



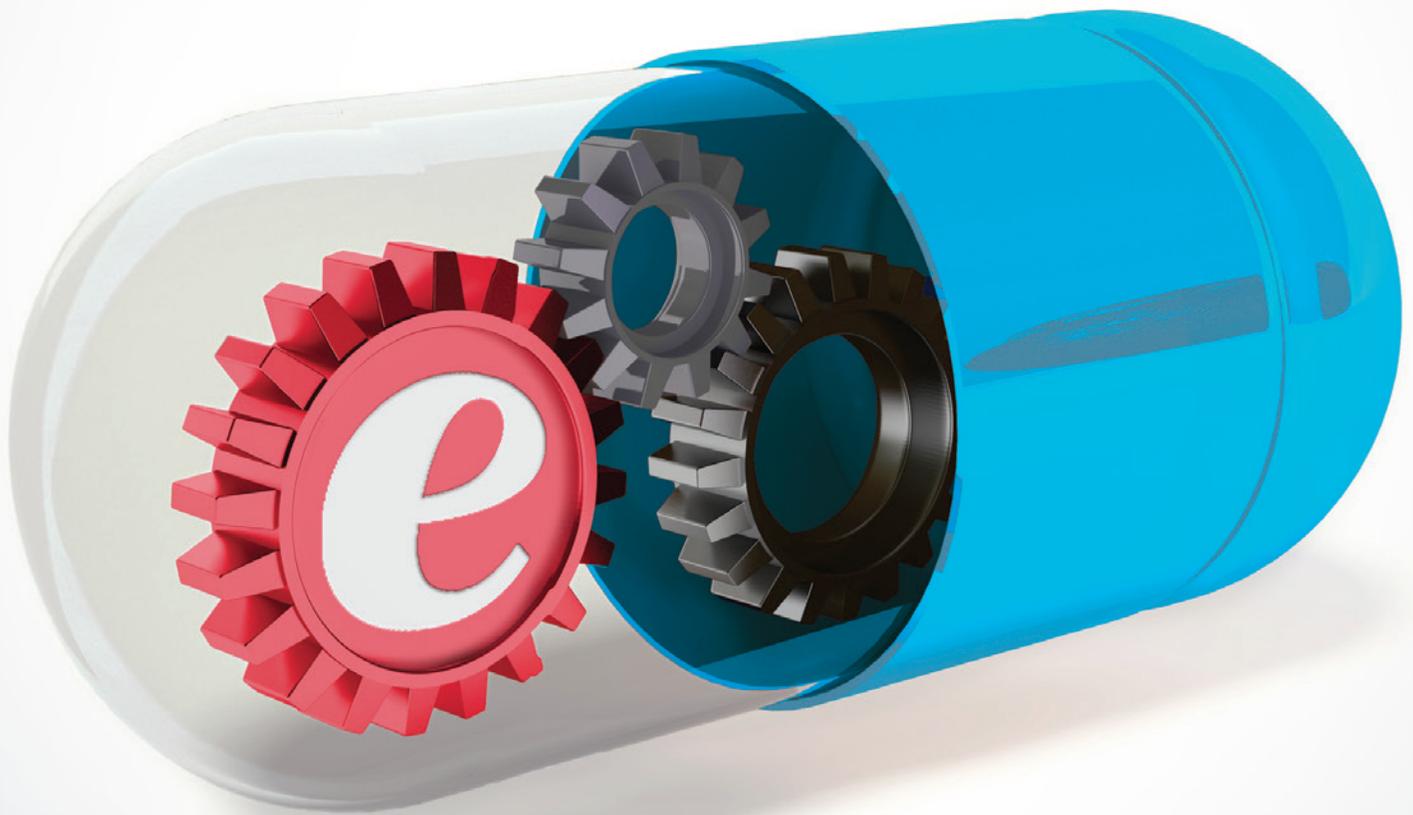
EDWARD P. FITTS DEPARTMENT OF
INDUSTRIAL AND SYSTEMS ENGINEERING

NC STATE

Engineering

in Gear

SUMMER 2015



IMPROVING NC HEALTHCARE

ISE student teams help Community Care of North Carolina improve service to Medicaid beneficiaries while cutting costs

2



IMPROVING NC HEALTHCARE



5 QUESTIONS WITH JENNIFER ROSE



WYSKTALKS ENGINEERING AND MEDICINE

IN THIS ISSUE

06 39th ANNUAL C.A. ANDERSON AWARDS
A night of celebration culminates with Dr. Stephen Roberts winning the 2015 C.A. Anderson Outstanding Faculty Award

08 FACULTY PROFILE: SHU-CHERNG FANG
A desire to solve real-world problems drove Shu-Cherng Fang's move from mathematics to engineering

12 WETMORE WINS AWARD
ISE senior Hannah Wetmore impresses the committee to earn the College of Engineering's Faculty Senior Scholar Award

14 ISE SEEN
ISE Seen covers what's happening around the department. Have you been seen?

16 SPOTLIGHT: ALPHA PI MU

18 SENIOR DESIGN SPONSORS

22 AWARDS AND HONORS

DEPARTMENT HEAD **Dr. Paul Cohen**

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FROM THE DEPARTMENT HEAD

Dear Alumni and Friends of ISE,

The recently completed academic year has been an exciting one featuring outstanding accomplishments by our students and faculty.

