution in American schools serve as a central case study of this.

423 Ethnicity, Race, and Religion in America (3). Prerequisite, RELI 140. Permission of the instructor for students lacking the prerequisite. A theoretical inquiry into ethnicity, race, and religion as constituents of personal and communal identity. Emphasis on global migrations, colonial and postcolonial relations, diasporic communities, and issues of religious pluralism.

424 Gender Theory and the Study of Religion (WMST 424) (3). An examination of contemporary gender theory, with particular focus on its application to the study of religion.

425 Psychology of Religion (3). A critical exploration of the concept of religious experience as defined by such authors as William James and Sigmund Freud.

428 Religion and Anthropology (ANTH 428, FOLK 428) (3). See ANTH 428 for description.

429 Religion and Society (SOCI 429) (3). See SOCI 429 for description.

438 Religion, Nature, and Environment (3). A seminar on concepts of nature within religions and a variety of world-wide spiritual traditions. Emphasis on sacred space, place, and pilgrimage as a vital intersection of religion and nature.

441 History of Religion in America to 1865 (3). An examination of primary sources in the history of American religion from the precolonial era to the Civil War.

442 History of Religion in America since 1865 (3). An examination of primary sources in the history of American religion since the Civil War.

443 Evangelicalism in Contemporary America (3). Juniors or seniors only. Examination of evangelicalism and its role in American society, politics, and culture. Exploration of its various subdivisions and its relation to such movements as fundamentalism, pentecostalism, revivalism, and premillennialism.

444 Gender and Sexuality in Contemporary Judaism (JWST 444) (3). The seminar examines the developments in gender roles and in sexuality in contemporary Judaism.

445 Asian Religions in America (ASIA 445) (3). A study of intercultural interaction and interreligious encounter focusing on Asian religions in America, 1784 to the present.

446 Christian-Jewish Relations throughout the Ages (3). An exploration of the varied and complex relationships which have developed between Christianity and Judaism, from the first century to the 21st century.

450 Sexuality and Marriage in Jewish Tradition and History (3). This course deals with various topics related to sexuality and marriage in Jewish tradition and history: sex outside of marriage, wedding ceremonies, regulation of marital sex, menstruation, homosexuality, and more.

454 The Reformation (HIST 454) (3). See HIST 454 for description.

463 Medieval Slavic Culture (SLAV 463) (3). See SLAV 463 for description.

480 Modern Muslim Literatures (3). Stresses the diversity of modern Islamic experience by examining the works of various Muslim authors. Genres may include travelogues, memoirs, novels, sermons, and treatises, among others.

481 Religion, Fundamentalism, and Nationalism (PWAD 481) (3). An exploration of explosive combinations of religion and politics in the Iranian revolution, the Palestinian movement, Hindu nationalism in India, and Christian fundamentalism in America.

485 Marriage and Sexuality in Islam (3). This course approaches questions of sexuality and marriage in Muslim discourse and practice in historical and geographical contexts. It focuses on gender as a category of inquiry and considers issues such as Muslim family law, normative sexuality, marriage practices, and religiously defined family values in their changing interpretations and applications.

487 Mountains, Pilgrimage, and Sacred Places in Japan (ASIA 487) (3). This course explores the role that mountains and pilgrimage have played in Japanese cosmology and how they relate to methodology of studying place and space.

488 Shinto in Japanese History (ASIA 488) (3). This course discusses the development of Shinto in Japanese history and covers themes such as myths, syncretism, sacred sites, iconography, nativism, religion and the state, and historiography.

489 Animals in Japanese Religion (3). Permission of the instructor. This course examines the cultural construction of animals in Japanese myth, folklore, and religion.

502 Myths and Epics of the Ancient Near East (FOLK 502) (3). Permission of the instructor. An examination of Babylonian, Canaanite, Egyptian, Hittite, and Sumerian texts from the prebiblical era, focusing on representative myths, epics, sagas, songs, proverbs, prophecies, and hymns.

503 Exploring the Dead Sea Scrolls (JWST 503) (3). A comprehensive introduction to the Dead Sea Scrolls and the different Jewish groups connected with them.

512 Ancient Synagogues (CLAR 512, JWST 512) (3). Prerequisite, RELI 110. Permission of the instructor for students lacking the prerequisite. This is a course on ancient synagogues in Palestine and the Diaspora from the Second Temple period to the seventh century CE.

522 19th-Century Critiques of Religion (3). Permission of the instructor. An exploration of influential 19th-century critiques of religion, including texts by such thinkers as Feuerbach, Marx, Kierkegaard, Nietzsche, Stanton, Douglass, and Freud.

524 Ethnographic Approaches to Contemporary Religion (3). Permission of the instructor for undergraduates. Critical exploration of exemplary ethnographies of religion. Intended primarily for students considering ethnographic research, the course examines classic studies and recent experiments in project design, methods, and textual strategies. Addresses ethical, epistemological, and methodological questions/innovations in the ethnographic study of contemporary religion(s).

525 Seminar in Religion and Literature (3). Seminar topic varies.

528 Rituals and Rhetorics of Religion (3). An examination of ritual, allegory, and symbol as modes of religious expression in cultic and literary contexts.

530 Genealogies of Religion (3). This seminar explores the historical development of "religion" as a concept and object of academic scholarship through the critical study of key texts and foundational debates about religion in Western thought.

534 Religious Ethics and Issues in Contemporary Medicine (3). Seniors or graduate students only. Examination of religious-ethical dimensions of such issues as the dying patient, organ transplants, abortion, prolongation of life, and experimentation on human beings, drawing on theory from the traditional Western religions and the social sciences.

540 Mormonism and the American Experience (3). Prerequisite, RELI 140. Permission of the instructor for students lacking the prerequisite. Exploration of the history, beliefs, and practices of Mormons. Will include visits to Latter-Day Saints services, guest speakers, and discussion of race and gender in the contemporary church.

541 Global Evangelicalism (3). The course will examine the evangelical tradition from a global perspective, exploring the tradition from its early rise in Europe to its impact on the Americas, Africa, and Asia.

565 Medieval Jews and the Bible (3). This course explores the Jewish interpretation of the Bible, focusing on important commentaries from influential medieval Ashkenazi and Sephardic thinkers.

566 Jewish Legal Literature (3). This course explores many aspects of the Halakhah, the Jewish traditional legal system, focusing on issues such as rituals, holidays, religious obligations and prohibitions, and laws regulating sexual activity.

569 Interfaith Marriages and Intimacy in World Religions (3). This seminar explores the topic of intimate relations between people who consider themselves, or are considered by others, to be part of different religious groups. We will explore cases in which such relations achieve the social sanction of marriage and cases in which the relations are of a more temporary nature.

574 Chinese World Views (ANTH 574, ASIA 574) (3). See ANTH 574 for description.

580 African American Islam (3). An historical examination of African American Islam in the United States. Explores the intellectual, cultural, social, and political roots of black Islam in addition to its diverse doctrinal, ritual, and institutional manifestations.

581 Sufism (ASIA 581) (3). Permission of the instructor. A survey of Islamic mysticism, its sources in the Qur'an and the Prophet Muhammad, and its literary, cultural, and social deployment in Arab, Persian, Indic, and Turkish regions.

582 Islam and Islamic Art in South Asia (ASIA 582) (3). A survey of the formation of Islamic traditions in the subcontinent from the eighth century to the present, with emphasis on religion and politics, the role of Sufism, types of popular religion, and questions of Islamic identity.

583 Religion and Culture in Iran, 1500–Present (ASIA 583) (3). Iran from the rise of the Safavid empire to the Islamic Republic. Topics include Shi'ism, politics, intellectual and sectarian movements, encounters with colonialism, art and architecture, music, literature.

584 The Qur'an as Literature (ASIA 584) (3). A nontheological approach to the Qur'an as a literary text, emphasizing its history, form, style, and interpretation.

585 Religion and Culture of Turkey (3). This course will cover the history of Turkey from the Byzantine period until contemporary times. Key aspects of Turkish culture (architecture, music, poetry to arts) will be covered.

586 Women and Gender in Japanese Religions (3). This seminar explores the roles of women in the religions of Japan (including Buddhism, Shinto, folk religions, pilgrimage, new religions movements, and new spirituality culture) from goddesses, shamans, nuns, and pilgrims to demons, temptresses, and lesser human beings. The course traces these themes across Japanese socioeconomic and religious history.

590 Topics in the Study of Religion (3). Permission of the instructor. Subject matter will vary with instructor but will always be focused on a particular problem or issue.

592 Religious Conflict and Narrative in India (HNUR 592) (3). See HNUR 592 for description.

602 What Is Scripture? Formations of the Hebrew Bible/Old Testament Canon (JWST 602) (3). The course traces the past and continued canonical processes that define what the Hebrew Bible/Old Testament has been and is today, with a focus on the history of biblical interpretation.

603 The Bible and Its Translation (3). This course explores the translation of the Hebrew Bible in the West, with a view toward identifying religious and ideological trends.

607 Problems in Early Christian Literature and History (3). Prerequisite, RELI 104, 207, or 208. Permission of the instructor for students lacking the prerequisite.

608 The Messiah and the Apocalypse (3). Ideas concerning the Messiah and the end of the world held by Jews, Christians, and Muslims. Emphasis on the beginning of the Christian era.

617 Death and Afterlife in the Ancient World (3). Examinations of practices and discourses pertaining to death and the afterlife in the ancient civilizations of Near East, Greece, and Rome.

662 Vatican II: History and Story (3). This course explores the history of the Second Council of the Vatican (Vatican II, 1962–1965), and is crucial for the understanding of contemporary Catholicism.

665 Body and Suffering in Christian Mysticism (3). Permission of the instructor for nonmajors. Medieval Christians consistently focused on the suffering body as a means of reflecting on Christ's sacrifice. This course considers how medical theories of cognition, gender, and pain influenced the potential role of the body in medieval mystical experience.

668 Spanish Religions: Peninsular Convivencia and Colonial Encounter (3). Strong background in medieval and early modern studies and permission of the instructor required for undergraduates. This course studies Muslims, Christians, and Jews in the medieval Iberian kingdoms, then interreligious discourse in the colonial expansion to Mexico, Peru, and the Philippines, by deploying theories concerning race, gender, sexuality, and postcoloniality.

681 Readings in Islamicate Literatures (ARAB 681, ASIA 681) (3). Permission of the instructor. Study of selected religious, literary, and historical texts in Arabic, Persian, or Urdu.

688 Observation and Interpretation of Religious Action (ANTH 688, FOLK 688) (3). Permission of the instructor. Exercises (including field work) in learning to read the primary modes of public action in religious traditions, e.g., sermons, testimonies, rituals, and prayers.

691H Honors in Religious Studies (3). Permission of the director of undergraduate studies. Required of all students reading for honors in religious studies.

692H Honors in Religious Studies (3). Permission of the director of undergraduate studies. Required of all students reading for honors in religious studies.

696 Independent Study (3). Advanced undergraduate or graduate standing and permission of the instructor. Subject matter should be arranged with a specific instructor.

697 Capstone: Undergraduate Seminar (3). Majors only. Concentrating on a different theme each year, this departmental seminar introduces the different areas and approaches in religious studies.

Courses for Graduate Students

RELI

700 Theory and Method in the Study of Religion (3). Graduate standing in religious studies or permission of the instructor. A basic problems and methods course required of all graduate students in religious studies.

702 Religion and Literature of Israel (3). A study of the religious traditions in ancient Israelite literature from the twelfth through the second centuries BCE.

703 Critical Approaches to the Study of the Hebrew Bible and its History of Interpretation (3). Exploration of current critical approaches to the study of the Hebrew Bible, including those oriented toward a study of its interpretive history.

704 Readings in Religions of the Ancient Near East (3). Focusing on the Mediterranean religions before Alexander, the course consists of readings of original documents in translation, illustrating theology and cult, as well as on the major history of religions interpretations.

707 Early Christian History and Literature (3). Permission of the instructor. A critical study of the history and literature of early Christianity from Paul to Irenaeus, with texts to be read in the original languages.

712 Early Jewish History and Literature (3). Permission of the instructor. An examination of the main varieties of pre-rabbinic Judaism: Hellenistic Judaism, apocalyptic Judaism, and the Judaism of the Dead Sea Scrolls.

718 Readings in Greco-Roman Religion (3). Permission of the instructor. Opportunity for reading of ancient documents representing the more important religious trends of the Greco-Roman world.

720 Critical and Comparative Lineages in Religion and Culture (3). Exploration of intellectual lineages shaping the contemporary study of religion and culture.

721 Theories of Religion and Culture (3). Permission of the instructor. Studies in early modern, Enlightenment and Romantic political, philosophical, and literary texts.

723 Critical Approaches to Religion and Culture (3). Graduate standing in religious studies or permission of the instructor. Exploration of various forms of contemporary critical thought (including gender theory, critical race theory, and postcolonial studies) in order to assess the value of these critical tools for the study of religion.

729 Religion and Modernity (3). Graduate standing in religious studies or permission of the instructor. This course examines the relationships between religion and modernity, both as conceptual categories and through ethnographic studies of religion and/in modern life.

734 Studies in the Rhetoric of Images (3). Permission of the instructor. Selected readings on image production, exhibition, and interpretation, with consideration of different ritual and cultic settings.

735 Critical Works in Religion and Literature (3). Permission of the instructor. Textual analysis of several theoretical and literary works dealing with selected problems in religion and literature.

740 Approaches to the Study of American Religions (3). Graduate standing in religious studies or permission of the instructor. Consideration of methods, theories, and interpretations that have been influential in the study of American religion.

741 Themes in African American Religious History (3). Graduate standing in religious studies or permission of the instructor. A historical and thematic survey of the religions of African Americans from the precolonial era to the present.

742 Religion and Literature in America (3). Graduate standing in religious studies or permission of the instructor. A study of the religious tradition in American literature from the Puritan period to the present.

743 Current Trends in American Judaism (3). The course aims at examining the current developments in American Judaism: cultural, spiritual, liturgical, as well as social and institutional.

744 Readings in American Religion to 1865 (3). An examination of primary sources in the history of American religion from the precolonial era to the Civil War.

745 Readings in American Religion since 1865 (3). An examination of primary sources in the history of American religion since the Civil War.

746 The Christian-Jewish Encounter in America (3). Course examines the Christian-Jewish encounter in America from the 17th century to the present. Analyzes both theological and social interactions.

760 Approaches to Medieval and Early Modern Studies (3). Graduate standing in religious studies or permission of the instructor. An introduction to the problems and methods in the study of medieval and early modern religion in the West.

780 Methods in Islamic Studies (3). Principal topics will include the history of Islamic studies; problems of anti-Islamic bias; use of textbooks, primary sources, novels, films and the Internet; teaching the Qur'an; the Muslim presence in Europe and America; modern Muslim thinkers; gender studies; and other related subjects. Gateway course.

782 Islam and Reform (3). Exploration of reformist intellectual movements in modern Muslim societies, paying close attention to the case of post-revolutionary Iran and examining the compatibility of Islam and human rights, women's rights, democracy, and fresh hermeneutical approaches to scriptures.

785 Critical Genealogies of Middle East Studies (3). Permission of the instructor. This seminar is the core course for the graduate certificate in Middle East studies. It is an introduction to critical issues in the study of the Middle East, focusing on classic works of the humanities and social sciences.

801 Seminar in Biblical Studies (3). Topics vary; consult the department.

807 Hellenistic Religious Texts in Greek (3). Studies in Greek texts drawn from early Christianity, Judaism, and other religions of the Greco-Roman World.

808 The Apostolic Fathers (3). Required preparation, proficiency in Greek. Permission of the instructor. A study of selected works of the Apostolic Fathers, including Barnabas, Ignatius, and Polycarp.

809 Textual Criticism of the Greek Bible (3). Required preparation, proficiency in Greek. Permission of the instructor. Reconstruction; application of text-critical principles.

810 Readings in Early Jewish and Christian Apocalyptic (3). Permission of the instructor. Readings from apocalyptic texts in the original languages.

812 Diaspora Judaism (CLAR 812) (3). Permission of the instructor for undergraduates. Seminar examines the evidence for the ancient Jewish communities of Egypt, Rome, Asia Minor, and Mesopotamia.

813 Readings in Talmud (3). Permission of the instructor. An introduction to the study of the Babylonian Talmud in the original Hebrew and Aramaic, with the traditional commentaries. The emphasis is on understanding Talmudic logic.

814 Problems in Rabbinic Historiography (3). Prerequisite, RELI 712. Permission of the instructor for students lacking the prerequisite. Examination of the methodological problems of using rabbinic materials as sources for the history of Judaism in the period after 70 CE.

817 Ancient Rhetoric and Early Christianity (3). Permission of the instructor. Survey of the development of rhetorical theory and practice through the Hellenistic and Roman Period. Explores the connection between rhetorical tradition and early Christian literature.

818 The Gnostic Scriptures (3). Prerequisite, RELI 413. Permission of the instructor for students lacking the prerequisite. Close reading and interpretation of ancient Gnostic texts found near Nag Hammadi in Egypt.

819 Ancient Philosophy and Early Christianity (3). Required preparation, proficiency in Greek and/or Latin. Survey of the Hellenistic schools of philosophy and their impact on early Christian theories of the universe, ethics, cultural history, and salvation.

821 Seminar in Religion and Culture (3). Permission of the instructor. Topics vary; consult the department.

823 Postcolonial Approaches to the Study of Religion (3). Permission of the instructor. An examination of major themes in contemporary postcolonial thought, and the application of this work to the study of religion.

835 Space, Place, and Religion (3). This interdisciplinary graduate seminar focuses on religion, space, and place in the United States.

838 Topics in Religion and Law (3). This course examines selected themes in legal and social theory relating to the position of religion in contemporary American society.

840 Seminar in American Religion (3). Topics vary. May be repeated for credit.

841 Religion and Social Issues in America (3). Historical analysis of the relationship between religious developments and social issues in America. Topics may include economics, politics, and social reform.

842 Religion and Cultural Contact in America (3). Examination of religion in America through instances of intercultural contact. Topics vary.

843 Roman Catholicism in America (3). A seminar on Roman Catholicism in the United States that also considers developments elsewhere in the Western hemisphere. Focus is on ritual practice and visual culture.

866 Medieval Religious Texts (3). Permission of the instructor. Selected texts which illumine significant aspects of medieval religious culture are read in the original languages.

867 Texts of the Catholic and Protestant Reformations (3). Permission of the instructor. Selected texts which illumine significant aspects of the Catholic and Protestant Reformations are read in the original languages.

870 Methods and Topics in the Study of Western Religious Traditions (3). Permission of the instructor. Exploration of one enduring issue in the history of the Western Christian tradition. The instructor selects several case studies that illustrate both the topic and the developments within traditions.

881 Islamic Thought (3). Required preparation, proficiency in Arabic and/or Persian. Advanced study of major Islamic thinkers and topics, based on original language texts and modern scholarly interpretations.

885 Buddhist Studies and the Construction of Buddhism (3). Introduction to major approaches and methodological questions in Buddhist studies. This course serves as a gateway course.

890 Topics in the Study of Religion (3–9). Graduate standing in religious studies or permission of the instructor. Topics vary.

891Topics in Islamic Studies (3). Graduate seminar on critical issues in Islamic studies. Topics vary.

900 Readings and Research (3–9). Permission of the instructor.

990 Preliminary Preparation (1–21).

993 Master's Thesis (3–6).

994 Doctoral Dissertation (3–9).

Courses for Graduate and Advanced Undergraduate Students

JWST

412 20th-Century Polish Literature and Culture (PLSH 412) (3). See PLSH 412 for description.

444 Gender and Sexuality in Contemporary Judaism (RELI 444) (3). See RELI 444 for description.

464 Imagined Jews: Jewish Themes in Polish and Russian Literature (SLAV 464) (3). See SLAV 464 for description.

465 Literature of Atrocity: The Gulag and the Holocaust in Russia and Eastern Europe (PWAD 465, SLAV 465) (3). See SLAV 465 for description.

469 Coming to America: The Slavic Immigrant Experience in Literature (SLAV 469) (3). See SLAV 469 for description.

486 Shalom Y'all: The Jewish Experience in the American South (AMST 486) (3). See AMST 486 for description.

503 Exploring the Dead Sea Scrolls (RELI 503) (3). See RELI 503 for description.

512 Ancient Synagogues (CLAR 512, RELI 512) (3). See RELI 512 for description.

602 What Is Scripture? Formations of the Hebrew Bible/Old Testament Canon (RELI 602) (3). See RELI 602 for description.

697 Capstone Course: Themes and Methodologies in Jewish Studies (3). Required of majors in religious studies with a concentration in Jewish studies; graduate students may enroll. Concentrating on a different theme each year, the course offers intensive grounding in key areas of and approaches to Jewish studies. Combines exploration of broad topics with scholarly rigor and specificity.

Department of Romance Languages and Literatures

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FEDERICO LUISETTI, *Chair*

Professors

French

Sahar Amer, Medieval French Literature, Franco-Arab Literature and Culture
Martine Antle (45) 20th-Century French and Francophone Literature, Franco-Arab Studies, European Cinema
Dominique Fisher (46) 19th-Century French Literature, Fin-de-Siècle Literature, Francophone Literature
Hassan Melehy (64) Early Modern French and Comparative Literature, Contemporary Critical Theory, Film, Franco-American Literature

Italian

Dino Cervigni (44) Medieval and Renaissance Italian Literature
Federico Luisetti (69) 20th-Century Italian Literature, Contemporary Critical Theory
Ennio Rao (15) Italian Renaissance, Italian Dialectology

Portuguese

Fred M. Clark (29) Portuguese Language and Brazilian Literature
Monica P. Rector (43) Portuguese Language and Literature

Spanish

Lucia Binotti (47) Medieval, Renaissance, Golden Age Philology and Linguistic Thought
Frank A. Domínguez (25) Medieval and Golden Age Spanish Literature, Ideology and Literature, Computer Applications in the Humanities
Larry D. King (36) Spanish and Portuguese Linguistics
Rosa Perelmuter (37) Colonial Spanish American Literature, Contemporary Spanish American Narrative

Associate Professors

Spanish

Samuel Amago (3) 19th through 21st-Century Spanish Literature, Culture, and Film
Emilio del Valle Escalante (05) Indigenous Literatures and Social Movements, Central American Literatures and Cultures, Cultural and Postcolonial Studies
Oswaldo Estrada (04) 20th-Century Latin American Literature, Mexican and Peruvian Literatures, Theory of the Novel, New Narrative
Juan Carlos González Espitia (62) 19th-Century Spanish American Literature, Decadentism and Nation Building
Carmen Hsu (51) Golden Age Spanish Literature, Chronicle Literature of the East Indies
Alicia Rivero (38) Contemporary Spanish American Literature, Contemporary Critical Theory, Gender Issues, Literature and Science, Intellectual History

Assistant Professors

French

Jessica Tanner (30) 19th-Century French Literature and Culture, Contemporary Critical Theory, Colonial Studies, Urban Studies
Ellen Welch (08) 17th-Century French Literature; Colonial/Postcolonial and Transnational Approaches

Italian

Marisa Escolar (39) Modern and Contemporary Italian Literature and Culture, Translation and Censorship Theory, Anglophone Translations of Italian Narrative

Spanish

Patricia Amaral, Spanish and Portuguese Linguistics, Semantics
Bruno Estigarribia (22) Spanish Syntax; First Language Acquisition; Corpus Linguistics; Language Contact
Irene Gómez Castellano (13) 18th-Century Spanish Literature and Culture, Poetry and Visual Arts

Professors Emeriti

Cesáreo Bandera
Pablo Gil Casado
Angel L. Cilveti
Yves de la Quérière
I. R. Stirling Haig II
Antonio Illiano
Anthony G. Lo Ré
Catherine A. Maley
Edward D. Montgomery
José Manuel Polo de Bernabé
María A. Salgado
Carol Lynn Sherman

Requirements for Advanced Degrees

The degree of master of arts is offered with a major in Romance languages and literatures and concentrations in French and francophone studies, Franco-Arab studies, Italian literature and culture, or Hispanic literatures and cultures. The program for the M.A. degree is open to students holding the bachelor of arts degree or the equivalent, and whose major field of undergraduate study was normally a Romance language and literature. Students are expected to have proficiency in the Romance language and in English upon admission to the program.

The degree of doctor of philosophy is offered with a major in Romance languages and literatures. Concentrations are in French and Francophone studies, Italian literature and culture, the literatures, languages, and cultures of the Iberian Peninsula and the Americas, and medieval and early modern studies. Teaching experience is an essential

part of professional training. Therefore, teaching assistance or lecture instruction equivalent to at least three contact hours a week for two semesters, or until teaching competence is acquired, is required of all doctoral candidates.

Research Facilities

The Walter Royal Davis Library's Spanish, French, Portuguese, and Italian collections rank in the top 20 in the nation. The Spanish and Spanish American collections are particularly strong in medieval, Golden Age/Colonial, 19th- and 20th-century holdings. The French collection has similar strengths in the 17th, 18th, and 19th centuries and is enriched by the Charles Nodier and René Char materials. The Italian collection exhibits strength in the 19th century and the Portuguese collection in 20th-century Brazilian. These strengths are enhanced by extensive holdings in reference, specialized journals, and rare books. Among the latter are a notable gathering of 20th-century first editions of French writers, a distinguished Spanish drama collection of more than 26,000 plays (many of them pre-1830 sueltas) and the Flatow Collection of Latin American Cronistas, consisting of early imprints of the discovery and conquest of the New World. A more complete description of the collections is available in the "Resources" section of the department's Web site at roml.unc.edu.

Catalan

Courses for Graduate and Advanced Undergraduate Students *CATA*

401 Elementary Catalan (3). Introduction to Catalan language and culture. Designed for students who already have proficiency in another foreign language.

402 Intermediate Catalan (3). Continuation of CATA 401 with more emphasis on reading authentic texts.

French

Courses for Graduate and Advanced Undergraduate Students *FREN*

401 Beginning Accelerated French (3). For students with proven competence in another foreign language. Covers first-year material in one semester; emphasis on speaking and grammar. May not be used to satisfy the Foundations foreign language requirement.

402 Intermediate Accelerated French (3). Prerequisite, FREN 102, 105, 111, or 401. Covers second-year material in one semester. Develops skills, with increasing emphasis on reading and writing. Prepares for more advanced courses.

403 Advanced Composition (3). Prerequisite, FREN 300. Review of advanced grammar. Exercises in translation from English into French of literary and critical materials. Free composition and training in the use of stylistic devices.

451 Orientalist Fantasies and Discourses on the Other (ASIA 451) (3). See ASIA 451 for description.

452 Muslim Women in France and the United States (3). This class will follow Muslim women's experiences and changing roles in France and the United States from the 1970s through today.

500 Research Methods in French and European Studies (3). Provides training in research methodology either for a B.A. honors or M.A. thesis topic related to contemporary European studies. Students will learn to conceptualize an original research project and to identify and assess the current intellectual debates in their chosen areas of research.

504 Cultural Wars: French/United States Perspectives (3). This course examines the limits of universalism in today's "multicultural" France and how the European Union will affect French universalism and French resistance to identity politics.

505 African Francophone Cinema (3). Prerequisite, FREN 300. Study of the production of films from francophone sub-Saharan and North African communities.

564 History of the French Language (LING 564) (3). Prerequisite, FREN 300. Permission of the instructor for students lacking the prerequisite. The phonology, morphology, and syntax of French are traced from the Latin foundation to the present. Lectures, readings, discussions, and textual analysis.

565 French Phonetics and Phonology (LING 565) (3). Prerequisite, FREN 300. Permission of the instructor for students lacking the prerequisite. The study of sounds as system in modern standard French. Lecture, discussion, laboratory practice in practical phonetics according to individual needs.

566 Structure of Modern French (LING 566) (3). Prerequisite, FREN 300. Permission of the instructor for students lacking the prerequisite. Introduction to phonology, morphology, and syntax of modern standard French. Application of modern linguistic theory to the teaching of French.

594 Writing the Mediterranean (3). Explores early modern literary representations of the Mediterranean as a space of cross-cultural encounter, exchange, rivalry, and negotiation.

601 French for Reading (3). French language for reading. For students with no background in French or those needing a review of grammatical structures and vocabulary in preparation for the reading knowledge exam for graduate degrees (FLPA).

611 French Novelists of the 20th Century (3). Evolution of the novel in France up to the nineties.

613 20th-Century Literature (3). Studies of a single author, a literary movement, or an aesthetic movement from the avant-garde to postmodernism.

615 Readings in Francophone Literature (3). Evolution of francophone literature from a literary and cultural perspective (Maghreb, Africa, Caribbean Islands, and Canada).

616 Readings in Cultural Studies (3). An examination of national and transnational identity within European culture and recent economic and ethnologic changes in Western Europe and France.

661 Studies in French Renaissance (3). Interdisciplinary seminar on a cultural topic or a theme through readings in literary and nonliterary texts.

662 Poetry of the French Renaissance (3). Major currents in French Renaissance poetry: the Rhétoriqueurs, the break with the Middle Ages, Italian influences, the formation of the French Renaissance sonnet, poetry and gender, poetry and politics, the Pléïade. Clément Marot, Maurice Scève, Louise Labé, Olivier de Magny, Pierre de Ronsard, Joachim Du Bellay. Taught in French.

670 Studies in 17th-Century French Literature (3). Prerequisites, FREN 300, and 371, 372, or 373. Permission of the instructor for students lacking the prerequisites. In-depth study of a particular aspect of 17th-century literature and culture. Possible topics are the court and its elsewhere, Frenchness and foreignness in the 17th century, theater and theatricality, enchantment and disenchantment.

683 18th-Century Prose (3). Intensive study of a major 18th-century writer.

685 Libertinism (3). In-depth study of the genealogy of the concept of libertinage as a philosophical discourse and aesthetic manifestation.

687 Diaspora and Transculturalism in Québécois Literature (3). Evolution of identity and nationhood in Québécois literature from the 1960s to the present, including the study of the literature of immigration (diasporic or *littrature migrante*).

691H Honors Thesis in French (3). Required of students reading for honors. Preparation of an essay under the direction of a member of the faculty. Topic to be approved by thesis director in consultation with honors advisor.

692H Honors Thesis in French (3). Restricted to senior honors candidates. Second semester of senior honors thesis. Thesis preparation under the direction of a departmental faculty member.

Courses for Graduate Students
FREN

714 French Drama of the Twentieth Century (3). Semiotic readings in French and Francophone theater at the crossroads of cultures from the avant-garde to postmodernism.

721 Old French (3). An introductory course designed to enable students to read medieval texts with rapidity and accuracy. Phonology, morphology, semantics, and syntax.

726 French Feminist Theory (WMST 726) (3). See WMST 726 for description.

734 Seventeenth-Century Drama (3). Readings in sixteenth- and seventeenth-century French theater, Crébillon père and Voltaire. Selection of texts will be announced by the instructor.

