



in Gear

Fall/Winter 2023

Legendary YouTuber, ISE alum and part-time DJ Link Neal delivers his commencement address to the ISE class of 2023. He shares the cautionary tale of one Elk Hound Snugglebaby and, like all good speeches, concludes with a musical number.

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Math, Mischief and Medium-Sized Holes

NC State ISE

12.7M views • 5 months ago

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ise BY THE NUMBERS



Degrees Offered

- B.S. in Industrial Engineering
- Accelerated Bachelor/Master in Industrial Engineering
- Master in Industrial Engineering
- Master in Industrial Engineering (Online)
- Master of Engr. Management
- Master of Engr. Management (Online)
- Master of Industrial Engineering / Master of Business Administration
- M.S. in Industrial Engineering
- Doctor of Philosophy in IE

Operations Research

- Master in Operations Research
- M.S. in Operations Research
- Doctor of Philosophy in Operations Research

Integrated Manufacturing Systems Engineering

- Master in Integrated Manufacturing Systems Engineering
- Master of Integrated Manufacturing Systems Engineering (Online)



Degrees Granted (2022-2023)

- 120** Undergraduates
- 67** Masters
- 13** Ph.D.



National Rankings

- Undergraduate Program: **#12**
- Graduate Program: **#15**



Faculty (2022-2023)

- 28** Tenured and Tenure-track
- 5** Distinguished Professors
- 8** Professors
- 9** Associate Professors
- 9** Assistant Professors
- 3** Lecturers
- 14** Emeritus
- 18** Adjunct



Enrollments (Fall 2023)

- 361** Undergraduates
- 82** Masters
- 75** Ph.D.

inGear

Fall/Winter 2023

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inGear is a publication of the Edward P. Fitts Department of Industrial and Systems Engineering. It is distributed two times a year to alumni, ISE departments, faculty, students and friends. We welcome your feedback about the magazine and invite submissions of news to ise-socialmedia@ncsu.edu.

To receive news updates throughout the calendar year, please subscribe to inGear online by going to go.ncsu.edu/JoininGear.

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FROM DEPARTMENT THE HEAD

They say that at any given moment, we have two options. We can step forward into growth or backward into safety. I feel confident to say that the department continues to step forward every day. We are adapting the ISE curriculum to better prepare our students for the future by introducing new areas of study like sustainability, supply chains, data analytics and certificates across various areas.

Speaking of change, the department welcomed its newest faculty members, Adolfo Escobedo, Jordan Kern, Fred Livingston and April Yu. You can meet our new faculty members and learn something about them on [page 4](#). We also celebrate the careers of senior faculty members Julie Ivy and CS Nam, who each earned a promotion to department head at the University of Michigan and Kettering University, respectively. We wish them well and hope to collaborate with their departments on research projects in the future. You can read more about Julie on [page 9](#).

Speaking of new faculty members, The College welcomed its new Dean, Jim Pfaendtner, this August. We are excited that former dean Louis Martin-Vega returned to the ISE Department as a full-time faculty member.

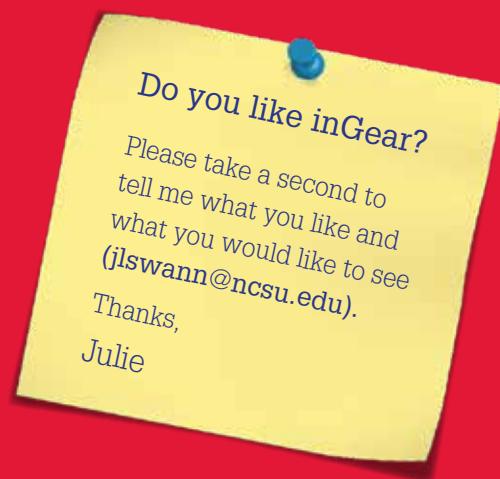
On a less serious note, we had the pleasure of having ISE alum Link Neal of the comedy duo Rhett & Link return to campus and deliver our spring graduation address. You can read more about all of the shenanigans on [page 18](#).



This year's Day of Giving was another success. Your 257 gifts totaled \$73,936 and allowed us to support student chapters of professional organizations and sponsorships for K12 summer camps. It also allowed us to promote the department by having a booth at the IISE and INFORMS annual conferences.

This year's Day of Giving results put us in the top three among the engineering departments, a place we have been every year since the Day of Giving began. Again, your generosity has enabled us to support our students, faculty and staff, and I thank you.

Dr. Julie Swann
ISE Department Head and
A. Doug Allison Distinguished
Professor



A white, cursive handwritten signature of Julie Swann.

Julie Swann

5 Questions with ... **DICK FRANKLIN**

Hometown Asheville, NC
Graduating Class BSIE 1971
Career Overview Kenneth D. Franklin retired from AT&T/Bellsouth in 2008. He worked for AT&T/BellSouth for 37 years. At AT&T/BellSouth, Franklin filled many roles, including Outside Plant Engineer, Senior Director and Network Vice President. After retirement, Dick formed his executive consulting firm focusing on end-to-end process redesign. He and his wife Wanda endowed the Alpha Pi Mu Outstanding Sophomore Award and the ISE Merit Scholarship for NC State ISE students.

1. What is the single most important experience or understanding you gained in the ISE Department?

Thanks to Dr. Dick Bernhard, I learned how to evaluate the merits of competing projects. Most importantly, I learned the magic of compound interest. I recall his quoting Albert Einstein: "The most powerful force in the universe is compound interest." He referred to it as one of the greatest "miracles" known to man. This insight was a powerful lesson for a 19-year-old sophomore.

2. What is society's most pressing issue that engineers should work harder to solve?

Food production and distribution to ensure no one goes to bed hungry rank is high on my list. Still, I have often said that an individual alone cannot solve world hunger, but they can focus on the top 20 percent of the things they can accomplish that will yield an 80 percent improvement. The Pareto Principle always works as long as you look at systems end-to-end.

3. What had you hoped to accomplish in your career? What are you most proud of so far?

My most valuable accomplishments were improving customer service (J.D. Power) while reducing costs. I used sampling to identify where processes were broken and what are the five doable changes to get 80 percent of the desired improvements. Some people have credited me with saving several billion dollars over my career as an employee for 37 years with Southern Bell, BellSouth and AT&T.

4. What would you likely be doing if you were not in the engineering field?

A lawyer or consumer advocate. The opportunity to help people is endless.

5. What advice do you have for ISE students and graduates?

First and foremost, open a Roth account and save 15 percent of your salary. I would also learn leadership skills and appreciate the value of everyone. Finally, I suggest reading books and articles to grow your thinking. Here are some of my favorites: *Seven Habits of Highly Effective People* by Stephen Covey, *Who's Got the Monkey?* by David Onckey, Jr. & Donald Wass, *Swim With Sharks Without Being Eaten Alive* by Harvey B. Mackay, *Leadership is an Art* by Max Depree, *The Go-Getter* by Peter B. Kyne, *The Dog Poop Initiative* by Kirk Weisler and *Good to Great* by Jim Collins.