ISE continues its pioneering work in healthcare with a unique partnership with Community Care of North Carolina, a non-profit corporation seeking better health outcomes for patients on Medicaid (see Improving NC Healthcare on page 2). ISE faculty and students are working closely with CCNC to model their processes to provide affordable healthcare to people in need. This year also saw the First ISE Research Symposium in April. The event was highlighted by oral and poster presentations of student research.



This has also been a year in which our students have been recognized locally and nationally. Senior Hannah Wetmore was the College of Engineering Faculty Scholar while two students placed at the regional IIE paper competition with Amelia Hardee representing the region in Nashville at the IIE Annual Conference. ISE student Karen Hicklin placed second in the IIE Doctoral Colloquium Poster Competition while alumna Yuanhui Zhang placed third in the IIE Pritzker Outstanding Dissertation Competition.

Our faculty was also recognized for its excellence. David Kaber was inducted as a Fellow of IIE and Rohan Shirwaiker received the IIE Manufacturing and Design Division Outstanding Young Investigator Award. Stephen Roberts was selected as a Diplomate of the Society for Health Systems and also named the winner of the C.A. Anderson Outstanding Faculty Award as selected by our students.

Please enjoy reading more about these accomplishments in this edition of inGear.

Sincerely,

A handwritten signature in black ink that reads "Paul H. Cohen".

Paul H. Cohen, Ph.D.

ISE Department Head and Edgar S. Woolard Distinguished Professor

NEW LINKEDIN ALUMNI GROUP

Our alumni asked so we delivered. We have launched a **NEW private LinkedIn ISE alumni group**. This is an alumni-only private group that will allow you to network and communicate with fellow ISE alumni. It will also allow you to keep up with all that is going on in the department in one convenient place. Getting access to the new group is simple. Go to:

<https://www.linkedin.com/grp/home?gid=8285397>

and **click the "JOIN" button in the upper right-hand corner of the page**. That's it! We look forward to connecting with you there.





ISE students Amelia Hardee, Chad Glenn (foreground), Kiron Allen and Sofia Robles (background) talk with representatives from CCNC

IMPROVING NC HEALTHCARE

ISE student teams help Community Care of North Carolina (CCNC) improve service to Medicaid beneficiaries while cutting costs.

At its annual meeting earlier this year, CCNC, Inc. announced a research partnership with ISE. As part of the announcement, ISE's department head Paul Cohen, Ph.D. and professor Maria Mayorga, Ph.D. discussed ISE's plan to use advanced analytics and modeling to control Medicaid costs while raising the quality of care delivered. "Our students and faculty partner with organizations to solve real world problems,"

Dr. Cohen explained. "Our health systems engineers optimize decision making with state-of-the-art modeling, resulting in measurable improvements to service and value."

CCNC's ongoing effort to control North Carolina's Medicaid costs has been extremely successful. Numerous studies over the years, including those commissioned by NCDHHS and other independent efforts, have estimated that

Community Care’s unique medical home model helped North Carolina Medicaid avoid hundreds of millions in costs annually. That success has caught the eye of health care policymakers across the country that plan to use this model in other states.

Health Systems Engineering Certificate Program

For almost 10 years, ISE has partnered with the healthcare community through its Health Systems Engineering (HSE) Program. Led by former ISE department head Dr. Stephen Roberts, the program uses innovative tools for clinical operations and supports high quality, accessible healthcare.

“HSE brings invaluable expertise in healthcare delivery over the entire patient care cycle,”

said L. Allen Dobson,

Jr., MD, CEO of CCNC. “We already work with HSE in bringing LEAN principles to our clinical operations. With ISE, we will explore opportunities to reduce costs and get more value for the state’s Medicaid dollar.”

ISE Student Projects

This spring, two student teams from the ISE program worked with CCNC to streamline its operations, lower costs and improve outcomes. In addition to Dr. Roberts, Dr. Maria Mayorga, Dr. Julie Ivy and graduate student advisor Karen Hicklin advised the two teams.

“Our health systems engineers optimize decision making with state-of-the-art modeling.”

ISE students Kiron Allen and Sofia Robles focused on Transitional Care (TC) in the Sandhills Network, one of 14 non-profit entities that make up the Community Care’s statewide network. The TC program provides continuity and coordination of care as patients transition to home after a hospitalization. It is primarily provided to Medicaid beneficiaries with multiple or complex chronic conditions and seeks to prevent repeat, unnecessary hospitalizations. If more Medicaid patients are reached by the TC program, the greater the savings which accrue to the NC Medicaid program.

Allen and Robles used database reconciliation and statistical analysis to analyze current care management costs and processes. The main goal was to estimate the amount of time and costs for the patients to complete the TC process. With the results, CCNC developed a Return on Investment Calculator that the other networks across the state can use in their own settings.

The student team of Amelia Hardee and Chad Glenn focused its research on streamlining



ISE department head Paul Cohen speaks at the CCNC annual meeting



ISE associate professor Maria Mayorga speaks at the CCNC annual meeting

CCNC decision support for Personal Care Services (PCS). Medicaid spends more than \$600 million a year on home-based services in North Carolina, and PCS provides help in the beneficiary's home with Activities of Daily Living. Beneficiaries must have a physical or developmental disability, cognitive impairment, or chronic health condition that hinders their independence and their ability to do tasks that they would ordinarily do for themselves if they were not disabled.

Hardee and Glenn analyzed all aspects of decision making, processes and information flow within the PCS system. This included communication between doctors and the Community Care and educating doctors and hospitals about the need for decision support services. NCCCN will use this data to develop an optimal process that is scalable statewide. It will enable Community Care to give

healthcare providers critical information to relay patient needs.