735 Eighteenth-Century Drama (3). A study of the genre from Marivaux to the end of the nineteenth century.

737 Literary and Cultural Theory in France (3). A study of structuralist and poststructuralist methods in poetics, semiotics, psychoanalysis, sociology, and philosophy.

781 Eighteenth-Century Novel (3). An array of novelists and conteurs such as Prévost, Lesage, Marivaux, Laclos, Crébillon fils, Montesquieu, Diderot, Rousseau, and others.

784 Philosophers of the Enlightenment (3). Intellectual currents (religious, scientific, epistemological) and morals as reflected in such writers as Bayle, la Mettrie, Condillac, Helvétius, d'Holbach, the Encyclopedists, and others.

789 Franco-Asian Encounters (3). Cultural encounters between France, Vietnam, and China and overview of the French presence in Vietnam from the 1880s to the end of the colonial period in 1954.

793 Nineteenth-Century French Literature (3). Intensive study of a single major author of the romantic or post-romantic period. The subject changes from year to year among writers in the different literary genres.

794 French Nineteenth-Century Post-Romantic Poetry (3). A study of the evolution of poetry and poetics in modernity beginning with Baudelaire.

795 The French Realistic and Naturalistic Novel (3). A study of major realistic and naturalistic novelists (Flaubert, the Goncourts, Daudet, Zola, Maupassant, and Huysmans).

796 French Brief Fiction of the Nineteenth Century and/or Twentieth Century (3). A study of short narrative as a hybrid genre from a literary and cultural perspective.

797 Fin-de-Siècle Literatures (3). Fiction from the 1880s through WWI and its aftermath: modernity (the1850s), decadence, naturalism, the avant-garde, and the belle époque.

830 Seminar (3). Topic determined by instructor and announced in advance.

840 Special Readings (1–21). Doctoral students only.

993 Master's Thesis (3).

992 Master's Thesis Substitute (3).

994 Doctoral Dissertation (3). Research in a special field under the direction of a member of the graduate faculty.

Italian

Courses for Graduate and Advanced Undergraduate Students
ITAL

401 Beginning Accelerated Italian (3). For students with special aptitude and interest in developing Italian language skills. Covers first-year material in one semester. Emphasis in the first semester is on grammar. May not be used to satisfy the Foundations foreign language requirement.

402 Intermediate Accelerated Italian (3). Prerequisite, ITAL 102 or 401. Covers second-year material in one semester. Develops skills, with increasing emphasis on reading and writing. Prepares students for more advanced courses.

503 Advanced Composition for Graduate Students (3). Review of advanced grammar. Composition on a variety of topics designed to enhance writing proficiency in Italian. Training in the use of stylistic devices.

511 Survey of Italian Literature and Culture I (to 1600) (3). Permission of the instructor for undergraduates. The survey is based on anthologies, with particular attention to authors and texts included in the current departmental reading lists.

512 Survey of Italian Literature and Culture II (1600 to present) (3). Permission of the instructor for undergraduates. See ITAL 511 for description.

526 History of the Italian Language (3). Prerequisite, ITAL 204 or 402. Permission of the instructor for students lacking the prerequisite. The evolution of the Italian language from vulgar Latin. Substratum theory and the development of the various dialects. Codification of the literary standard during the Renaissance. "Questione della lingua."

691H Honors Thesis (3). Required of students reading for honors. Preparation of an essay under direction of a member of the faculty. Topics to be approved by thesis director in consultation with honors advisor.

692H Honors Thesis in Italian (3). Restricted to senior honors candidates. Second semester of senior honors thesis. Thesis preparation under the direction of a departmental faculty member.

Courses for Graduate Students
ITAL

706 Proseminar (3). An introduction to modern Italian criticism and to current methods of research and scholarship. Bibliographic survey of basic tools and secondary literature. Guidance in preparation of papers, theses, and dissertations.

731 Dante I (3). Permission of the instructor for undergraduates. Dante's life and works; a critical reading of the Vita Nuova and Inferno. Original texts; course taught in Italian or English.

732 DANTE II (3). Permission of the instructor for undergraduates. Completes the critical reading of the Divine Comedy. Original texts; course taught in Italian or English.

734 Petrarch and Lyric Tradition (3). A reading of Petrarch's Canzoniere within the context of previous lyric tradition and Petrarchism in Europe. Class discussion in English; readings in Italian for majors and in translation for nonmajors.

735 Boccaccio and European Narrative (3). Boccaccio's Decameron within the context of previous narrative traditions and the subsequent development of narrative in Europe. Class discussions in English; readings in Italian for majors and in translation for nonmajors.

741 Italian Literature of the Renaissance I: The Quattrocento (3). Prerequisite, ITAL 204 or 402. A study of the major figures of Italian Humanism, Latin, and vernacular, from Salutati to Poliziano.

751 Italian Literature of the Renaissance II: The Cinquecento (3). Prerequisite, ITAL 204 or 402. Brief description of the literary and historical situation in the Cinquecento. Three authors studied in detail are Ariosto, Orlando Furioso, Machiavelli, Il Principe, and Castiglione, Il Cortegiano.

771 The 17th and 18th Centuries (3). Prerequisite, ITAL 204 or 402. The Age of the Baroque, Campanella, the new genres, Tassoni. The literature of Arcadia, the Enlightenment, Goldoni, Parini, and Alfieri.

781 Italian Romanticism (3). Prerequisite, ITAL 204 or 402. Preromanticism; Alfieri; the lyrics and novels of Foscolo, Leopardi, Manzoni; the romantic drama from Pindemonte to Niccolini.

782 Italian Literature in the Second Half of the 19th Century (3). Prerequisite, ITAL 204 or 402. The major literary forms in the second half of the century with particular regard to Verismo, Verga, Carducci, Pascoli, Scapigliatura, and Decadentismo.

784 Italian Avant-Gardes and Neo-Avant-Gardes 20th Century (3). Prerequisite, ITAL 204 or 402. Examines the critical issues raised by the Italian avant-gardes and neo-avant-gardes of the 20th century.

795 Modern Italian Fiction (3). Prerequisite, ITAL 204 or 402. D'Annunzio, Svevo, Moravia, Pavese, Vittorini, Calvino, etc.

796 Modern Italian Drama (3). Grotteschi, Pirandello, Italian drama after World War II, Eduardo de Filippo, etc.

830 Seminar (3). Special study and research in set topics; e.g., Seicento and Baroque, autobiography, Renaissance theater, literature, and film.

840 Special Readings (1–21). A tutorial on a topic agreed upon by the student and a member of the graduate faculty.

993 Master's Thesis (3). Research in a special field under the direction of a member of the graduate faculty.

992 Master's Thesis Substitute (3).

994 Doctoral Dissertation (3). Research in a special field under the direction of a member of the graduate faculty.

Portuguese

Courses for Graduate and Advanced Undergraduate Students

PORT

401 Accelerated Brazilian Portuguese I (3). For students who have fulfilled their foreign language requirement with another language. Covers first-year material in one semester. Introduction to spoken Portuguese with literary and cultural readings. May not be used to satisfy the Foundations foreign language requirement.

402 Accelerated Brazilian Portuguese II (3). Prerequisite, PORT 102, 111, or 401. Covers second-year material in one semester. Further study of spoken Portuguese with literary and cultural readings. May not be used to satisfy the Foundations foreign language requirement.

501 Survey of Portuguese Literature I (3). Prerequisite, PORT 204 or 402. An introduction to Portuguese literature from its origins through the 18th century.

502 Survey of Portuguese Literature II (3). Prerequisite, PORT 204 or 402. A survey of Portuguese literature of the 19th and 20th centuries.

503 Survey of Brazilian Literature I (3). Prerequisite, PORT 204 or 402. A survey of Brazilian literature of the colonial period and 19th century.

504 Survey of Brazilian Literature II (3). Prerequisite, PORT 204 or 402. Study of major writers of 20th-century Brazilian literature.

526 History of the Portuguese Language (3). Prerequisite, PORT 402. Permission of the instructor for students lacking the prerequisite. Survey of the history of Portuguese with stress on the characteristics of Brazilian Portuguese and the factors underlying them.

530 Varieties of Portuguese (3). Introduction to the linguistic analysis of Portuguese. Basic linguistic comparison of Portuguese dialects at different levels of linguistic structure. Emphasis on theoretical background in understanding language variation as a property of natural languages.

535 Brazilian Drama (3). Prerequisite, PORT 402. Permission of the instructor for students lacking the prerequisite. A study of representative Brazilian plays of the 20th century with a review of the development of the theater in Brazil.

691H Honors Thesis (3). Required of all students reading for honors. Preparation of an essay under the direction of a faculty member. Topic to be approved by thesis director in consultation with honors advisor.

692H Honors Thesis in Portuguese (3). Restricted to senior honors candidates. Second semester of senior honors thesis. Thesis preparation under the direction of a departmental faculty member.

Courses for Graduate Students

PORT

703 Advanced Composition for Graduate Students (3). Advanced grammar with exercises in translation from English into Portuguese. Free composition and training in the use of stylistic devices.

704 Luso-Brazilian Bibliography and Methodology (3). An introduction to bibliography and methodology in Luso-Brazilian literary and linguistic research.

710 The Portuguese Novel (3). A study of prose fiction, particularly from the nineteenth and twentieth centuries, with special emphasis on Camilo Castelo Branco, Eça de Queirós, Aquilino Ribeiro, Ferreira de Castro, and the neo-realistas.

712 The Brazilian Novel (3). Extensive reading of representative Brazilian novels from the second half of the 19th century to the present.

713 Machado de Assis (3). A study of the prose fiction, drama, poetry, and criticism of Machado de Assis, with reference to other major writers of the second half of the 19th century.

714 Modern Brazilian Short Fiction and Essays (3). A study of Brazilian short stories, novellas, and essays of the twentieth century.

721 Old Portuguese (3). A study of Portuguese historical phonology and morphology with readings from medieval verse and prose.

731 Camões (3). The works of Camões (epic, lyric poetry, and drama) are studied with reference to the contemporary Iberian historical and literary background.

791 Portuguese Overseas Language and Literature (3). A survey of the use and characteristics of Portuguese as used in Africa and Asia (especially Cape Verde creole) and readings from contemporary African authors using Portuguese.

830 Seminar in Portuguese Literature (3). Topic determined by instructor and announced in advance.

833 Seminar in Luso-Brazilian Linguistics (3). Topic determined by instructor and announced in advance.

835 Seminar in Brazilian Literature (3). Topic determined by instructor and announced in advance.

840 Special Readings (1).

993 Master's Thesis (3).

994 Doctoral Dissertation (3).

Romance

Courses for Graduate and Advanced Undergraduate Students
ROML

500 Research Methods in Romance Languages and European Studies (3). Provides training in research methodology either for a B.A. with honors or M.A. thesis. Students will learn to conceptualize an original research project and to identify and assess the current intellectual debates in their chosen areas of research.

600 Master's Workshop on Theory (3). This graduate seminar consists of a series of in-depth studies of several major contemporary approaches to literary theory. Designed primarily as an elective for master's candidates in Romance languages, this course aims to prepare students for advanced literature and literary theory courses.

650 The Politics of Remembering: Memory, History, and Power in 20th-Century Europe (3). Interdisciplinary, comparative, and multimedia approach to the question of memory and history in 20th-century Europe. Explores individual memory, collective memory, and commemoration. Survey of interdisciplinary approaches to the field and an examination of historical sites through the narratives of mental illness, fiction, memoir, testimonial literature, photography, and film.

660 Film and Culture in Brazil and Spanish America (3). Critical examination of 20th-century Latin American cultural history in Brazil and Spanish-speaking countries, including Mexico, Cuba, El Salvador, Peru, Colombia, and Argentina. Course is framed between late 19th-century modernization and the contemporary discussion on globalization.

698 Seminar in Romance Languages: Capstone Course (3).

Courses for Graduate Students
ROML

700 Theories and Techniques of Teaching (3). Required of all new graduate instructors. Exploration of theoretical issues in teaching Romance languages with their practical applications, including the integration of technology.

751 Introduction to Medieval Studies (3). Interdisciplinary course to introduce graduate students to the sources, methods, and approaches of medieval studies.

755 Workshop on Literary Theory and Research Methods (1.5). An introduction to contemporary theoretical positions to acquaint the student with issues posed by formalism, Marxism, feminism, and deconstruction. Orientation to Romance bibliography and research methods.

820 Introduction to Latin for Romance Studies (3). Thorough study of the basic grammar and syntax of classical Latin, followed by readings from representative medieval literary texts and a sampling of writings by the Italian humanists. Restricted to graduate students in the Department of Romance Languages and Literatures.

824 Romance Paleography (3). Study of the development of medieval romance book hands and diplomatics from their origins to the advent of printing; with practical exercises.

825 Provençal (3). Linguistic analysis of the langue d'oc and investigation of medieval Provençal literature.

830 Seminar in Romance Languages (3). Topic determined by instructor and announced in advance.

840 Special Readings (1–21).

870 Minor Romance Tongues (3). Introduction to the historical development of Catalan, Rhaeto-Romance, and Rumanian. Readings in period texts.

993 Master's Thesis (3).

994 Doctoral Dissertation (3).

Spanish

Courses for Graduate and Advanced Undergraduate Students
SPAN

401 Beginning Accelerated Spanish (3). Required preparation, proven competence in another foreign language. Covers first-year material in one semester. Emphasis on speaking and grammar. May not be used to satisfy the Foundations foreign language requirement.

402 Intermediate Accelerated Spanish (3). Prerequisite, SPAN 102, 105, 111, or 401. Covers second-year material in one semester. Continued development of all skills. Spanish 402 prepares students for more advanced courses.

403 Advanced Composition (3). Prerequisite, SPAN 300 or 326. Review of advanced grammar. Compositions on a variety of topics designed to enhance writing proficiency in Spanish. Training in the use of stylistic devices.

404 Elementary Spanish for Health Professionals (3). Distance course requiring access to the Internet. Focuses on communication within the context of Latino/a immigrant culture in health care settings.

405 Intermediate Spanish for Health Care Professionals (3). Prerequisite, SPAN 102 or 404. Distance course requiring access to the Internet. Focuses on improving communication within the context of Latino/a immigrant culture in health care settings. This course is equivalent to SPAN 203 (Intermediate Spanish I) and therefore fulfills the foreign language requirement.

414 Languages of Spain I (3). Study of the language and culture of one of the languages of Spain other than Spanish. Selection will vary according to term: Catalan, Euskera (Basque), Galician.

415 Languages of Spain II (3). Continuation of the study of the language and culture of one of the languages of Spain other than Spanish. Selection will vary according to term: Catalan, Euskera, Galician.

416 Languages of the Americas I (3). Study of the language and culture of one of the languages of Spanish America other than Spanish. Selection will vary according to term: Mayan, Nahuatl, Quechua, Guarani.

417 Languages of the Americas II (3). Continuation of the study of the language and culture of one of the languages of Spanish America other than Spanish. Selection will vary according to term: Mayan, Nahuatl, Quechua, Guarani.

601 Spanish for Reading (3). For students with no background in Spanish or those needing a review of grammatical structures and vocabulary in preparation for the reading knowledge exam for graduate students (FLPA).

613 Colonial and 19th-Century Spanish American Literature (3). Prerequisites, SPAN 371 or 372, and 373. Advanced survey of literary works from 16th- through 19th-century Spanish America, with emphasis on their rhetorical foundations and historical, political, and aesthetic connections.

614 Modernist and Contemporary Spanish American Literature (3). Prerequisites, SPAN 371, and 372 or 373. Advanced survey of Spanish American works from the 1880s through the present, with emphasis on their rhetorical foundations and historical, cultural, political, and aesthetic connections.

617 Cervantes and the *Quijote* (3). Prerequisites, SPAN 371, and 372 or 373. Close reading of Cervantes' *Quijote* and selected *Novelas ejemplares*, with consideration of the background of Renaissance prose (romance of chivalry, pastoral, and sentimental novel) in relation to 16th-century historiography.

620 Women in Hispanic Literature (WMST 620) (3). Prerequisites, SPAN 371 or 372, and 373. The image of woman in 16th- and 17th-century Hispanic literature. A study of texts by Spanish and Spanish American authors. Readings in Spanish or in English translation. Lectures in English.

625 Indigenous Literatures and Cultures of the Américas (3). Panoramic view of indigenous literatures in the Américas through a study of a variety of indigenous textual production including chronicles, manifestos, novels, testimonial narratives, short stories, poetry, artistic production, and film.

630 Literature and the Visual Arts in Spain (3). Study of the literature of the Iberian Peninsula and developments in the visual arts from the Middle Ages to the early 20th century.

635 Modern Spanish Drama (3). Prerequisite, SPAN 370, 371, or 373. A study of plays by principal Spanish dramatists of the 20th century.

650 The Spanish Comedia of the Golden Age (3). A comprehensive study of the Golden Age Spanish theater from its Renaissance beginnings through the 17th century.

677 Spanish Syntax (3). Prerequisite, SPAN 377. Permission of the instructor for students lacking the prerequisite. Why do we say in Spanish "me gusta" ("to me pleases") for "I like it"? Syntax studies how words associate in larger structures. This class provides the tools to understand the forms of different varieties of Spanish.

678 Cultural and Linguistic History of the Spanish Language (LING 309) (3). Prerequisite, SPAN 300 or 326. The formation of the Spanish language and its cultures from Latin origins. Special attention to expansion of the Spanish Americas and the situation of Spanish today.

679 Spanish Pragmatics (3). Prerequisite, SPAN 377. This course is an introduction to the study of meaning and language use, with a focus on Spanish. Includes discussion of the classical texts in the field as well as analysis of a variety of data (corpora, fieldwork, and experimental materials).

680 First- and Second-Language Acquisition of Spanish (3). Prerequisite, SPAN 377. Why and how do children learn language so easily, and why is it so difficult for adults to learn a second language? This course examines these and related questions in the light of current theories of first- and second-language acquisition, with a focus on Spanish.

682 Spanish Sociolinguistics (3). Prerequisite, SPAN 376, 377, or 378. Interdisciplinary approach to studying the Spanish language as a social and cultural phenomenon. Explores the relationship between language and culture, communicative competence and pragmatics, social and linguistic factors in language variation and change, attitudes toward language and language choice, linguistic prejudice and language myths, and language and identity.

691H Honors Thesis (3). Required of students reading for honors. Preparation of an essay under the direction of a faculty member. Topic to be approved by thesis director in consultation with honors advisor.

692H Honors Thesis in Spanish (3). Restricted to senior honors candidates. Second semester of senior honors thesis. Thesis preparation under the direction of a departmental faculty member.

Courses for Graduate Students

SPAN

701 Beginnings of Castilian Hegemony to 1369 (3). Early medieval romance period (11th century to 1369). The establishment of Castilian hegemony studied through a variety of texts (chronicles, miracles, collections of law and exempla, fueros, epic and lyric poems).

702 The Trastamara Dynasty: 1369 to 1504/1516 (3). The final shaping of Castile, the beginning of nationhood, and American expansion studied through a variety of texts (chronicles, books of chivalry, lyric and narrative poems, sentimental novels and travel narratives).

707 Film Theory and Practice (3). Introduction to theoretical, analytical and historical approaches to narrative cinema in the Spanish-speaking world. For graduate students with no prior experience working with film.

709 Nonfiction Prose of the 16th and 17th Centuries (3). An examination of the histories, chronicles, and other documents written in Spain and Spanish American, with special emphasis on the literature of exploration.

710 19th-Century Spanish Novel (3). A study of the development of romanticism, costumbrismo, realism, and naturalism, principally through the novels of Gil y Carrasco, Pereda, Valera, Pérez Galdós, Pardo Bazán, Clarín, and Blasco Ibañez.

711 The Modern Spanish Novel (3). Trends in modern Spanish narrative fiction from 1900 to 1975. Modernism, Civil War, and dictatorship.

712 The Contemporary Spanish Novel (3). Trends in contemporary Spanish narrative from 1975 to the present. Post-totalitarian fiction, postmodernism, and minority literatures.

713 War, History, and Society in Iberian Narrative and Film (3). Focuses on the narrative production of Iberian literature in Castilian, Catalan, Basque, and Galician since 1936, with their corresponding film adaptations when available. Begins with the end of the Spanish Civil War, continuing with the years of the Francoist dictatorship and the transition to democracy, and concludes with Spain today.

714 Golden Age Poetry (3). Selected poetic works from Garcilaso through Quevedo.

715 Modern and Contemporary Spanish Poetry (3). Study of Spanish poetry from the 19th to the 21st centuries in terms of aesthetics and literary movements including romanticism, modernism, and postmodernism.

716 Contemporary Lyric Poetry (3). Major poets from the Generation of 1927 to the present.

721 Old Spanish I (3). Provides a detailed and comprehensive survey of the Spanish language, tracking its development from its Indo-European ancestors to modern usage and examining its phonology, morpho-syntax, verbal dynamics, lexis, and semantics.

722 Old Spanish II (3). Traces the development of the Spanish language from Latin to the present, focusing upon cultural, literary, and historical factors that have contributed to its evolution.

725 Golden Age Prose (3). The major prose works of the Golden Age, excluding those of Cervantes.

737 Topics in Contemporary Literary and Cultural Theory (3). Study of major topics in modern theory such as identities, time, space, history, nation, language, text, and image, from modernity to postmodernity and beyond.

738 Topics in the Intellectual History of Spain (3). Historical concepts such as power, ideology, class, culture, identity, attitude, race, perception, and methods as they developed among elite and nonelite groups of the 16th and 17th century Spanish society. Focuses on evolution of ideas, sciences, arts, techniques, and cultural expression of social movements—nationalism, colonialism, racism—and historical reflection.

741 The Essay and Short Story (CMPL 741) (3). Theory and practice of the essay and short story. Topics include masters of the Spanish American and international essay and short story, the evolution of both genres, gender, cultural studies.

742 Poiesis in Spanish America (3). Theories and practices of literary creation across genres and periods.

743 Topics in Spanish American Performance Studies (3). A thorough grounding in contemporary plays in the Spanish-speaking Americas. Topics include performing class, ethnicity, and gender; parody; staging nations; politics of metatheatre; post-modern agency; and the performance of everyday life.

744 The Aesthetics of the Baroque in Spanish American Literature (3). The origin, development, and persistence of a baroque aesthetic in Spanish American literature through an examination of diverse theories of baroque and close readings of representative texts.

745 The Vanguards (CMPL 745) (3). The theory and practice of innovative writing, especially since the 19th century. Topics include the historical Spanish American and Anglo-European vanguards, experimental literature, modernismo's literary rebellion, gender, and cultural studies.

746 The Novel in Spanish America (3). The novel to 1960. The course examines romanticism, realism, naturalism, modernism, and the new national literatures through such authors as Avellaneda, Blest Gana, Silva, Asturias, Carpentier, Rulfo, Bombal, and Vargas Llosa.

747 The Contemporary Spanish American Novel (CMPL 747) (3). The theory and practice of the novel since the 1960s. Topics include: the Spanish American "Boom" of the 60s and 70s, major international trends and writers, gender, cultural studies.

750 Enlightenment and Romanticism in Spain (3). Readings from 18th and 19th-century Spanish authors in various genres.

834 Seminar in Peninsular Spanish Literature and Culture (3). Topic determined by instructor and announced in advance.

835 Seminar in Spanish American Literature (3). Topic determined by instructor and announced in advance.

836 Seminar Spanish/Spanish American Transatlantic Topics (3). Topic determined by instructor and announced in advance.

840 Special Readings (1–21). Doctoral students only.

992 Master's Thesis Substitute (3).

993 Master's Thesis (3).

994 Doctoral Dissertation (3).

Curriculum in Russian and East European Studies

cseees.unc.edu
ROBERT M. JENKINS, *Director*
Jacqueline M. Olich, *Associate Director*

Professors

Richard N. Andrews, Public Policy
Christopher Browning, History
Richard R. Cole, School of Journalism and Mass Communication
Patrick Conway, Economics
Carl Ernst, Religious Studies
Suzanne Gulledge, School of Education
H. Garland Hershey, School of Dentistry
Konrad Jarausch, History
Charles Kurzman, Sociology
Gary Marks, Political Science
Timothy McKeown, Political Science
David McNelis, Environmental Sciences and Engineering
Louise McReynolds, History
Barbara Moran, School of Information and Library Science
John Pickles, Geography
David Pike, Germanic Languages
Barry Popkin, Carolina Population Center
Donald J. Raleigh, History
Thomas Ricketts, School of Global Public Health
Steven S. Rosefielde, Economics
Peter Sherwood, Slavic Languages and Literatures
Stanislav Shvabrin, Germanic Languages
Eren Tasar, History
Irene Zipper, School of Social Work

Associate Professors

Chad Bryant, History
Dean M. Harris, Health Policy and Management
Hana Pichova, Slavic Languages and Literatures
Zlatko Plese, Religious Studies
Andrew Reynolds, Political Science
Christopher Putney, Slavic Languages and Literatures
Michele Rivkin-Fish, Anthropology
Graeme Robertson, Political Science
Silvia N. Tomášková, Anthropology, Women's Studies
Milada Vachudova, Political Science

Assistant Professors

Radislav Lapushin, Slavic Languages and Literatures
Klara Peter, Economics
Mark Sorensen, Anthropology
Ewa Wampuszyc, Slavic Languages and Literatures

Senior Lecturer

Robert Jenkins, Curriculum in Russian and East European Studies and Political Science

Lecturers

Erica Johnson, Global Studies
Eleonora Magomedova, Slavic Languages and Literatures
Jacqueline Olich, Curriculum in Russian and East European Studies and History
Katya Pertsova, Linguistics
Marzanna Poplawska, Music
Jonathan Weiler, Global Studies

Professors Emeriti

Joseph Anderle, History
Samuel H. Baron, History
Willis E. Brooks, History
Carolyn Connor, Classics
Lawrence E. Feinberg, Slavic Languages and Literatures
David M. Griffiths, History
Michael Hunt, History
Madeline G. Levine, Slavic Languages and Literatures
Vasa D. Mihailovich, Slavic Languages and Literatures
Anthony R. Oberschall, Sociology
Chuck Stone, School of Journalism and Mass Communication

Requirements for the M.A. Degree

The Curriculum in Russian and East European Studies offers graduate work leading up to the degree of master of arts in Russian and East European studies. The degree program satisfies the general requirements of The Graduate School. In addition, the student must fulfill the following curriculum requirements:

- Four semester courses in a Slavic or East European language (Czech, Hungarian, Polish, Russian, or Serbo-Croatian)
- Completion of HIST 783, RUES 710, RUES 730, and RUES 993
- Completion of at least three courses in a concentration determined in consultation with the graduate program advisor.
- Completion and defense of the thesis project

Further information may be obtained from Robert Jenkins, Director, The Center for Slavic, Eurasian, and East European Studies, CB# 5125, FedEx Global Education Center, 301 Pittsboro St., The University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-5125. Telephone: (919) 962-0901. Fax: (919) 962-2494. E-mail: rjenkins@email.unc.edu. Web: cseees.unc.edu.

Courses for Graduate and Advanced Undergraduate Students

RUES

469 Conflict and Intervention in the Former Yugoslavia (POLI 469, PWAD 469) (3). See POLI 469 for description.

690 Selected Topics in Russian and East European Studies (3). Selected topics in Russian and East European studies. Varies by semester.

Courses for Graduate Students

RUES

710 Core Colloquium (1). Series of follow-up discussions of guest lectures sponsored by the Center for Slavic, Eurasian, and East European Studies. The discussions will be based on bibliographies previously assigned by guest lecturers.

730 Identities and Transitions (POLI 746) (3). Capstone course for the master of arts in Russian/East European studies. Interdisciplinary course focusing on the variety of problems encountered by the societies of East European countries and successor states of the former Soviet Union in their transition from communism to democracy.

991 Independent Study in Russian and East European Studies (1–21). Allows students to undertake advanced research under the supervision of a faculty member.