(left to right) Dick Franklin, Wanda Franklin and Dick Bernhard



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MATH, MISCHIEF AND MEDIUM-SIZES HOLES

ISE alum and legendary YouTuber Link Neal regales the graduation audience with the tale of Elk Hound Snugglebaby. A DJ whose name was both unforgettable and hard to remember. Neal concluded the speech with a musical mashup of Tom Petty and Snoop Dog.



04

FOUR ACES

As part of the campaign to grow NC State Engineering by 40 percent, ISE has hired four up-and-coming “aces” to its faculty.



22

RWANDA BOUND

This summer, ISE’s Kanton Reynolds led a group of students that included three ISE students, Catherine Reckard, Daniela Santibanez and Gracie Suggs, to Rwanda to put their industrial engineering skills to work helping local schools and communities.

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ROCKET-POWERED SEEDS

“How funny would it be if there was a seed mortar?” is the question that sparked the idea of spreading seeds via rockets for IMSEI student Spencer Lee.



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“TEACH A PERSON TO FISH ...

...and you feed them for a lifetime.” This philosophy underlies and informs the new ISE Worldwide Societal Impact Endowment.



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FOUR ACES

ADOLFO ESCOBEDO | ASSOCIATE PROFESSOR

JORDAN KERN | ASSISTANT PROFESSOR

Biography

Before coming to the NC State ISE Department, Adolfo Escobedo worked with the School of Computing and Augmented Intelligence at Arizona State University. He was an assistant professor in the industrial engineering program starting in 2016 and executive director of the Department of Homeland Security's Center for Accelerating Operational Efficiency in 2023. Escobedo received his Ph.D. in industrial and systems engineering from Texas A&M University in 2016 and a BA in mathematics (with a minor in history) from California State University in 2009.

Why Engineering? ISE?

Escobedo picked engineering as his way of moving from studying the past to exploring the future. As a history major for the first half of his undergraduate studies, he always took at least one math course a quarter to hone his quantitative skills. However, Escobedo's interests gradually gravitated towards more challenging mathematics courses that satisfied his intellectual curiosity. Eventually, he switched majors. After graduating, he decided to pursue graduate school in a field where a mathematics skill set would be necessary but where his work could make more tangible and timely impacts on real-world problems.

As far back as 2009, Escobedo had been interested in the NC State ISE Department. He was captivated by the unique research areas of the ISE faculty at that time (which included furniture manufacturing). Luckily, the stars aligned this time, and he jumped at the opportunity to join the Wolfpack.

Research Interests

Escobedo's research interests focus on operation research, discrete optimization, computational linear algebra, sustainable infrastructure development, circular economy, computational social choice and crowdsourcing.

Even or Odd Numbers?

Odd numbers. A mathematical reason is that they include all but one of the current (and yet-to-be-discovered) prime numbers. A non-mathematical reason is they have the lucky and unlucky numbers 3, 7, 13 and 23.

Biography

Jordan Kern's first job after undergrad was as a contractor at the US Department of Energy. He then returned to Chapel Hill for his master's and Ph.D. in Environmental Sciences and Engineering. He remained at UNC and became a research faculty member before starting at NC State.

Kern joined NC State in 2018 as an assistant professor in the Department of Forestry and Environmental Resources (FER). It was the only academic offer then, so he didn't choose NC State as much as NC State chose him.

Why Engineering? ISE?

Kern only had a little direct exposure to engineering as a kid. Science, yes, but not engineering. However, he had a strong interest in understanding complex systems and problem-solving. Halfway through his time as an undergrad, Kern realized that he wanted to pursue engineering. But because UNC doesn't have an undergraduate engineering program, he pursued it in graduate school.

His road to ISE was a little more complicated. Kern's background is in environmental systems engineering – an area of applied research that combines environmental science, engineering, economics, applied statistics and operations research to solve problems that involve both natural and human systems. Although he enjoyed being in the FER department, he knew being in engineering would be a better fit. So, he jumped at the chance to switch to the ISE department.

Research Interests

Kern's research interests lie in the design and management of low-to-zero carbon energy systems focusing on building high-resolution models of real-world energy systems, simulating system dynamics under uncertainty and stress, and providing insights for making capital investments and short-term operational decisions.

Even or Odd Numbers?

Evens. Kern is a twin, and he has twins. Being able to divide things equally has been important in my life.



A promotional image for ISE featuring two individuals, Fred Livingston and April Yu, wearing white ISE baseball caps. Fred Livingston, on the left, is a Black man holding a red heart playing card. April Yu, on the right, is a woman with glasses holding a black club playing card. They are standing on a green field with a stadium light background. The text is centered over the image.

As part of the
campaign to grow
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by 40 percent, ISE
has hired four up-
and-coming “aces” to
its faculty.

FRED LIVINGSTON | ASSOCIATE TEACHING PROFESSOR

APRIL YU | ASSISTANT PROFESSOR

Biography

Fred Livingston received his Ph.D. from the Department of Electrical and Computer Engineering at NC State in 2014. Before joining the NC State faculty, he was a principal robotic engineer for defense contractors. He developed autonomous solutions for health systems, maritime systems, precision agriculture, and search and rescue for the Department of Defense. Livingston explored the integration of cutting-edge technologies like decentralized sensor fusion, edge computing, machine learning, robot manipulation, advanced control and computer vision for advanced autonomy.

Why Engineering? ISE?

Growing up in North Carolina during the 80s, Livingston spent time in my parents’ garage, fascinated by how things were made. He would tinker with almost anything but often couldn’t put the items back together. His parents eventually locked the tool cabinet to prevent further mishaps. During that time, he also became an avid supporter of Wolfpack basketball, particularly after their victory in the 1983 championship. His family often visited the NC State campus and attended engineering open houses. These experiences fueled his desire to pursue a degree in engineering at NC State.

Twenty years later, Livingston is proud to be a faculty member at the university, where he can use his robotics and automation expertise. The ISE department aligns perfectly with his interests and expertise.

Research Interests

Livingston’s research and teaching involve the advancement of cyber-physical systems for autonomy. These systems utilized multi-agent robotics technologies, decentralized control, sensor fusion, optimal motion planning, edge computing, reinforcement learning, blockchain, smart contracts, perception and security.

Even or Odd Numbers?

As an identical twin, Livingston firmly believes in the power of two. Having a companion who shares his every experience makes life even more fulfilling.

Biography

April Yu received her Ph.D. and MS in Operations Research from Georgia Tech. Before that, she received her bachelor’s degree in Statistics from Nankai University in Tianjin, China. In 2022, she spent the summer as an applied scientist intern at Amazon.

Why Engineering? ISE?

Yu has always enjoyed applying what she has learned to solving real-life problems and improving system performance (even a little bit). She believes engineering bridges the gap between theoretical science and practical applications by solving complex real-world problems and contributing to cutting-edge developments. Yu chose NC State because it offered great opportunities for collaboration among different disciplines. She decided on the ISE Department because it provides various research topics, from advanced manufacturing to biomedical engineering to operations research. Yu is excited about working with students and faculty from diverse backgrounds and experiences at NC State.