The ISE and Community Care partnership is an example of how the department continues to work with private enterprise, furthering its mission to solve real-world problems and have a positive impact on the quality of life in our communities as well as on the bottom line.

About CCNC

Community Care is a community-based, public-private partnership that takes a population management approach to improving health care and containing costs for North Carolina's most vulnerable populations. We create "medical homes" in all 100 counties for Medicaid beneficiaries, individuals that are eligible for both Medicare and Medicaid, privately-insured employees and uninsured people. ■

5 Questions with ...

JENNIFER ROSE

Jennifer Rose has spent her 15 year career in the healthcare industry with Premier, Duke and now Performance Services. She is a senior director with oversight of management engineers, comparative data, quality programs and patient satisfaction. Rose received her BSIE from NC State in 2000.

What's the single most important experience or understanding you gained in the ISE department?

Teamwork and collaboration. Much of the work we do in healthcare revolves around multidisciplinary teams. Working as a team during many of my classes and my senior design project really set me up for success as a healthcare employee.

What's the most pressing issue facing society that engineers should be working harder to solve?

A pressing issue is being able to provide high quality, affordable healthcare to the growing population. Engineers in healthcare should be working harder to understand healthcare reform. For example, within my team we are focused on pay for performance quality programs, care bundles, care redesign, throughput and length of stay, productivity and overall performance improvement. These are all linked and are all key to the future success of healthcare.

What would you like to achieve in your career?

What are you most proud of so far?

I am most proud of how much I have grown in the 15 years since I graduated from NC State. I never thought I would be leading a team at Duke, and now I get asked to speak about our program at numerous forums.

What's the best book you have read?

Unbroken by Laura Hillenbrand. This book was a true testament to the resilience of the human spirit.

What advice do you have for current ISE students?

If you know you want to be in the healthcare field, get involved early. Enroll in the healthcare certificate program or try to get an internship. Healthcare is a very complex industry, so the more you know, the more marketable you will be when trying to get a job.



39th ANNUAL C.A. ANDERSON AWARDS

A night of celebration culminates with Dr. Stephen Roberts winning the 2015 C.A. Anderson Outstanding Faculty Award.

NC State's University Club lit up as the stars of ISE came out to shine at the 39th annual CA Anderson Award Ceremony. The annual awards dinner is a chance to celebrate student, staff and faculty achievements and this year didn't disappoint.

Dr. Paul Cohen, department head, kicked off the celebration with a review of the outstanding accomplishments that made this year such an unrivaled success. He also spoke of ISE's bright future and the quality of the incoming freshman class, which boasts one of the highest GPAs and was one of the most awarded in departmental history. Cohen wrapped up by presenting the first award of the night, the Staff Employee of the Year. This year, the honor went to Steve Walker, who is best known for his years of loyal service to the Furniture Manufacturing and

Management Program. He is now an integral part of the staff for the Center for Additive Manufacturing and Logistics (CAMAL).

Then it was the students' turn in the spotlight. Professors Vila-Parrish, Ivy, Shirwaiker, King and Roberts all stepped to the podium to recognize their student organization officers with a variety of awards, honors and scholarships. In particular:

- **Hannah Wetmore** received the College of Engineering Faculty Senior Scholar Award
- **Michael Harrison** earned the ISE Outstanding Senior Award
- **Anjali Mani** won the Alpha Pi Mu Outstanding Sophomore Award
- **Theresa Mazzoleni** accepted the ISE Outstanding Teaching Assistant Award



A. Doug Allison Distinguished Professor Stephen Roberts receives the 2015 C.A. Anderson Outstanding Faculty Award

The evening culminated with the three student organization presidents awarding Dr. Stephen Roberts the 2015 C.A. Anderson Outstanding Faculty Award. The Anderson Award recognizes the member of the Industrial and Systems Engineering faculty who, by consensus of the students, has made the greatest contribution toward their educational development. Dr. Roberts heads the Health Systems Engineering Certificate Program and recently received the status of Diplomate from the Society for Health Systems.

Congratulations to Dr. Roberts on his well-deserved award. As the C.A. Anderson Award winner, he provided the commencement address at the ISE graduation in May and will again in the fall. ■



To see all of the photos from the event, go to:

go.ncsu.edu/CAAnderson2015

FACULTY PROFILE: SHU-CHERNG FANG



It was his sense of honor and love for mathematics that started his career. But it was his refusal to settle for “good enough” that brought Shu-Cherng Fang to NC State. “They told me in high school that mathematics, physics and economics were important for everyone’s future,” recalled Dr. Fang. “So I picked mathematics.”

Upon graduation from Taichung First Senior High School in Taiwan, Fang attended National Tsing Hua University. There he would receive his undergraduate degree in mathematics. His next stop was Johns Hopkins University where he received a Hopkins Fellowship.

At Johns Hopkins, Dr. Fang had a realization. “The world is more than mathematical equations and formulas,” he mused. “I wanted to do something for society, to see something happen more quickly.” He wanted to move away from abstract to more concrete, real-world problem solving.

After a sincere conversation with his brothers, the idea of transitioning from mathematics to engineering arose.

So he enrolled at Northwestern University, where he received the Murphey Fellowship. Here, Dr. Fang received his Ph.D. in industrial engineering and management Science in just six quarters. During his fifth quarter, Dr. Ron Thomas, a recruiter for Bell Laboratories, offered him a position at Bell Labs.