993 Master's Thesis (3–6).

School of Social Work

ssw.unc.edu
JACK M. RICHMAN, *Dean*

Distinguished Professors

Gary L. Bowen (98) Social Work with Families, Middle and High School Success, Crime and Violence in Schools, Work and Family Linkages, Military Families, Community Capacity Building, Neighborhood Effects, Performance-Driven Management
Mark W. Fraser (229) Children and Families at Risk, Antisocial and Aggressive Behavior in Childhood, Early Adolescence, and Adolescence, Risk and Resilience in Childhood, Prevention of Conduct Problems in Childhood and Adolescence
Shenyang Guo (213) Research Methods, Quantitative Data Analysis, Child Welfare, Child Mental Health Services, Welfare Policies
Matthew O. Howard (310) Adolescent Substance Abuse, Consequences of Inhalant and Ecstasy Abuse, Delinquency and Conduct Problems in Children and Adolescents, Evidence-Based Social Work and Chemical Dependency Practice
Kimberly J. Strom-Gottfried (033) Managed Care, Professional Ethics, Social Work Education, Bereavement
Mark Testa (217) Kinship Foster Care, Adoption and Guardianship, Child Welfare Consent Decrees and Class-Action Litigation, Social Indicators and Child and Family Policy, Experimental and Quasi-Experimental Designs
Marie O. Weil (95) Community Practice, Social Administration, Services to Families and Children, Community Development, Social Work and the Law
Sheryl Zimmerman (295) Evaluation of Practice, Social Gerontology, Psychosocial Aspects of Health, Long-Term Care, Outcome Research, Methods for Studying Older Populations, Dementia, Hip Fracture

Professors

Iris B. Carlton-LaNey (239) Social Welfare History (Especially African Americans and the Progressive Era), Rural Elderly African American Women and Social Support
Walter C. Farrell Jr. (351) Social Welfare and Health Policy, Hispanic Immigration Issues, Management and Community Practice, Nonprofit Leadership, Community and Economic Development and Employment, Discrimination and Inequality Issues
Michael Lambert (102) Adjustment in Children, Youth, Adults and Families; Cross-nationally in General, Focusing on Children of Color
Gary M. Nelson (83) Organizational and Community Change, Social Gerontology, Self-Evaluation
Dennis K. Orthner (82) Human Services Design and Evaluation, Public Welfare and Family Policy, Family Strengths, Military Families
Jack M. Richman (88) Individual, Couples and Family Practice, Social Support, At-Risk Students, Evaluation
Kathleen A. Rounds (034) Public Health and Social Work, Maternal and Child Health, Program Evaluation

Paul R. Smokowski (101) At-Risk Youth, Acculturation and Latino Families, Mixed-Methods Research Design, Developmental Science, Technology in Social Work Practice

Clinical Professor

Irene Nathan Zipper (27) Early Childhood Intervention, Family Support, Children's Mental Health Services, Service Coordination/Case Management, Service Integration

Research Professor

Dean F. Duncan III (218) Program Evaluation, Management of Human Services Agencies, Research Methods, Community Collaboration, Achievement Gap

Distinguished Associate Professor

Rebecca J. Macy (325) Interpersonal and Relationship Violence, Coping with Personal Threats and Trauma, Prevention and Practice Interventions

Associate Professors

Natasha K. Bowen (103) Mental Health of Children and Adolescents, Prevention and Treatment of Behavior Problems, Evaluation of Practice, Developmental Psychopathology, Risk and Protection, School Social Work, Research Methods and Statistics

Mimi V. Chapman (293) Social Work Practice, Child Abuse and Neglect, Children's Health and Mental Health, Immigration, Acculturation, Mental Health

Amelia C. Roberts-Lewis (292) Women and Chemical Dependency, Cultural Diversity and Social Work Practice, Spirituality and Social Work Practice, Developing and Evaluating Gender-Specific Substance Abuse Programs for Females, Implementation and Evaluation of Evidence-Based Practice in Substance Abuse Treatment Programs

Clinical Associate Professors

Rebecca B. Brigham (091) Child Welfare and Public Policy, Foster Care and Adoption, Adult Learning Theory, International Social Work Education

Joanne S. Caye (260) Child Welfare, Family-Centered Practice, Adolescence, Work with Foster Care and Adoptive Parents, Effects of Disasters on Families and Children

Lane G. Cooke (244) Family-Centered Services/Home-Based Services Delivery Systems in Communities and Neighborhoods, Family Preservation Programs, Child Abuse/Neglect, Family Violence, Rapid Assessment and Planning

Mathieu Despard (333) Community Economic and Asset Development for Lower-Income Communities, Community-Level Interventions and Problem Solving through Public-Private Partnerships, Social Entrepreneurship, Capacity Building with Small Nonprofits and Grassroots Organizations, Local and State Health Coverage Policies for the Uninsured and Community-Academy Partnerships

Anne C. Jones (224) Women's Health Issues, International Social Work, Practice with Couples and Families, Step-Families

Wanda F. Reives (012) Public Child Welfare, Family-Based Service, Public Human Services Management/Leadership

Mary Anne P. Salmon (219) Aging Issues (with Focus on Underserved Populations), Survey Development, Aging and Demographics, Family Caregiving

Tina M. Souders (007) Professional Ethics, Social Work and the Law, Child/Adolescent Mental Health, Nonprofit Law

Evelyn S. Williams (105) Child Abuse Prevention, Domestic Violence, Cultural Competence, Staff Development, Training and Supervision, Organizational Change

Research Associate Professor

Hye-Chung Kum (225) Program Evaluation, Management of Human Services Agencies, Research Methods, Community Collaboration, Social Welfare Policy and Program Analysis

Assistant Professors

Sarah E. Bledsoe (202) Mental Health Services Research, Evidence-Based Practice, Interpersonal Psychotherapy, Mood and Anxiety Disorders, Clinical Intervention Research, Knowledge Dissemination and Implementation in Agency Practice, Culturally Relevant Practices, Low-Income Populations

Gina A. Chowa (206) International Social Development, particularly in Asset Building, HIV/AIDS, Social Protection and Financial Capability

Trenette Clark (304) Etiology and Prevention of Adolescent Drug Use, Problem and Risky Behaviors during Childhood and Adolescence, Risk and Resilience in Childhood and Adolescence, Preventive Interventions

Gary S. Cuddeback (279) Severe Mental Illness, Criminal Justice, Mental Health Services

Amanda Sheely (392) Determinants of Poverty and Its Effects on Families, Welfare Reform Implementation, Devolution and Service Provision, Effects of Welfare Reform on Poor Families, Homeless Families

Susan Snyder (261) Child Welfare, Juvenile Justice, Social Policy

Clinical Assistant Professors

Mellicent O. Blythe (203) Child Abuse and Neglect, Child Welfare, Foster Care, and Clinical Practice

Tara L. Bohley (110) Family Systems, Child Welfare, Adolescent Mental Health, Nonprofit management, Public Policy

Lyndin W. Bolton (294) Substance Abuse Services, Mental Health

Jean L. Byassee (291) Children's Mental Health, Parent/Provider Partnerships, Learning and Attention Disorders in Children and Adults

Selena B. Childs (205) Child Welfare, Workforce Development, Policy Development, Advocacy

Christopher Egan (107) Intellectual Disabilities; Developmental Disabilities; Mental Illness; including Co-Occurring I/DD and MH; Physical Disabilities; Public Policy

Jodon A. Flick (298) Clinical Safety, Suicide, Mental Health, Child Welfare

Sherry M. Hrynewych (275) Substance Abuse, Women's Issues, Spirituality and Psychotherapy, Experiential Therapies, Self-Psychology, Autism Spectrum Disorders

Daniel C. Hudgins (038) Aging, Social Welfare Policy, Human Services Management, Community Collaboration

Lisa R. Lackmann (247) Child and Adolescent Behavioral Health, Integrated Care, Family Support

Rodney D. Little (226) Group Process and Facilitation, Leadership Development for Supervisors/Managers in Public Social Services, Conflict Resolution, Rural Social Work Practice and Culture, Grief Loss and Bereavement

Ronald L. Mangum (230) Mental Health, Substance Abuse, Individual and Group Facilitation, Risk-Focused Prevention

John D. McMahon (232) Family and Children's Services, Child Welfare, Improving Outcomes for Families

Margaret L. Morse (398) Aging, Computer-Based Training, Web Site Design

Sarah M. Naylor (256) Academic Advising, Qualitative Research, Higher Education, Evaluation

Tanya M. Richmond (236) Older Adults, End of Life Issues, Long-Term Care, Children with Special Needs, Deaf and Hard of Hearing, Social Work Licensure, Training, Strategic Planning

Laurie J. Selz-Campbell (240) Community-Based Services, Mental Illness and Identity, Early Intervention, Children's Mental Health, Activity-Based Therapies, Peer Support, Intervention Design and Evaluation

Barbara B. Smith (253) Prevention and early intervention in mental health, mental health advocacy, empowerment of people with psychiatric disabilities, schizophrenia, severe mental illness, early psychosis, family psychoeducation, mental health recovery
Martha A. Weems (252) Clinical Practice, Substance Abuse, Mental Health, Crisis Intervention
Lisa D. Zerden (222) HIV/AIDS Prevention and Treatment; Health Disparities and Access; Healthcare Policy; Injection Drug Use and Harm Reduction; Social Welfare Policy and History

Research Assistant Professors

Steven H. Day (387) Program Evaluation, Delinquency Prevention, Community Planning and Development
Crystal Joy Stewart (242) Child Welfare, Program Evaluation, Racial Disparities in Child Welfare, Social Services Data Analysis, Human Services Management
Danielle Swick (234) Evidence Based Intervention, School Readiness and Success, Early Childhood Academic and Socio-emotional development, Military Families, Community Capacity Building, Research Methods and Statistics

Clinical Instructors

Travis J. Albritton (200) Public Child Welfare, Substance Abuse Services, Spirituality and Social Work Practice, Family and Community Social Supports
Daniel Comer (212)
Denisé G. Dews (005) Aging, End-of-Life Care, Medical Social Work, Field Education, Child Welfare Workforce
Susana G. Eguez (208) Special Education, Developmental Disabilities, Curriculum and Support Program Development
Dania M. Ermentrout (209) Relationship and Interpersonal Violence Prevention and Intervention, Program Evaluation, Maternal and Child Health, Child Abuse and Neglect, Research Design, Evidence-Based Practice
Robin J. Gault-Winton (281) Aging, Adult Mental Health, Curriculum Development, Leadership, and Organizational Development
Marilyn A. Ghezzi (243) Severe Mental Illness and Case Management, Childhood Trauma and Groupwork
Melissa L. Godwin (210) Substance Abuse Prevention and Intervention, School-Based Mental Health Services, Gender Issues, Clinical Social Work
Quentin J. Hinson (241) Immigration, Immigrant Health, Mental Health and Substance Abuse, Community Organizing, Sustainable Development.
Christine B. Howell (216) Group Process and Facilitation, Leadership Development for Supervisors/Managers in Public Social Services, Conflict Resolution, Rural Social Work Practice and Culture
Teresa L. Ilinitch (248) Child Welfare, Leadership and Workforce Development, Staff Development and Training, Family Group Decision Making, and Solution Focused Practice.
Denise R. Lindley (228) Community Capacity Building, Program Development and Evaluation, Military Families, Family Support, Sustainable Development
Michael B. Owen (337) Workforce Development, Behavioral Health Training Programs, Client Rights
M. Theresa Palmer (258) Clinical Practice, Social Work Education
Laura Phipps (257) Positive Behavior Intervention and Supports, Trauma-Informed Child Welfare, Implementation Science and Outcomes Focused Practice
Lawrence J. Rosenfeld (111) Family Violence Prevention; Child Welfare; Technology-Facilitated social work
Robin A. Snead (104) Health and Human Services, Clinical Supervision, Intellectual and Developmental Disabilities
Jaime G. Swaine (246) Children and Adults with Developmental Disabilities and Their Families
Tauchiana Vanderbilt (259) Social Work Services to Families and Children, School Social Work, Clinical Practice
Deborah J. Vassar (249) Family-Centered Services, Organizational Development, Coaching, Teambuilding and Process Consulting
Jennifer S. Vaughn (250) Health and Mental Health Policy, Severe and Persistent Mental Illness, Homelessness
Ashton P. Williams (235)
Ronni L. Zuckerman (052) Program Evaluation, Adolescent Pregnancy Prevention, Women's Health Issues

Research Instructor

Harlene C. Gogan (391) Child Welfare, Foster Care, Child Abuse and Neglect, Data Analysis

Professors Emeriti

S. Rachel Dedmon
Andrew W. Dobelstein
Maeda Galinsky
Dorothy N. Gamble
H. Carlisle Henley Jr.
Albert L. Johnson
Hortense K. McClinton

The M.S.W. Program

Students complete the foundation curriculum of 32 credit hours of content in the areas of human behavior and the social environment, institutionalized discrimination, social work practice, social policy,and research. In the advanced curriculum, students choose among three concentration areas for an additional 30 academic credit hours, including (1) the community, management and policy practice concentration area, (2) the direct practice concentration area, and (3) the self-directed concentration area.

The community, management and policy practice concentration prepares students for advanced work in social work administration, management, community and policy practice. The direct practice concentration prepares students for advanced practice with individuals, families, and groups. The self-directed concentration allows students who have specific career goals requiring an equal mix of direct and community or management skills to craft a blended concentration, combining direct and community, management and policy practice courses to gain the skills needed for their particular professional goals.

In both the MSW foundation and advanced curriculum, students also enroll in field education in addition to their classroom-based coursework. In field education, MSW students are placed in more than 250 government, nonprofit, and other human services agencies throughout North Carolina each semester of their studies. Through these field placements, students receive hands-on experience working in various areas, such as anti-poverty programs, child welfare, community and program development, family violence, geriatrics, healthcare, mental health, and substance abuse.

Students develop coherent and cohesive plans of study to meet their MSW degree requirements in consultation with faculty advisors. Working with their advisors, students select courses to meet their individual professional and educational goals while also meeting the academic requirements of their concentration. In addition, students can explore content outside of their concentration, and use elective credits to pursue learning goals related to diverse areas of interest.

Admission into the MSW program is based on an evaluation of the applicant's transcripts, references, written statement of interest in the field, Graduate Record Examination (GRE) scores, prior experience,

and readiness to undertake graduate professional education. To be considered for admission, the applicant must have a bachelor's degree from an accredited college or university, preferably with a broad liberal arts preparation in social and biological sciences and the humanities.

The school offers two distance education programs. One program is in the Triangle, and the other is located in Winston-Salem. Students in these programs complete M.S.W. degree requirements over the course of three years. The first two years of M.S.W. study take place at the distance education program site. In the first year, students take two courses each semester. In the second year of these programs, students take two courses each semester, participate in a field seminar and complete 16 hours per week in a field placement each semester. In the final year, distance education students complete the degree as full-time students on the Chapel Hill campus.

The typical time for degree completion is four semesters of full-time study. However, graduates of undergraduate social work programs that are accredited by the Council on Social Work Education and who meet specific course and admissions requirements are eligible to apply for the advanced standing program. In the advanced standing program, students fulfill the degree requirements in 12 months through two summer sessions and two semesters.

The Ph.D. Program in Social Work

The Ph.D. program in social work is designed to meet the growing demand for social work and social welfare research scholars in academic and research settings. Graduates are prepared to conduct a variety of theory construction and research activities that include building, testing and refining both explanatory theory for understanding social problems, and practice theory for understanding change processes; designing social interventions that test explanatory and/or practice theory; and assessing the effects of planned social interventions, including policies, through models of process, outcome, and impact evaluation.

The curriculum is grounded in core social work and social welfare courses and thorough training in research methodology and data analysis. At the same time, students design their program of study to focus on a social problem and intervention in their area(s) of interest. Students also complete a teaching practicum and are provided opportunities to teach in the M.S.W. program.

In the admissions process, students are asked to provide evidence of:

- A master's degree in social work from a school accredited by the Council on Social Work Education
- Academic ability, as demonstrated in academic achievement and Graduate Record Examination (GRE) scores
- Writing ability, as demonstrated in a writing sample
- Commitment to the values, goals, and purposes of the social work profession
- Professional experience in human services, and
- A direction for and commitment to scholarly work congruent with the objectives and resources of the doctoral program

Courses for Graduate and Advanced Undergraduate Students

SOWO

401 Managing the Effects of Disasters on Families and Children (3). Designed to examine the effects that disasters have on children, their families, and on communities, this course gives students an understanding of how to deal with survivors' reactions to trauma and how to decrease the chances of long-term damage when disaster strikes.

403 Social Work Study Abroad (1–6). Variable content. Course examines international social issues, programs, and policies and their impact on client populations and cultures in a particular country or global region.

404 Social Work Study Abroad: Africa (1–6). Course examines social issues, development strategies, health/mental health programs. Explores how country's fledgling democracy and people are redesigning organizations and interventions to respond to the needs of South Africans.

489 Public Service and Social Change (4). Course examines the role of volunteer involvement and citizen participation in community development, grassroots organizing, advocacy, and other efforts to create a more just and democratic society. Includes a service-learning requirement.

490 Preprofessional Special Topic (1-6). Focuses on current professional social work issues. The focus will be specified each time the course is offered.

491Community Organizing for Social Change (4). Course examines different types of advocacy strategies and their use in efforts both to enhance the delivery of services to disadvantaged populations and to promote social change in communities.

492 Seminar in Service Learning (1-6). Participants explore frameworks, values, and skills around the democratic principles of service, citizenship, and social justice. Accompanies an intensive, paid internship in a local nonprofit agency.

500 Human Development in Context I: Infancy to Adolescence (3). This course provides an overview of child and adolescent development in context, surveying major theoretical frameworks and highlighting the impact of different factors on individual development, functioning, and health.

501 Confronting Oppression and Institutional Discrimination (3). This course examines institutionalized oppression and its implications for social work practice at all levels, emphasizing the consequences of social inequality and the social worker's responsibilities to fight oppression.

505 Human Development in Context II: Adulthood to Older Adulthood (3). This course reviews typical and divergent adult development in context, surveys major theoretical frameworks, and highlights the impact of social injustices on adult development.

510 Foundations for Evidence-Based Practice and Program Evaluation (3). Develop knowledge of evidence-based practice, including skills needed to acquire and assess appropriate interventions for practice and skills required to evaluate social work practice.

517 Integrated Social Work Practice (3). Prerequisites, SOWO 540 and 570. Examines practice theories and models with individuals, families, groups, communities, organizations, and human service systems. Identifies and builds evidence-based skills to create change in multiple levels of social work practice.

520 Social Work Practicum I (3). Students learn beginning practice skills through experimental opportunities and apply core knowledge to direct (individuals, families, groups) and macro (organizations, communities) social work practice two days per week in an agency setting. (Field fee: $300.)

521 Social Work Practicum II (3). A continuation of SOWO 520, providing opportunities for students to demonstrate increased ability to assess, plan, administer, and evaluate appropriate social work practice interventions. (Field fee: $300.)

522 Pre-Concentration Practicum for Advanced Standing Students (4). Course designed to assist students in summer classroom learning with direct experience in specialized field of practices. Serves to bridge the B.A.S.W. practicum with advanced concentration practicum. (Field fee: $300.)

523 Foundation Field Seminar I (1). Course is designed to assist students in integrating and applying classroom learning with the direct experience of the foundation field practicum. Opportunities are provided for discussion, support, and skills practice.

524 Foundation Field Seminar II (1). Course is designed to assist students in integrating and applying classroom learning with the direct experience of the foundation field practicum. Opportunities are provided for discussion, support, and skills practice.

530 Foundations of Social Welfare and Social Work (3). Introduces public welfare policy through lecture and discussion of the purposes public welfare serves; describes the most important programs created by those policies.

540 Social Work Practice with Individuals, Families, and Groups (3). Provides the foundation for social work practice with individuals, families, and groups. It emphasizes basic knowledge, analytic and practice skills, and values necessary for practice.

570 Social Work Practice with Organizations and Communities (3). Participants explore frameworks, values, and skills to meet individual and family needs through interventions with work groups, organizations, and communities.

604I Aging and Health (DENT 604I, EPID 620I, HMSC 904I, MEDI 604I, NURS 782I, PHCY 604I, PHYT 904I, PSYC 904I, SOCI 824) (3). Introduction to normal aging, diseases of aging, mental health issues and the use of health services by older adults.

607I Aging and Public Policy (DENT 607I, FMME 607I, HMSC 951I, HPM 961I, MEDI 607I, NURS 783I, PHCY 607I, PSYC 907I) (3). Prerequisite, SOWO 530. Students learn of social service, health and income policy with the aged. Issues pertaining to informal support systems and disadvantaged groups are explored in the context of aging policy.

613I Intermediate Spanish for Health Care I (AHSC 613I, NURS 613I, PHCY 613I, PUBH 613I) (3). See PUBH 613I for description.

614I Intermediate Spanish for Health Care II (AHSC 614I, NURS 614I, PHCY 614I, PUBH 614I). See PUBH 614I for description.

615I Advanced Spanish for Health Care I (AHSC 615I, DENT 615I, MEDI 615I, NURS 615I, PHCY 615I, PUBH 615I) (3). See PUBH 615I for description.

Courses for Graduate Students

SOWO

700 Alcohol, Tobacco, and Other Drugs (ATOD): Abuse and Dependence (3). Surveys the field of substance use, abuse, and dependency, providing an overview of macro and micro issues and the use of the bio-psycho-social-spiritual model of addictions.

701 Alcohol, Tobacco, and Other Drugs (ATOD): Biomedical Basis (3). Pre- or corequisite, SOWO 700. This course covers the biomedical basis of substance-related disorders. Students will develop a broad scientific perspective on different classes of substances of abuse and the biological basis of substance dependence.

703 Ethical Decision Making in Social Work Practice (3). A study of ethical decision making, along with potential guidelines for resolving dilemmas, and an in-depth examination of current illustrative practice issues.

704 Advanced Seminar on Health Inequality (1.5). Prerequisites, SOWO 500 and 505. This advanced seminar addresses social determinants of health inequities associated with race/ethnicity, class, gender, sexual orientation, and environment. Students will develop independent or group health disparity projects.

705 Mental Health Recovery and Psychiatric Rehabilitation (1.5). Prerequisites, SOWO 500 and 505. The concept of mental health recovery is introduced, exploring theoretical foundations and lived experiences of consumers. Psychiatric rehabilitation is discussed as a framework and set of interventions supporting recovery.

709 Special Topics in Human Behavior and Social Environment (1–6). Permission of the instructor. Topic determined by instructor and announced in advance.

715 Advanced Standing Bridge Course (6). Course facilitates students' transition from baccalaureate programs to Advanced Standing M.S.W. Program. Course will review and integrate selective core baccalaureate content in practice, human behavior, diversity, social policy, and research.

719 Special Topics in Research (1–6). Permission of the instructor. Topic determined by instructor and announced in advance.

720 Individualized Field Practicum (1–6). (Field fee: $300.)

730 Social Work and the Law (3). Course provides familiarity with legal processes, legal research and legal analysis within the context of socio-legal issues important to social work practice.

732 International Comparative Policy (1.5). Prerequisite, SOWO 530. Engages students in comparative policy approaches and preparing tripartite policy analyses of a specific U.S. policy with comparable policies in two other nations in different stages of economic development.

739 Special Topics in Policy (1–6). Permission of the instructor. Topic determined by instructor and announced in advance.

750 Cognitive Behavioral Therapy (1.5). Prerequisites, SOWO 517 and 540. This course will use the CBT framework to teach students how to move from an assessment to intervention using the model.

751 Behavioral Intervention with Children (1.5). Prerequisites, SOWO 517 and 540. This course teaches basic principles of behavior theory and intervention, current applications, and how to assess, design, and implement behavior plans for children.

752 Ethical Decisions and Actions (1.5). Prerequisites, SOWO 540 and 570. Addresses knowledge and skills for exploring and addressing ethical dilemmas encountered in social work practice.

753 Interpersonal Psychotherapy (1.5). Prerequisites, SOWO 517 and 540. This practice course focuses on interpersonal psychotherapy, an empirically supported intervention for depression in adolescents and adults. Adaptations for other mental health disorders are discussed.

754 Managing Sensitive and Dangerous Situations (1.5). Prerequisites, SOWO 517 and 540. Apply cognitive-behavioral, strategic, structural, and motivational models in challenging practice situations common to public and nonprofit agency social work. Extensive, observed, skill practice is followed by analysis, feedback, and reflection.

755 Issues for Contemporary Clinical Practice (1.5). Prerequisites, SOWO 517 and 540. This is a seminar designed to help prepare students for contemporary clinical practice, covering topics such as managed care, independent practice and self-care.

756 Evidence Based Practice in School Social Work (1.5). Prerequisites, SOWO 517 and 540. Students will learn an evidence-based approach to school social work practice that includes ecological assessment, team data-based goal selection, and the identification of best practices to better promote school success.

757 Professional Use of Self: What We Bring to Practice (1.5). Prerequisites, SOWO 517 and 540. This course explores students' professional use of self in clinical practice. Using scholarly literature, students examine practice situations in which personal characteristics and experiences positively and negatively shape clinical work.

758 The Process of Differential Diagnosis of Mental Disorders (1.5). Prerequisites, SOWO 517 and 540. This course focuses on the process of conducting a differential diagnosis of mental health disorders using the Diagnostic and Statistical Manual of Mental Disorders-IV.

760 Alcohol, Tobacco, and Other Drugs (ATOD): Clinical Practice (3). Pre- or corequisites, SOWO 540 and 700. Permission of the instructor for students lacking the pre- or corequisites. Students develop knowledge, skills, and attitudes specific to substance use, abuse, and dependency in order to work effectively in a variety of clinical settings with clients experiencing substance-related problems.

761 Alcohol, Tobacco and Other Drugs (ATOD): Social Work Practice with Culturally Diverse Populations (3). Pre- or corequisites, SOWO 540 and 700. Permission of the instructor for students lacking the pre- or corequisites. Provides an overview of the unique problems and needs of diverse populations who misuse ATOD, and focuses on the application of culturally sensitive intervention strategies.

762 Special Topics in Social Work (1–6). Permission of the instructor. Topic determined by instructor and announced in advance.

763 Interdisciplinary Teamwork in Geriatrics (3). Emphasizes the acquisition of skills and competencies necessary for effective interdisciplinary geriatrics care and leadership with a focus on a variety of settings in rural and/or underserved communities.

764 Motivational Interviewing (1.5). Prerequisites, SOWO 517 and 540. This course presents the theoretical basis of motivational interviewing, its basic principles, and key strategies for facilitating behavior change.

769 Special Topics in Direct Practice (1–6). Permission of the instructor. Topic determined by instructor and announced in advance.

790 The Facilitative Leader (1.5). Prerequisites, SOWO 517 and 540. In this highly interactive course, participants will learn how to use facilitative skills in their roles as leaders and members of groups/teams to help these groups become more effective.

791 Disaster Planning and Response: Social Work Role in Large Systems (1.5). Prerequisites, SOWO 517 and 570. Focus on the social work role at the macro system level (school, public health, community, government) when planning for and responding to disasters.

792 Program Development and Proposal Preparation (1.5). Prerequisites, SOWO 517 and 570. In this skills-oriented course, students will learn to apply three approaches to program development and prepare a proposal draft suitable for submission to a foundation or governmental organization.

793 Asset Development Practice and Policy (1.5). Prerequisites, SOWO 517 and 570. This course explores community-based efforts and social policies to help lower-income individuals and families build wealth through increased access to financial services and asset-building opportunities.

799 Special Topics in Macro Practice (1–6). Permission of the instructor. Topic determined by instructor and announced in advance.

810 Evaluation of Social Work Interventions (1.5). Prerequisite, SOWO 510. Students apply knowledge of evidence-based practice to evaluation of social work interventions, including development of a detailed proposal to conduct evaluation of specific social work organization and client or service population.

811 Advanced Evaluation of Social Work Interventions (3). Prerequisite, SOWO 510. Students gain and apply advanced knowledge of research methods and evidence-based practice to the evaluation of social work interventions by conducting a detailed evaluation of a social work intervention.

820 Social Work Practicum III (6). Prerequisites, SOWO 500, 505, 517, 540, and 570. Students apply specialized knowledge to social work practice at an advanced level with individuals, families, small groups, organizations, and/or communities in an agency of a specialized field. (Field fee: $300.)

821 Social Work Practicum IV (6). A continuation of SOWO 820, providing opportunities for the students to demonstrate increased ability to assess, plan, administer, and evaluate appropriate social work interventions in a specialized field of practice (Field fee: $300.)

832 Multi-Generational Family Policy (1.5). Prerequisite, SOWO 530. This course will provide students with a framework for advanced policy analysis and strategies for policy change, with a focus on multi-generational families.

834 Advanced Policy Practice (3). Prerequisite, SOWO 530. Advanced Policy Practice focuses on skills development in advanced policy analysis and change at administrative and legislative levels and on multiple levels of advocacy and lobbying strategies.

835 Poverty Policy (1.5). Prerequisite, SOWO 530. Using an advanced policy analysis framework, this course focuses on strategies for policy change, national and state policy, and legal and socio-political factors influencing financing, access, and service delivery.

836 Health Access and Health Disparities (1.5). Examines factors leading to disparities in health outcomes for persons disadvantaged by income, age, ethnicity, gender, and sexual orientation. Critically evaluates health and social policies aimed at resolving disparities.

837 Disability Policy (1.5). Using an advanced policy analysis framework, this course focuses on strategies for policy change, national and state policy, and legal and socio-political factors influencing financing, access and service delivery.

838 Policies Impacting Military Families (1.5). Prerequisite, SOWO 530. This course will provide students with a framework for advanced policy analysis and strategies for policy change, with a focus on military families.

840 Adult Mental Health: Theory and Practice (3). Prerequisites, SOWO 500, 505, 517, and 540. This course focuses on mental health social work practice with adults, covering assessment and several theoretically based interventions with an emphasis on gaining practice skills.

841 Child Mental Health: Theory and Practice (3). Prerequisites, SOWO 500, 505, 517, and 540. This course presents knowledge and theories from various disciplines to understand mental health and well-being in children and their families with an emphasis on gaining practice skills.

842 Families: Theory and Practice (3). Prerequisites, SOWO 500, 505, 517, and 540. This course covers explanatory and practice theories for understanding family functioning and interaction and practice skills for intervention.

843 Older Adults: Theory and Practice (3). Prerequisites, SOWO 500, 505, 517, and 540. This course fosters understanding of normal aging, illness, and common challenges associated with aging, and also practice skills to treat older adults and their families.

844 Adolescent Mental Health: Theory and Practice (3). Prerequisites, SOWO 500, 505, 517, and 540. This course covers both the social context of adolescent mental health problems and intervention theories and skills to address those problems. It covers assessment, practice theories, and evidenced-based interventions.

845 Health: Theory and Practice (3). Prerequisites, SOWO 500, 505, 517, and 540. This course focuses on social work practice in healthcare covering the social context of health problems, and the theories and interventions that facilitate prevention of and coping with health problems.

850 School Social Work Policy/Practice (3). Prerequisites, SOWO 517 and 540. An examination of public school social work policy and practice. The course emphasizes an ecological approach within the context of the school-family-community environment.

851 Social Work Practice with Groups (3). Prerequisites, SOWO 517 and 540. Enables students to become more knowledgeable and skillful as social group workers. Phases of group development and worker tasks in each phase provide the course framework.

852 Social Work Practice with Couples (3). Prerequisites, SOWO 517 and 540. A clinical seminar that analyzes the operations and character of couples counseling as a human services technique.

853 Brief Treatment (3). This advanced practice elective course covers theories and application of four models of brief psychotherapy. Skill building, critical thinking, and utilization of empirical support are emphasized.

854 Antisocial Behavior in Childhood and Early Adolescence: Theory and Practice (3). Prerequisites, SOWO 517 and 540. This course explores theories and interventive methods related to practice with children who have antisocial, aggressive behavior. Emphasis is placed on using protective/risk factors to design multisystemic service strategies.

855 Treatment of Trauma and Violence (3). Prerequisites, SOWO 517 and 540. This course provides an in-depth analysis of the etiology, effects and dynamics of family violence, as well as the identification of appropriate assessment and treatment strategies.

856 Care of the Dying and Bereaved (3). Prerequisite, SOWO 517 and 540. This interdisciplinary clinical course addresses issues and practice models relating to terminal illness and bereavement faced throughout the life span.

857 Clinical Practice with Families (3). Prerequisite, SOWO 517 and 540. This practice course is devoted to intervention with families. Intervention methods will be applied to families coping with major life stressors and relational problems. Family therapy models are covered.

860 Child Welfare Perspectives and Practices (3). Focus on the knowledge, skills, and critical thinking necessary for effective practice in child welfare. Students examine their own perspectives regarding pertinent research, current events, and initiatives in the state.

874 Administrative and Management: Theory and Practice (3). Prerequisites, SOWO 500, 505, 517, and 570. This course explores contemporary theories, models, and practices for managing human service organizations, emphasizing skills in team building, motivation, organizational learning strategies, and cultural competence with a diverse staff.

875 Community: Theory and Practice (3). Prerequisites, SOWO 500, 505, 517, and 570. Engages students in examining theory and planning strategies for community practice within complex political and economic environments, emphasizing values and intervention methods.

880 Sustainable Development (3). Prerequisites, SOWO 517 and 570. Examines perspectives and models of sustainable development. Students will analyze a project and present a participatory plan for engaging in sustainable development work.

881 Community Practice: Global Perspectives (3). This course prepares students for work in global community practice and development, provides analytic frameworks, and builds skills for engagement and facilitative leadership.

882 Citizen Participation and Volunteer Involvement (3). Prerequisites, SOWO 517 and 570. Examines the role of grassroots organization in advocacy, self-help and social development, the involvement of citizens in public planning, and the development of volunteer programs.