Research Interests

Yu’s research primarily focuses on stochastic modeling and optimization, with applications to healthcare, queueing systems and supply chain management. She considered topics in her recent works: How to set vaccine pricing models better to create more equitable access to vaccinations worldwide? How about personalized scheduling to help more children get vaccinated? What impact can the combination of testing and self-isolation have on the spread of infectious diseases? What are the differences in utilization and survival between split liver and whole liver transplantation?

Even or Odd Numbers?

Although Yu doesn’t have a strong preference, she believes that even numbers are slightly better because there is no need to worry about any remainder when they are divided by two.

AJ COLE III



MY CAUSE, MY CLEATS

On December 4th, 2022, the Las Vegas Raiders participated in the league-wide “My Cause My Cleats” initiative, which brings awareness to a charity of their choice. ISE Alum and Las Vegas Raider punter AJ Cole III represented the Kenya Project during the game.

Cole has a long history of supporting the Kenya Project—a nonprofit with a mission to provide resources and facilities for health, education and spiritual development to the children of Kenya. “It’s the organization I’ve done on ‘My Cause My Cleats’ every year since I’ve been in the NFL. They are an organization I got connected with in college,” Cole told FanNation Raider Maven. The Project has a school in Nakuru, Kenya, that serves 800 children, many of whom are orphans. About 300 of the students stay on-site at the boarding school. “I was able to go every year in college for spring break. It’s an organization that I’ve been working with for a long time and feel pretty passionate about.”

When asked about his experiences back in 2018, Cole stated that “The biggest thing I’ve learned from these trips is just how blessed we are living in a country like we do. Being able to play college football, I have everything I need and everything I want, really.” He explained “There are all kinds of people across the world that would kill for an opportunity to be blessed like that, so I’m really just trying to appreciate everything that I have.”

Cole is focused not just on the game but on how the game can improve lives. “I think it’s important that the NFL puts such a huge emphasis on community outreach, social justice,” Cole told Raider Nation. “I’ve always felt like we have such an incredible platform. Because we play football, for some reason, people care about what we have to say. And if we’re not using that to enrich the lives of others, then we’re wasting the platform we have.” Later during his interview with Raider Nation, Cole expanded on this idea. “Everybody wants to look good on gameday, but at the end of the day, looking good on gameday doesn’t really mean anything.” Cole hopes that by seeing his cleats, viewers will be interested enough to look up not only the Kenya Project but the other causes on display.

After the game, players had the option to donate their cleats to NFL Auction, where fans can bid for their custom cleats. All proceeds from sales will go to the respective causes selected by the players.

Walter Payton Man of the Year

AJ Cole was also named as a Walter Payton Man of the Year nominee due to his commitment to not only his community but communities abroad. The Walter Payton award is considered the league’s most prestigious honor and is given to players that represent the values of respect, integrity, resiliency and responsibility on and off the field. ■

ISE FACULTY SPOTLIGHT



HONG WAN

In the sport of boxing, there is a saying that goes, “Everyone has a plan until they get punched in the mouth.” Thankfully for ISE associate professor Hong Wan, she metaphorically experienced a moment like that when she suddenly changed her entire career plans in grad school. With a good job offer in hand, Wan decided to pursue her Ph.D. based on advice from an advisor. “He thought I was good at research and encouraged me to get a Ph.D.,” recalled Wan. “He persuaded me that even for industry, getting a Ph.D. would give me more freedom.” Then in the last year of earning her doctorate, she would face another “punch” that would transform her career.

But let’s rewind the clock to 1998 and join Wan as she finished her undergraduate chemistry degree (minor in economics) at Peking University and explored her options for grad school. “I wanted to do something with more industry connections,” she remembered. “My planned career path was to join a promising company and eventually go for management positions.” Part of

that plan included getting an MBA in her 30s. She also saw herself traveling the world.

But at that time, the Chinese education system was quite different from the US, and she wanted to experience life in the United States. “I also wanted to do something more math-related compared to the pure bench work involved in organic chemistry,” shared Wan. She received full scholarship offers from several excellent universities and knew it would be a great experience.

She selected Northwestern University and earned her MS in Material Science. In 2002, as she wrapped up her second master’s (Industrial Engineering and Management Sciences) and prepared to head out into the working world, she had that career-changing talk with her advisor. She remained at Northwestern and was well on her way to earning her Ph.D. when she made another career-changing decision. Wan realized the benefits of an academic job: autonomy and flexibility, and never looked back.

Before joining the NC State ISE faculty, she was an associate professor in the School of Industrial Engineering at Purdue University. She also directed the Purdue Blockchain Lab, co-directed the Smart Design Lab and was part of the

SEED Center for Data Farming at the Naval Postgraduate School. Although Wan enjoyed her life at Purdue, she missed city life. “My husband was a software engineer, and there are limited on-site opportunities in West Lafayette, Indiana,” said Wan. She chose NC State because of its beautiful location and excellent faculty. “I also had a good interview experience and enjoyed talking with the students and faculty there,” said Wan.

Today, her research focuses on distribution systems and learning-based simulation. More specifically, she works on blockchain, not the technology itself, but the agents’ optimal strategies and behaviors in a decentralized network. Wan and her students are also interested in how recent developments in generative models can help in simulation. Their preliminary work will be presented in December at the 2023 Winter Simulation Conference in San Antonio, Texas.

Although it seems that her decisions have worked out quite well, When it comes to making plans and “getting punched in the mouth,” Wan offers this advice: “Do not have two sons that are close ages.” It sounds like some of those punches might be more literal than metaphorical. **Good luck, Wan.** ■

FASTER & LESS FURIOUS

OLD CITY. NEW TRANSIT.

The sun rises in Ankara – the capital of Turkey. Its unique blend of old and new is revealed as the sun’s golden rays bounce along cramped Roman streets. These streets were made not for cars or buses but for horses and foot. And yet they feed into wide, modern boulevards created for high-speed metal boxes. This disconnect in the city’s transit network, plus its growing population and economy, only serves to make things worse unless something is done today to address the ever-increasing need for transport.

That’s where Ali Unal comes in. Unal is a postdoctoral researcher for the NC State ISE department, focusing on public transit. Working with ISE assistant professor Leila Hajibabai, Unal is researching the best way to optimize Ankara’s public transport system and improve the lives of its citizens. “The study conducted on Ankara’s public transport system using real-world transit data has the potential to benefit the city in multiple ways,” described Unal.

Unal was drawn to NC State because of its research-intensive environment and commitment to advancing knowledge in diverse fields. “I was also drawn to the university’s emphasis on interdisciplinary research and its collaborations with other institutions and industry partners,” he explained. “In addition, the resources and

facilities available at NC State were a major factor in my decision to join as a postdoctoral researcher.” Unal was also eager to work with Hajibabai, an experienced researcher in her own right focusing on transportation systems.

According to their research, their strategy can save the Turkish transportation authority \$858,240 annually. “Our research on optimizing the public transit system in Ankara can have a significant impact on the daily lives of its residents,” emphasized Unal. “With the optimized system, passengers can reduce their travel time by over 55,000 hours annually, leading to more efficient and faster transportation.” These shorter travel times and reduced fuel consumption will make public

transport in Ankara work better for the communities within the city.