Dr. Fang’s career at the AT&T Engineering Research Center at Princeton was quick, intense and rewarding. By proving his skill and expertise, he received a promotion to a technical supervisor position at Bell

Labs. Dr. Fang won the Technical Achievement Award and was again promoted. This time to department manager at the headquarters of AT&T Technologies.

As is common in many large corporations, solutions to problems that were “good enough” were often implemented. Fang found that he had an appetite for investigating the possibility of a perfect solution. “I wanted to have the luxury of looking into a problem inside out to find the optimal and best result,” explained Dr. Fang. “What better position to achieve this than a college professor?”

This concept, along with corporation’s demands of travel and the uncertainty of long-term satisfaction, set Dr. Fang on the path to NC State University in 1988. NC State, where he had been a college recruiter for Bell Labs, was appealing. “It was the progressive nature of the University and the quality of the individuals that worked in the ISE Department,” he recalled.

“The most satisfactory things about being a professor are being able to watch students grow, being a part of their lives and having the luxury to work on problems that are important,” he remarked.

Dr. Fang believes in the philosophy of becoming a complete person. “Life has many, many faces,” he proposed. “It is important to study and immerse yourself in the things that you enjoy about life; to read, to experience and to learn about what makes you happy.”

“If I put all my time into my research, I could have done better,” he said. “But life is more than that.” ■

3-D PRINTED FOOTBALL

ISE's additive manufacturing lab 3-D printed a one-of-a-kind NC State football for University Chancellor Randy Woodson.

To see photos of the Chancellor's visit, go to: go.ncsu.edu/ChancellorISE



NC State Chancellor Randy Woodson shows off his new 3D printed football



ENGINEERING ONLINE

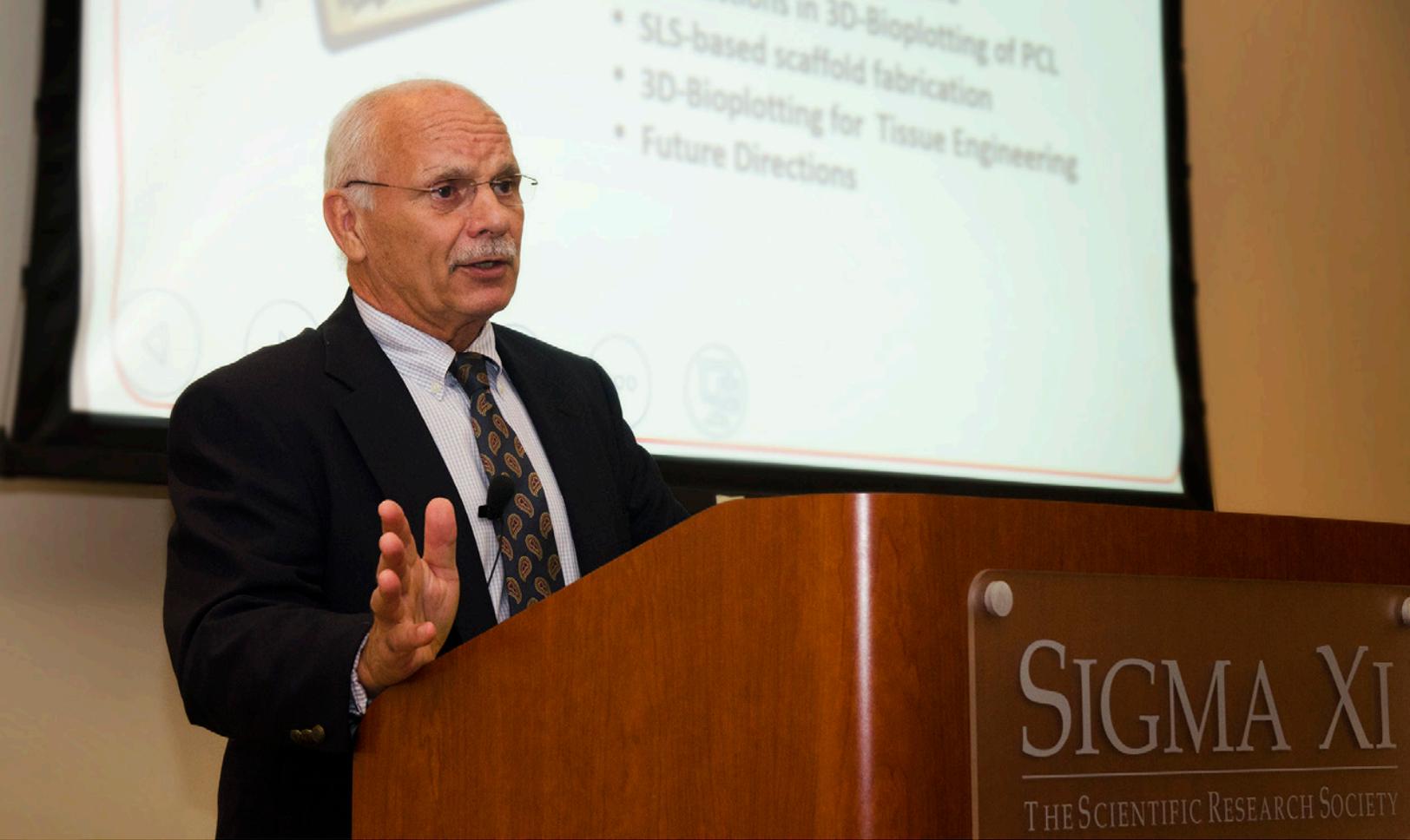
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engineeringonline.ncsu.edu



Dopaco Distinguished Professor Richard Wysk talks to engineers and scientists at Sigma Xi Headquarters in Research Triangle Park

WSYK TALKS ENGINEERING AND MEDICINE

At a luncheon held at Sigma Xi, ISE professor Rick Wysk spoke to a full house of scientists and engineers about ISE's role in the future of 3-D printed organs.