883 Marketing and Fundraising for Nonprofit Organizations (3). Prerequisites, SOWO 517 and 570. This course helps students to develop skills and practices associated with marketing and fundraising strategies for nonprofit organizations at the macro level.

884 Leadership in Nonprofit Organizations (3). Prerequisites, SOWO 517 and 570. An in-depth analysis of the executive role in nonprofit organizations, particularly in leadership transitions, strategic planning, board development, policy administration, governance, employee relations, and resource planning and acquisition.

885 Financial Management of Nonprofit Organizations (PUBA 757) (3). Prerequisites, SOWO 517 and 570. Provides basic financial skills for leaders of nonprofits, including bookkeeping fundamentals, interpreting financial statements, budgeting, cash management and investment, and legal compliance.

886 Human Resources Management and Supervision (3). Prerequisites, SOWO 500, 505, 517, and 570. Addresses the knowledge and skills needed to effectively institute and carry our HRM, supervision, and consultation processes in nonprofit, public, and for profit settings.

900 Foundations for Theory Construction (3). A critical and historical understanding of social work knowledge, values, and intervention provides students with a foundation for theory construction.

910 Research Methods in Social Intervention (3). Prerequisites, SOWO 304 and 510. An introduction to the basic principles of research for planning and evaluating social interventions. Topics include problem formulation, design, measurement, analysis, and the application of findings to theory and practice.

911 Introduction to Social Statistics and Data Analysis (3). Prerequisite, SOWO 510. Designed to explore basic principles and to provide advanced instruction in data analysis, including the construction and analysis of tables, statistical tests and an introduction to the use of computer programs.

912 Research Practicum I (3). Prerequisite, SOWO 911. Students develop independent research competence through work on a research project under the direction of an experienced researcher.

913 Advanced Research Methods in Social Intervention (3). Prerequisites, SOWO 900 and 940. Students build advanced competence in research design, data collection, data analysis, and statistics by analyzing exemplary social work research and presenting independent learning projects within specialized areas of study.

914 Measurement in Social Intervention Research (3). Prerequisites, SOWO 910 and 911. Course deals with quantitative and qualitative measurement strategies. Readings focus on theoretical and conceptual foundations of qualitative and quantitative measurement. Students develop skill through two field studies.

915 Research Practicum II (1–21). Continuation of Research Practicum I.

916 Structural Equation Modeling (3). In this course, students will learn fundamental concepts and skills to conduct structural equation modeling and will learn how to apply these techniques to social work research.

917 Longitudinal and Multilevel Analysis (3). This course introduces statistical frameworks, analytical tools, and social behavioral applications of three types of models: event history analysis, hierarchical linear modeling (HLM), and growth curve analysis.

918 Applied Regression Analysis and Generalized Linear Models (3). Permission of the instructor. This course introduces statistical frameworks, analytical tools, and social behavioral applications of OLS regression model, weighted least-square regression, logistic regression models, and generalized linear models.

919 Special Topics in Doctoral Research (1–6). Permission of the instructor. Topic determined by instructor and announced in advance.

920 Special Topics in Social Work Doctoral Studies (1-6). Permission of the instructor. Topic determined by instructor and announced in advance.

940 Development of Social Intervention Models (3). Prerequisite, SOWO 900. A systematic approach to the design, implementation, and evaluation of social interventions provides the framework for developing models that address a range of social issues and needs.

941 Teaching Practicum (3). This practicum provides a range of supervised classroom or training opportunities designed to prepare advanced doctoral students for faculty positions in undergraduate- and graduate-level social work education.

994 Doctoral Dissertation (3–9). Dissertation work.

Department of Sociology

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HOWARD E. ALDRICH, *Chair*

Professors

Howard E. Aldrich (42) Formal Organizations, Race and Ethnic Relations, Inequality, Evolutionary Theory, Social Networks
Kenneth T. Andrews (68) Social Movements, Political Sociology, Organizations, Race and Ethnic Relations, Environment
Kenneth A. Bollen (47) Comparative Political Structures, Statistics, International Development
Barbara Entwisle (48) Social Demography, Methods, Community, Environment
Guang Guo (51) Biosocial Interactions, Social Statistics, Demography
Jacqueline Hagan, (72) Migration, Religion, Race and Ethnicity
Kathleen M. Harris (6) Social Demography, Family and Child Well-Being, Poverty, Public Policy
Arne L. Kalleberg (49) Work, Organizations, Occupations, Social Stratification, Economic Sociology
Sherryl Kleinman (38) Social Psychology; Qualitative Research; Sociology of Emotions; Race, Class and Gender
Charles Kurzman (57) Political Sociology, Social Movements, International Development, Comparative and Historical, Social Theory, Islamic Studies
S. Philip Morgan (82) Social Demography, Sociology of the Family, Research Methods
François Nielsen (43) Comparative and Historical, Methods, Sociobiology
Michael J. Shanahan (66) Social Psychology, Life Course Studies, Sociology of Childhood and Adolescence, Transition to Adulthood
Peter Uhlenberg (20) Demography, Family, Aging

Research Professors

Glen H. Elder Jr. (46) Life Course, Social Change, Family, Human Development
Ronald R. Rindfuss (34) Demography, Family, Environment

Associate Professors

Neal Caren (73) Social Movements/Collective Action
Ted Mouw (58) Social Stratification, Demography, Economic Sociology
Lisa D. Pearce (65) Family, Demography, Religion
Andrew J. Perrin (64) Political Sociology, Sociology of Culture, Sociology of Work, Social Theory, Social Movements
Karolyn Tyson (62) Sociology of Education, Qualitative Methods, Social Inequality, Social Psychology
Yang Yang (78) Population, Sociology of Health and Medicine, Methods and Models, and Stratification

Assistant Professors

Christopher Bail (79) Economic, Cultural, Political and Comparative-Historical Sociology
Yong Cai (77) Social Demography, Sociology of Health, Chinese Society, Comparative Historical Sociology, Research Methodology
Mosi Ifatunji Race and Ethnic Identities, Immigration
Laura Lopez Sanders (80) Immigration, Economic Sociology, Inequality and Work
Anthony Perez (76) Race and Ethnic Identities, Poverty and Inequality, Quantitative Methods, Stratification
Liana J. Richardson (81) Health/Medical Sociology, Race and Ethnicity

Joint Appointment

Adjunct Faculty

M. Richard Cramer, Intergroup Relations and Religion
Douglas Lauen, Associate Professor, Education Policy
Anne S. Hastings, Senior Lecturer, Family, Race and Ethnicity, Social Stratification
Gail Henderson, Medical Sociology (including Social and Economic Determinants of Health and Health Services Utilization), Health and Health Care in China, Social Contexts and Factors Related to Research Ethics
James Johnson, Public Policy, Urban Sociology, Social Geography
John D. Kasarda (32) Human Ecology, Urban Sociology, Public Policy
Robert Miles, Comparative Sociology/Historical Sociology, Racialized and Minority Relations, Migration and Immigration
John Calvin Scott, Social Policy, Population Aging, Pensions and Benefits, Politics and Lobbying Contentious Politics and Social Movements, Social Networks
John D. Stephens, Political Sociology, Political Economy, Comparative and Historical
Zeynep Tufekci, Social Impacts of Technology, Privacy and Surveillance, Inequality, Research Methods and Complex Systems
Paul Voss, Spatial Analysis and Spatial Regression
Catherine Zimmer, Quantitative Methodology, Formal Organizations and Sociology of Work

Professors Emeriti
Judith Blau
Henry A. Landsberger
Gerhard Lenski
Anthony Oberschall
Victor W. Marshall
John Shelton Reed
Richard L. Simpson

The Department of Sociology offers the master of arts and doctor of philosophy degrees in sociology. Students receive training that equips them for careers in both teaching and research. All sociology students take basic course work in sociological theory, research methods and statistics, and substantive areas. The program emphasizes balanced training and the integration of theory, method and substantive knowledge. Detailed information on graduate degree procedures is available online at www.unc.edu/depts/soc. For further information, including information about financial aid for students, contact the department's administrative assistant for student services.

The department's main concentrations of faculty research interest and graduate training are in cultural and political sociology, demography, research methods and social statistics, labor force and industrial relations, stratification and complex organizations.

A large proportion of first-year students (as well as more advanced students) receive financial assistance. Sources of aid include teaching assistantships, research assistantships, and nonservice fellowships.

The department works closely with the Carolina Population Center, the Odum Institute for Research in Social Science, and the University Computation Center. The department maintains the Odum Computer Laboratory for training and research. Computer programming assistance, consultation and computing services are available without charge for student research. The department also sponsors and edits Social Forces, a national sociological journal.

Courses for Graduate and Advanced Undergraduate Students
SOCI

410 Formal Organizations and Bureaucracy (MNGT 410) (3). Varieties of organizational forms, their structures and processes; creation, persistence, transformation, and demise; role of organizations in contemporary society.

411 Social Movements and Collective Behavior (3). Study of nonroutine collective actions such as demonstrations, strikes, riots, social movements, and revolutions, with an emphasis on recent and contemporary movements. Students may not receive credit for both SOCI 411 and SOCI 413.

412 Social Stratification (MNGT 412) (3). Analysis of social structure and stratification in terms of class, status, prestige, and rank. Attention to social roles of elites, professionals, the middle class, and the working class and to comparative topics.

413 Social Movements and Collective Behavior–Experiential (3). Study of nonroutine collective actions such as demonstrations, strikes, riots, social movements, and revolutions, with an emphasis on recent and contemporary movements. Substantial field work for experiential education. Students may not receive credit for both SOCI 411 and SOCI 413.

414 The City and Urbanization (3). The city as a social, spatial, and political-economic phenomenon in the modern world. Analysis of urban demographic trends, spatial characteristics and economic functions. Substantive topics include segregation, social turmoil, unemployment, fiscal problems, suburbanization, and urban public policy. Students may not receive credit for both SOCI 414 and SOCI 417.

415 Economy and Society (MNGT 415) (3). Examination of the structure and operation of institutions where economy and society intersect and interact, such as education, industrial organizations, on-the-job training, labor markets, and professional associations. Emphasis on the contemporary United States, with selected comparisons with Western Europe and Japan.

416 Comparative Perspectives on Contemporary International Migration and Social Membership (3–4). This course provides a special focus on international migration and social membership/citizenship across a number of advanced industrial immigrant-receiving states.

417 The City and Urbanization, Experiential Education (3). The city as a social, spatial, and political-economic phenomenon in the modern world. Analysis of urban demographic trends, spatial characteristics, and economic functions. Substantive topics include segregation, social turmoil, unemployment, fiscal problems, suburbanization, and urban public policy. Students may not receive credit for both SOCI 414 and SOCI 417.

418 Contemporary Chinese Society (3). Designed to help students read complex pictures of contemporary China and to understand how China's rise affected people's lives, both inside and outside of China, from a sociological perspective. The course does not assume any background in Chinese studies.

419 Sociology of the Islamic World (3). Investigates issues such as tradition and social change, religious authority and contestation, and state building and opposition in Muslim societies in the Middle East and around the world.

420 Political Sociology (3). Analysis of the reciprocal influences of state and social organizations upon each other; the social bases of political authority and stability, of revolution and counterrevolution.

422 Sociology of Health and Mental Illness (3). Course examines uniqueness of the sociological perspective in understanding mental health and illness. It draws upon various fields to explain mental illness in as broad a social context as possible. Attention focuses on how social factors influence definitions and perceptions of illness.

423 Sociology of Education, Experiential Education (3). An overview of theory and research on education and schooling, with an emphasis on inequalities in educational opportunities, education as a social institution, and the changing context of schools and schooling. Substantial field work for experiential education. Students may not receive credit for both SOCI 423 and SOCI 426.

424 Law and Society (3). A sociological analysis of comparative legal systems, the role of law in social change and in shaping social behavior. Topics may include the legal profession, property distribution, and the role of law in achieving racial and sexual justice.

425 Family and Society, Junior/Senior Section (3). A special version of SOCI 130 for juniors, seniors, and beginning graduate students. Students may not receive credit for both this course and SOCI 130.

426 Sociology of Education (3). An overview of theory and research on education and schooling, with an emphasis on inequalities in educational opportunities, education as a social institution, and the changing context of schools and schooling. Students may not receive credit for both SOCI 423 and SOCI 426.

427 The Labor Force (MNGT 427) (3). Supply and characteristics of labor and of jobs, including industrial and occupation changes, education and mobility of labor, and changing demography of the workforce.

428 Sociology of Art (3). Connections between artworks, art theory, and social theory are examined. Approaches in the fine arts and the social sciences are examined.

429 Religion and Society (RELI 429) (3). Sociological analysis of group beliefs and practices, both traditionally religious and secular, through which fundamental life experiences are given coherence and meaning.

431 Aging (3). The process of aging from birth to death, with a concentration on the later years of life, examined from a broad perspective. Topics include individual change over the life-course, the social context of aging, and the aging of American society.

439 Comparative European Societies (POLI 439) (3). See POLI 439 for description.

442 Conflict and Bargaining (PWAD 442) (3). Conflict and conflict-resolution behavior. Applications to labor–management relations, family, sports, community politics, international relations.

444 Race, Class, and Gender (WMST 444) (3). Conceptualizations of gender, race, and class and how, separately and in combination, they are interpreted by the wider society. Emphasis on how black and working-class women make sense of their experiences at work and within the family.

445 Sociology of Emotions (3). The course examines how emotions are organized within social groupings and institutions. Differences in socialization by gender, ethnicity, social class, and age will be explored.

450 Theory and Problems of Developing Societies (3). Theories concerning the development process (motivational vs. institutional economics vs. political and social development; similarity of sequential states and outcomes) will be related to policy problems facing the developing nations.

453 Social Change in Latin America (3). Introduction to Latin American ideologies and values; economic and demographic changes; major pressure groups (old elites, entrepreneurs, peasants and working classes, military, and intellectuals); and relations with the United States.

460 Contemporary Social Theory (3). Prerequisite, SOCI 250. Analysis of current problems in general social theory; action and structure, justice and equity, social change and reproduction. Contrast and evaluation of leading approaches to solutions.

468 United States Poverty and Public Policy (3). This course examines issues of poverty and social policy, single-mother families, the welfare debate, and homelessness.

469 Medicine and Society (3). This course explains why and how particular social arrangements affect the types and distribution of diseases and how the medical care system is organized and responds. The course focuses on three topics: social factors in disease and illness; health care practitioners and patients; and changes in the health care system.

470 Human Rights (3). Human rights are inherent in the advance of peace, security, prosperity, and social equity. They are shared by the global community, yet require local embedding.

481 Managing International Conflict (3). This course introduces the principles of international cooperation and conflict resolution; theories of how international agreements develop or break down; and the logic of mediation, arbitration, and negotiation.

620 Aging and Cohort Analysis in Social and Epidemiologic Research: Models, Methods, and Innovations (3). Required preparation, basic statistics courses. This seminar introduces guidelines for conducting aging and cohort analysis in social and epidemiologic research in which time and change are concerns. Uses three common research designs with an emphasis on new analytic models and methods.

688 Society, Human Behavior, and Genomics (3). The course focuses on how molecular genetics can enrich the social sciences. Topics include a brief overview of genetics and how genetic and social factors combine to predict behavior. We also consider the ethical, legal, and social issues that sometimes complicate the use of genetic data to study human behavior.

691H Senior Honors Research and Seminar (3). Permission of the department. 691H is required of senior honors candidates. Individual student research (under supervision of an advisor). Weekly seminar to discuss work on honors thesis, as well as special topics in sociology.

692H Senior Honors Research and Seminar (3). Prerequisite, SOCI 691H. Permission of the department. Individual student research (under supervision of an advisor). Weekly seminar to discuss work on honors thesis, as well as special topics in sociology.

696 Undergraduate/Graduate Study in Sociology (3–4). Permission of the instructor. Graduate study in sociology for undergraduate students. Undergraduate students taking a 700- or 800-level course in sociology register via this course and complete all requirements for the associated graduate course.

Courses for Graduate Students

SOCI

700 History of Social Thought (3). Graduate standing in sociology or permission of the instructor. Historic social ideas of Western culture are considered against a background of general cultural analysis in terms of systematic theory. Required of all graduate degree candidates in sociology.

707 Measurement and Data Collection (4). Provides an introduction to measurement theory and a review of various methods of data-gathering. Gaining experience with a variety of techniques of measurement and preparing a pretested research proposal are required for all students.

708 Statistics for Sociologists (4). Provides an introduction to probability theory, descriptive statistics, inferential statistics and the algebra of expectations. Emphasis is on elements useful to research sociologists, including bivariate regression and correlation.

709 Linear Regression Models (4). The course presents regression analysis and related techniques. The major topics are the assumptions of the regression model, dummy variables and interaction terms, outlier diagnostics, multicollinearity, specification error, heteroscedasticity and autocorrelation. The final section introduces path analysis, recursive models, and nonrecursive systems.

711 Analysis of Categorical Data (3). Permission of the instructor. Introduction to techniques and programs for analyzing categorical variables and nonlinear models. Special attention is given to decomposition of complex contingency tables, discriminant function analysis, Markov chains, and nonmetric multidimensional scaling.

715 Seminar on Social Networks (3). Permission of the instructor. Theoretical and substantive issues in social network analysis. Focus is on models of social structure.

717 Structural Equations with Latent Variables (3). Prerequisite, SOCI 708. Permission of the instructor. This course examines models sometimes referred to as LISREL models. Topics include path analysis, confirmatory factor analysis, measurement error, model identification, nonrecursive models, and multiple indicators.

718 Longitudinal and Multilevel Data Analysis (3). Prerequisite, SOCI 709 or 711. This course provides an introduction to event history analysis or survival analysis, random effects and fixed effects models for longitudinal data, multilevel models for linear and discrete multilevel data and growth curve models.

720 Participant Observation and In-Depth Interviewing (3). Students will learn the methods of participant observation and in-depth interviewing. Each student will collect data (provide detailed field notes and transcriptions of interviews) in one group or setting for the duration of the course. Such topics as gaining access, ethics of research, and analysis of data will be covered.

753 Experimental Design in Sociology (3). Permission of the instructor. Statistical aspects of experimental designs, with emphasis on applied problems involved in executing a statistically sound design.

754 Survey Sampling (3). Permission of the instructor. The different sampling techniques are discussed. Major emphasis on planning of large-scale sample surveys rather than on statistical theory.

760 Data Collection Methods (3). Reviews alternative data collection techniques used in surveys, concentrating on the impact these techniques have on the quality of survey data. Topics covered include errors associated with nonresponse, interviewing, and data processing.

761 Questionnaire Design (3). Examines the stages of questionnaire design including developmental interviewing, question writing, question evaluation, pretesting, questionnaire ordering, and formatting. Reviews the literature on questionnaire construction. Provides hands-on experience in developing questionnaires.

762 Case Studies in Surveys (3). A number of external speakers from government and industry will describe various problems they encounter in surveys. Students will be challenged to develop proposals for addressing the problems, citing the literature as appropriate.

763 Survey Computing (1). Introduces basic statistical concepts and practices emphasizing the analysis of real data. Provides training in the use of the SAS statistical analysis system and the practical problems of stratification, clustering, and weighting in survey analysis.

800 Current Issues in Social Theory (3). An examination of selected recent work of general significance in sociology. Themes vary.

801 Evolutionary Theory (3). Introduction to the new evolutionary theory and associated research.

802 Social Psychological Theory (3). Introduction to basic theoretical approaches in social psychology, including social learning, social exchange, symbolic interaction, cognitive consistency, and affect control.

803 Human Ecology (3). Examination of how human populations adapt to their environments. Emphasis on linkages among population, organization, environment, and technology. Research applications of this approach to urban communities and organizations.

804 Marx and Marxism (2). Brief exposition and evaluation of Marx's theory of human nature, societal change and evolution, class, the state, family and other institutions. Summary of dependency theory and critical theory.

806 Principles of Theorizing (3). This course in metatheory analyzes methods of theorizing. It examines the criteria for constructing and evaluating scientific theories developed by philosophers of science and applies them to social theorizing. The hypothetico-deductive model of theorizing is contrasted with other theoretical approaches.

807 Major Sociological Theories (0.5–21). Examination of selected writing, concepts, and issues of a major sociological theory or theoretical approach.

808 Macrosociological Theory (3). The objective of the course is to illustrate three aspects of macrosociological theory: 1) the conception of macrosociology, 2) the structural approach in sociology and 3) hypothetico-deductive theorizing. A hypothetico-deductive macrostructural theory developed by the instructor is analyzed, and extensive empirical tests of the theory are presented.

810 Social Movements (3). The structure and dynamics of social movements and their societal environment, with special reference to sociopolitical movements of minority and low status groups in industrialized and third world societies.

811 Seminar in Political Sociology (POLI 811) (3). The relationships between social structure and political decisions. Regimes and social structure; bureaucracies, political associations and professions; science and politics; closed and open politics; political movements and change.

812 Civil Society (1–3). Under the conditions of globalization, civil society takes on new and different meanings. Course examines what the term means and how it is applied.

813 Comparative Welfare States (POLI 813) (3). See POLI 813 for description.

814 Comparative and Historical Analysis Exploration (3). Exploration and use of techniques for the comparative study of social processes and historical events. Special attention is devoted to methodologies that facilitate the collection, analysis, and interpretation of historical and/or comparative phenomena.

816 Influential Works in Democracy (POLI 816) (3). The course covers the major traditions of democratic theory from ancient Greece to the present, ethnographies on political organization and 19th- and 20th-century observations on democracy.

820 Seminar in Marriage and the Family (3). Introduces students to a wide range of studies in the sociology of family, to develop familiarity with the empirical, theoretical and methodological foundations of family research in sociology. Examines demographic trends; marriage and family relationships; race/ethnicity; poverty and social class; work/family issues; childbearing and rearing; and mate selection.

821 The Life Course (3). Provides an intense introduction to the life course as a theoretical orientation and methodology (logic of inquiry).

822 Sociological Theories of Aging and the Adult Life Course (3). Overview and critical assessment of sociological theory applied to aging, including explicit theories of aging. The course examines the historical development of the field and considers the nature of theory development.

824 Aging and Health (DENT 604I, EPID 620I, HMSC 904I, MEDI 604I, NURS 782I, PHCY 604I, PHYT 904I, PSYC 904I, SOWO 604I) (3). See SOWO 604I for description.

830 Demography: Theory, Substance, Techniques, Part I (3). A basic introduction to the discipline of demography. Materials covered include population history, data sources, mortality and fertility trends, and differentials and techniques of analysis.

831 Demography: Theory, Substance, Techniques, Part II (3). A continuation of SOCI 830. Materials covered include population growth and stable population theory, migration and distribution, population policy, and population estimates and projections.

832 Migration and Population Distribution (3). Treats migration trends, patterns, and differentials and their effects on population distribution in continental and regional areas. Attention is given to theoretical and methodological problems in the study of population movement.

833 Socioeconomic Factors in Fertility (3). Study of fertility differentials by social and economic factors, changes over time, the manner in which these factors affect fertility and the implications thereof for fertility-control programs.

835 Mortality: Social Demographic Perspectives (3). Prerequisite, SOCI 830. Permission of the instructor for students lacking the prerequisite. This advanced seminar covers mortality date and measurement, the inequality of death, trends in morbidity and mortality and explanations of mortality decline. Social demographic perspectives receive primary emphasis.

836 Social Gerontology (3). Permission of the instructor. The study of the aged in our society.

840 Social Attitudes (3). Basic theories and methods in attitude research, with special attention to attitude dynamics and social relations.

841 Social Structure and Personality (3). The generic processes by which individuals become members of a society, with emphasis on the influence of social structure on socialization and the patterning of personality.

842 Seminar in Socialization and Group Process (3). Permission of the instructor. Analysis of theoretical issues and empirical research relevant to socialization. Special emphasis upon group process effects on the evolution of the social self, the "fit" between personality and role, and other issues.

843 Seminar in Social Control and Deviance (3). Permission of the instructor. The relation of social norms to conforming and deviant behavior. Types of social and personal controls. Theoretical and research problems are reviewed.

850 Social Stratification (3). Analysis of major theories of and approaches to the study of social inequality, with attention to how the various theories and approaches are operationalized. Focus on recent research in labor markets and worldwide inequality.

851 Sociology of Gender (WMST 851) (3). Reviews theory on variation in men's and women's gender roles, with emphasis on industrialized societies and women's roles.

852 Ethnicity, Race and Education (1–21). Emerging new theory and research paradigms in the sociology of education are reviewed. The course covers the following: racial and ethnic variation, parenting, contextual variation, peer influence, and school variation.

853 Justice and Inequality: Selected Topics (1–21). Permission of the instructor. Examination of selected issues regarding societal, economic, and political inequality and questions of justice in the United States and Western Europe.

854 Seminar in Urban Sociology (3). Theory and research in the study of the location and growth of urban areas, the effect urban areas have upon behavior, and the study of social behavior in different urban subareas. Each member of the seminar completes a project interrelating theory and research.

855 Poverty in America (3). This graduate seminar will study trends, causes, and consequences of poverty in America, covering the topics of single-mother families, child poverty, low-wage work, immigrant families, and welfare reform and social policy.

860 Sociology of Organizations (3). Permission of the instructor. Structural features of organizations. Behavior in organizations. Organizational career patterns. Comparative analysis of structure, behavior and careers in different types of organizations. Interorganization and organization-environment relations.

861 Occupations and Work (3). The changing occupational system. Structural types of labor markets. Occupational organization, role sets, power relations, careers and satisfaction in different types of labor markets and occupations.

862 Health Organizations and Occupations (3). Considers various treatment settings, socialization and job performance of health workers, patienthood, the relation between organizational structure and effectiveness, and professional self-regulation.

863 Medical Sociology: Health, Illness, and Healing (3). Presents a conceptual and substantive overview of fundamental and salient issues in medical sociology. Focuses on continuity and change in health and healthcare. Examines social causation of disease, medicalization of social problems, medicine as a profession, treatment systems and organization of care, politics and the changing medical care system.

870 Sociology of Culture (3). Focuses on substantive and theoretical issues in this field and their intellectual origins. Topics include organizations, art, religion, science, class, and politics. Quantitative and qualitative approaches are examined.

871 Sociology of Religion (3). An introductory, graduate-level survey of the sociology of religion as a field of study, reviewing literature on important theoretical approaches and key problems and issues in the field.

872 The Sociology of Science: Science as a Social and Cultural Activity (3). This course examines the production of scientific knowledge. The focus is on the processes by which scientific knowledge and technological artifacts are constructed through cultural practices and the organization of scientific work.

901 Field Research (3). Permission of the instructor.

905 Survey Practicum (1). Applied workshop in sample survey design and implementation. The student works in a data collection center under the guidance of the instructor. Course focuses on real world problems in data collection and their practical, cost-effective solutions.

950 Seminar in Selected Topics (1–6). Permission of the instructor. The course description for a particular semester is available in the departmental office.

960 Training Program Seminars (1). Continuing seminars in selected topics.

961Reading and Research (1–6). Permission of the instructor.

962 Advanced Reading (3). Library research or field research on a selected topic under guidance of the instructor.

970 Reading and Research in Methodology (3). Permission of the instructor. Special work on selected problems of research methodology.

971 Reading and Research in Methodology (3). Permission of the instructor. Special work on selected problems of research methodology.

979 Publishing in Sociology (3). Permission of the instructor. This seminar exposes students to a variety of issues related to journal publication in sociology, such as types of journals and collaboration, the experience of writing an article for submission to a journal, reviewing articles for journals, and responding to editorial decisions.

980 Seminar on the Teaching of Sociology (3). Doctoral candidacy in sociology or permission of the instructor. Examines the teacher's role and the teaching process, planning a course and constructing syllabi, testing for teaching or grading, evaluating teacher performance and the needs of different student populations.

993 Master's Thesis (3–6). Individual research in a selected field under the direction of a member of the department.

994 Doctoral Dissertation (3–9). Individual research in a selected field under the direction of a member of the department.

Division of Speech and Hearing Sciences

www.med.unc.edu/ahs/sphs
JACKSON ROUSH, *Director*

Professors

Elizabeth R. Crais (048) Communication Disorders in Infants, Identification/Intervention with Young Children with Autism
Karen Erickson (045) Assessment of Reading and Writing, Literacy Instruction
Melody Harrison (040) Early Speech, Language, and Auditory Development in Children with Hearing Loss
Lee McLean, Early Intervention and Language Development in Children
Jackson Roush (058) Pediatric Audiology, Newborn Hearing Screening
Linda R. Watson (067) Language Disorders in Young Children, Autism, Emerging Literacy

Associate Professors

Katarina L. Haley (072) Speech Perception and Production, Neurogenic Communication Disorders
Kate Kowala (093) Hearing Aids and Adult Audiologic Rehabilitation
Lori Leibold (009) Developmental Psychoacoustics, Pediatric Audiology
Martha Mundy (053) Educational and Pediatric Audiology
Stephanie Sjoblad (082) Aural Rehabilitation, Hearing Aids and Assistive Devices
Sharon Williams (074) Geriatrics, Communication Disorders of Older Adults, Multicultural Issues, Counseling
David Zajac (063) Speech Aerodynamics, Developmental Aspects of Speech Production, Cleft Palate Research

Assistant Professors

Lauren Calandruccio (730) Speech Perception
Lisa Domby (025) Phonology, Bilingual Learning
Penelope Hatch (090) Literacy, Augmentative and Alternative Communication
Andrea Hillcock-Dunn (712) Pediatric Audiology
Adam Jacks (085) Aphasia Neurogenic Communication Disorders, Speech Science
Gary Martin (079) Child Language Disorders, Neurodevelopmental Disabilities
Cara McComish (001) Early Identification of Autism and Pediatric Feeding
Nancy McKenna (062) Genetics, Hearing Disorders
Brenda Mitchell (80) Speech and Language Disorders
Amanda O'Donnell (086) Adult Hearing Aids and Balance
Debra R. Reinhartsen, Augmentative Communication, Low-Incidence Disabilities

Research Professors

Emily Buss, Psychoacoustic Research
John H. Grose (050) Audiology and Psychoacoustics Research
Joseph W. Hall, Audiology and Psychoacoustics Research

Instructor

Kathryn Wilson (076), Childhood Hearing Loss

Adjunct Associate Professors

Douglas Fitzpatrick, Anatomy and Physiology of the Auditory System
Holly Teagle (084) Cochlear Implants in Children

Adjunct Assistant Professor

Richard Clendaniel (085) Balance and Vestibular Disorders

Adjunct Instructors

Hillary Bartholomew, Voice
Kristen Brackett, Dysphagia
Geri Chadwick, Intraoperative Monitoring
Margaret Dillon, Adult Cochlear Implants
Hannah Eskridge, Pediatric Aural Rehabilitation
Lynn Fox, Fluency Disorders
Brian Kanapkey Dysphagia, Neurogenic Speech Disorders
Lisa Markley, Medical Speech-Language Pathology
Stephanie McAdams, Medical Speech-Language Pathology
Gina Vess, Voice and Voice Disorders

The Division of Speech and Hearing Sciences in the School of Medicine's Department of Allied Health Sciences provides academic and professional education for speech-language pathologists and audiologists. Programs of study are available at the master's and doctoral levels in speech language pathology. Both clinical (Au.D.) and research (Ph.D.) doctoral degrees are offered. The study of speech and hearing requires knowledge in both normal and abnormal speech, hearing, and language. The speech and hearing sciences curriculum provides a multifaceted learning environment including classroom, laboratory, and clinical experiences. Three major tracks of study are possible within the curriculum: audiology, speech-language pathology, and speech and hearing sciences. There are three academic degree programs: 1) a master's degree (M.S.) for entry-level clinical practice of speech-language pathology, 2) a professional doctorate (Au.D.) for entry-level clinical practice in audiology, and 3) a Ph.D. in speech and hearing sciences, for individuals with a background in speech-language pathology or audiology who desire a research degree. All the programs are interdisciplinary, involving clinical and research activities with other University departments and institutions, in addition to the Division of Speech and Hearing Sciences.