Unal and Hajibabai are also researching bike sharing and micro-mobility—a sustainable transportation option that can reduce traffic congestion and carbon emissions—to develop Turkey’s transportation infrastructure. They are optimizing existing micro-mobility systems, a task that considers the placement of stations and routing strategies. The goal is to promote sustainable transit modes and reduce carbon emissions in urban areas. The data in this study will go on to benefit not just Ankara but large cities around the globe.



ALI UNAL

FOR SHE'S A JOLLY GOOD FELLOW, AGAIN

For the second time in six months, ISE professor Julie Ivy has earned a Fellow Award from an international organization. In November 2022, it was from the Institute for Operations Research and Management Sciences (INFORMS); in May 2023, it was from the Institute of Industrial and Systems Engineers (IISE).

Her most recent prize, the 20th in the department's history, only strengthens that NC State has the country's highest percentage of IISE Fellows. "NC State is extraordinarily lucky to have so many excellent ISE faculty," shared Julie Swann, ISE department head. "The hard work by previous heads, such as Jim Wilson, contributed to the many Fellows recognized in the department.

I am delighted to recognize Dr. Julie Ivy as our newest IISE Fellow, with complements her recognition as an INFORMS Fellow and the inaugural class of the MIF Fellows."

The IISE Fellow Award is the highest rank a member can achieve and recognizes outstanding leaders who have made significant, nationally-recognized contributions to the industrial and systems engineering field. Ivy has had an extraordinary impact on education through her work with the health certificate program and the Master of Engineering Management program.

"She is well-known for her extensive work mentoring undergraduate students, graduate students and faculty, especially women and people from under-represented communities," confided Swann. "Her level of research and funding remains high, and she collaborates with government, companies and non-profits to impact society in areas such as improved health systems and food aid while capturing the impact on cost, outcomes and inequities."

Although she has received these awards lately, some believe they needed to come sooner. "This recognition is long overdue, including Dr. Ivy's work at NC State and her impact on IISE and the associated Society for Health Systems, where she has been the faculty advisor for many years," said Swann. "Dr. Ivy is a faculty treasure!" ■

AN UPDATE ON JULIE IVY

After reading about all that Ivy has achieved throughout her career so far, it should not be surprising that she was selected as the new chair of the Department of Industrial and Operations Engineering (IOE) at the University of Michigan. She succeeded Brian Denton, who was also an ISE faculty member at NC State before moving to Michigan. Ivy earned her BS and Ph.D. in Industrial and Operations Engineering and was a Ross School of Business faculty member at Michigan.

Everyone in the ISE Department would like to thank Ivy for her hard work and dedication to the department, the College and NC State University since 2007. But a special thanks for her commitment to her many, many students. Thank you, Julie and good luck.

ISE "SEEN"

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

ISE celebrated Valentines Day by hosting a cookies and coffee celebration with staff, students and faculty.



ISE director of undergraduate programs Kanton Reynolds led a team of students to Rwanda to install solar panels at a primary school in Rwanda.

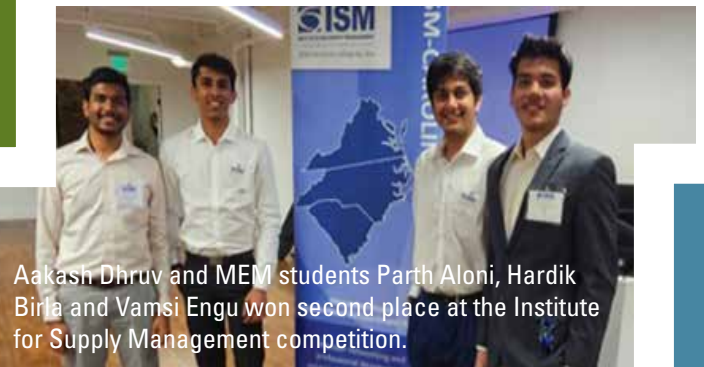


ISE graduate student Jessica Bryant showed summer camp students some 3D printers and CNC machines



@ncstateise
on
Instagram

Yiwei Zhang defends her dissertation in front of her committee which included department head Julie Swahn and OR director Maria Mayorga.



Aakash Dhruv and MEM students Parth Aloni, Hardik Birla and Vamsi Engu won second place at the Institute for Supply Management competition.

See
ncstate
on
YouTube

Students Ben Stonefield, Devpradnya Kadam and Nisarg Shah represented the MEM program at NC State's Pack-a-Palooza this fall.



Distinguished Chair in Operations Research Maria Mayorga hugged retired Edgar Woolard Distinguished Professor Julie Ivy at the ISE 2023 transition party.



Polish Deputy Ambassador Adam Krzywosdzki tour Fitts-Woolard Hall with Brandon McConnell (MEM director), Julie Swann (department head) and Wanda Urbanska (development director).

Search **ncstateise** on Facebook

ISE summer campers pose together with their summer camp certificates.



Search **ncstateise** on YouTube

Jack Bolton, first year ISE student and Park Scholar, wants to apply his problem-solving mindset to industrial engineering.



As fall 2023 kicks off the ISE Department hosts a meet and greet for all returning students to talk about their summers.

GRADUATE | ZIYANG XIE

STUDENT SPOTLIGHT

Ph.D. student Ziyang Xie knew precisely when his passion for engineering began. At the age of five. With toy cars. "I discovered that my fascination lay not only in racing them but also in assembling and modifying them," recalled Xie. "Also, it didn't take long for me to learn how to replace engines and make modifications." This passion for understanding how things worked and how to improve them would take him halfway around the world to study industrial engineering.

After receiving his BS in Automotive Engineering from Xi'an Jiaotong University in Xi'an, Shaanxi, China, Xie Being wanted to attend grad school because it allowed him to learn, understand and create new methods for improving safety and productivity. He knew he wanted to come to the United States but had a limited understanding of the universities in America. "When I got offers, I started to research each university," said Xie. "NC State was the most cost-efficient, creative and well-reviewed university, so I chose to be here. Of course, I have never doubted this decision in the last five years."

Xie believes the future holds great potential for an industrial revolution powered by artificial intelligence (AI). He also thinks the ISE Department and NC State are at this exciting field's forefront. "When I first met with my advisor, Dr. Xu [ISE associate professor], he shared his innovative ideas about using AI to enhance driving and occupational safety," explained Xie. "I was truly impressed by these ideas and made the decision to work closely with him." Since beginning his research, he has discovered several other advantages of the ISE Department, including the machine learning expertise of the faculty and the outstanding IT support that allows him to focus on his AI work without getting blocked by technical difficulties. "Justin ensures that we have a smooth experience by resolving any issues or bugs that may arise within our internal systems," he said.