"I'm here today to talk about making things," began Dr. Wysk. He continued with the brief history of regrowing human tissues from the earmouse to today's 3-D printed organs. The Wake Forest Institute of Regenerative Medicine (WFIRM), an ISE partner, has already grown and implanted these types of organs in humans. "But how do we go from the earmouse to a complete organ manufacturing system?" asked Dr. Wysk.

"Developing cells, tissues and organs is an exciting and challenging new field in industrial engineering. At NC State, a team of ISE engineers is one of the first in the world to work with regenerative medicine research groups to examine these issues," stated Dr. Wysk. "The processes developed at places like

WFIRM for creating cells, tissues and organs can be modeled by industrial engineers to scale up production."

The demand for custom-made replacement organs and tissues has never been greater. At the current rate, a new patient joins the organ donor waiting list every 10 minutes. Compound this with the fact that the rejection rate after transplantation is as high as 50 percent for some organs. The fact that these organs are manufactured from the patient's own cells circumvents the problem of transplant rejection. It also eliminates the patient's need to take anti-organ rejection medication for the rest of their life.

Dr. Wysk concluded his presentation with next steps he and the ISE team are taking to someday bring affordable, 3-D printed organ transplants to the marketplace. ■

WETMORE WINS AWARD

ISE senior Hannah Wetmore impresses the committee to earn the College of Engineering's Faculty Senior Scholar Award.

Hannah Wetmore, rising ISE senior, received the College of Engineering's (COE) Faculty Senior Scholar Award for 2015. Each of the 12 departments within the college chooses a nominee who then completes an essay and interviews with the selection committee. "Hannah's application stood out," said ISE professor and selection committee member, Dr. Rohan Shirwaiker. "She did a fantastic job on her interview highlighting the larger role ISE has played in her life and ways she is trying to give back to the community." Based on the strength of both her application and her interview, the committee selected Wetmore by a clear majority.

"I feel honored to receive the award and represent the ISE Department at NC State," said Wetmore. "It is encouraging

to know that others see the value in what I have been able to achieve thus far with my industrial engineering degree. I hope to become an industrial engineer in healthcare after I graduate because I want to have a strong, positive impact on human experiences."

Each year the COE gives the Faculty Senior Scholar Award to the top rising engineering senior. They select students based on academic excellence, intellectual breadth and depth of character. Wetmore received a plaque and a monetary award. The ISE department also displays a plaque that has all past winners. ■

Congratulations, Hannah!



ISE "SEEN"

It's an exciting time to be part of ISE, and these photos prove it. Have you been seen?



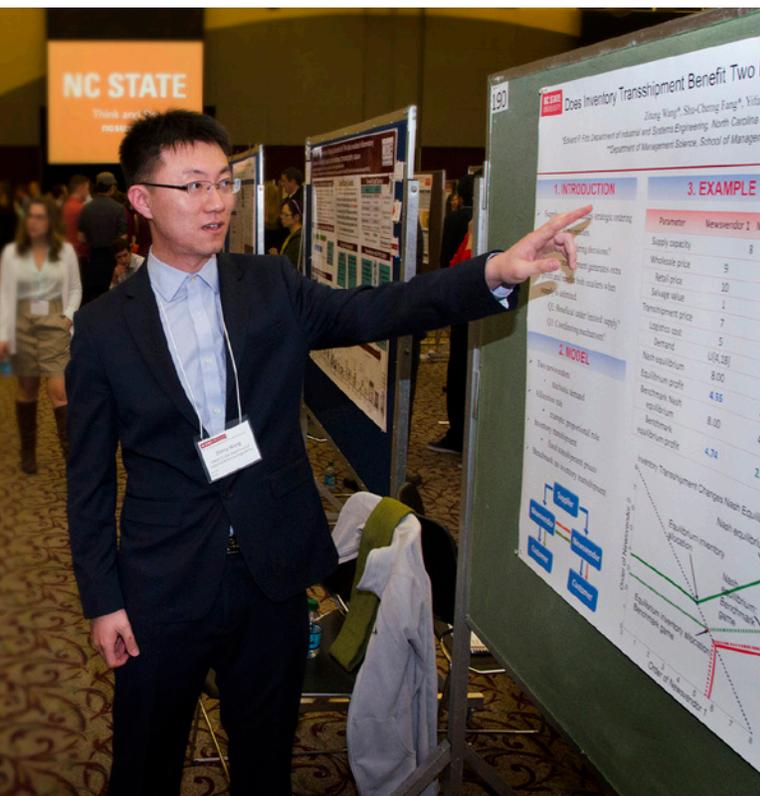
Amelia Hardee and Baxter flip pancakes at Engineering Open House



Paul Whitley demonstrates the Baxter Robot at Engineering Open House



Anita Vila-Parrish with IIE officers: Jenna Pennock, Kady Ward, Kayla Summers and Julianne Spencer @ C.A. Anderson Awards