The entrance, academic, and residence requirements for the M.S. and Ph.D. degrees correspond to those of The Graduate School. Applicants to the Au.D. program follow the guidelines established by the School of Medicine for that degree program. All students enrolled in professional tracks (M.S. and Au.D.) are prepared to meet licensure and certification requirements necessary for the practice of speech-language pathology or audiology. More complete information describing the graduate program can be obtained on the Web at www.med.unc.edu/ahs/sphs.

Courses for Graduate and Advanced Undergraduate Students *SPHS*

530 Introduction to Phonetics (COMM 530) (3). A detailed study of the International Phonetic Alphabet with emphasis on the sound system of American English. Application of phonetics to problems of pronunciation and articulation. Includes broad and narrow phonetic transcription.

540 Speech Science (COMM 540) (3). Introduction to the science of speech, including production, acoustics, and perception.

570 Anatomy and Physiology of the Speech, Language and Hearing Mechanisms (COMM 570) (3). Anatomy and physiology of the speech-producing and aural mechanisms.

582 Introductory Audiology I (COMM 582) (3). Theory and practice of the measurement of hearing, causative factors in hearing loss, evaluation of audiometric results, and demonstration of clinical procedures.

583 Introduction to Clinical Practice in Speech-Language Pathology and Audiology (3). Introduction to diagnosis and treatment of communication disorders, including articulation, fluency, voice and language, and those resulting from autism and hearing loss.

Courses for Graduate Students

SPHS

701 Introduction to Research in Speech and Hearing (3). Required preparation, statistics course. Experimental and descriptive research designs in speech and hearing sciences, including both group and single subject.

704 Supervised Clinical Experience (1–2). Supervised clinical experience in the practice of speech-language pathology.

706 Clinical Practicum in Audiology (1–21). Supervised clinical experience. May be repeated for credit.

708 Cochlear Implants (3). Prerequisites, SPHS 715 and 811. Examines fundamentals of cochlear implants, candidacy, evaluation, equipment, programming, and performance outcomes.

710 Audiologic Assessment (3). Prerequisite, SPHS 582 or equivalent. Clinical Audiology assessment including pure-tone audiometry, immittance measures, and other measures commonly employed in the standard diagnostic battery.

710L Audiologic Assessment Lab (1). Laboratory exercises in threshold determination, clinical masking and speech recognition testing, all concepts introduced in SPHS 710, Audiologic Evaluation I.

712 Characteristics of Amplification Systems (3). Amplification options for the hearing-impaired; specifically, hearing aid, electroacoustics, and earmold technologies. Additionally, hearing aid selection procedures are presented.

712L Characteristics of Amplification Lab (1). Laboratory activities related to earmolds, hearing aids, and ANSI electroacoustic verification.

715 Anatomy and Physiology of Hearing (3). This course will cover anatomy and physiology of the peripheral hearing system (outer, middle, and inner ear) as well as relevant central pathways.

722 Auditory Perception (3). This course provides an overview of psychoacoustics—the psychology of hearing. Content includes introductory acoustics, normal sound perception, and the perceptual consequences of impaired hearing.

725 Hearing Disorders (3). Prerequisite, SPHS 582. Diseases and disorders of the auditory system and their management.

726 Clinical Issues and Experiences in Audiology (1). Online course covering universal precautions, privacy regulations, clinical practice with diverse cultural groups, report writing, and other aspects of audiology practice.

730 Instrumentation and Calibration (1). Principles of instrumentation relevant to clinical practice including study of electronics, filters, and analog and digital processing.

740 Principles of Prevention, Assessment, and Intervention in Speech-Pathology (3). Principles and methods of prevention, assessment, and intervention for people with communication and swallowing disorders, including consideration of anatomical/physiological, psychological, developmental, and linguistic and cultural correlates of the disorders

741 Neuroanatomy (3). Prerequisite, SPHS 570. A survey of neurological anatomy in relation to clinical speech-language pathology. Topics considered include organization of the CNS, neuroanatomy, neurophysiology, and neurochemistry.

742 Aphasia (3). Prerequisite, SPHS 570. Discussion of adult aphasia and its clinical management, including assessment, diagnosis, prognosis, counseling, and treatment. Combined lectures and laboratories.

743 Pediatric Speech Sound Disorders (3). Prerequisites, SPHS 530 and 570. Course deals specifically with the major diagnostic tests of articulation and the specific management programs associated with each. Thorough examination of the research supporting each test and treatment plan is included.

744 Motor Speech Disorders (3). Prerequisites, SPHS 540 and 570. Assessment and treatment of adults presenting with disorders of motor speech control (i.e., dysarthria, anarthria, and apraxia of speech).

745 Contemporary Professional Issues (1–2). Contemporary professional issues in the practice of speech-language pathology.

748 Voice Disorders (2–4). Assessment and management of children and adults with voice disorders (including laryngectomy).

749 Evaluation and Clinical Management of Persons with Oral-Facial Anomalies (3). Prerequisites, SPHS 540 and 570. In-depth analysis of the embryologic and physiologic bases of oral-facial anomalies and the team approach to assessment and habilitation. Particular emphasis placed upon the following specialties: genetics, plastic surgery, prosthodontics, orthodontics, otolaryngology, and speech-language pathology.

751 Communication Disorders: Global Service Learning (2). This course combines seminars, readings, and service-learning fieldwork, providing students the opportunity to practice and refine language skills for working with culturally and linguistically diverse individuals with communication disorders.

752 Seminar in Medical Speech Language Pathology (3). Discussion of normal aging and language. Assessment and treatment of cognitive and linguistic problems in persons with dementing conditions, right hemisphere dysfunction, and traumatic brain injury.

754 Dysphagia (3). Discussion of the development of the normal swallow, anatomy, and physiology of the swallowing mechanism, and assessment and team management of swallowing disorders.

760 Adult Communication Disorders (3). Overview of communication disorders commonly seen in adult populations. These include disorders of language, cognition, speech and motor control, voice, and fluency.

762 Language and Learning Disorders (3). Course in normal and abnormal learning from a language perspective. Emphasis on evaluation and treatment from a psycholinguistic model.

765 Augmentative and Alternative Communication (3). A comprehensive look at the theoretical and clinical issues related to augmentative/alternative communication. Techniques and strategies to provide effective communication for the severely handicapped are discussed.

802 Problems in Speech and Hearing Sciences (1–3). May be repeated for credit.

803 Audiologic Rehabilitation for Children (3). Covers speech perception and the effects of hearing loss on perception and production of speech as background for understanding assessment and treatment, with an auditory-verbal emphasis. Pediatric assessment and amplification are reviewed.

804 Audiologic Rehabilitation for Adults (3). Theoretical bases and history of audiologic rehabilitation of adults. Also, practical approaches to assessment and therapeutic intervention are presented. The roles of assistive technology and family-based counseling are included.

806 Communication Assessment and Intervention with Children Birth to Five (3). Stages of communication development of children from birth to five years old; clinical issues related to the assessment tools and intervention and planning for children with disabilities and their families.

808 Seminar in Audiologic Rehabilitation (2). Prerequisites, SPHS 712 and 813. Audiologic rehabilitation including counseling, visual speech perception, auditory training, special needs of older adults, and psychosocial aspects of hearing loss will be addressed. Review of technology to enhance communication included.

809 Introduction to Cochlear Implants (1). Introductory information regarding cochlear implant candidacy, an overview of implant components, the evaluation process, surgery, device programming, and initiation of post implantation therapy. Class meets three hours for five weeks.

811 Pediatric Audiology (2). Clinical procedures used in the identification and management of hearing loss in young children.

812 Pediatric Amplification and Assistive Listening Devices (2). Prerequisites, SPHS 712 and 811. This course covers prescriptive formulas, verification and fitting of hearing aids and FM systems, and suggested monitoring of progress when working with young children with hearing loss and their families.

813 Fitting and Dispensing of Amplification Systems (3). Prerequisite, SPHS 712. Theoretical and practical approaches to fitting amplification systems and the procedures for dispensing amplification systems to the hearing-impaired.

813L Fitting and Dispensing of Amplification Lab (1). Prerequisite, SPHS 712. Laboratory experiences related to the selection, programming, and fitting of amplification devices to hearing impaired individuals.

814 Auditory Evoked Potentials I (3). Prerequisites, SPHS 710, 715, and 722. This course explores the field of electrophysiologic responses within the auditory and vestibular systems. Auditory brainstem response (ABR), electrocochleography (ECoG), electroencephalography (EEG), and otoacoustic emissions (OAE) are covered.

814L Auditory Evoked Potentials I Lab (1). Prerequisites, SPHS 710, 715, and 722. Elecrophysiologic laboratory exercises to accompany Auditory Evoked Potentials I course.

815 Auditory Evoked Potentials II (2). Prerequisite, SPHS 582. Advanced principles of pediatric audiology and intervention strategies for hearing-impaired children. Procedures for counseling and case management.

816 Occupational and Community Audiology (2). Prerequisite, SPHS 582, Military and industrial audiology and hearing conservation, including physiological and psychological factors.

818 Balance Assessment and Rehabilitation (3). Principles of vestibular function and dysfunction, clinical assessment and management.

818L Balance Assessment Lab (1). Prerequisite, SPHS 710. Laboratory exercises to accompany Balance Assessment course. To include case history, bedside examination, and objective measurements.

819 Educational Audiology (2). Prerequisites, SPHS 710 and 871L. Examines the provision of services to school-age children, with special focus on eligibility determination and assessment of central auditory perception.

823 Business Management and Professional Issues (3). Examines healthcare and business models that impact audiology practice. Personnel management, marketing, quality assurance, and service reimbursement for audiology practices will be covered.

824 Audiology Grand Rounds (1). Examines clinical cases from the perspective of presenting symptoms, test results, and clinical outcomes.

825 Embryology and Genetics of Hearing and Deafness (2). Genetics related to developing hearing and balance structures as well as syndromic and nonsyndromic hearing loss and deafness.

830 Independent Study (1–5). This course gives enrolled graduate students in the curriculum an opportunity to pursue research supervised by one or more faculty members, culminating in a written document or special project.

831 Advanced Signal Processing (1). This course will provide information regarding advanced signal processing utilized in digital amplification and cochlear implants.

832 Speech Acoustics (2). Prerequisite, SPHS 833. This course provides information on the fundamentals of speech production, including the acoustic characteristics of normal and disordered speech.

833 Special Topics (3). This is the foundation course in a series related to providing services to children with hearing loss. Six units focus on working with families, speech acoustics, audiological interpretation, instrumentation, foundations of speech and language and early literacy.

834 Counseling and Communication Disorders (3). This course provides a broad overview of contemporary counseling issues in communication disorders. The impact of subject age, life course, and cultural background on interviewing and counseling is included.

836 Audiology Interpretation and Hearing Technologies (4). This course focuses on behavioral and physiologic assessment of hearing in children and how these measures are used in aural habilitation. Fundamentals of hearing instrument technology including the selection and fitting of hearing aids and cochlear implants are addressed.

840 Aging and Communication Disorders (3). This course focuses on medical, psychological, and social theories and aspects of aging as they relate to communication processes and disorders.

841 Seminar in Speech-Language Pathology (0.5–21). Special topics and significant literature in the field of speech pathology.

849 Fluency Disorders (2). Course participants will develop an understanding of evaluation and treatment of acquired and developmental fluency disorders in children and adults through lecture and hands-on practice.

850 Language Disorders Encountered in Audiology (3). Students will learn about four areas of language disorders affecting children and adults (receptive and expressive language disorders, communication modalities, social aspects of communication, and cognitive aspects of communication) through readings, posted videos, and online quizzes. This is an asynchronous online course.

851 Speech Disorders Encountered in Audiology (3). Students will learn about speech disorders (fluency, voice, articulation, and craniofacial anomalies) through readings, posted videos, and online quizzes. This is an online asynchronous course.

852 Speech and Language Disorders Encountered in Audiology (3). Students will select two topics from speech disorders (fluency, voice, articulation, and craniofacial anomalies) and two topics from language disorders(receptive and expressive language disorders, communication modalities, social aspects of communication, and cognitive aspects of communication). This is an online asynchronous course with readings, videos, and quizzes.

860 Seminar on Early Communication Disorders (3).

861 Seminar in Language and Language Disorders (1–3). Special topics and significant literature in the field of language and language disorders. May be repeated for credit.

863 Listening and Spoken Language Development and Intervention (3). Prerequisites, SPHS 832 and 836. The course focuses on typical development, impact of hearing loss on listening, and spoken language acquisition, assessment, strategies/techniques, and intervention for children birth-five years who are deaf/hard of hearing.

864 Speech and Language Impairments of Children (3). Seminar course exploring categorical classifications of young children and the impact of these categories on assessment and intervention. Common topics include autism, visual impairments, fragile X syndrome, and Down syndrome.

865 Doctoral Seminar in Grant Writing (3).

870 Directed Research Experience (2). This course gives enrolled audiology and Speech-language pathology graduate students an opportunity to pursue research supervised by one or more faculty members culminating in a document, project, or presentation (1-3).

871 Teaching and Supervision (1). Course regarding teaching of skills and supervision of individuals conducting screening programs. Introduction to teaching and development of assessment tools provides a background for the teaching lab associated with this course.

871L Teaching and Supervision Lab (1). Experience developing and delivering training module, instructional module, and supervising new trainees.

882 Seminar in Speech Science (1–3). Advanced special topics and current research in speech science. May be repeated for credit.

897 Autism Seminar (3). Participants develop knowledge of the major neuropsychological theories of autism and methodological issues in autism research through reading and discussion of literature; participate in developing and presenting autism research projects individually or in groups.

898 Literacy (3). This course provides an overview of literacy development for children birth to eight years old. It will also address the impact of hearing loss on the development of literacy.

900 Research Design (3). Doctoral seminar that introduces the student to principles of quantitative research methodology.

901 Seminar in Single Subject and Survey Research (3). Doctoral student seminar that introduces the student to principles of single subject and survey research methodology.

902 Research in the Context of the Evidence-Based Practice Movement in Early Intervention (3). Overview of the evidence-based practice (EBP) movement in early intervention (EI), definitions of EBP, systems for appraising evidence quality, examination of evidence base for current practices in EI.

950 Research, Resources, and Technologies (1). This course explores the use of computers in research and clinical practice for speech-language pathologists and audiologists.

993 Master's Thesis (3–6).

994 Dissertation (3–9).

Department of Statistics and Operations Research

www.stat-or.unc.edu
EDWARD CARLSTEIN, *Chair*

Professors

Amarjit Budhiraja (2) Probability, Stochastic Analysis, Stochastic Control
Edward Carlstein (3) Nonparametric Statistics, Resampling
Jan Hannig (23) Statistics, Fiducial Inference, Stochastic Processes
Douglas G. Kelly (5) Statistics, Evolutionary Game Theory
Vidyadhar G. Kulkarni (6) Stochastic Models of Queues, Telecommunication Systems, Warranties, Supply Chains
Malcolm Ross Leadbetter (7) Probability, Statistics, Extreme Value Theory
James Stephen Marron (10) Amos Hawley Distinguished Professor. Object-Oriented Data Analysis, Visualization, Smoothing
Andrew Nobel (11) Machine Learning, Data Mining, Computational Genomics
Vladas Pipiras (13) Long-Range Dependence, Self-Similarity, Heavy-Tails, Fractional Calculus, Wavelets, Applications to Telecommunications
J. Scott Provan (14) Network Design, Linear and Combinatorial Optimization, Bioinformatics
Pranab Kumar Sen (15) Cary C. Boshamer Professor of Biostatistics. Nonparametric Methods, Multivariate Analysis, Sequential Analysis
Richard L. Smith (17) Mark L. Reed Distinguished Professor and Director, Statistical and Applied Mathematical Sciences Institute. Extreme Value Theory, Environmental Statistics, Spatial Statistics

Associate Professors

Nilay Argon (1) Stochastic Models, Manufacturing and Health Care Applications, Simulation
Chuanshu Ji (4) Financial Econometrics, Computational Materials Science, Monte Carlo Methods
Yufeng Liu (8) Carolina Center for Genome Sciences. Statistical Machine Learning, Data Mining, Bioinformatics, Experimental Designs
Gabor Pataki (12) Convex Programming, Combinatorial Optimization, Integer Programming
Haipeng Shen (16) Functional Data Analysis, Time Series, Statistical Modeling of Customer Contact Centers
Serhan Ziya (20) Stochastic Models, Revenue Management, Service Operations

Assistant Professors

Shankar Bhamidi (25) Stochastic Processes and Random Networks
Shu Lu (9) Optimization, Variational Inequalities
Yin Xia (28) High Dimensional Statistical Inference
Kai Zhang (26) Mathematical Statistics

Lecturer

Charles Dunn (27) Actuarial Models

Joint Professors

Jason Fine, Biostatistics, Nonparametrics
Joseph Ibrahim, Alumni Distinguished Professor of Biostatistics. Bayesian Methods, Missing Data, Cancer Research
Alan F. Karr, Director, National Institute of Statistical Sciences. Inference for Stochastic Processes, Image Analysis, Engineering Applications of Statistics
Michael Kosorok, Biostatistics
Jayashankar Swaminathan, Benjamin Cone Research Professor, Kenan–Flagler Business School. Supply Chain, Stochastic Models

Adjunct Professors

Kenneth A. Bollen, H.R. Immerwahr Distinguished Professor of Sociology. Comparative Political Structures, Statistics, International Development
Harry L. Hurd, Stochastic Processes, Statistical Inference
Robert Rodriguez, Statistical Quality Improvement, Statistical Graphics

Professors Emeriti

Charles R. Baker
George S. Fishman
Gopinath Kallianpur, Alumni Distinguished Professor Emeritus
David S. Rubin
Gordon D. Simons
Walter L. Smith
Shaler Stidham Jr.
Jon W. Tolle

Graduate Degrees in Statistics and Operations Research

The department offers the master of science (M.S.) and doctor of philosophy (Ph.D.) in statistics and operations research (STOR). Each degree encompasses three programs: statistics (STAT), operations research (OR), and interdisciplinary statistics and operations research (INSTORE).

The Ph.D. degree in STOR is designed for students planning a career in teaching or research. This degree requires at least three (but usually four to five) years of full-time graduate study, predicated upon substantial undergraduate mathematical preparation. Research is a central component in the work of doctoral candidates. Research training consists of required core course work as well as electives that are designed to bring students up to date in their research field, and intensive one-on-one work with a faculty member on a specific dissertation topic. Doctoral students who want to pursue academic careers are provided with ample opportunities to teach introductory undergraduate courses, and they are given extensive training to develop their instructional skills. Doctoral students may also participate in paid internships with local industrial employers to gain experience in a business environment. Their professional skills are further enhanced by work on real-world projects with clients in the department's consulting courses. Several courses provide opportunities for students to give technical presentations and refine their communication skills.

The M.S. degree in STOR prepares students for jobs in industry and government, and for further graduate study. The philosophy of the M.S. degree is to train students in the basic theory and applications of statistics and/or operations research. Completion of the M.S. degree typically requires two years of full-time graduate study.

Further information on the graduate degree programs can be obtained from the department's home page on the Web at www.stat-or.unc.edu. Information about the OR, STAT, and INSTORE programs may also be obtained from the admissions chair of the individual programs, CB# 3260, Hanes Hall, The University of North Carolina at Chapel Hill, Chapel Hill, NC 27599.

Application forms for admission and/or financial aid are available through the Web site of The Graduate School at gradschool.unc.edu/admissions. Students can indicate on this application form whether they intend to pursue the degree program in OR, STAT, or INSTORE. Applicants are required to submit scores for both the Aptitude and Advanced Mathematics portions of the Graduate Record Examination (GRE) in support of their application, and a supplementary sheet providing brief course descriptions (including textbook title where applicable) of previous undergraduate and graduate courses in mathematics, probability, and statistics.

Graduate Program in Operations Research

Operations research is concerned with the process of decision-making for the purpose of optimal resource allocation. The spectrum of related activities includes basic research in optimization theory, development of deterministic and stochastic mathematical models as aids for decision-making and application of these models to real world problems. The principal steps in modeling consist of analyzing relationships that determine the probable future consequences of decision choices, and then devising appropriate measures of effectiveness in order to evaluate the relative merits of alternative actions. During the past 50 years, operations research has developed as a mathematical science whose methods of analysis are regularly employed in many diverse industries and governmental agencies.

The operations research faculty consists of a resident faculty and an interdisciplinary faculty, with programs of study that offer considerable opportunity for the pursuit of individual student interests. Specialization is possible in deterministic optimization theory (such as nonlinear and integer programming), in stochastic processes and applied probability (such as queueing theory and simulation) or in an approved area of application (such as management science). The M.S. program is intended for the student who is preparing for a career in industry, government, or consulting. The Ph.D. program emphasizes theoretical depth and is tailored primarily for the student who is preparing for a career in teaching and/or research. Each program includes study of the mathematical foundations of operations research. In either case, the specific program of study for each student is determined to a large extent on an individual basis through consultations with a faculty advisor to obtain a balance between application and theory. Although it is possible for the well-prepared student to complete the M.S. requirements in three semesters, it more typically requires four semesters. The Ph.D. program, including the dissertation, generally requires four or five years beyond the bachelor's degree. The department offers a minor for Ph.D. students in other departments. The department also offers a course sequence that enables qualified UNC–Chapel Hill undergraduates in the mathematical decision sciences B.S. degree program to fulfill the requirements for the M.S. degree in operations research in one additional academic year (beyond the four years required for the undergraduate degree).

Requirements for Admission to Graduate Study in Operations Research

Applicants must have demonstrated a high level of scholastic ability in their undergraduate studies and must satisfy the entrance requirements of The Graduate School. No restrictions are placed on the undergraduate major for admission to the program. However, to be prepared adequately for study in operations research, an applicant should have a good mathematical background, including courses in advanced calculus, linear or matrix algebra, probability and statistics, and the knowledge of a computer language. A student admitted with a deficiency in one or more of these topics must make up for it at the beginning of her or his graduate work. If the deficiency is not severe, this can be accomplished without interrupting the normal program.

Degree Requirements for Operations Research

Candidates for degrees in operations research must meet the general requirements of The Graduate School. Course selections for a degree in operations research are taken from the department's offerings and from the regular offerings of related departments including Biostatistics, City and Regional Planning, Computer Science, Epidemiology, Economics, Health Policy and Management, Information and Library Science, Mathematics, Psychology, the Kenan–Flagler Business School, and the Fuqua School of Business at Duke University.

For more details, see stat-or.unc.edu/programs and click on "Operations Research."

Graduate Program in Statistics

The statistics program offers graduate training leading to the master of science (M.S.) and doctor of philosophy (Ph.D.) degrees. The M.S. degree may be included in the doctoral program.

M.S. Program

The statistics M.S. program provides students with rigorous training in one or more areas of statistics and probability. The program is flexible enough to accommodate students with a variety of backgrounds and a variety of career interests.

The M.S. degree provides a valuable complement to a number of Ph.D. programs in the sciences and social sciences, and enhances the credentials of students in these programs seeking academic or industrial jobs. Over the years, students have completed the statistics M.S. degree concurrently with a Ph.D. in other areas such as economics, sociology, psychology, mathematics, and physics.

The statistics M.S. degree requires 30 credit hours of course work and the completion of a master's project. Students can choose from a wide variety of courses, including a limited number from outside the department. Upon approval of The Graduate School, at most six credit hours may be transferred from another accredited institution, or from within UNC–Chapel Hill for courses taken before admission to the M.S. program.

Ph.D. Program

The Ph.D. program in statistics provides students with a broad-based course of study in applied statistics, theoretical statistics and probability, as well as numerous advanced topic courses. The breadth and depth of the program has served graduates well in their subsequent careers in academia, industry, and government. Doctoral students pursue a wide range of dissertation research topics ranging from applied statistics to theoretical probability. Many students are involved in interdisciplinary research that puts them in regular contact with faculty and students from other disciplines.

Basic Requirements for the Statistics Ph.D.

The Ph.D. degree requires at least 45 semester hours of graduate course work and the successful completion of a doctoral dissertation. To meet the course requirements, students typically take 15 three-credit courses. Most courses are selected from among those offered by the statistics program, but approved courses from outside the program can also be counted toward the 45-credit minimum.

The Ph.D. curriculum in statistics places strong emphasis on the mathematical foundations of statistics and probability. A sound mathematical preparation is thus an essential prerequisite for admission to the program. An applicant's mathematical background should include a one-year course in real analysis, at least one semester of matrix algebra, and calculus-based courses in probability and statistics.

For more details, see stat-or.unc.edu/programs/statistics/phd.

Applicants for financial aid are considered for assistantships within the department, as well as for various fellowships and limited service awards provided on a competitive University-wide basis by The Graduate School. Assistants perform academically related duties, such as teaching, grading, and leading tutorials. Other awards include merit assistantships, University graduate and alumni fellowships, Pogue fellowships, and Morehead fellowships. Assistantships and fellowships generally include a stipend for the academic year as well as tuition.

Application for admission and financial aid may be made simultaneously simply by indicating on the admission application form a desire to be considered for financial aid.

More detailed information about the statistics program is available on the department's home page (listed above). Specific inquiries should be addressed to the Director of Graduate Admissions, Statistics Program, CB# 3260, The University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-3260.

Statistics Courses for Students from Other Disciplines

A number of STOR courses in probability and statistics are of potential interest to students in other disciplines. At the advanced undergraduate/beginning graduate level, STOR 455 and 456 provide an introduction to applied statistics, including regression, analysis of variance, and time series. STOR 435 and 555 provide introductions to probability theory and mathematical statistics, respectively, at a post-calculus level.

The three graduate course sequences—(664, 665), (654, 655), and (634, 635)—provide comprehensive introductions to modern applied statistics, theoretical statistics, and probability theory, respectively, at a more mathematical level. In each case it is possible to take only the first course in the sequence. Concerning mathematical prerequisites, 664 and 665 require a background in linear algebra and matrix theory, while the remaining courses require a solid background in real-analysis.

INSTORE Program

A Ph.D. and M.S. program entitled Interdisciplinary Statistics and Operations Research (INSTORE) was established in the fall semester of 2007. The INSTORE program is suitable for students pursuing an interdisciplinary research agenda who want to combine elements from the traditional statistics and operations research programs, or who want to develop significant expertise in the applications of statistics and operations research to some outside area such as genetics, finance, social science, or environmental science. The INSTORE program allows flexibility for adaptively combining statistics, operations research, and external fields of application. However, there are specific tracks that contain suggested sequences of courses allowing students to focus on certain areas of study. For example, there is a track in applied statistics and optimization, a track in computational finance, and a track in business analytics; further tracks are planned in econometrics and in bioinformatics. A mechanism also exists for students to propose their own track (subject to approval by the department's faculty). For detailed descriptions of the content and requirements of the INSTORE program go to stat-or.unc.edu/programs and click on "Interdisciplinary Statistics and Operations Research."

Courses for Graduate and Advanced Undergraduate Students

STOR

415 Deterministic Models in Operations Research (3). Prerequisite, MATH 547. Linear, integer, nonlinear, and dynamic programming, classical optimization problems, network theory.

435 Introduction to Probability (MATH 535) (3). Prerequisite, MATH 233. Introduction to the mathematical theory of probability, covering random variables; moments; binomial, Poisson, normal and related distributions; generating functions; sums and sequences of random variables; and statistical applications.

445 Stochastic Models in Operations Research (3). Prerequisite, BIOS 660 or STOR 435. Introduction to Markov chains, Poisson processes, continuous-time Markov chains, renewal theory. Applications to queueing systems, inventory, and reliability, with emphasis on systems modeling, design, and control.

455 Statistical Methods I (3). Prerequisite, STOR 155. Review of basic inference; two-sample comparisons; correlation; introduction to matrices; simple and multiple regression (including significance tests, diagnostics, variable selection); analysis of variance; use of statistical software.

456 Statistical Methods II (3). Prerequisite, STOR 455. Topics selected from design of experiments, sample surveys, nonparametrics, time series, multivariate analysis, contingency tables, logistic regression, and simulation. Use of statistical software packages.

465 Simulation Analysis and Design (3). Prerequisite, STOR 445. Introduces concepts of random number generation, random variate generation, and discrete event simulation of stochastic systems. Students perform simulation experiments using standard simulation software.

471 Long-Term Actuarial Models (3). Prerequisite, STOR 435. Probability models for long-term insurance and pension systems that involve future contingent payments and failure-time random variables. Introduction to survival distributions and measures of interest and annuities-certain.

472 Short Term Actuarial Models (3). Prerequisite, STOR 435. Short term probability models for potential losses and their applications to both traditional insurance systems and conventional business decisions. Introduction to stochastic process models of solvency requirements.

496 Undergraduate Reading and Research in Statistics and Operations Research (1–3). Permission of the director of undergraduate studies. This course is intended mainly for students working on honors projects. May be repeated for credit.

515 Computational Mathematics for Decision Sciences (3). Permission of the instructor. Reviews basic mathematical and computational theory required for analyzing models that arise in operations research, management science, and other policy sciences. Solution techniques that integrate existing software into student-written computer programs will be emphasized.

555 Mathematical Statistics (3). Prerequisite, STOR 435. Functions of random samples and their probability distributions, introductory theory of point and interval estimation and hypothesis testing, elementary decision theory.

565 Introduction to Machine Learning (3). Prerequisites, STOR 215 or MATH 381, and STOR 435. Introduction to theory and methods of machine learning including classification; Bayes risk/rule, linear discriminant analysis, logistic regression, nearest neighbors, and support vector machines; clustering algorithms; overfitting, estimation error, cross validation.

582 Neural Network Models for the Decision and Cognitive Sciences (3). Prerequisite, MATH 231, PHIL 155, PSYC 210, or STOR 155 or 215. The interactions between cognitive science and the decision sciences are explored via neural networks. The history of these networks in neuroscience is reviewed and their adaptation to other fields such as psychology, linguistics, and operations research is presented.