What does the future hold for Xie? Since graduating in the spring, he has explored 22 different states. He also works as a machine learning engineer at Nextdoor, where his goal is to leverage his AI knowledge to enhance community communication and safety on a global scale. He realizes that these opportunities and many more are due in part to the ISE Department. "I sincerely appreciate the opportunity ISE offered me, which changed my life," confided Xie. "I greatly appreciate Dr. Xu and my committee members, who patiently answered my questions. Lastly, thank you, all my friends! Go Pack!" ■

ROCKET-POWERED SEEDS

Deforestation can devastate the environment and the people who live there. Land degradation, erosion and flooding are some of the long-term effects of removing a forest. These areas need to be reforested as quickly as possible to minimize their damage, but it's dangerous for people to traverse the devastated landscape and sow new trees. What if they could do it from afar? Master of Integrated Manufacturing and Systems Engineering (MIMSE) student and SMART Scholar Spencer Lee found himself thinking of the situation with a friend. "How funny would it be if there was a seed mortar" is the sentence that sparked the idea of spreading seeds via rockets. This idea works like a real mortar, but instead of being filled with gunpowder, the rocket is filled with seeds to regrow a forest. People never have to enter the defrosted area or be exposed to the environment's dangers.

DEVELOPING THE IDEA

The idea of using rockets for seeds came long before the IMSE Program. After discussing the loose idea with a friend, which was more of a joke than anything serious, the idea stayed with him. "During my undergrad, I proposed it to a few faculty, but none were interested enough to pursue it, so the idea went on the shelf," he recalled.

However, the idea became a real opportunity once Lee was at NC State. He explained, "Once I was at NC State, in Ola Harrysson's class, and he mentioned a class project involving 3D printing and additive manufacturing, I thought what better chance to propose

the project again. Everyone was on-board, and off we went."

The project not only drew interest from IMSEI but from the Industrial and Systems Engineering Department, students and faculty of all kinds. Not only were people interested in becoming rocket scientists, they were in awe of how a simple product could solve a huge problem. "Basically, it's like a Tee-shirt cannon you would see at a game," Lee explained, "The big difference is that instead of putting an object inside of a tube then launching with compressed CO₂, we put 3D printed rocket-shaped housings over a small tube then launched using compressed air." The goal was to produce a bio-safe/degradable 'carrying' mechanism to deliver multiple seed pods into deforested areas to protect people from dangerous landscapes.

"I'd love to see it widely used by forestry services worldwide," Lee shared. "It is simple, and I feel it could be useful and productive with additional testing." He plans to continue pursuing the idea and working towards a final product, hoping it becomes more than just a semester project. At the DoD, Lee believes this project shows his creative problem-solving and initiative to do more than just what is required. "Plus, I think they will see it and think, 'Well, that is really cool!'" he said. ■



Watch Lee launch his test rocket
go.ncsu.edu/rocketseeds

MAYORGA NAMED OR DIRECTOR

After a national search, Maria Mayorga—who has served as the interim director since 2022, has been selected as the Director of the Operations Research (OR) Program. “Maria has done an excellent job serving as Interim OR Director in 2022-2023 and we appreciate the many new and creative efforts that she has implemented that have already enhanced the program for its students and affiliated faculty,” said Louis Martin-Vega, the former College of Engineering Dean. Martin-Vega was one of three deans that approved the appointment, along with John Blondin (College of Sciences) and Frank Buckless (Poole College of Management). “Please

join us in congratulating Maria on her permanent appointment to this important leadership role as we look forward to it becoming one of the premier OR programs nationwide,” said Martin-Vega.

The deans would also like to thank the OR Program Director Search Committee members, professors Julie Swann, Alina Chertock, Julie Ivy, Len Stefanski, and Sebastian Heese, for their willingness to serve in this role and their dedication and commitment to this vital endeavor. ■



KEEPING PEOPLE OFF THE GRID

A hack into the U.S. energy infrastructure could mean widespread shutdowns of the power system, causing turmoil in our hospital systems, police departments, banks, gas stations and military bases. The question is: how can we protect our power grid? Verónica Díaz Pacheco, an Operations Research (OR) graduate student, has been selected as a fellow for the New Frontiers Graduate Initiative for her research on answering that exact question.

Díaz Pacheco’s research uses an optimization model to make large-scale power systems more resilient. “I’m hoping we will gain insight to

help design power systems that are robust against cyberattacks and similar disruptions.” Díaz Pacheco elaborated. Her research is not only impressive, but it is also thorough and relevant. “NSF Awards are quite competitive and prestigious. Awards like this speak to the quality of OR students,” Maria Mayorga, interim director of the OR Graduate Program, remarked. “Applicants from all disciplines are eligible to apply, meaning that Verónica did not only compete with other OR students but students from any computational discipline!”

When asked to advise students interested in pursuing research,

Díaz Pacheco said, “Persevere when facing deterrents and be bold with pursuing and taking on new opportunities – in the end, anything that doesn’t work out can become a learning experience.” This same perseverance and boldness are how she has received this incredible honor and made groundbreaking strides in her research. To Díaz Pacheco, this honor is momentous. “It means I have people supporting me, and I feel grateful for that and this amazing opportunity to pursue meaningful research,” she reflected. Her research is not only meaningful but crucial for the protection of America’s energy infrastructure. ■



UNDERGRADUATE STUDENT SPOTLIGHT CATHERINE RECKARD

In her senior year of high school, ISE senior Catherine Reckard had never considered an engineering career. Like many high schoolers, she viewed engineering as building bridges, designing car engines or constructing circuit boards. But when her AP Calculus teacher shared that he thought she would enjoy engineering, Reckard realized that she had always loved math and creative problem-solving. So she looked into engineering with the hopes of finding some opportunities.

Armed with her preconceived ideas about what engineers do, Reckard attended NC State's Spring Engineering Open House and learned two important things. One is that the people in the College of Engineering are much friendlier than other universities she had visited. "I remember being drawn to the sense of community," Reckard recalled. Second, engineers do much more than bridges, cars and circuit boards. "At this open house, I learned about industrial and systems engineering, which especially piqued my interest," she said. "I heard it described as 'people-oriented engineering.'"

Reckard always knew she loved working with people and performing work that directly impacted and helped others. At that point, she was considering a career in occupational therapy and was drawn to the Health Systems Certificate Program. "I began to see ISE as an opportunity to combine my passions for healthcare, creative problem-solving, collaboration and math," she explained.

After earning her healthcare certificate and graduating this spring, Reckard stayed one more semester to pick up her Master of Industrial Engineering through the Accelerated Bachelors/Masters Program. After graduation, she hopes to move to Charlotte and begin working in healthcare process improvement at a hospital or within healthcare consulting.

"I hope to work part-time for a few months after graduation to have a small break before going full-time, take some seminary classes, and spend extra time with friends and family," confided Reckard. ■



4 Reasons YOU

“I already paid you what I owe.”

Yes. We understand that you may still have student loans or other forms of debt and are not in a place to support the Department financially. That’s why we created the FREE ISE Alumni Engagement Program (go.ncsu.edu/alumni-resources), which offers non-monetary ways to give back.

Volunteering is one of the most significant ways to impact a student’s experience. Sharing your expertise and wisdom to help prepare them for their careers is an invaluable resource. We offer one-time events and ongoing programs to fit your commitment level better. This help can be reviewing resumes, running mock interviews, speaking to students in class, offering internships and co-ops and giving industry tours. These enrich the students’ experience and prepare them for the future.