Ziteng Wang presents at Graduate Student Research Symposium



Julie Ivy with APM officers: Jerel Jordan, Melissa Pressley, Ethan Miller and Hannah Wetmore at C.A. Anderson Awards



Katie Basinger presents at 1st Annual ISE Research Symposium



Jia Deng talks at 1st Annual ISE Research Symposium



Harshad Srinivasan explains advanced manufacturing at Graduate Student Research Symposium



Justin Wolczynski talks organizing volunteers at 1st Annual ISE Research Symposium



Joseph Cook talks with the judges at Senior Design Day



David Goyer on point at ISE Spring Graduation



Paul Cohen talks with ISE alumni in Charlotte, NC at ISE Alumni Event



Michael Harrison and Daniel Godfrey impress the Dean and others at Senior Design Day



Hannah Leskovec says thanks to Mom and Dad at ISE Spring Graduation



Ethan Miller celebrating with family and friends at ISE Spring Graduation



Members of Alpha Pi Mu working with Habitat for Humanity of Wake County last fall



ALPHA PI MU

Alpha Pi Mu (APM) is a well recognized society throughout the field of industrial engineering with more than 60 active chapters and a membership of 15,000. The society identifies its members as being at the top of their class. APM promotes industrial engineering with its members through monthly events and social/community activities. Moreover, it offers students the opportunity to build relationships that last beyond college. Finally, potential employers recognize APM students as leaders, able to bring their high level of academic achievement to the work force.

Faculty Advisor: Dr. Julie Ivy

Interested?

Email us at ncsu.alpha.pi.mu@gmail.com.

APM members are high achieving upperclassmen and graduate students interested in the field of industrial engineering and serving the NC State community. In the fall, we initiated 12 new members and this spring we admitted 14 as part of the C.A. Anderson Awards. This year, we have introduced our students to companies such as Triumph, Eastman Chemical and Deloitte. We also hosted a health systems informational meeting and faculty-student mixers. Our goal was to get interested students involved with some of the great opportunities available in the ISE department.

Our membership is growing which allows us to pursue more ways to give back to ISE. Last fall, we began departmental tutoring, a service opportunity that continued through the spring and into the coming years. Tutoring helps connect APM members with ISE underclassmen. We also worked with Habitat for Humanity of Wake County as our fall service project and participated in Service Raleigh on March 28. ■

Melissa Pressley

APM President

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SENIOR DESIGN SPONSORS



Company: **AKG Thermal Systems**
Location: **Mebane, NC**
Leader: **Jacob Miller**
ISE Team Members: **Rachel Black, George Korn, Emily Peeler and Samuel Wurst**

AKG Thermal Systems wanted to implement a continuous improvement plan as well as lean manufacturing principles to support their growth and need for increased order fulfillment capacity. Specifically, they wanted to reduce the time of the scheduling and assembly processes. The ISE student team created an automated program that prioritized orders and improved the overall assembly and shipping process.



Company: **Big Rock Sports**
Location: **Raleigh, NC**
Leader: **Wayne Decker**
ISE Team Members: **Charles Clayton, Chris Dodds, Nick Lepore and Pat Nager**

Head Quarters Taxidermy Supply (Big Rock Sports) needed to improve their current process for manufacturing Habitat materials to meet the growing demand. The ISE student team created a more efficient process to allow HQ to mass produce Habitat materials by designing a new floor layout, applied 5S and created a shop floor control system.



Company: **Big Rock Sports**
Location: **Raleigh, NC**
Leader: **Wayne Decker**
ISE Team Members: **Justin Ferguson, Zach Little, Jonathan Page and Kyle Trainor**

At Big Rock Sports, orders are comprised of different products made in multiple cells. Once an item is finished in its cell and boxed, it is sent to the merge area to wait for the rest of the items in the order. Some items can wait for days in the merge area for the rest of the items to be completed. The ISE Student team created a schedule for each item in an order to be started so the entire order will arrive in the merge area at the same time, thus reducing the amount of time orders spend in the merge area.



Company: **Cummins, Inc.**
Location: **Rocky Mount, NC**
Leader: **Paul Powell**
ISE Team Members: **David Goyer, Hannah Leskovec, William Nifong & Christian Peterson**

At Cummins, Inc., engines must be properly closed off to any water before being washed. If water gets into the engine, it is considered defective and must be reworked. Currently, the task of closing off engines to any water is handled by the operator. The ISE student team created a robust, systematic way to identify to the operator which caps are needed for each engine as they come through the Pre-Wash station. The system eliminated the trial and error method for determining the appropriate masking.

This spring the ISE Department had the pleasure working with eight local companies on 11 Senior Design Projects. These projects are an opportunity for companies to utilize student resources and have new concepts and fresh ideas injected into their real-world projects. This sponsorship is rewarding for both the project sponsor and the student team. ISE would like to thank this semester's sponsors for their participation in the program.



Company: **Cummins, Inc.**
Location: **Rocky Mount, NC**
Leader: **Kevin Carlson**
ISE Team Members: **James Beall, Kevin Gahagan, Jerel Jordan and Ethan Miller**

At Cummins, Inc., the process for masking an engine in the pre-paint station is not standardized and is performed, by memory, by the operator. Combine this with the fact that there are no quality control systems to ensure the maskings are correct and all too often the results are customer disapproval and loss of profits. The ISE student team created a system or framework to provide error proofing and a standard means of masking engines.