612 Models in Operations Research (3). Required preparation, calculus of several variables, linear or matrix algebra. Formulation, solution techniques, and sensitivity analysis for optimization problems which can be modeled as linear, integer, network flow, and dynamic programs. Use of software packages to solve linear, integer, and network problems.

614 Linear Programming (3). Required preparation, calculus of several variables, linear or matrix algebra. The theory of linear programming, computational methods for solving linear programs, and an introduction to nonlinear and integer programming. Basic optimality conditions, convexity, duality, sensitivity analysis, cutting planes, and Karush-Kuhn-Tucker conditions.

634 Measure and Integration (3). Required preparation, advanced calculus. Lebesgue and abstract measure and integration, convergence theorems, differentiation. Radon-Nikodym theorem, product measures. Fubini theorems. Lp spaces.

635 Probability (MATH 635) (3). Prerequisite, STOR 634. Permission of the instructor for students lacking the prerequisite. Foundations of probability. Basic classical theorems. Modes of probabilistic convergence. Central limit problem. Generating functions, characteristic functions. Conditional probability and expectation.

641 Stochastic Models in Operations Research I (3). Prerequisite, STOR 435. Review of probability, conditional probability, expectations, transforms, generating functions, special distributions, and functions of random variables. Introduction to stochastic processes. Discrete-time Markov chains. Transient and limiting behavior. First passage times.

642 Stochastic Models in Operations Research II (3). Prerequisite, STOR 641. Exponential distribution and Poisson process. Birth-death processes, continuous-time Markov chains. Transient and limiting behavior. Applications to elementary queueing theory. Renewal processes and regenerative processes.

654 Statistical Theory I (3). Required preparation, two semesters of advanced calculus. Probability spaces. Random variables, distributions, expectation. Conditioning. Generating functions. Limit theorems: LLN, CLT, Slutsky, delta-method, big-O in probability. Inequalities. Distribution theory: normal, chi-squared, beta, gamma, Cauchy, other multivariate distributions. Distribution theory for linear models.

655 Statistical Theory II (3). Prerequisite, STOR 654. Point estimation. Hypothesis testing and confidence sets. Contingency tables, nonparametric goodness-of-fit. Linear model optimality theory: BLUE, MVU, MLE. Multivariate tests. Introduction to decision theory and Bayesian inference.

664 Applied Statistics I (3). Permission of the instructor. Basics of linear models: matrix formulation, least squares, tests. Computing environments: SAS, MATLAB, S+. Visualization: histograms, scatterplots, smoothing, QQ plots. Transformations: log, Box-Cox, etc. Diagnostics and model selection.

665 Applied Statistics II (3). Prerequisite, STOR 664. Permission of the instructor for students lacking the prerequisite. ANOVA (including nested and crossed models, multiple comparisons). GLM basics: exponential families, link functions, likelihood, quasi-likelihood, conditional likelihood. Numerical analysis: numerical linear algebra, optimization; GLM diagnostics. Simulation: transformation, rejection, Gibbs sampler.

Courses for Graduate Students

STOR

701 Statistics and Operations Research Colloquium (1). This seminar course is intended to give Ph.D. students exposure to cutting edge research topics in statistics and operations research and assist them in their choice of a dissertation topic. The course also provides a forum for students to meet and learn from major researchers in the field.

705 Operations Research Practice (3). Prerequisites, STOR 614, 641, and 762. Permission of the instructor. Gives students an opportunity to work on an actual operations research project from start to finish under the supervision of a faculty member. Intended exclusively for operations research students.

712 Mathematical Programming I (3). Prerequisites, MATH 661 or STOR 515, and STOR 614. Permission of the instructor for students lacking the prerequisites. Advanced topics from mathematical programming such as geometry of optimization, parametric analysis, finiteness and convergence proofs, and techniques for large-scale and specially structured problems.

713 Mathematical Programming II (3). Prerequisite, STOR 712. Permission of the instructor for students lacking the prerequisite. Advanced theory for nonlinear optimization. Algorithms for unconstrained and constrained problems.

722 Integer Programming (3). Prerequisite, STOR 614. Permission of the instructor for students lacking the prerequisite. Techniques for formulating and solving discrete valued and combinatorial optimization problems. Topics include enumerative and cutting plane methods, Lagrangian relaxation, Benders' decomposition, knapsack problems and matching and covering problems.

724 Networks (3). Prerequisite, STOR 614. Permission of the instructor for students lacking the prerequisites. Network flow problems and solution algorithms; maximum flow, shortest route, assignment, and minimum cost flow problems; Hungarian and out-of-kilter algorithms; combinatorial and scheduling applications.

734 Stochastic Processes (3). Prerequisite, STOR 435. Discrete and continuous parameter Markov chains, Brownian motion, stationary processes.

743 Stochastic Models in Operations Research III (3). Prerequisite, STOR 642. Intermediate queueing theory, queueing networks. Reliability. Diffusion processes and applications. Markov decision processes (stochastic dynamic programming): finite horizon, infinite horizon, discounted and average-cost criteria.

744 Queueing Networks (3). Prerequisite, STOR 642. Permission of the instructor for students lacking the prerequisite. Jackson networks; open and closed. Reversibility and quasi-reversibility. Product form networks. Nonproduct form networks. Approximations. Applications to computer performance evaluations and telecommunication networks.

754 Time Series and Multivariate Analysis (3). Prerequisites, STOR 435 and 555. Introduction to time series: exploratory analysis, time-domain analysis and ARMA models, Fourier analysis, state space analysis. Introduction to multivariate analysis: principal components, canonical correlation, classification and clustering, dimension reduction.

755 Estimation, Hypothesis Testing, and Statistical Decision (3). Prerequisites, STOR 635 and 655. Bayes procedures for estimation and testing. Minimax procedures. Unbiased estimators. Unbiased tests and similar tests. Invariant procedures. Sufficient statistics. Confidence sets. Large sample theory. Statistical decision theory.

756 Design and Robustness (3). Prerequisite, STOR 555. Introduction to experimental design, including classical designs, industrial designs, optimality, and sequential designs. Introduction to robust statistical methods; bootstrap, cross-validation, and resampling.

757 Bayesian Statistics and Generalized Linear Models (3). Prerequisite, STOR 555. Bayes factors, empirical Bayes theory, applications of generalized linear models.

762 Discrete Event Simulation (COMP 762) (3). Prerequisites, STOR 555 and 641. Familiarity with computer programming required. Introduces students to modeling, programming and statistical concepts applicable to discrete event simulation on digital computers. Emphasizes statistical analysis of simulation output. Students model, program, and run simulations.

763 Statistical Quality Improvement (3). Prerequisites, STOR 655 and 664. Methods for quality improvement through process control, graphical methods, designed experimentation. Shewhart charts, cusum schemes, methods for autocorrelated multivariate process data, process capability analysis, factorial and response surface designs, attribute sampling.

765 Statistical Consulting (3). Application of statistics to real problems presented by researchers from the University and local companies and institutes. (Taught over two semesters.)

772 Introduction to Inventory Theory (3). Permission of the instructor. Introduction to the techniques of constructing and analyzing mathematical models of inventory systems.

790 Operations Research and Systems Analysis Student Seminar (1). Survey of literature in operations research and systems analysis.

822 Topics in Discrete Optimization (COMP 822) (3). Prerequisite, STOR 712. Permission of the instructor. Topics may include polynomial algorithms, computational complexity, matching and matroid problems, and the traveling salesman problem.

824 Computational Methods in Mathematical Programming (3). Prerequisites, STOR 712. Permission of the instructor. Advanced topics such as interior point methods, parallel algorithms, branch and cut methods, and subgradient optimization.

831 Advanced Probability (3). Prerequisites, STOR 634 and 635. Advanced theoretic course, covering topics selected from weak convergence theory, central limit theorems, laws of large numbers, stable laws, infinitely divisible laws, random walks, martingales.

832 Stochastic Processes (3). Prerequisites, STOR 634 and 635. Advanced theoretic course including topics selected from foundations of stochastic processes, renewal processes, Markov processes, martingales, point processes.

833 Time Series Analysis (3). Prerequisites, STOR 634 and 635. Analysis of time series data by means of particular models such as autoregressive and moving average schemes. Spectral theory for stationary processes and associated methods for inference. Stationarity testing.

834 Extreme Value Theory (3). Prerequisites, STOR 635 and 654. Classical asymptotic distributional theory for maxima and order statistics from i.i.d. sequences, including extremal types theorem, domains of attraction, Poisson properties of high-level exceedances. Stationary stochastic sequences and continuous time processes.

835 Point Processes (3). Prerequisite, STOR 635. Random measures and point processes on general spaces, Poisson and related processes, regularity, compounding. Point processes on the real line stationarity, Palm distributions, Palm-Khintchine formulae. Convergence and related topics.

836 Stochastic Analysis (3). Prerequisites, STOR 634 and 635. Brownian motion, semimartingale theory, stochastic integrals, stochastic differential equations, diffusions, Girsanov's theorem, connections with elliptic PDE, Feynman-Kac formula. Applications: mathematical finance, stochastic networks, biological modeling.

842 Control of Stochastic Systems in Operations Research (3). Prerequisites, STOR 641 and 642. Review of Markov decision processes. Monotone control policies. Algorithms. Examples: control of admission, service, routing and scheduling in queues and networks of queues. Applications: manufacturing systems, computer/communication systems.

851 Sequential Analysis (3). Prerequisites, STOR 635 and 655. Hypothesis testing and estimation when sample size depends on the observations. Sequential probability ratio tests. Sequential design of experiments. Optimal stopping. Stochastic approximation.

852 Nonparametric Inference: Rank-Based Methods (3). Prerequisites, STOR 635 and 655. Estimation and testing when the functional form of the population distribution is unknown. Rank, sign, and permutation tests. Optimum nonparametric tests and estimators including simple multivariate problems.

853 Nonparametric Inference: Smoothing Methods (3). Prerequisites, STOR 635 and 655. Density and regression estimation when no parametric model is assumed. Kernel, spline, and orthogonal series methods. Emphasis on analysis of the smoothing problem and data based smoothing parameter selectors.

854 Statistical Large Sample Theory (3). Prerequisites, STOR 635 and 655. Asymptotically efficient estimators; maximum likelihood estimators. Asymptotically optimal tests; likelihood ratio tests.

855 Subsampling Techniques (3). Prerequisite, STOR 655. Basic subsampling concepts: replicates, empirical c.d.f., U-statistics. Subsampling for i.i.d. data: jackknife, typical-values, bootstrap. Subsampling for dependent or nonidentically distributed data: blockwise and other methods.

856 Multivariate Analysis (3). Prerequisite, STOR 655. Required preparation, matrix theory, multivariate normal distributions. Related distributions. Tests and confidence intervals. Multivariate analysis of variance, covariance and regression. Association between subsets of a multivariate normal set. Theory of discriminant, canonical, and factor analysis.

857 Nonparametric Multivariate Analysis (3). Prerequisite, STOR 852. Nonparametric MANOVA. Large sample properties of the tests and estimates. Robust procedures in general linear models, including the growth curves. Nonparametric classification problems.

890 Special Problems (1–3). Permission of the instructor.

891 Special Problems (1–3). Permission of the instructor.

892 Special Topics in Operations Research and Systems Analysis (1–3). Permission of the instructor.

893 Special Topics (1–3). Advance topics in current research in statistics and operations research.

910 Directed Reading in Operations Research and Systems Analysis (1–21). Permission of the instructor.

930, 950 Advanced Research (0.5–21). Permission of the instructor.

940 Seminar in Theoretical Statistics (1-3). Prerequisite, STOR 655.

960 Seminar in Theoretical Statistics (0.5–21). Prerequisite, STOR 655.

970 Practicum (1–3). Students work with other organizations (Industrial/Governmental) to gain practiced experience in Statistics and Operations Research.

992 Master's Substitute for Thesis (3–21). Permission of instructor.

993 Master's Thesis (3–6). Permission of instructor.

994 Doctoral Dissertation (3–9). Permission of instructor.

Curriculum in Toxicology

www.med.unc.edu/toxicology
ILONA JASPERS, *Director of the Curriculum in Toxicology*

Professors

Louise M. Ball, Metabolism and Genotoxicity of Environmental Xenobiotics
Thomas W. Bouldin, Neuropathology, Ocular Pathology and Neurotoxicology
Kim R. Brouwer, Pharmacokinetics, Hepatic Transport, Hepatobiliary Disposition, Biliary Excretion, Hepatotoxicity
Frank C. Church, Thrombosis and Hemostasis, Breast and Prostate Carcinogenesis, Macromolecular Structure-Function
William B. Coleman, Hepatocarcinogenesis, Tumor Suppressor Genes, Biology of Liver Stem Cells, Cancer Epigenetics
Marila Cordeiro-Stone, DNA Repair and Replication in Human Cells, Mechanisms of Response to DNA Damage
Channing J. Der, Ras Protein Superfamily, Signal Transduction and Oncogenesis
Mohanish P. Deshmukh, Molecular Mechanisms of Apoptosis in Neurons and Other Postmitotic Cells
Avram Gold, Structure-Reactivity Relationships in Metabolism and Mutagenicity of Polycyclic Aromatic Hydrocarbons
Milan J. Hazucha, Health Effects of Air Pollutants, Human Studies, Mechanisms of Response
David J. Holbrook Jr., Biochemical Toxicology, Xenobiotic Metabolism
David G. Kaufman, DNA Replication, Chemical Carcinogenesis
William K. Kaufmann, DNA Metabolism in Radiation and Chemical Carcinogenesis
Nobuyo N. Maeda, Animal Models of Hyperlipidemia, Atherosclerosis and Cardiomyopathy
Terry Magnuson, Mammalian Genetics, Genomics and Development
A. Leslie Morrow, Neurotoxicology and Excitotoxicity of Alcohol
Leena A. Nylander-French, Development of Methods to Monitor and Assess Dermal Exposure to Chemical Carcinogens and Contact Sensitizers
Winston Campbell (Cam) Patterson, Vascular Biology, Angiogenesis, Protein Folding and Degradation
David B. Peden, Translational and Clinical Research in Environmental Lung Disease
Charles M. Perou, Characterization and Classification of Human Breast Tumors into Subtypes of Biological and Clinical Importance
Daniel Pomp, Genetic Architecture of Complex Traits, Gene-Environment Interactions, Polygenic Mouse Models, Obesity
Dale A. Ramsden, V(D)J Recombination and DNA Double Strand Break Repair
Ivan I. Rusyn, Environmental Genomics
Aziz Sancar, DNA Repair and Cancer, Structure and Function of DNA Repair Enzymes, Connection between the Circadian Clock and DNA Excision Repair
Norman E. Sharpless, Tumor Suppressor Genes, Genetics of Cancer and Aging
James A. Swenberg, Carcinogenesis, DNA and Protein Adducts, Cell Proliferation, Risk Assessment
Nancy E. Thomas, Molecular Carcinogenesis, Environmental Toxicology, Molecular Epidemiology, Research Translation, Biomarkers
David W. Threadgill, Mammalian Genetics, Systems Genetics, Toxicogenomics, Gene-Environment Interactions, Cancer Susceptibility
Alexander Tropsha, Molecular Modeling, Computer-Assisted Drug Design, Molecular Dynamics of Proteins, Protein Folding
Paul B. Watkins, Mechanistic Toxicology, Hepatotoxicology, Research Translation, Biomarkers
Bernard E. Weissman, Chromatin Remodeling and Epigenetic Alterations in Human Cancer
Elizabeth M. Wilson, Environmental Androgens and Antiandrogens, Androgen Receptor Regulation of Prostate Cancer

Associate Professors

David Neil Hayes, Lung Carcinogenesis, Research Translation, Biomarkers, Computational Toxicology
Ilona Jaspers, Cellular Mechanisms of Air Pollutant Toxicity

Jeffrey M. Macdonald, Metabolomics and Fluxomics Using NMR Spectroscopy and Imaging, Tissue Engineering
Scott H. Randell, Identification of Airway Epithelial Stem Cells, Airway Innate Immunity, Pathophysiology of Lung Diseases
W. Kimryn Rathmell, Genetics of Renal Cell Carcinoma
Philip C. Smith, Toxicokinetics and Xenobiotic Metabolism, Peptide Analysis and Disposition
Miroslav Styblo, Metabolism and Biological Effects of Essential and Toxic Metals and Metalloids
Cyrus Vaziri, Cell Cycle Responses to Environmental Genotoxins (Benzo[a]pyrene, UV Radiation), DNA Replication and Repair, Genome Stability

Assistant Professors

Rebecca Fry, Metal-Induced Disease, Prenatal Origins of Disease, Toxicogenomics
Michelle L. Hernandez, Severe Asthma, Development of Novel Therapies Against Neutrophilic Airway Inflammation
Mary F. Paine, Drug Xenobiotic Metabolism, Pharmacokinetics, Drug Xenobiotic Interactions

Faculty Affiliates from Other Research Institutions

Hamner Institutes for Health Sciences

Edward L. LeCluyse, Cellular/Molecular Mechanisms Regulating Liver Cytochrome P450 Enzymes Expression

ICF International

MaryJane K. Selgrade, Immunotoxicology

National Institute of Environmental Health Sciences

Trevor Archer, Molecular Carcinogenesis, Chromatin Structure, Control of Gene Transcription, Epigenetics
Linda S. Birnbaum, Chemical Disposition of Xenobiotics, Mechanistic Toxicology, Dose-Response and Risk Assessment
Michael DeVito, Development of Models for Cumulative Risk to Endocrine Disruptors
Suzanne Fenton, Environmental Effects on Mammary Gland Development and Function
Michael B. Fessler, Induction and Regulation of Innate Immune Response, Toll-like Receptor Signaling
G. Jean Harry, Developmental Neurotoxicology, Molecular Neuro/Immunotoxicology
Steven R. Kleeberger, Genetic Determinants of Environmental Lung Disease
Gregory S. Travlos, Hematology and Clinical Chemistry
Carmen J. Williams, Environmental Effects on Reproductive Biology and Early Mammalian Embryogenesis, Epigenetics, Endocrine Disruption

North Carolina State University

David C. Dorman, Experimental Neurotoxicology, Nasal Toxicology, Pharmacokinetics

U.S. Environmental Protection Agency

Martha Sue Carraway, Study Mechanisms of Cardiovascular Injury in Response to Inhaled Particulate and Gaseous Pollutants Using InVitro and Animal Models
Daniel L. Costa, Cardiopulmonary and Inhalation Toxicology, Health Effects of Air Pollutants
Kevin M. Crofton, Understanding the Consequences of Endocrine Disruption on Neurodevelopment
Robert B. Devlin, Pulmonary Toxicology, Molecular Biology
David Díaz-Sánchez, Translation Research, Environmental Impacts on Human Health, Immunology, Genetic Susceptibility, Epigenetics
Aimen K. Farraj, Comparative Cardiovascular Effects of Biodiesel and Petroleum Diesel Fuel Emissions
M. Ian Gilmour, Pulmonary Toxicology, Immunotoxicology
Mehdi A. Hazari, Neurophysiological mechanisms mediating cardiopulmonary dysfunction due to air pollution exposure
E. Sidney Hunter, Mechanisms of Developmental Toxicity, Oxidative Stress, Embryonic Stem Cells in Developmental Toxicity
Gary Klinefelter, Male Reproductive Toxicology
Urmila P. Kodavanti, Cardiovascular Diseases and Susceptibility, Air Pollutants, Cardiopulmonary Interactions, Molecular Mechanisms, Genetic and Environmental Factors
Robert Luebke, Modulation of Normal Immune Function by Environmental Agents, Alternative Methods for Screening/Testing Immunotoxicants
Michael C. Madden, Air Pollution Toxicology, Lung Oxidative Stress and Inflammation
Michael G. Narotsky, Developmental Toxicology, Pregnancy Maintenance and Parturition
Stephanie Padilla, Behavioral Toxicology and Neurotoxicology
John M. Rogers, Developmental Toxicology, Teratology, Developmental Biology, Embryology, Nutrition
James M. Samet, Inflammatory Responses to Pollutant Inhalation, Cytokines, Eicosanoids

Consultant

Ram (T. V.) Ramabhadran, Neurotoxicological Effects of Environmental Pollutants, Cellular Stress Pathways

The Curriculum

The Curriculum in Toxicology administers a degree program leading to the award of the Ph.D. in toxicology. The curriculum is an interdisciplinary program, and its faculty is drawn from various administrative units of the schools of Medicine, Pharmacy, and Public Health. The training faculty also includes scientists at government laboratories on campus or in the Research Triangle Park (e.g., EPA, NIEHS). The research interests of the faculty include most areas of toxicology, with particular emphasis on understanding the links between the environment and health risks, the mode of action of toxicants and disease pathogenesis and how emerging knowledge could be translated into prevention strategies, new therapeutic interventions, and an improved scientific basis for risk assessment. The main areas of research concentration are molecular carcinogenesis, mechanistic toxicology, neurotoxicology, cardiopulmonary toxicology, hepatic toxicology, computational toxicology, developmental toxicology, immunotoxicology, drug and xenobiotic metabolism, and ethanol toxicology. Multidisciplinary efforts are directed at environmental toxicology, systems biology, animal models of human diseases, translational research, and biomarkers. The faculty generally does not conduct research in the areas of aquatic toxicology, forensic toxicology, the ecological aspects of toxicology, or studies in invertebrate systems. The research activities of the Curriculum in Toxicology are conducted in the laboratory facilities assigned to each faculty member by a participating administrative unit.

Applications

Students with interest in the Ph.D. degree in toxicology must apply for Graduate School admission through the Biological and Biomedical Sciences Program. Applications are considered from students who have received or expect to receive a B.S./B.A. or an M.S. degree in a scientific discipline. A desirable background for predoctoral studies in toxicology includes courses in biological sciences (including histology and animal physiology), in chemistry (including analytical and organic), and in mathematics through calculus, although all of these are not absolutely essential. A strong course in general biochemistry accelerates the student's progress. Applicants are evaluated on the basis of undergraduate (and graduate) academic performance, Graduate Record Examination (GRE)

scores, and letters of recommendation. Students are accepted on the basis of their achievement and potential. Prior research experience is strongly considered in the assessment of qualifications for admission.

Requirements for the Ph.D. Degree

The selection of graduate courses is influenced by the student's prior academic background. The academic courses that are considered appropriate for graduate training in toxicology include biochemistry, biostatistics, pathology, pharmacology, toxicology, and two elective courses in the specific areas of the doctoral research. In addition, each predoctoral student is expected to participate in other training activities—i.e., student-centered seminars and scientific meetings—while developing the doctoral dissertation project. Attendance and participation in the Curriculum in Toxicology seminar series is required during the entire training period.

A major requirement for the Ph.D. degree is a doctoral dissertation based on the development of the student's research project. Written and oral examinations are required in the fields of general toxicology and the student's research concentration.

Financial Aid

The curriculum seeks to fund predoctoral students each year. All applicants are considered for financial aid awards.

Courses for Graduate and Advanced Undergraduate Students

TOXC

423 Developmental Toxicology and Teratology (CBIO 423) (2). See CBIO 423 for description.

442 Biochemical and Molecular Toxicology (BIOC 442, ENVR 442) (3). See ENVR 442 for description.

Courses for Graduate Students

TOXC

702 Principles of Pharmacology and Toxicology (PHCO 702) (3). See PHCO 702 for description.

707 Advanced Toxicology (ENVR 707, PHCO 707) (3). Prerequisite, PHCO 702. Permission of the instructor for students lacking the prerequisite. Cellular and physiological basis of toxicity of environmental chemicals, with emphasis on inhalation toxicology, developmental toxicology, immunotoxicology, radiation toxicology, renal toxicology, and neurotoxicology. Three lecture hours per week.

721 Toxicology Seminar II (1). Student-conducted presentations and discussions of recent advances in toxicology; emphasis on critical evaluation of published investigations and on organization and oral delivery of presentations. One hour per week.

722 Toxicology Seminar III (ENVR 722) (1). Presentations by outside invited speakers, local faculty, advanced graduate students, and postdoctoral trainees. Topics will cover all areas of research in toxicology. One hour per week.

760 Toxicokinetics (3). A quantitative examination of the time course of absorption, distribution, metabolism, excretion, and biologic effects of agents of toxicologic interest. Three lecture hours per week.

792 Seminar in Carcinogenesis (PATH 792) (2). See PATH 792 for description.

821 Scientific Writing (1). Doctoral candidacy in toxicology required. Workshops on scientific writing with special emphasis on fellowship applications and the doctoral research proposal. Students work on several written assignments and are expected to complete a draft of their proposals by the end of the semester.

901 Research in Toxicology (3). May be repeated. Students register in this course as they formulate their doctoral research projects.

993 Master's Thesis (3). May be repeated. Hours and credits to be arranged.

994 Doctoral Dissertation (3). May be repeated. Hours and credits to be arranged.

Graduate Minor in Women's and Gender Studies

www.unc.edu/depts/wmst/gradminor.html
JOANNE HERSHFIELD, *Chair*

Professors

E. Jane Burns, Feminist Medieval Studies, Courtly Love and Literature, French Feminist Theory, Women, Clothing, and Textiles, Mediterranean Silk Trade, Medieval Pilgrimage
Joanne Hershfield, Mexican Film and Visual Culture, Feminist Film and Visual Studies

Associate Professors

Michele T. Berger, Women and HIV/AIDS, Gender and Political Participation, Feminist Methods, and Multiracial Feminisms
Karen Booth, Sexual and Reproductive Health, Imperialism, Postcolonialism and Globalization, Feminist Policy Studies
Silvia Tomášková, Gender and Science, Archaeology, Prehistoric Art

Assistant Professors

Emily Burrill, Gender and Legal History, Colonial and Postcolonial Africa
Tanya L. Shields, 20th-Century Caribbean Literature, Caribbean Diaspora Studies, Cultural Citizenship, and Social Justice Discourses
Ariana D. Vigil, Contemporary U.S. Latina/o Literatures and Cultures; Transnational Latina/o – Latin American Studies; Queer and Feminist Literature; African American Literature.
Susan Page, Feminist Media Art, Photography, Altered Textiles, Video Installations

Adjunct Professor

Annegret Fauser (Department of Music)

Applications

Contact the chair of Women's and Gender Studies.

Requirements for the Minor

Women's and Gender Studies offers a graduate minor which requires students to take 15 credit hours in cross-listed courses at the 700 to 899 level. (The chair will consider substitution of 400–699 level courses where appropriate.) Courses must be distributed as follows:

- Nine credit hours in crosslisted courses in two different disciplines outside the student's major. These courses may include theory courses beyond the three-credit requirement.
- Three credit hours in feminist theory; this course may be taken in any department, including the student's major department.
- Three credit hours in a Women's and Gender studies seminar for graduate minors (WMST 790).

Graduate students minoring in Women's and Gender studies must include on their doctoral committee a faculty member who teaches women's studies courses.

Courses for Graduate and Advanced Undergraduate Students
WMST

410 Comparative Queer Politics (3). Prerequisite, WMST 101. Permission of the instructor. Compares the histories, experiences, identities, and political struggles of sexual and gender minorities in Asia, the Middle East, Africa, and the Américas and at the United Nations.

415 Women and Mass Communication (JOMC 442) (3). See JOMC 442 for description.

424 Gender Theory and the Study of Religion (RELI 424) (3). See RELI 424 for description.

437 Gender, Science Fiction, and Film (COMM 436) (3). The course combines several fields, analyzing the construction of gender through science, science fiction, and film. Students are exposed to science issues as they are represented in popular media.

441 The Anthropology of Gender, Health, and Illness (ANTH 441) (3). See ANTH 441 for description.

444 Race, Class, and Gender (SOCI 444) (3). See SOCI 444 for description.

446 American Women Authors (ENGL 446) (3). See ENGL 446 for description.

451 Women in the Visual Arts II (ARTH 451) (3). See ARTH 451 for description.

458 Archaeology of Sex and Gender (ANTH 458) (3). See ANTH 458 for description.

475 Philosophical Issues in Gender, Race, and Class (PHIL 475) (3). See PHIL 475 for description.

477 Advanced Feminist Political Theory (POLI 477) (3). See POLI 477 for description.

479 History of Female Sexualities in the West (HIST 479) (3). See HIST 479 for description.

486 Contemporary Russian Women's Writing (RUSS 486) (3). See RUSS 486 for description.

500 Gender and Nation in Europe and beyond, from the 18th to the 20th Century (HIST 500). See HIST 500 for description.

501 Gender of Welfare (HIST 501) (3). See HIST 501 for description.

537 Women in the Middle East (ASIA 537, HIST 537) (3). See HIST 537 for description.

550 The Social Construction of Women's Bodies (3). Prerequisite, WMST 101. Permission of the instructor for students lacking the prerequisite. Looking specifically at the social and cultural construction of women's bodies, this course considers the ways in which biological difference is imbued with social significance.

553 Theorizing Black Feminisms (3). Prerequisites, WMST 101 and 202. Permission of the instructor for students lacking the prerequisites. Introduction to the theoretical and practical contributions of African American feminists who maintain that issues of race, gender, sexuality, and social class are central, rather than peripheral, to any history or strategy for bringing about social justice in the United States.

555 Women and Creativity (3). Prerequisite, WMST 101. Permission of the instructor for students lacking the prerequisite. This course will present an overview of the variety and diversity of contemporary American women's experiences of creative expressions. We explore how women have been historically excluded from the arts.

560 Women and Religion in United States History (3). An interdisciplinary consideration of women's roles, behavior, and ideas in the religious life of Americans from 1636 to 1982.

561 Performance of Literature by Women of Color (COMM 561) (3). See COMM 561 for description.

562 Oral History and Performance (COMM 562, FOLK 562, HIST 562) (3). See COMM 562 for description.

563 Introduction to Women's Health and Health Education (3). Permission of the instructor. An overview of women's health emphasizing their specific interest as family and community members, as patients, and as health professionals. Implications for health education practice and research.

568 Women in the South (HIST 568) (3). See HIST 568 for description.

569 African American Women's History (HIST 569) (3). See HIST 569 for description.

576 The Ethnohistory of Native American Women (HIST 576) (3). See HIST 576 for description.

610 Feminism, Sexuality, and Human Rights (3). Required preparation for undergraduates, WMST 101, one other WMST course beyond the introductory level, and junior/senior standing. Permission of the instructor required for both undergraduates and graduate students. Examines how transnational struggles over reproductive rights, HIV/AIDS, sex work, and "LGBT" rights have used, challenged, and transformed human rights discourses.

620 Women in Hispanic Literature (SPAN 620) (3). See SPAN 620 for description.

656 Women in Film (COMM 656) (3). This course examines the representations of women in contemporary American film and also considers women as producers of film.