We would never want your volunteerism to cause you hardship. To see all the different ways you can share your expertise and wisdom and get answers to your most common volunteering questions on our volunteering page (go.ncsu.edu/ISEvolunteer).

Don't Engage

“What are you doing for me?”

Fair question. We understand that the typical alumnus-university relationship can be somewhat one-sided. We want to change that by offering you career and educational resources to help you further your career.

The first resource, Ask the Pack (ask.ncsu.edu/ask-the-pack), allows you to ask a network of 250,000 fellow NC State alum anything to help with your academic or professional development. Ask the Pack will connect you with the best person to help you with advice and introductions.

The second resource is the private ISE/OR/IMSEI/MEM Alumni Group on LinkedIn. With over 1375 members currently, it is an excellent resource for networking with your fellow alums, asking questions and finding job postings—both the Department and alumni post jobs in the group. ISE, OR, IMSEI and MEM alums, students, and faculty are encouraged to join the group by going to [linkedin.com/groups/8285397/](https://www.linkedin.com/groups/8285397/) and clicking on the JOIN button.

There are also resources available that you can explore on our website (ise.ncsu.edu/engagement/resources/). We offer multiple webinars and podcasts for career advice that cover various subjects, from financial planning and retirement to leadership skills training. Our collection of certification and professional learning opportunities is another way to advance career and educational goals. Additionally, you may recall that access to the NC State Library was a great resource during your campus experience. NC State's Friends of the Library program gives you online access and borrowing privileges. Even if you are not a North Carolina resident, every US state has a similar program to offer its residents access to a broad range of digital resources. We have collected all their information in one spot to use easily.

“You only call when you want money.”

Agreed. We don't want you to feel like you are being solicited. We would never want your support of the Department to cause you hardship. Even when the University asks for help, we know that volunteering your time and sharing your experiences are just as important as financial gifts.

We also understand our alums and friends give what they can. Your time and resources are valuable, and your drive to make a difference in a student's life is greatly appreciated. Again, we offer many ways to give back, like flexible, one-time events, including volunteering your time through class presentations, panels and lectures. Dedicating a day to being a judge at ISE Senior Design Day is another way to give a small amount of your time. If you enjoy long-term projects, we have an Alumni-Student Mentoring Program or become a senior design sponsor. See more at (go.ncsu.edu/ISEvolunteer).

“I don't know where my money is going.”

We can relate. Nobody wants to feel like their hard-earned money is going into some vast fund and spent on who knows what.

All gifts to the Department allow our students and faculty to fulfill their dreams and positively impact their lives. Your gift can support scholarships, fellowships, professorships, academic programs and faculty research. Your generosity empowers ISE to achieve excellence in our research, teaching and public engagement mission. There are more than eight distinct funds you can contribute to directly.

Specifically, The ISE Enhancement Fund addresses one of the Department's greatest needs, discretionary support. Every year we face the challenge of uncertain and shifting resources. Additionally, unexpected opportunities arise that require swift action. Discretionary funds allow the department head to respond quickly to these opportunities and challenges. Over the last few years, these funds have supported: senior design projects, awards recognition for students, new courses and programs, and more. Plus, you can always tell us where you want your donation to go. Not sure how you want to help? Contact Wanda Urbanska (wmurbans@ncsu.edu or 919.515.9976), and she will be happy to guide you through the process.

Have we given you enough good reasons to engage with your program?

www.ise.ncsu.edu/ise-volunteerism-form-nc-state-ise/



Math, Mischief and Medium-Sized Holes

NC State ISE

12.7M views · 5 months ago

YouTube sensations Rhett McLaughlin and Link Neal, collectively known as Rhett & Link, are among NC State College of Engineering’s most celebrated graduates. Their YouTube channels has over 23 million subscribers with an estimated 1 billion views a month. The duo met in first grade at Buies Creek Elementary School in Harnett County, North Carolina. They went to high school together, college together, quit their engineering jobs together and started their show business careers together. So it would be only fitting to have these legendary YouTubers

take the podium to deliver their commencement speech together. Right?

Well, actually, it didn’t work out that way. Each gave a speech to his department— Rhett for Civil, Construction and Environmental Engineering (CCEE), and Link’s for ISE.

They purposely did not attend each other’s ceremony. In fact,

they didn’t even discuss what they would talk about before the event.

They did this for a specific reason which we will explain later.

Rhett and Link began their busy day on campus with their commencement addresses. First up was Link, who entertained the

crowd with the tale of Elk Hound Snugglebaby, the DJ whose name

“Err on the side of action over certainty.”

Link Neal





Link Neal (shown here demonstrating how long his sandwich was at dinner last night) regales the graduation audience with the tale of Elk Hound Snugglebaby. A DJ whose name was both unforgettable and hard to remember.

was both unforgettable and hard to remember. Elk Hound Snugglebaby had landed his first gig in front of a large crowd, and things didn't go as planned. At the end of the story, it was revealed that Elk Hound Snugglebaby was, in fact, none other than Link Neal himself.

But dealing with failure wasn't the moral of this story. It was that Elk Hound had taken a chance and tried something new rather than playing it safe and not doing anything. Or, in Link's words, "Err on the side of action over certainty." He pointed out that when he was sitting right

where the graduates were sitting, only 22 years earlier in 2001, the platform that launched his highly successful internet career had yet to be invented. Link ended his speech with a unique rendition of Tom Petty's classic song, Time to Move On, that included a transition into Snoop Dogg's Drop It Like It's Hot that only a professional DJ could have pulled off.

THE INTERVIEW

While Rhett was delivering his commencement address, Link sat down with ISE department head Julie Swann to record a video



Link Neal's Commencement Speech

NC State ISE

13.2M views • 5 months ago



Link is Forced to do MATH!!!

NC State ISE

14.6M views • 5 months ago



Rhett & Link Tour Fitts-Woolard Hall

NC State ISE

12.2M views • 5 months ago



Rhett & Link Explore the VR CAVE

NC State ISE

14.1M views • 5 months ago

ranging over a number of topics, including Link’s mathematical abilities, how he used his industrial engineering skills to become a YouTube legend, and ultimately dig

and was much more complicated than the first two. After some clarifications, negotiations, a few hints and even rotating his answer 180 degrees, Link solved the problem and was allowed to “keep” his ISE degree.

gauntlet of rapid-fire questions, including such no-nonsense, hard-hitting inquiries as—what is your favorite word? least favorite word? favorite sound? is there something Rhett does better than you? If you want to have a good laugh while exploring the funny side of industrial engineering, go to the link (okay, this time, the pun is totally intended) on page 21.



Link Neal proving that he can still do Math

a medium-sized hole. The interview ended with Link submitting himself to a series of rapid-fire questions. There will be a link (no pun intended) to all these videos and Link’s commencement address on page 21.

SPOILERS
 We will be describing what happened in the videos. If you haven’t seen them yet and don’t want to be spoiled, watch them now.