Company: **EMC²**
Location: **Apex, NC**
Leader: **Andrea Rekut**
ISE Team Members: **John Hajnos, Alexander Hodge and Mark Trongdon**

At EMC², orders are comprised of different products made in multiple cells. Once an item is finished in its cell and boxed, it is sent to the merge area to wait for the rest of the items in the order. Some items can wait for days in the merge area for the rest of the items to be completed. The ISE student team created a schedule for each item in an order to be started so the entire order will arrive in the merge area at the same time.



Company: **EMC²**
Location: **Apex, NC**
Leader: **Andrea Rekut**
ISE Team Members: **Kristin Gavin, Ismail Lekorchi, Noah Linger and Alex White**

EMC² has decided to create its own stinger tools because current stingers have a 12-week lead time to order. This problem has reached the point at which the company may miss shipment goals and management wants to ensure this does not occur in the future. The ISE student team created a program to forecast the number of stingers needed one, two or multiple quarters out.



Company: **Flanders Filtration Inc.**
Location: **Smithfield, NC**
Leader: **Dan Butler**
ISE Team Members: **Charles Klecker, Malcolm Stephen and Andrew Wenk**

Flanders is currently transitioning from a hot glue to a cold glue lamination process. Because of the cost savings, Flanders will be adding more cold glue lamination machines into its facility to meet the high demand. Flanders wants to standardize its entire lamination process, from raw materials to the location of the finished rolls. To accomplish this, the ISE student team studied the current inventory flow and operating procedures in order to increase productivity to meet the high demand.



Company: **Lenovo**
 Location: **Morrisville, NC**
 Leader: **Cliff Richards**
 ISE Team Members: **Daniel Godfrey, Michael Harrison, Nathan Fouratt and Peter Yang**

Lenovo wanted to improve the efficiency of its small-pack line shipping system. The ISE student team built a simulation model to identify the inefficiencies in the current system and test new layouts and processes. This identified opportunities to reduce shipping lead time, which will enable Lenovo to set new shipping standards competitive across the industry.



Triumph Actuation Systems, LLC

A Triumph Group Company

Company: **Triumph Actuation Systems**
 Location: **Clemmons, NC**
 Leader: **Daniel Smith**
 ISE Team Members: **Cynthia Craig, Joseph Cook, Alexis Wilson and Christopher Becker**

At Triumph Actuation Systems, the receiving inspection process is causing a bottleneck. There is a large backlog of received inventory waiting to be inspected at any given time. The objective is to reduce the time of the receiving inspection process in order to reduce the number of components waiting in the queue to be inspected. The ISE student team measured throughput and work in progress to assess if the process improvements are reaching the goal.



Company: **Trivantage**
 Location: **Mebane, NC**
 Leader: **Dan Fouratt**
 ISE Team Members: **Matthew Ashburn, Hayley Derscheid, Nathan Harris and David Kane**

At Trivantage, shipping prices are calculated from the closest distribution center to the customer. But the order may ship from several centers depending on product availability, leaving the company to absorb the extra shipping costs. The ISE student team built a simulation model to calculate shipping costs which defined a set of rules for shipping and inventory levels.



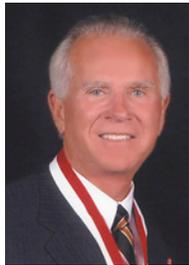
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go.ncsu.edu/ingearonline-SeniorDesign

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ADVISORY BOARD 2015

Board Chair's Notes - June 2015



The positive momentum we are experiencing at NC State ISE is at an all-time high, as are everyone's expectations for sustaining our worldwide reputation for excellence and innovation. And while it's exciting to look

forward, everyone in the ISE family should also be very proud of the accomplishments of our students and faculty so far this year (see Awards and Honors on page 22).

In addition to the honors and awards earned by our distinguished ISE faculty, innovative student research continues to deliver immediate and measurable impact to our corporate partners. As demonstrated by the research completed for Community Care of North Carolina and Senior Design Projects fulfilled for companies like Lenovo, the department has the capacity to serve the private sector with actionable solutions to real-world problems (see Improving NC Healthcare on page 2).

Once again, more than 90 percent of the ISE graduating class landed offers of employment either prior to or immediately following graduation, taking their talents into the corporate and entrepreneurial communities, as well as into the U.S. military and other specialized areas of service.

I encourage all ISE alumni to become involved and engaged with the department as it expands its influence across a growing number of industries throughout the U.S. and around the world. This October, ISE homecoming activities on campus will include a tribute to the department's historic legacy in furniture manufacturing, while providing a glimpse of a brilliant future in technology and systems analytics, imagined and engineered at NC State. **We hope that you will be able to join us on October 30th for all of the homecoming events.**

Ed Fitts, BSIE 1961
ISE Advisory Board Chair

The ISE Department receives valuable input from its Advisory Board. The board maintains and fosters relationships with students, faculty, the Dean of the College of Engineering, the community and alumni. The Advisory Board assists the department head in achieving department goals and provides counsel and advice from its unique perspective. Board members are typically engaged in other ways, such as helping to connect the department with industry stakeholders. The Advisory Board meets each semester.

The following distinguished alumni and friends of the ISE Department currently serve on the Board:

Dr. Leslie Alexandre

Director, Research Development and Collaborations at Georgia Regents University Cancer Center
Board Member at Arbovax, Inc.