660 Kinship, Reproduction, Reproductive Technology, and the New Genetics (ANTH 660) (3). See ANTH 660 for description.

662 Gender Issues in Planning and Development (PLAN 662) (3). See PLAN 662 for description.

665 Queer Latina/o Literature, Performance, and Visual Art (ENGL 665) (3). See ENGL 665 for description.

666 Queer Latina/o Photography and Literature (ENGL 666) (3). See ENGL 666 for description.

691H Honors in Women's Studies (3). Prerequisite, WMST 695 or 695H. Permission of the department. Second semester of the year-long honors thesis project. Writing and completion of an honors essay.

695 Senior Seminar: Principles of Feminist Inquiry (3). Prerequisites, WMST 101 and 202. Required preparation, at least one additional WMST course and senior standing or permission of the instructor. Required for majors; strongly recommended for minors. An advanced writing-intensive course drawing on a student's interests and background. Major research of specific topics utilizing feminist perspectives.

Courses for Graduate Students
WMST

715 Feminism and Society (ANTH 715) (3). See ANTH 715 for description.

725 Selected Readings in the Comparative or Global History of Women in Gender (HIST 725) (3). See HIST 725 for description.

726 French Feminist Theory (FREN 726) (3). An introduction to feminist literary theory, focusing on feminist writings from France (in translation) and their sources in psychoanalysis and poststructuralism. Anglo-American counterparts and adaptations of the French theorists in the United States will also be treated.

730 Feminist and Gender Theory for Historians (HIST 730) (3). See HIST 730 for description.

735 Readings in the History of Sexuality and Gender (HIST 735) (3). See HIST 735 for description.

751 Gender and Visual Culture (ARTH 751) (3). See ART 751 for description.

753 Gender, Sickness, and Society (ANTH 753) (3). See ANTH 753 for description.

755 Readings in Medieval and Early Modern Women's History (HIST 755) (3). See HIST 755 for description.

768 Feminist Political Theory (POLI 768) (3). See POLI 768 for description.

770 Readings in Modern European Women's and Gender History (HIST 770) (3). See HIST 770 for description.

775 Advanced Studies in Feminism (PHIL 775) (3).

776 Gender, Race, and Class Issues in Education (EDUC 776) (3). See EDUC 776 for description.

777 Gender, Policy, and Leadership in Education (EDUC 777) (3). See EDUC 777 for description.

790 Graduate Seminar in Women's Studies (3). Explores the complex interaction between women's studies, feminist studies and gender studies as these fields have evolved within and across academic disciplines, intersecting with issues of race, class, ethnicity, masculinity, sexuality, and with practices of queer theory and cultural studies.

796 Graduate Independent Reading and Research (1-3). Permission of the instructor. Intensive reading and research in a student's chosen area of interest under faculty supervision. Results in a written report.

851 Sociology of Gender (SOCI 851) (3). See SOCI 851 for description.

858 Seminar in Feminist Studies of Film and Television (COMM 858) (3). See COMM 858 for description.

865 Readings in U. S. Women's and Gender History (HIST 865) (3). See HIST 865 for description.

890 Topics in Women's Studies (3). This course allows faculty in WMST to offer graduate-level courses on special topics pertinent to their current research.

975 Seminar on Women's and Gender History (HIST 975) (3). See HIST 975 for description.

Appendix

Alcoholic Beverages

Possession and use of alcoholic beverages is substantially regulated by federal, state, and local laws and ordinances. Within this legal framework, the University's Policy on Student Possession and Consumption of Alcoholic Beverages in Facilities of the University of North Carolina at Chapel Hill sets out the conditions under which alcoholic beverages may be used on University property.

According to North Carolina law

- Generally persons 21 or older may purchase or consume alcoholic beverages and may possess alcoholic beverages at their homes or temporary residences.
- It is against the law for any person under 21 to purchase or possess any alcoholic beverage.
- It is against the law for anyone to sell or give any alcoholic beverage to a person under 21 or to aid or abet such a person in selling, purchasing, or possessing any alcoholic beverage.
- No alcoholic beverages may be sold by any person, organization, or corporation on a college campus except as permitted by N.C. Gen. Stat. § 18B-1006 (a).

According to Chapel Hill ordinance, it is against the law for anyone to possess any open container of alcohol on streets, sidewalks, alleys, or any other property owned or controlled by the Town of Chapel Hill.

In addition to following the law, the University's Policy on Student Possession and Consumption of Alcoholic Beverages in Facilities of the University of North Carolina at Chapel Hill sets out special rules about alcohol for students and student organizations. The Office of the Dean of Students will provide copies of the policy and assistance in understanding its full implications. The text of the policy can be accessed on the Web at policies.unc.edu/policy-category/university.

Under the policy

- Alcohol may not be served, consumed, or sold in any University facility or open space except as provided in the University's Guidelines for Serving Alcohol at University-Sponsored Events. The guidelines are available on the Web at policies.unc.edu/policy-category/university.
- Common source containers of alcohol (e.g., kegs) are not permitted on campus.
- Students and their guests age 21 and older may possess and consume alcoholic beverages in individual campus residence hall rooms or apartments on campus, but not in the common areas of a campus residence hall.
- No student activity fees or other University-collected fees may be used to purchase alcohol.
- No other funds of an officially recognized student group deposited or administered through the Student Activities Fund Office may be used to purchase alcohol.
- Student groups are not prohibited from having events off campus at which individual group members age 21 or older bring or buy their own alcoholic beverages.

Students who violate the policy face mandatory alcohol education, housing sanctions (for violations arising in University housing), and sanctions, including written reprimand, restitution, counseling/referral, and/or educational or community service activities. Student groups who violate the policy face sanctions of written reprimand, restitution, mandatory educational programs or community service, and/or loss of University recognition. Behavior that violates the Code of Student Conduct, state, or federal laws may also be referred to the Office of Student Conduct, the Emergency Evaluation and Action Committee, and/or state and federal authorities.

Emergency Disciplinary Action

In order to protect University property or members of the University community or to prevent disruption of the academic process, occasionally the University must take emergency action to separate a student from the University or such other intermediate action as may be warranted. The Chancellor has, therefore, created the Emergency Evaluation and Action Committee. With respect to disciplinary matters, the committee acts only when no other administrative solution, including action by the Student Judicial System, is in its judgment adequate to deal effectively with the situation.

Students whose cases may require action by the committee fall into five categories:

- Applicants for admission or readmission to the University who have been convicted of a crime involving assaultive or felonious behavior, who have a record of violent behavior, or who have a record of academic dishonesty or disciplinary rule violations elsewhere;
- Students whose behavior, on or off campus, is such that their presence in the University, in the judgment of the committee, poses a serious threat of disruption of the academic process or a continuing danger to other members of the University community, or University property;
- Students or applicants who have been arrested and charged with a serious crime of a violent or dangerous nature, or a serious crime that involved placing another person in fear of imminent physical injury or danger, where, in the judgment of the committee, if the students are found guilty, their presence in the University would pose a serious threat of disruption of the academic process or a continuing danger to other members of the University community, or University property;
- Students, charged by the University with a violation of policies concerning illegal drugs, whose continued presence within the University community would, if the charges are true, constitute a clear and immediate danger to the health or welfare of other members of the University community;
- Students whose behavior on or off campus is such that, in the judgment of the committee, they pose a danger to themselves.

Full information on the committee and its procedures is available from the Division of Student Affairs through the office of the Dean of Students. The text of the committee's policy and procedures is on the Web at policy.sites.unc.edu/files/2013/04/EEAC.pdf

Equity in Athletics Disclosure Act

Information compiled under the federal Equity in Athletics Disclosure Act is available on request from the Office of the Director of Athletics.

Expulsion

A student who has been expelled from an institution in the University of North Carolina system may not be admitted to another UNC System school unless the institution that originally expelled the student rescinds that expulsion.

Family Educational Rights and Privacy Act

As a general rule, under the federal Family Educational Rights and Privacy Act (FERPA), personally identifiable information may not be released from a student's education records without his or her prior written consent. Exceptions to this rule are set out in the FERPA regulations and the FERPA policy of the University of North Carolina at Chapel Hill. A few of the exceptions are listed below; others may be found in the University's FERPA policy and accompanying federal regulations.

The University will disclose personally identifiable information from a student's education records to officials of another institution in which the student seeks or intends to enroll, or where the student is already enrolled if the disclosure is for purposes related to the student's enrollment or transfer. The University will also disclose personally identifiable information from a student's education records to officials of another institution in which a currently enrolled UNC–Chapel Hill student is contemporaneously enrolled. It is the policy of the University of North Carolina at Chapel Hill to forward education records upon request to officials of other institutions in these situations without notifying the student of such transfer of records.

If the University takes disciplinary action against a student for conduct that posed a significant risk to the safety or well-being of the student, other students, or members of the University community, the University may disclose information about that disciplinary action to officials of other schools who have been determined to have a legitimate educational interest in the student's behavior. It is the policy of the University of North Carolina at Chapel Hill to disclose this type of disciplinary information to such officials of other schools without notifying the student that the information has been disclosed.

If the University, pursuant to campus disciplinary procedures, finds that a student has committed a violation of the Honor Code that constitutes a crime of violence or a nonforcible sex offense, the University, upon request, discloses the following information: the student's name, the rule or policy that was violated, any essential findings supporting the conclusion that the violation was committed, the disciplinary sanction imposed, the date the sanction was imposed, and the duration of the sanction. The University will release information from a student's education records to school officials who have a legitimate educational interest in the information. The term "school official" includes, but is not limited to, teachers; officials; employees (including employees of the UNC–Chapel Hill Department of Public Safety); contractors of UNC–Chapel Hill to whom the University has outsourced institutional services or functions (for example, the National Student Clearinghouse, Blackboard, entities providing practical or clinical training for students, and other similar or dissimilar contractors); UNC–Chapel Hill students who are functioning in an official University capacity (for example, members of the Honor Court); and employees of the General Administration of the University of North Carolina system. Disclosures may only be made to these individuals and entities if they have a "legitimate educational interest" in the information. They are deemed to have a "legitimate educational interest" in the information if it is in the educational interest of the student in question for the individuals and entities to have the information, or if it is necessary or desirable for them to obtain the information in order to carry out their official duties or their contractual obligations to the University and/or to implement the policies of the University of North Carolina.

The University makes public certain information that has been designated as "directory information" unless the student has notified the Office of the University Registrar to restrict the release of this information. The University considers the following to be "directory information": the student's name; address (local and grade/billing addresses); student e-mail address; telephone listing (local and grade/billing telephone numbers); date and place of birth; county, state, and/or United States territory from which the student entered the University; major field of study; class (first year, senior, etc.); enrollment status (full-time, half-time, or part-time); Person ID Number (PID); anticipated graduation date; participation in officially recognized activities and sports; weight and height of members of athletic teams; dates of attendance; degrees and awards received; and the most recent previous educational agency or institution attended by the student. The University also publishes the Campus Directory annually and maintains an online directory that includes faculty, staff, and students. Some professional and graduate student groups publish directories of students in their departments or schools.

Students who do not want any of their directory information to be made public must come in person to the records area of the Office of the University Registrar (Suite 3100, SASB North) and fill out a Requesting FERPA Privacy Flag On Student's Record, Non-Disclosure of Information form. Students completing this form will receive counseling about the effects of placing a FERPA privacy flag on their records. Students who are not within commuting distance of the campus may contact the records area at (919) 962-0495 for further instructions.

Students who choose this option will not be able to receive any information about their records by telephone. Instead, they must come in person and show a photo ID, or send a written request acknowledging that they have placed a restriction on their record but require specific information.

Once set, a FERPA privacy flag will remain on a student's record until the student removes it. To remove a FERPA privacy flag, the student must come in person to the registration area of the Office of the University Registrar (Suite 3100, SASB North) and fill out a Requesting Removal of a Previously Set FERPA Privacy Flag from a Student's Record, Remove Previously Set Restrictions on Release of Information form. Students who are not within commuting distance of the campus may contact the registration area at (919) 962-9851 for further instructions.

Students who wish to block certain information from the directory but do not wish to place a FERPA privacy flag on their records may do this through the portal my.unc.edu in the "Updating Personal Information" section. Checking the "Public" box next to an address or phone number causes that item to be included in the directory. Removing the checkmark from the "Public" box causes the item not to be included in the directory. Students who have questions about restricting information from the directory may contact the registration area at (919) 962-9851.

In order to assure that new students have a meaningful opportunity to request that their directory information not be made public, it is the policy of the University that it will not release directory information about entering undergraduate students until after the last day for late registration for the fall semester.

Receipt of an approved master's thesis or doctoral dissertation in

The Graduate School is tantamount to publication, and the thesis or dissertation will be available to the public. Honors theses are also made available to the public through the University Library. Other student papers may be put in campus libraries or otherwise made public in accordance with individual course or program requirements.

FERPA also gives a student the right to inspect his or her education records and to request amendment of those records if they are inaccurate, misleading, or otherwise in violation of the student's privacy rights. To inspect his or her education records, a student must file a written request with the individual who has custody of the records that the student wishes to inspect. To request amendment of his or her records, a student first discusses the matter informally with the records custodian, and if the custodian does not agree to amend the records, he or she will inform the student of applicable appeal rights. Enrolled students may file an appeal with the Student Grievance Committee. Students also have the right to file a complaint with the United States Department of Education alleging that the University has not complied with FERPA.

Questions about FERPA should be addressed to the Office of University Counsel (CB# 9105). The University's FERPA policy and the text of the federal FERPA regulations are available on the Web at policy.sites.unc.edu/files/2013/05/FERPA.pdf.

Fireworks, Firearms, and Other Weapons

It is a felony, punishable by fine and/or imprisonment, to possess or carry, openly or concealed, any gun, rifle, pistol, or other firearm of any kind, or any dynamite cartridge, bomb, grenade, mine, or powerful explosive on any University campus, in any University-owned or operated facility, or at a curricular or extracurricular activity sponsored by the University. Such conduct also may constitute a violation of the Honor Code.

It is a Class 1 misdemeanor, punishable by fine and/or imprisonment, to possess or carry any BB gun, stun gun, air rifle, air pistol, bowie knife, dirk, dagger, slingshot, leaded cane, switchblade knife, blackjack, metallic knuckles, razors and razor blades (except for personal shaving), fireworks, or any sharp-pointed or edged instrument (except instructional supplies, unaltered nail files, and clips and tools used solely for preparation of food, instruction, and maintenance) upon any University campus or in any University-owned or operated facility. Such conduct may also constitute a violation of the Honor Code.

Policy on Illegal Drugs

Introduction

The Board of Trustees of the University of North Carolina at Chapel Hill, in conformity with the direction of the Board of Governors of the University of North Carolina, hereby adopts this Policy on Illegal Drugs, effective August 24, 1988. It is applicable to all students, faculty members, administrators, and other employees.

Education, Counseling, and Rehabilitation

A. The University of North Carolina at Chapel Hill has established and maintains a program of education designed to help all members of the University community avoid involvement with illegal drugs. This educational program emphasizes these subjects:

- The incompatibility of the use or sale of illegal drugs with the goals of the University;
- The legal consequences of involvement with illegal drugs;
- The medical implications of the use of illegal drugs; and
- The ways in which illegal drugs jeopardize an individual's present accomplishments and future opportunities.

B. The University of North Carolina at Chapel Hill provides information about drug counseling and rehabilitation services available to members of the University community through campus-based programs and through community-based organizations. Persons who voluntarily avail themselves of University services are hereby assured that applicable professional standards of confidentiality will be observed.

Enforcement and Penalties

A. The University of North Carolina at Chapel Hill shall take all actions necessary, consistent with state and federal law and applicable University policy, to eliminate illegal drugs from the University community. The University's Policy on Illegal Drugs is publicized in catalogs and other materials prepared for all enrolled and prospective students and in materials distributed to faculty members, administrators, and other employees.

B. Students, faculty members, administrators, and other employees are responsible, as citizens, for knowing about and complying with the provisions of North Carolina law that make it a crime to possess, sell, deliver, or manufacture those drugs designated collectively as controlled substances in Article 5 of Chapter 90 of the North Carolina General Statutes. Any member of the University community who violates that law is subject both to prosecution and punishment by the civil authorities and to disciplinary proceedings by the University. It is not "double jeopardy" for both the civil authorities and the University to proceed against and punish a person for the same specified conduct. The University will initiate its own disciplinary proceeding against a student, faculty member, administrator, or other employee when the alleged conduct is deemed to affect the interests of the University.

C. Penalties will be imposed by the University in accordance with procedural safeguards applicable to disciplinary actions against students, faculty members, administrators, and other employees, as required by Section 3 of the Trustee Policies and Regulations Governing Academic Tenure in the University of North Carolina at Chapel Hill; by Section III. D. of the Employment Policies for EPA Non-Faculty Employees of the University of North Carolina at Chapel Hill; by regulations of the State Personnel Commission, and the Disciplinary Procedure of the Staff Personnel Administration Guides (Human Resources Manual for SPA Employees); by the Instrument of Student Judicial Governance; and by all other applicable provisions of the policies and procedures of the University of North Carolina at Chapel Hill.

D. The penalties to be imposed by the University may range from written warnings with probationary status to expulsions from enrollment and discharges from employment. However, the following minimum penalties shall be imposed for the particular offenses described.

Trafficking in Illegal Drugs

a. For the illegal manufacture, sale, or delivery, or possession with intent to manufacture, sell, or deliver, of any controlled substance identified in Schedule I, North Carolina General Statutes 90–89, or Schedule II, North Carolina General Statutes 90–90 (including, but not limited to, heroin, mescaline, lysergic acid diethylamide, opium, cocaine, amphetamine, methaqualine), any student shall be expelled and any faculty member, administrator, or other employee shall be discharged.

b. For a first offense involving the illegal manufacture, sale, or delivery, or possession with intent to manufacture, sell, or

deliver, of any controlled substance identified in Schedules III through VI, North Carolina General Statutes 90–91 through 90–94, (including, but not limited to, marijuana, anabolic steroids, pentobarbital, codeine), the minimum penalty shall be suspension from enrollment or from employment for a period of at least one semester or its equivalent. (Employees subject to the State Personnel Act are governed by regulations of the State Personnel Commission. Because the minimum penalty specified in this section and required by the Board of Governors exceeds the maximum period of suspension without pay that is permitted by State Personnel Commission regulations, the penalty for a first offense for employees subject to the State Personnel Act is discharge.) For a second offense, any student shall be expelled and any faculty member, administrator, or other employee shall be discharged.

Illegal Possession of Drugs

a. For a first offense involving the illegal possession of any controlled substance identified in Schedule I, North Carolina General Statutes 90–89, or Schedule II, North Carolina General Statutes 90–90, the minimum penalty shall be suspension from enrollment or from employment for a period of at least one semester or its equivalent. (Employees subject to the State Personnel Act are governed by regulations of the State Personnel Commission. Because the minimum penalty specified in this section and required by the Board of Governors exceeds the maximum period of suspension without pay that is permitted by State Personnel Commission regulations, the penalty for a first offense for employees subject to the State Personnel Act is discharge.)

b. For a first offense involving the illegal possession of any controlled substance identified in Schedules III through VI, North Carolina General Statutes 90–91 through 90–94, the minimum penalty shall be probation, for a period to be determined on a case-by-case basis. A person on probation must agree to participate in a drug education and counseling program, consent to regular drug testing, and accept such other conditions and restrictions, including a program of community service, as the Chancellor or the Chancellor's designee deems appropriate. Refusal or failure to abide by the terms of probation shall result in suspension from enrollment or from employment for any unexpired balance of the prescribed period of probation. (If this balance for an employee subject to the State Personnel Act exceeds one week, that employee shall be discharged.)

c. For second or other subsequent offenses involving the illegal possession of controlled substances, progressively more severe penalties shall be imposed, including expulsion of students and discharge of faculty members, administrators, or other employees.

E. Suspension Pending Final Disposition. When a student, faculty member, administrator, or other employee has been charged by the University with a violation of policies concerning illegal drugs, he or she may be suspended from enrollment or employment before initiation or completion of regular disciplinary proceedings if, assuming the truth of the charges, the Chancellor, or in the Chancellor's absence, the Chancellor's designee, concludes that the person's continued presence within the University Community would constitute a clear and immediate danger to the health or welfare of other members of the University community; provided, that if such a suspension is imposed, an appropriate hearing of the charges against the suspended person shall be held as promptly as possible thereafter.

Implementation and Reporting

Annually, the Chancellor shall submit to the Board of Trustees a report on campus activities related to illegal drugs for the preceding year. The report shall include, as a minimum, the following information:

1) A listing of the major educational activities conducted during the year

2) A report on any illegal drug-related incidents, including any sanctions imposed

3) An assessment by the Chancellor of the effectiveness of the campus program

4) Any proposed changes in the Policy on Illegal Drugs

A copy of the report shall be provided to the President, who shall confer with the Chancellor about the effectiveness of campus programs.

Immunization Requirement

Effective July 1, 1986, North Carolina state law requires that no person shall attend a college or university in North Carolina unless a certificate of immunization indicating that the person has received the immunizations required by the law is presented to the college or university on or before the first day of matriculation.

If a student's UNC–Chapel Hill Medical History Form containing the certificate of immunization is not in the possession of the UNC–Chapel Hill Campus Health Service 10 days prior to the registration date, the University shall present a notice of deficiency to the student in question. He or she shall have 30 calendar days from the first day of attendance to obtain the required immunizations. Those persons who have not complied with the immunization requirements by the end of 30 calendar days will be administratively withdrawn from the University.

Military Tuition Benefit

The information in this section comes from two sources: 1) North Carolina General Statutes, Sect. 116–143.3; and 2) *A Manual to Assist the Public Higher Education Institutions of North Carolina in the Matter of State Residence* (the *Manual*). Please refer to the *Manual* at www.northcarolina.edu/legal/residence/committee/manual/Residence_Manual_Aug_2010.pdf for specific policy information regarding the military tuition benefit.

Certain members of the Armed Services and their dependent relatives who are not residents for tuition purposes may become eligible to be charged the in-state tuition rate under North Carolina General Statutes Section 116–143.3, the military tuition benefit provision. Any person seeking the military tuition benefit must qualify for admission to UNC–Chapel Hill and must file an application for the benefit with his or her admissions office. The burden of proving eligibility for the military tuition benefit lies with the applicant. Because of the time involved in securing the necessary affidavits from the appropriate military authorities, prospective applicants for the military tuition benefit are urged to secure application forms from their admissions offices and begin the application process several weeks before the first day of classes of the term for which they seek the benefit. The application deadlines are posted on the Office of the University Registrar's Web site at registrar.unc.edu/academic-services/residency/important-dates.

Eligibility of Members of the Armed Services. To be eligible for this military tuition benefit, the individual must be on active duty and a member of the United States Air Force, Army, Coast Guard, Marine Corps, Navy, North Carolina National Guard, or a reserve component of one of these services and must be abiding in North Carolina incident to active military duty.

Eligibility of Dependent Relatives of Service Members. If the service member meets the conditions set forth above, his or her dependent relatives may be eligible to pay the in-state tuition rate if they share the service member's North Carolina abode, if they have complied with the requirements of the Selective Service System (if applicable), and if they qualify as military dependents of the service member.

Special exceptions apply to military personnel and their dependents if the military person is reassigned outside of North Carolina or retires in North Carolina. Please consult the *Manual* at www.northcarolina.edu/legal/residence/committee/manual/Residence_Manual_Aug_2010.pdf for specific policy information.

Appeals of Eligibility Determinations of Admissions Officers. A student appeal of an eligibility determination made by any admissions officer must be in writing and signed by the student and must be filed by the student with that officer within 15 working days after the student receives notice of the eligibility determination. The appeal is transmitted to the Residence Appeals Board by that officer. The student is notified of the date set for consideration of the appeal, and, on request by the student, is afforded an opportunity to appear and be heard by the Board.

Any student desiring to appeal a determination of the Residence Appeals Board must give notice in writing of that fact to the chair of the Residence Appeals Board within 10 days of receipt of the Board's decision. The chair will promptly process the appeal for transmittal to the State Residence Committee.

Adjustment of Tuition

If a student withdraws from the University tuition and fees will be prorated according to the withdrawal refund schedule posted under "Important Dates" on the Web at finance.unc.edu/university-controller/student-account-services/student-billing.html. If a student drops the only course he or she is taking, this constitutes a withdrawal from the University.

Residence Status for Tuition Purposes

The information in this section comes from two sources: 1) North Carolina General Statutes, Sect. 116–143.1, and 2) *A Manual to Assist the Public Higher Education Institutions of North Carolina in the Matter of State Residence*, adopted by UNC in August 2010.

The following sections summarize important aspects of the residency law. A complete explanation of the statute and the procedures under the statute is contained in *A Manual to Assist the Public Higher Education Institutions of North Carolina in the Matter of State Residence* (the *Manual*). The *Manual* is available online at www.northcarolina.edu/legal/residence/committee/manual/Residence_Manual_Aug_2010.pdf.

Every applicant for admission is required to make a statement of his or her length of residence in North Carolina. A person who qualifies as a resident for tuition purposes under North Carolina law pays a lower rate of tuition than a nonresident. To qualify for in-state tuition, a legal resident must have been domiciled in North Carolina for at least 12 months immediately prior to the beginning of the term for which classification as a resident for tuition purposes is sought. The student must also establish that his or her presence in the state during such 12-month period was for purposes of maintaining a bona fide domicile rather than for purposes of maintaining a mere temporary residence incident to enrollment in an institution of higher education. "Domicile" means one's permanent home of indefinite duration, as distinguished from a temporary place of abode. Domicile is synonymous with legal residence and is established by being physically present in a place with the concurrent intent to make that place a domicile. To determine intent, the University evaluates an individual's objectively verifiable conduct as an indicator of his or her state of mind.

Procedural Information

General. A student admitted to initial enrollment in an institution (or permitted to reenroll following an absence that involved a formal withdrawal from enrollment) is classified by the admitting institution either as a resident or as a nonresident for tuition purposes prior to actual matriculation. In the absence of a current and final determination of the student's residence prior to matriculation, the student is classified as a nonresident for tuition purposes. The institution will thereafter reach a final determination of the student's residence status. Unless a person supplies enough information to allow the admissions officer to classify him or her as a resident for tuition purposes, the person will be classified a nonresident for tuition purposes. A residence classification once assigned (and confirmed pursuant to any appellate process invoked) may be changed thereafter (with a corresponding change in billing rates) only at the beginning of a term.

Transfer Students. When a student transfers from one North Carolina public institution of higher education to another, he or she is required to be treated as a new student by the institution to which he or she is transferring and must be assigned an initial residence classification for tuition purposes. The residence classification of a student by one institution is not binding on another institution. The North Carolina institutions of higher education will assist each other by supplying residency information and classification records concerning a student to another classifying institution upon request. A student or prospective student who wants the University to consider his or her "resident" classification by another North Carolina public higher education institution must include, with his or her application for resident status, copies of all the information that was before the other institution at the time that institution classified the student a resident for tuition purposes.

Responsibility of Students. Any student who is uncertain about the accuracy of his or her current residence classification for tuition purposes is responsible for securing a ruling by completing an application for resident status and filing it with the admissions officer. The student who subsequently becomes eligible for a change in classification, whether from out-of-state to in-state or the reverse, is responsible for immediately informing the Office of Admissions in writing of his or her new status. Failure to give complete and correct information regarding residence constitutes grounds for disciplinary action.

Application Process. A person may apply for resident status by visiting his or her admissions office or by going online to registrar.unc.edu/AcademicServices/Residency/ApplicationForms/index.htm. Also available on the Web site is the *Manual*, which sets forth the requirements of the statute. Applicants for admission who claim eligibility for the in-state tuition rate will complete a brief questionnaire as a part of the online admissions application. If a person has not been living in North Carolina for at least five consecutive years, he or she will be required to complete a more detailed residency application. Enrolled students seeking a reclassification from nonresident to resident status are required to complete a residency application.

When to file an application. All applications for resident status must be filed with the proper admissions office during the filing period posted at registrar.unc.edu/AcademicServices/Residency/ImportantDates/index.htm. The University follows the application guidelines of the State Residence Committee. Applications not received by the applicable deadlines are not accepted for consideration. The deadline to submit an application along with all supporting documentation cannot be later than the 10th business day of the term for which the applicant is seeking residency for tuition. Deadlines are posted on the Office of the University Registrar's Web site at registrar.unc.edu/AcademicServices/Residency/ImportantDates/index.htm. The burden of proof remains the responsibility of the applicant. A

preponderance of evidence that the applicant is a bona fide domiciliary for tuition purposes may be established by providing tangible evidence to support relevant conduct of legal residence and its duration. This evidence is required at the time of application.

Evidence of North Carolina domicile for tuition purposes includes actions that would normally be characteristics and expected of any permanent resident. A variety of evidence is considered when evaluating requests for in-state tuition status; however, no single factor or combination of factors may be considered conclusive evidence of domicile. Please consult the *Manual* for illustrative lists of the kinds of information and conduct that may be considered as evidence in determining domicile; including financial dependency and independency.

When a student receives a request for additional documentation as evidence, he or she must supply the requested information no later than 10 business days after receipt of the request. Failure to supply the requested information within the specified time limit will result in a continuation of the student's nonresident classification unless good cause is shown for such failure.

The admissions office may require an applicant for admission to file a residency application or respond to a request for more information more quickly when residence status is a factor in the admissions decision.

For more details about the residency application process and other important information about the resident status for tuition purposes statute, visit registrar.unc.edu/AcademicServices/Residency/index.htm.

Fraudulent Applications. If a student is classified a resident for tuition purposes after submitting falsified residency information or after knowingly withholding residency information, the student's application for in-state tuition status is fraudulent. The institution may reexamine any application suspected of being fraudulent and, if warranted, will change the student's residence status retroactively to the beginning of the term for which the student originally made the fraudulent application. If this occurs, the student must pay the out-of-state tuition differential for all the enrolled terms intervening between the fraudulent application and its discovery. Further, knowing falsification of responses on a resident status application may subject the applicant to disciplinary action, including dismissal from the institution.

Burden of Proof and Statutory Prima Facie Evidence. A person has the burden of establishing facts that justify his or her classification as a resident for tuition purposes. The balancing of all the evidence must produce a preponderance of evidence supporting the assertion of in-state residence. Under the statute, proof of resident status is controlled initially by one of two evidentiary beginning points which are stated in terms of prima facie evidence.

a. Even if the person is an adult, if his or her parents (or court-appointed guardian in the case of some minors) are not legal residents of North Carolina, this is prima facie evidence that the person is not a legal resident of North Carolina unless he or she has lived in this state the five consecutive years prior to enrolling or reregistering. To overcome this prima facie showing of nonresident, a person must produce evidence that he or she is a North Carolina domiciliary despite the parents' nonresident status.

b. Conversely, if the person's parents are domiciliaries of North Carolina under the statute, this fact constitutes prima facie evidence that the person is a domiciliary of North Carolina. This prima facie showing may also be overcome by other evidence to the contrary. If a person has neither living parents nor legal guardian, the prescribed prima facie evidence rule cannot and does not apply.