ISE alums can relax because Link solved all three of the math problems Swann gave him. The first was a simple equation involving fractions that Link handled without breaking a sweat. The second put Link’s math and artistic abilities to the test. He was asked to draw a “normal distribution curve,” which he did with his eyes closed, literally. The third and final question involved row and column vectors

With the math safely in the rearview mirror, the conversation turned to their shared love of process refinement. Link shared a hilarious story about attempting to use his industrial engineering knowledge to “fix” a long, inefficient concession stand line at a concert. The results were “mixed” at best. They wrapped up the process conversation by discussing Rhett & Link’s We Dug a Medium-Sized Hole video. This is where they had to drive 90 minutes outside of town to demonstrate, in hilarious detail, the proper process for digging a medium-sized hole. There was even a musical number, We’re Digging a Hole.

The final part of the interview involved running Link through a

THE TOUR

After their speeches and interviews, Rhett & Link were treated to a tour of the newest engineering building on campus, Fitts-Woolard Hall, which houses both departments and the dean’s office. They arrived on the second floor after visiting the 360-degree Driving Simulator Lab on the first floor. They saw ISE associate professor Karen Chen’s Virtual and Augmented Reality Lab, where they



Rhett & Link in the floating 360 degree driving simulator





Rhett & Link inside the VR CAVE where they have been scaled down to the size of a bird

got to experience the VR CAVE. Next was associate professor Xu Xu's Biomechanics Lab, where they picked up virtual boxes and put them on a virtual shelf. Finally,



Rhett & Link check out a 3D-printed custom wolfpack guitar made in the CAMAL Lab

stopping in on distinguished professor Ola Harrysson's Center for Additive Manufacturing and Logistics Center, where they watched a demonstration of the world-class 3D printers. On the third floor, they entered Civil's Transportation Control and Sensors Lab, where they took a few hot laps around the track on the floor using ISE assistant professor Leila Hajibabai's segways.

Their day ended with a reception in their honor held at The GARAGE

across the street from Fitts-Woolard Hall in the Partners I Building. Here they got to hang out, sign autographs and take pictures with the faculty, staff, students and friends of

both departments.

THE PODCAST

As teased earlier in the article, Rhett & Link purposely did not discuss their speeches with each other before the event and did not attend each other's speeches. The reason. So they could watch them together, for the first time, on their podcast, Ear Biscuits, to explore how each person handled the assignment of delivering a speech and what was the theme of those speeches.

With their trademark blend of humor and insight, the two internet icons shared their speech writing process, writing schedule and the emotional rollercoaster that both caused. As they watched each video, they shared a behind-the-scenes look into what landed with the audiences and what was running through their minds as they gave the speech.

By weaving together their personal narratives and the insights gleaned over the years, Rhett & Link demonstrated that growth is a continuous journey, and the

wisdom accumulated along the way deserves to be acknowledged, questioned and embraced. ■



Rhett & Link in the Biomechanics Lab with Rhett lifting a virtual box



Rhett, Jacqueline Gibson (CCEE), Julie Swann (ISE) and Link showing off their best Wolfies



WATCH THE VIDEOS

Link's Interview with Julie Swann
go.ncsu.edu/LINKSinterview

Link's Commencement Speech
go.ncsu.edu/LINKSpeech

RWANDA BOUND

Kanton Reynolds, ISE Director of Undergraduate Programs, led a group of students that included three ISE students to Rwanda to put their industrial engineering skills to work in the classroom and the community.



As a graduate student, Kanton Reynolds, ISE Director of Undergraduate Programs, realized the transformative power of international education and wanted to provide the same opportunities to ISE students. This summer, he led a group of students that included three ISE students, Catherine Reckard, Daniela Santibanez and Gracie Suggs, to Rwanda to complete community service projects. This trip allowed them to put their industrial engineering skills to work in the classroom and the community.

Upon arrival to Rwanda, the team joined up with five local college students from a partner institution, the Institute for Natural Sciences (INES). These students helped with translation while the team was in the classrooms. They also spent much of the free time showing them their favorite activities and taking them to their homes. Both groups collaborated on two critical projects—one involved using virtual reality to refine their curricular activities, and the other was the Umuganda Community Service Project. This assignment was a community service tradition in Rwanda. One household member must sign up to help with a specific community service activity on the last Saturday of each month.

The group repaired and cleaned the area where an illegal mining operation had devastated the landscape in Musanze. "The best part of that experience was seeing the thousands of people who came to help with this project," recalled Santibanez. "This was the first time I had seen such a

large group of people coming together with a similar goal and passion for the same thing." Reynolds believed this experience was impactful beyond what they could learn in a strictly classroom environment.

Catherine Reckard

In the fall of 2022, Catherine Reckard took Reynolds's Diversity and Social Justice in Engineering Education class, where Reynolds spoke about the trip regularly. "I had always wanted to study abroad while in college," shared Reckard. "So this is the perfect opportunity to study abroad while still being able to complete my summer internship."

Having known little about Rwanda before she arrived, Reckard learned much about the history and culture of the country. "I also learned the importance of culturally and socially relevant educational practices and tools for prioritizing that in lesson planning," she recalled. At the local high school, Reckard performed research related to her previous virtual reality-based work with ISE associate professor Karen Chen. "I was able to apply the skills I gained from my REU experience, in addition to teaching the students problem-solving and critical thinking skills." For many local students, this was the first time they had experienced virtual reality. "It was fun to hear their remarks of excitement and fascination," Reckard said.

Reflecting on her experience, she appreciated her relationships with the local university students and participated in many aspects of



Rwandan culture. "I loved being able to walk to most places and being surrounded by such a beautiful landscape," she confided.

Daniela Santibanez

Going into her senior year, Daniela Santibanez knew the engineering education aspect of the study abroad program was an opportunity she wanted to seize. "As a first-generation student, I've always been passionate about exposing and encouraging others to STEM opportunities," confided Santibanez. "So this is a great way to aid in that goal."

On the surface, the engineering education project didn't seem to be ISE-related to Santibanez. However, she quickly discovered that education is its own system, and ISEs identify straightforward ways to improve systems. So, she collected feedback from students, teachers and her professors to ensure changes to the lesson plans targeted the right goals. "Essentially, continuously making small improvements for an overall better system," She said. "A core ISE method."

Santibanez was pleasantly surprised by the level of understanding that the students already had for core STEM topics. However, they struggled to apply these subjects to real-world situations or experiments because they lacked resources. "In teaching our classes, the most impactful aspect was seeing the interest and excitement from students after they realized they had achieved the goals of their projects," shared Santibanez. One goal she achieved was to distill complicated concepts

into meaningful interactions for the students. To do so, she had to learn how to collaborate across disciplines to achieve a common goal.

Gracie Suggs

Knowing that she always wanted to study abroad, Gracie Suggs chose the Rwanda trip because she loved visiting local schools and interacting with the students and teachers. "I felt like this was a different experience than typical study abroad trips," recalled Suggs. "I also wanted to learn about a culture I knew little about before."