Dr. Tony Atala

Director of the Wake Forest Institute for Regenerative Medicine
W.H. Boyce Professor and Chair of the Department of Urology at Wake Forest University

Larry Bowman

BSIE, North Carolina State University 1973
ISE Distinguished Alumni 2008
Principal with Bowman Investments, LLC

Edward Fitts (Chair)

BSIE, North Carolina State University 1961
ISE Distinguished Alumni 2006
Founder and CEO of Dopaco, Inc. (Retired)

Dr. Leon McGinnis

Ph.D., North Carolina State University 1975
ISE Distinguished Alumni 2006
Professor Emeritus in the H. Milton Stewart School of Industrial and Systems Engineering at Georgia Tech

Joe Pleasant, Jr.

BSIE, North Carolina State University 1972
ISE Distinguished Alumni 2010
Chief Information Officer and Senior Vice President of Premier, Inc. (Retired)

AWARDS and HONORS



Stephen Roberts, professor, received **Diplomate Status** from the Society for Health Systems (SHS). The Society awards Diplomate Status to a select few of its 900 members for their contributions to the Society and to the healthcare industry. Diplomates are leaders who take part in shaping the future of the Society and the greater healthcare community.

SHS works to improve healthcare processes around the world. They encourage the exchange of ideas and innovative techniques among healthcare professionals.



Rohan Shirwaiker, assistant professor, received the 2015 **Manufacturing and Design Division Outstanding Young Investigator Award** from the Institute of Industrial Engineers. This award recognizes researchers early on in their careers for outstanding technical contributions to the manufacturing and design research community.

Dr. Shirwaiker earned the award for his work on implantable medical device and tissue-engineered technologies.



David Kaber, distinguished professor, received **Fellow Status** from the Institute of Industrial Engineers (IIE). A fellow is the highest classification of IIE membership. The award recognizes outstanding leaders of the profession who have made significant, nationally recognized contributions to industrial engineering.

Fellows have made notable contributions in the areas of management, technical innovation and practical innovation. They have volunteered significant time and effort on behalf of IIE while enhancing the visibility of IIE.



Hannah Wetmore, senior, received the College of Engineering's (COE) **Faculty Senior Scholar Award**. Each of the 12 departments within the college selects a nominee who then completes an essay and interview with the selection committee.

The COE Faculty Senior Scholar Award is given each year to the top rising senior in the College of Engineering. Students are selected based on academic excellence, intellectual breadth and depth of character.

AWARDS and HONORS



Amelia Hardee, senior, **placed second** in the Institute of Industrial Engineers Regional Paper Competition for her paper, "Additive Manufacturing Approach to Design, Manufacture and Encapsulate the Battery-Pack for a Medical Implant." The competition was held during the 2015 IIE Mid-Atlantic Regional Conference at Clemson University in February. She presented her research at the IIE National Conference in Nashville in June.

She is currently working under the supervision of Dr. Rohan Shirwaiker in the area of regenerative medicine.



Julianne Spencer, junior, **placed third** in the Institute of Industrial Engineers Regional Paper Competition for her paper, "Use of Translucent Materials in an Orbicular Skin Tissue Expander." The competition was held during the 2015 IIE Mid-Atlantic Regional Conference at Clemson University in February.

She is currently working under the supervision of Drs. Ola Harrysson and Richard Wysk in the area of regenerative medicine.



Anita Vila-Parrish, assistant teaching professor and director of undergraduate programs, was nominated for an **Outstanding Global Engagement Award** by the Office of International Affairs at NC State University. She was nominated for her accomplishments in globally engaged teaching and international activities while working at NC State.

In the summer of 2015, Dr. Vila-Parrish took a group of engineering students abroad to study the challenges that industrial engineers face working in a global work environment.



Hakan Sungur, contract manager, was nominated for an **Award for Excellence** by the College of Engineering (COE). Sungur was one of seven COE nominees who were selected based on innovations, outstanding service, public service, safety/heroism and human relations.

The NC State University Awards for Excellence program recognizes the accomplishments and achievements of permanent NC State employees at both the college and university levels who do not hold faculty rank.

A HIGHER GEAR

A look at some of the numbers that shape the Edward P. Fitts
Department of Industrial and Systems Engineering at NC State

15

IIE FELLOWS on the ISE faculty (9 active). More than any other IE department in the country.

1930

The year the **IE PROGRAM** began at NC State University.

1

NATIONAL ACADEMY of ENGINEERING MEMBER

Thom J. Hodgson was elected in 2001. Membership is one of the highest professional honors accorded an engineer.

2

ISE TEAMS that placed in the top eight in the global SIMIO Simulation Competition.

ISE GRADUATES in the spring of 2015.

92

CONNECT JOIN THE ISE COMMUNITY!



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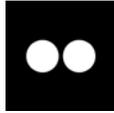
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GOT NEWS?

E-mail, news, feedback and ideas to:

ise-socialmedia@ncsu.edu





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CHANGE OF ADDRESS?

Visit www.engr.ncsu.edu/alumni or send address corrections to alumnianddonor_records@ncsu.edu; or call 919.515.7458, toll free: 866.316.4057.

A large photograph of an engineering career fair. The scene is filled with people in professional attire, including suits and business casual wear. In the foreground, a man in a dark suit and red tie is looking towards the right. Next to him, a man in a dark polo shirt with a 'Callisto Inspiration' logo and a name tag is holding a red clipboard and talking to a woman with long brown hair. The background shows a busy event space with various booths, banners, and other attendees. The lighting is bright and indoor.

ENGINEERING CAREER FAIR

SEPTEMBER 29-30, 2015