Erroneous Notices Concerning Classification. If a student who has been found to be a nonresident for tuition purposes receives an erroneous written notice from an institutional officer identifying the student as a resident for tuition purposes, the student is not responsible for paying the out-of-state tuition differential for any enrolled term beginning before the classifying institution notifies the student that the prior notice was erroneous.

Grace Period. If a student has been properly classified as a North Carolina resident for tuition purposes and, thereafter, his or her state of legal residence changes while he or she is enrolled in a North Carolina public institution of higher education, the statute provides for a grace period during which the student is allowed to pay tuition at the in-state rate despite the fact that the student is no longer a North Carolina legal resident. This grace period extends for a minimum of 12 months from the date of change in legal residence, and if the 12-month period ends during a semester or academic term in which the student is enrolled, the grace period extends also to the end of that semester or academic term.

Reacquisition of Resident Tuition Status. The prescribed 12-month period of legal residence may be shortened if the person seeking to be classified as a resident for tuition purposes was formerly classified a North Carolina resident for tuition purposes, abandoned North Carolina domicile, and reestablished North Carolina domicile within 12 months after abandoning it. Interested persons should consult their admissions offices for a detailed explanation of the conditions which must be met to qualify under this section.

Appeals. A student appeal of a classification decision made by any admissions officer must be in writing and signed by the student and must be filed by the student with that officer within 15 working days after the student receives notice of the classification decision. The appeal is transmitted to the Residence Appeals Board by that officer, who does not vote in that committee on the disposition of such appeal. The student is notified of the date set for consideration of the appeal, and on request of the student, he or she is afforded the opportunity to appear and be heard by the appeals board. Any student desiring to appeal a decision of the Residence Appeals Board must give notice in writing of that fact (within 10 days of receipt of the Board's decision) to the chair of the Residence Appeals Board, and the chair promptly processes the appeal for transmittal to the State Residence Committee.

Tuition Payment. It is the responsibility of the student to pay tuition at the rate charged and billed while an appeal is pending. In effect, the student who is classified a nonresident at the time of tuition billing pays the nonresident rate. Conversely, if a student is classified as a resident at the time of billing, he or she pays the resident rate. Any necessary adjustments in the rate paid will be made at the conclusion of the appeal.

Application of the Law to Specific Situations

Aliens. Aliens who are permanent residents of the United States, or who hold a visa that will permit eventual permanent residence in the United States, are subject to the same considerations with respect to determination of legal residence as citizens. An alien abiding in the United States under a visa conditioned at least in part upon intent not to abandon a foreign domicile cannot be classified a resident. An alien abiding in the United States under a visa issued for a purpose that is so restricted as to be fundamentally incompatible with an assertion by the alien of bona fide intent to establish a legal residence cannot be classified a resident.

Possession of certain other immigration documents may also allow an alien to be considered for in-state tuition status. For more details, aliens should consult their admissions offices and the *Manual*. Aliens must file a Residence Status Supplemental Form in addition to the forms normally required of applicants for resident status for tuition

purposes. Aliens should also provide a copy of the front and back of the document(s) that they claim allow them to remain in the United States and establish a legal residence. More information concerning alien resident status for tuition purposes information and supplemental applications may be found online at registrar.unc.edu/AcademicServices/Residency/index.htm.

Married Persons. The North Carolina resident status for tuition purposes statute provides a special provision for legal residents who are married. This provision is called the "spouse-pair" provision.

The domicile of a married person, irrespective of sex, is determined by reference to all relevant evidence of domiciliary intent. No person is precluded, solely by reason of marriage to a person domiciled outside of North Carolina, from establishing or maintaining legal residence in North Carolina. No person is deemed, solely by reason of marriage to a person domiciled in North Carolina, to have established or maintained a legal residence in North Carolina. The fact of marriage and the place of the domicile of the student's spouse are deemed relevant evidence to be considered in ascertaining domiciliary intent.

If a person otherwise can demonstrate compliance with the fundamental statutory requirement that he or she be a legal resident of North Carolina before the beginning of the term for which resident status is sought, the second statutory requirement relating to duration of residence may be satisfied derivatively, in less than 12 months, by reference to the length of the legal residence of the person's spouse, if the spouse has been a legal resident of the state for the requisite 12-month period.

If a person believes that he or she qualifies for the marital status provision, special application procedures must be followed. A separate supplemental spousal residency application should be filed at the same time as the residency form is submitted. Residency applications of persons who are married and claiming the North Carolina "spouse-pair" provision are not to be submitted to the admissions office. They should be filed with the Office of the University Registrar. Applications for residency and the spouse-pair provision are available online at registrar.unc.edu/AcademicServices/Residency/ApplicationForms/index.htm.

Military Personnel. The domicile of a person employed by the federal government, Department of Defense, is not necessarily affected by assignment in or reassignment out of North Carolina. Such a person may establish domicile by the usual requirements of residential act plus intent. No person loses his or her in-state resident status solely by serving in the armed forces outside of the state of North Carolina. See the section entitled "Military Tuition Benefit" for other benefits provided to military personnel and their dependents.

Minors. A minor is any person who has not reached the age of 18 years. Under the common law, a minor child whose parents are not divorced or legally separated is presumed to have the domicile of his or her father. This presumption may be rebutted if a preponderance of the evidence indicates that the mother and father have separate domiciles and that, under the circumstances, the child can fairly be said to derive his or her domicile from the mother. If the father is deceased, the domicile of the minor is that of the surviving mother. If the parents are divorced or legally separated, the domicile of the minor is that of the parent having custody by virtue of a court order; or, if no custody has been granted by virtue of court order, the domicile of the minor is that of the parent with whom he or she lives; or, if the minor lives with neither parent, in the absence of a custody award, the domicile of the minor is presumed to remain that of the father. If the minor lives for part of the year with each parent, in the absence of a custody award, the minor's domicile is presumed to remain that of the father. If the minor has lived in North Carolina for five years as set forth above in "Burden of Proof and Statutory Prima Facie Evidence," subsection a, the common law presumptions do not absolutely control on the issue of the minor's domicile, but they continue to be very strong evidence thereof.

In determining residence status for tuition purposes, there are three exceptions to the above provisions:

- If a minor's parents are divorced, separated, or otherwise living apart and one parent is a legal resident of North Carolina, during the time period when that parent is entitled to claim, and does claim, the minor as a dependent on the North Carolina individual income tax return, the minor is deemed to be a legal resident of North Carolina for tuition purposes, notwithstanding any judicially determined custody award with respect to the minor.
- If immediately prior to his or her 18th birthday a person would have been deemed a North Carolina legal resident under this provision but he or she achieves majority before enrolling in a North Carolina institution of higher education, that person will not lose the benefit of this provision if the following conditions are met:
    a. Upon achieving majority the person must act, as much as possible, in a manner consistent with bona fide legal residence in North Carolina; and
    b. The person must begin enrollment at a North Carolina institution of higher education not later than the fall academic term next following completion of education prerequisite to admission at the institution.
- If immediately prior to beginning an enrolled term the minor has lived in North Carolina for five or more consecutive years in the home of an adult relative (other than a parent) who is a legal resident of North Carolina, and if the adult relative during those years has functioned as a de facto guardian of the minor, then the minor is considered a legal resident of North Carolina for tuition purposes. If a minor qualified for resident status for tuition purposes under this provision immediately prior to his or her 18th birthday, then, upon becoming 18, he or she will be deemed a legal resident of North Carolina of at least 12 months' duration.

Even though a person is a minor, under certain circumstances the person may be treated by the law as being sufficiently independent from his or her parents as to enjoy a species of adulthood for legal purposes. If the minor marries or obtains a judicial decree of emancipation under North Carolina General Statutes Section 7A–717, et seq., he or she is emancipated. The consequence, for present purposes, of such emancipation is that the affected person is presumed to be capable of establishing a domicile independent of that of the parents; it remains for that person to demonstrate that a separate domicile has, in fact, been established.

Prisoners. There are special provisions concerning domicile of prisoners. For more information, persons to whom these provisions may apply should consult the *Manual*.

Property and Taxes. Ownership of property in or payment of taxes to the State of North Carolina apart from legal residence will not qualify one for the in-state tuition rate; homeownership alone does not necessarily qualify one for the tuition benefit.

Students or prospective students who believe that they are entitled to be classified residents for tuition purposes should be aware that the processing of requests and appeals can take a considerable amount of time. One should not apply until they have met the minimum requirements of having an established 12-month domicile along with physical presence.

The University follows the application guidelines of the State Residence Committee. Applications not received by the applicable deadlines are not accepted for consideration. The deadline to submit an application

along with all supporting documentation cannot be later than the 10th business day of the term for which the applicant is seeking residency for tuition. Deadlines are posted on the Office of the University Registrar's Web site at registrar.unc.edu/AcademicServices/Residency/ImportantDates/index.htm.

Benefit for UNC Employees and Related Persons

Full-time, permanent employees of UNC who are legal residents of North Carolina may qualify for the in-state tuition rate even if they do not meet the 12-month requirement.

This provision includes spouses and dependent children of the employee. The employee must be full-time, permanent, and a legal resident of North Carolina. Further, if it is a child who seeks to qualify, the child must be a dependent (as defined by tax dependency laws). Finally, if the person qualifies for this benefit, there is no limit on the number or type of courses for which the classification will apply.

Please consult the *Manual* at www.northcarolina.edu/legal/residence/committee/manual/Residence_Manual_Aug_2010.pdf to learn more about the benefit. Application information may be obtained by visiting the Office of the University Registrar's Web site at registrar.unc.edu.

Student Right-to-Know Act

Pursuant to the federal Student Right-to-Know Act, we report that, in 2012–2013, the completion or graduation rate for undergraduates who entered the University of North Carolina at Chapel Hill in 2006 on a full-time basis was 89.4 percent.

Students' Education Records at the University of North Carolina General Administration: Annual Notification of Rights

Certain personally identifiable information about students ("education records") may be maintained at the University of North Carolina General Administration, which serves the Board of Governors of the University system. This student information may be the same as, or derivative of, information maintained by a constituent institution of the University; or it may be additional information. Whatever their origins, education records maintained at General Administration are subject to the federal Family Educational Rights and Privacy Act of 1974 (FERPA).

FERPA provides that a student may inspect his or her education records. If the student finds the records to be inaccurate, misleading, or otherwise in violation of the student's privacy rights, the student may request amendment to the record. FERPA also provides that a student's personally identifiable information may not be released to someone else unless 1) the student has given a proper consent for disclosure or 2) provisions of FERPA or federal regulations issued pursuant to FERPA permit the information to be released without the student's consent.

A student may file with the United States Department of Education a complaint concerning failure of General Administration or an institution to comply with FERPA.

The policies of the University of North Carolina General Administration concerning FERPA may be inspected in the office at each constituent institution designated to maintain the FERPA policies of the institution. Policies of General Administration may also be accessed in the office of the secretary of the University of North Carolina, General Administration, 910 Raleigh Road, Chapel Hill, NC.

Further details about FERPA and FERPA procedures at General Administration are to be found in the referenced policies. Also, see below. Questions about the policies may be directed to the Division of Legal Affairs, The University of North Carolina General Administration, Annex Building, 910 Raleigh Road, Chapel Hill, North Carolina (mailing address Post Office Box 2688, Chapel Hill, NC 27515-2688; telephone: [919] 962-4588).

Tuition Waiver for Family Members of Deceased or Disabled Emergency Workers

The information in this section comes from three sources: 1) North Carolina General Statutes, Section 115B-1 et seq.; 2) University of North Carolina Administrative Memorandum No. 377, dated November 17, 1997; and 3) University of North Carolina Administrative Memorandum No. 385, dated August 6, 1998.

Certain family members of emergency workers killed or permanently disabled in the line of duty may become eligible for tuition-free enrollment. The statute sets out the following requirements that must be met before the waiver can be obtained:

- The deceased or disabled emergency worker (firefighter, volunteer firefighter, law enforcement officer, or rescue squad member) must have been a North Carolina legal resident (domiciliary), in active service or training for active service at the time of death or disability occurring in the line of duty;
- The emergency worker's death or disability must have occurred on or after October 1, 1997;
- The emergency worker must have been employed by the State of North Carolina or any of its departments, agencies, or institutions, or a county, city, town, or other political subdivision of the State of North Carolina;
- The applicant for the tuition waiver must be either a child or a widow or widower (who has not remarried) of a deceased emergency worker killed in the line of duty, or a spouse or a child (between the ages of 17 and 23; but not yet 24) of an emergency worker who became permanently and totally disabled as a result of a traumatic injury sustained in the line of duty as an emergency worker;
- The applicant must qualify academically for admission to UNC–Chapel Hill, must meet all the requirements of the statute and implementing University regulations, and there must be space available in the course(s) for which he or she intends to register;
- The completed application, with all supporting documents, must be submitted to the proper admissions office no later than the first day of class of the term for which the waiver is sought. If the applicant is under 18 years of age, a parent must also sign; and
- The time period for pursuing a baccalaureate degree is up to 54 months.

The following documents are required as proof of eligibility for this tuition waiver:

To prove permanent and total disability of an emergency worker:

- Documentation of the permanent and total disability from the North Carolina Industrial Commission

To prove cause of death of an emergency worker:

- Certification of the cause of death from the Department of State Treasurer; or
- The appropriate city or county law enforcement agency that employed the deceased; or
- The administrative agency for the fire department or fire protection district funded under the Department of State Auditor; or
- The administrative agency having jurisdiction over any paid firefighters of all counties and cities

To prove the parent/child relationship:

• Applicant's birth certificate or legal adoption papers

To prove the marital relationship:

• Applicant's marriage certificate

The *Manual* is available online at www.northcarolina.edu/legal/residence/committee/manual/Residence_Manual_Aug_2010.pdf.

Appeals of eligibility determinations of admissions offices must be in writing and signed by the applicant and must be filed by the applicant with that admissions officer within 15 working days after the applicant receives notice of the eligibility determination. The appeal is submitted to the Residence Appeals Board by that officer. The applicant is notified of the date set for consideration of the appeal, and, on request by the applicant, is afforded an opportunity to appear and be heard by the Board.

Any applicant desiring to appeal a determination of the Residence Appeals Board must give written notice of that fact to the chair of the Residence Status Committee within 10 days of receipt of the committee's decision. The chair will promptly process the appeal for transmittal to the State Residence Committee.

WEST FRANKLIN STREET
EAST FRANKLIN STREET
NORTH COLUMBIA STREET
SOUTH COLUMBIA STREET
PICKARD
BOUNDARY STREET
HOOPER LANE
SENLAC ROAD
RALEIGH STREET
BATTLE LANE
COLONY CT.
FRATERNITY CT.
KENAN STREET
MALLETTE STREET
BASNIGHT LANE
CAMERON COURT
WEST CAMERON AVENUE
EAST CAMERON AVENUE
McCAULEY STREET
RANSOM STREET
VANCE STREET
UNIVERSITY DR.
PITTSBORO STREET
DAUGHTRY DR.
SOUTH ROAD
LENOIR DRIVE
COBB DRIVE
PAUL GREEN THEATER DRIVE
COUNTRY CLUB ROAD
GLAMOR DRIVE
GIMGHOUL ROAD
RALEIGH ROAD
to N.C. 54 and Friday Center
Hwy. 54 Lot
STADIUM DRIVE
RIDGE ROAD
EMERSON DRIVE
MASON FARM ROAD
WEST DRIVE
DENTAL CIRCLE
HOSPITAL DRIVE
EMERGENCY ROOM DRIVE
MANNING DRIVE
NEW EAST DRIVE
PAUL HARDIN DRIVE
BERNARD ST.
HIBBARD DRIVE
WILLIAM BLYTHE DRIVE
SKIPPER BOWLES DRIVE
BIRMINGHAM DR.
MANNING DRIVE
HINTON JAMES DR.
KENAN CENTER DRIVE
WILLIAMSON DRIVE
PINE LANE
BUTTONS LANE
LAUREL HILL ROAD
FERN LANE
IRIS LANE
BRANSON STREET
PUREFOY ROAD
WHITEHEAD CIRCLE
OTEY'S ROAD
BAITY HILL DRIVE
US 15-501 / NC 54 BYPASS
FORDHAM BLVD.
MORGAN CREEK RD.
KINGS MILL
to N.C. Botanical Garden
to I-40 and MLK Jr. Blvd.
US 501 to Pittsboro
University Square
McCorkle Place
Coker Arboretum
Polk Place
Upper Quad
Lower Quad
The Pit
Bell Tower
Stone Cultural Center
Kenan Stadium
Navy Field
Bryson Field
Ehringhaus Field
Coker Pinetum and Meeting at the Waters Creek
Memorial Grove
Forest Theatre
Carolina Inn
Peabody
Phillips
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Abernethy Hall, American Indian Center, Public Policy F-3
Ackland Art Museum F-2
Alumni Ctr., George Watts Hill, Alumni Association I-9
Alumni Hall, Archaeology, Anthropology, Women's and Gender Studies H-2
Arboretum, Coker J-3
Bank of America Ctr., Biostatistics, Carolina Ctr. for Public Svc., Carolina Environmental Program, Epidemiology, Human Res. Ethics, Injury Prevention Res., Inst. for the Environment, Res. Development, University Counsel G-1
Battle Hall, African and African American Studies, Archaeology H-1
Belk Track K-8
Bell Tower, Morehead-Patterson H-7
Bingham Hall, Communication Studies, Cultural Studies H-5
Boshamer Baseball Stadium K-10
Brooks Bldg., Computer Science F-5
Brooks Hall, UNC Press L-3
Bryson Field K-11
Bynum Addition H-4
Bynum Hall, Graduate School, Res. and Economic Development H-4
Caldwell Hall, Anthropology, Dramatic Art, Philosophy, Odum Institute for Res. in Social Science I-4
Campus Y H-4
Carmichael Arena K-7
Carolina Inn E-4
Carr Bldg., Academic Affairs, Faculty Governance, Institutional Res. I-4
Carroll Hall, School of Journalism and Mass Communication G-4
Caudill Labs, Chemistry G-6
Center for Dramatic Art, Dramatic Art, PlayMakers Repertory Co. L-6
Chapman Hall, Max Carrol Jr., Physics/Astronomy F-4
Chase Dining Hall at Rams Head, Dining I-10
Coates Bldg., Albert and Gladys I-1
Cobb Parking Deck K-6
Coker Hall, Biology G-7
Daniels Bldg., Student Stores I-6
Davie Hall, Psychology I-3
Davis Library, Walter R. I-5
Dey Hall, English and Comp. Lit., Modern Foreign Language G-5
Educational Foundation Parking Deck G-14
Education Ctr., N.C. Botanical Garden N-18
Ehringhaus Field J-11
Evergreen House, Asian Studies, Psychology F-2
FedEx Global Education Ctr., Americas, Area, European, International Studies; International Affairs; Public Safety Transp. and Parking; Slavic, Eurasian, and East European Studies Ctr.; Study Abroad E-6
Fetzer Addition H-6
Fetzer Field K-8
Fetzer Grandstands K-8
Fetzer Gymnasium I-7
Fordham Hall, Biology, Molecular Biology F-7
Forest Theatre, Dramatic Art L-4
Franklin Street, 134 East, Archaeology, International Studies, Summer School, University Ombuds Office, Women's Center F-1
Franklin Street, 208 West, University Advancement C-1
Friday Center for Continuing Education, William and Ida N-8
Gardner Hall, Economics G-5
Gerrard Hall H-4
Graham Memorial, Honors Program, Robertson Scholars Program H-2
Greenlaw Hall, English and Comparative Literature H-5
Hamilton Hall, Archaeology; History; Peace, War and Defense; Political Science; Sociology I-5
Hanes Art Ctr., Art F-2
Hanes Hall, Statistics and Operations Research G-4
Henry Stadium K-10
Hickerson House, Urban Studies K-2
Hill Commercial Bldg., Graduate School, Education G-1
Hill Hall, Music G-2
Hill Hall Annex, Music G-2
Hooker Fields K-7
Howell Hall, Statistics and Operations Res. I-3
Hyde Hall, Institute of Arts and Humanities H-2
Information Technology Services (ITS Manning) F-11
Jackson Hall, Undergraduate Admissions K-5
Kenan Ctr., Kenan-Flagler Business School G-14
Kenan Football Ctr. G-8
Kenan Labs, Chemistry G-6
Kenan Music Bldg., Music F-3
Kenan Stadium H-8
Kessing Pool J-8
Knapp-Sanders Bldg., School of Government M-8
Koury Natatorium I-16
Lenoir Hall, Dining I-5
Loudermilk Center for Excellence I-9
Love House and Hutchins Forum, Ctr. for the Study of the American South K-1
Manning Hall, School of Information and Library Science, Odum Institute for Res. in Social Science I-5
McCaskill Soccer Center J-8
McColl Bldg., Kenan-Flagler Business School G-15
McCorkle Place H-3
Memorial Hall G-4
Mitchell Hall, Geological Sciences F-7
Morehead Chemistry Teaching Labs F-6
Morehead Planetarium and Science Ctr., Physics and Astronomy, Visitors' Ctr. I-2
Murphey Hall, Classics H-5
Murray Hall, Chemistry, Marine Sciences G-5
Naval ROTC Armory, Aerospace Studies, Military Science, Naval Science F-5
Navy Field K-9
New East Hall, City and Regional Planning I-3
New West Hall, Asian Studies G-3
North Carolina Botanical Garden M-18
Old Well H-3
Paul Green Theatre, Dramatic Art L-6
Peabody Hall, School of Education F-4
Person Hall, Music G-3
Pettigrew Hall, Equal Opportunity/ ADA Office, Scholarships and Student Aid, Student Accounts H-1
Phillips Hall, Mathematics, Physics and Astronomy F-4
Phillips Hall Annex G-4
Pit, The I-6
Pittsboro Street, 210, News Services D-4
Playmakers Theatre, Dramatic Art H-4
Polk Place H-5
Porthole Bldg., Information Technology Services F-2
President's Residence K-1
Public Safety Bldg., Public Safety, Parking and Transportation G-11
Rams Head Parking Deck I-10
Rams Head Recreation Ctr., Exercise and Sport Science I-10
Recreation Complexes K-5, I-14
Saunders Hall, Geography, Religious Studies H-4
School of Government Parking Deck L-8
Sitterson Hall, Computer Science F-4
Smith Bldg., Exercise and Sport Science, Linguistics G-3
Smith Ctr., Dean E., Athletic Dept. H-15
Smith Field House, Eddie L-8
South Bldg., Office of the Chancellor; Office for Diversity and Multicultural Affairs; Office of the Provost H-4
Steele Bldg., Academic Advising, Arts and Sciences, General College, Undergraduate Education H-4

Stone Ctr. for Black Culture and History, Sonja Haynes, Academic Affairs Library, Institute of African American Res., School of Education G-7
Student and Academic Services Bldg., Academic Services, Cashier, Dean of Students, Accessibility Resources & Service, Diversity and Multicultural Affairs, Fraternity and Sorority Life, Housing, ITS Help Desk, LGBTQ Ctr., New Students and Carolina Parent Programs, Registrar I-11
Student Health Services Bldg. G-9
Student Recreation Ctr. I-7
Student Stores, Daniels Bldg. I-6
Student Union, F.P. Graham J-6
Sundial I-2
Swain Hall, Communication Studies, English and Comparative Literature F-3
Tate-Turner-Kuralt Bldg., School of Social Work D-6
Totten Ctr., N.C. Botanical Garden N-18
Undergraduate Library, Robert B. House, H-6
Vance Hall, Scholarships and Student Aid H-1
Van Hecke-Wettach Hall, School of Law L-9
Venable Hall, New, Chemistry, Marine Sciences G-5
Williamson Athletic Ctr., Ernie (Carolina Basketball Museum) I-16
Wilson Hall, Biology F-6
Wilson Library H-6
Woollen Gymnasium J-7

HEALTH AFFAIRS

Ambulatory Care Ctr., Dermatology, Ophthalmology, Orthopedics, Pediatrics, School of Medicine, Surgery, UNC Hospitals A-11
ACC Express, Dining A-12
Aycock Family Medicine K-18
Baity Environmental Res. Lab, H. D., Environmental Sciences and Engineering C-8
Beard Hall, Eshelman School of Pharmacy E-7
Berryhill Hall, Anesthesiology, Institute of Marine Sciences, Laboratory Animal Medicine, Medicine Admin., Molecular Biology F-8
Bioinformatics Bldg., Ctr. for Aging and Health, Div. of Teaching Laboratories, Laboratory Animal Medicine, Medicine Admin., Molecular Biology, Neurodevelopmental Disorders Res. Ctr., Neurology, Ophthalmology, Orthopedics, Otolaryngology (ENT), Pediatrics, Radiology, Surgery, School of Medicine C-11
Biomedical Research Imaging Bldg. (construction) C-10
Bondurant Hall, Allied Health Sciences, Medicine Admin. E-8
Bowles Bldg., Thurston, Alcohol Studies Ctr., Cystic Fibrosis/Pulmonary Res., Dermatology, Gene Therapy Ctr., Laboratory Animal Medicine, Medicine Admin., Pediatrics, Surgery, School of Medicine, Thurston Arthritis Res. Ctr. C-9
Brauer Hall, Clinical Services, Dental Ecology, Dental Faculty Practice, Endodontics, Oral Surgery, Pediatric Dentistry, Periodontology, Prosthodontics, School of Dentistry D-9
Brinkhous-Bullitt Bldg., Chief Medical Examiner, Pathology and Laboratory Medicine, UNC Hospitals E-8
Burnett-Womack Bldg., Allied Health Sciences, Medicine Admin., Pediatrics, Pharmacology, School of Medicine, Surgery E-9
Carrington Hall, Office of Human Research Ethics, School of Nursing E-7
Craige Parking Deck G-12
EPA, Environmental Protection Agency B-10
Faculty Laboratory Office Bldg. (Mary Ellen Jones Bldg), Basic Sciences, Biochemistry and Biophysics, Laboratory Animal Medicine, Medicine Admin., Pharmacology, School of Medicine D-10
Genetic Medicine Research Bldg. B-11
Genomic Sciences Bldg. F-7
Glaxo (Molecular Biology Res. Bldg.), Biochemistry and Biophysics, Biomedical Engineering, Cardiovascular Science and Medicine, Cell and Molecular Physiology, Medicine Admin., Orthopedics, School of Medicine B-10
Gravely Bldg. (N.C. Clinical Cancer Ctr.) F-10
Health Affairs Bookstore F-8
Health Affairs (Cardinal) Parking Deck D-10
Health Affairs (Dogwood) Parking Deck D-11
Health Sciences Library E-8
Hooker Res. Ctr., Michael, Environment Sciences and Engineering, Epidemiology, Nutrition, School of Public Health D-8
Hospitals, UNC F-9
Jackson Parking Deck E-12
Kerr Hall, Laboratory Animal Medicine, School of Pharmacy E-7
Koury Oral Health Sciences Bldg., Dental Sciences D-8
Lineberger Cancer Res. Ctr., Cancer Ctr., Pharmacology D-10
MacNider Hall, Anesthesiology, Biomedical Engineering, Ctr. for Aging and Health, Cancer Ctr., Div. of Teaching Laboratories, Emergency Medicine, Medical Illustrations, Medicine Admin., Obstetrics and Gynecology, Otolaryngology (ENT), Pediatrics, Social Medicine, School of Medicine, Surgery E-8
Main Hospital Entrance E-9
McGavran-Greenberg Hall, Biostatistics, Environment Sciences and Engineering, Epidemiology, Health Policy and Admin., Laboratory Animal Medicine, Nutrition, School of Public Health D-7
Medical Biomolecular Res. Bldg., Basic Sciences, Cell and Developmental Biology, Cell and Molecular Physiology, Div. of Teaching Laboratories, Genetics, Laboratory Animal Medicine, Medicine Admin., Neurology, Orthopedics, Pediatrics, School of Medicine, Surgery B-9
Medical Res. Lab A, Dermatology, Medicine Admin., Otolaryngology (ENT), Pediatrics, Psychiatry D-10
Medical Res. Bldg. B, Allied Health Sciences, Medicine Admin., P&A Admin., Psychiatry C-12
Medical School Bldg. 52, Office of Human Research Ethics B-10
Medical School Wings, Allied Health Sciences, Anesthesiology, Div. of Teaching Laboratories, Gastrointestinal Biology and Disease Ctr., Medical Illustrations, Medicine Admin., Pediatrics, Psychiatry, Social Medicine, Surgery G-9
Miller Hall, Environmental Sciences and Engineering E-5
MRI Facility, Magnetic Resonance Imaging C-10
N.C. Cancer Hospital F-11
N.C. Neurosciences Hospital F-10
N.C. Women's and Children's Hospitals F-10
Neurosciences Res. Ctr., Cell and Molecular Physiology, Genetics, Laboratory Animal Medicine, Medicine Admin., Neurology, Neurosciences Ctr., Ophthalmology, Pathology and Laboratory Medicine, School of Medicine C-9
Paint Shop, UNC Hospitals G-10
Physicians Office Bldg. E-11
Radiological Res. Labs, Radiology C-10
Rosenau Hall, Environmental Sciences and Engineering, Epidemiology, Health Behavior and Health Education, Maternal and Child Health, Public Health Leadership Program, Gillings School of Global Public Health D-7
Stallings-Evans Sports Medicine Center J-8
Tarrson Hall, Clinical Services, Dental Faculty Practice, Dental Research, Diagnostic Science and General Dentistry, Endodontics, Oral Surgery, School of Dentistry D-9
Taylor Hall, Swing Bldg., Alcohol Studies Ctr., Anesthesiology, Biomedical Engineering, Cell and Developmental Biology, Cell and Molecular Physiology, Laboratory Animal Medicine, Medicine Admin., Molecular Biology, Ophthalmology, Psychiatry, School of Medicine, TEACCH Div. C-10
UNC Hospitals F-9

STUDENT HOUSING

Alderman K-2
Alexander J-6
Avery J-10
Aycock K-4
Baity Hill Mason Farm Rd.,
Student Family Housing D-14–I-18
Carmichael J-8
Cobb L-5
Connor J-6
Craige H-13
Craige North H-12
Ehringhaus J-12
Everett K-4
Graham K-4
Grimes J-4
Hardin H-11
Hinton James I-14
Horton, George Moses I-13
Joyner J-5
Kenan K-3
Koury J-12
Lewis K-4
Mangum J-4
Manly J-4
Mason Farm Rd.,
Student Family Housing D-13
McIver K-3
Morrison H-11
Odum Village, Student Family Housing E-12
Odum Village Community Service Bldg.,
Student Family Admin. E-13
Old East H-3
Old West G-3
Parker J-10
Ram Village at Paul Hardin Dr., 540 G-13
Ram Village at Paul Hardin Dr., 550 G-13
Ram Village at Paul Hardin Dr., 560 G-13
Ram Village at Williamson Dr., 510 I-14
Ram Village at Williamson Dr., 520 J-14
Ruffin J-4
Spencer J-2
Stacy K-4
Teague J-9
Whitehead E-5
Winston J-7