Although serving the local community was the trip's goal, the friendships she made had the most significant impact. "I developed such a strong relationship with the INES students, and I was able to learn so much about culture and life in Rwanda," confided Suggs. "I still keep in contact with many of these students now."

She not only formed strong bonds with her fellow students but also with the students and teachers at the boarding schools. "This was an amazing experience because I spent time interacting with the students and teaching them about a subject I was passionate about," she said. The team talked with the students about educational opportunities in the United States, such as various scholarships they could obtain and ways they could come to NC State. "We hoped to encourage some of these students to try for scholarships to NC State so they can use that education to make a positive impact in Rwanda."

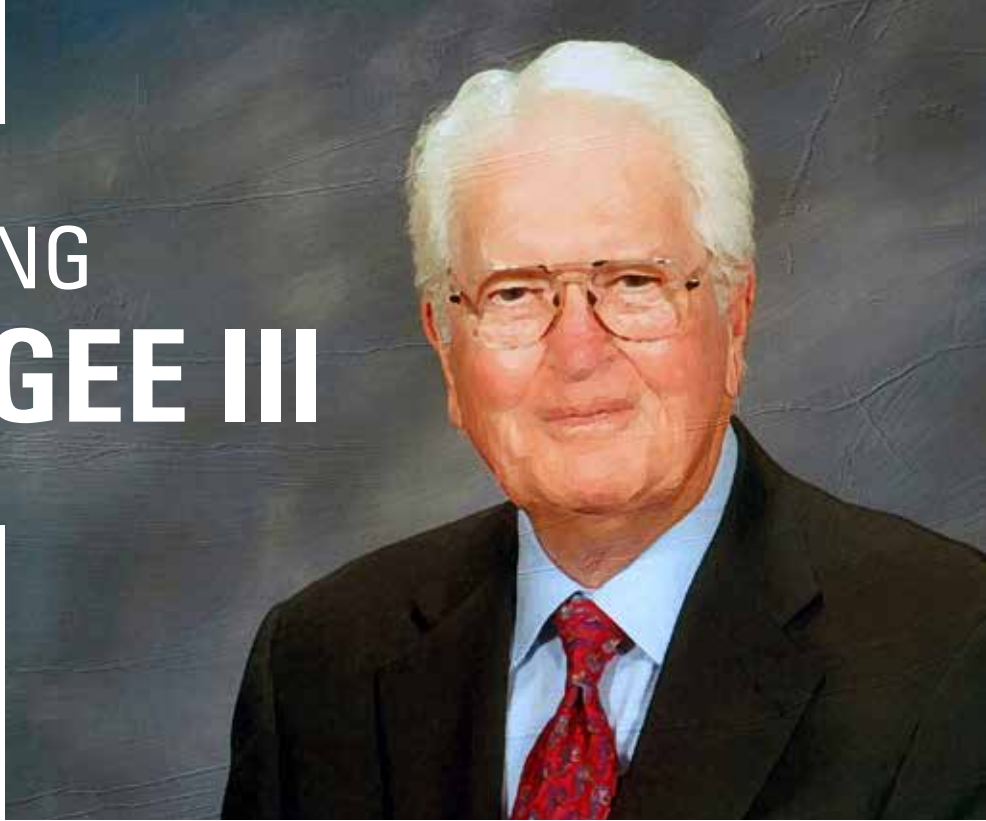
Embracing Adaptability

An excellent trait to possess when traveling abroad is adaptability. This quality is also fantastic for any successful engineer. "I am continually amazed by the ability of our students to adapt to the prevailing circumstances once they immerse themselves in the experience," shared Reynolds. "They realized they don't have to become engineering educators to get something tangible out of the course that can assist them in other areas of their future careers."

If this sounds like a student adventure you want to experience and collect a few course credits along the way, Reynolds is already planning a return trip next summer. "We will be teaching a second course (Ethics for Engineering Education) on this study abroad program for a total of six credit hours," he said. "ISE students can continue to use the Field Experiences course as a technical elective but will also be able to satisfy their Ethics requirement with the newly added course."

The program hopes to partner with the University of Rwanda. It has the support of three NC State alums who will be Fulbright Scholars in Rwanda this coming year, including Meriem Laroussi, who just finished the ISE Master's Program and was co-lead for the Rwanda ASB in March and Amy Isvik, a Ph.D. student in Computer Science who was a part of the inaugural Study Abroad Program to Rwanda last summer. ■

REMEMBERING V.B. LOUGEE III



Virginius Bryan “V.B.” Lougee III, ISE Distinguished Alumnus—Class of 2007—passed away on February 10th, 2023. He had a long and successful career at the American Tobacco Company (ATC), where he started after graduating from NC State. Lougee was known for his infectious humor that inspired smiles and laughter. “Over multiple conversations, I was immediately drawn to Mr. Lougee’s kind heart, love for his alma mater, for ISE and for helping students find their way to our department,” recalled Wanda Urbanska, ISE’s director of development. “Dad was very proud of his NC State degree,” recalled Carol Danforth, Lougee’s daughter. “Dad was born to be an engineer. His military service probably helped him know this. He was a problem-solver and a creative planner.”

Lougee was born in Durham, NC, and attended Durham High School. After graduation, he enlisted in the U.S. Navy. He served during World War II as a machinist mate 3rd class on the destroyer Norman Scott in the Pacific arena. Following the war, Lougee enrolled at NC State College, where he would meet and marry Dorothy (Dot) Leonard Lougee, a Watts Hospital School of Nursing graduate in Durham. “He happened to attend college at a unique time when so many men were returning from military service,” shared Danforth. In 1951, he earned his degree in industrial engineering. By this time, the Lougees had a two-year-old daughter, Carol, and later had a son, Brent. “His last year at State, he,

my mom, and I lived in Verville, newly created housing for students with families,” said Danforth. “They formed lasting friendships with other young families of returning servicemen.”

After graduation, Lougee began working at the American Tobacco Company. He started as an assistant foreman, was promoted to foreman then became the master mechanic for the ATC in Durham. In 1969, he transferred to the company’s research and development department in Richmond, VA and by 1973, he became R&D Director. In June of 1976, they moved to Darien, CT, so Lougee could take on new responsibilities. In just two years, he became the President and COO of ATC. In 1981 he became President and COO of the parent company, American Brands (currently Fortune Brands), where he would remain until his retirement in 1988. Throughout Lougee’s career, he served on the boards of many companies and was a member of the Chancellor’s Circle at NC State.

During his 34-year retirement, He and Dot enjoyed visits with their children and grandchildren and vacations at Hilton Head. Lougee was an avid golfer

and woodworker and loved to garden. In 2006, they moved to Bermuda Run, NC—outside Winston-Salem—to be closer to their family. When Dot passed away in 2014, V.B. continued to stay active, attending many events like the symphony, sporting events, concerts and UNC School of the Arts events. But family visits and holiday gatherings were always his favorites.

“It amazed me at how professional and plugged in he was despite his advanced age,” shared Urbanska. “He always returned my calls promptly and we had wonderful conversations about his well-lived life. When I heard from his daughter Carol about his passing, I went right for the tissues.” Lougee will be remembered as someone who was drawn to all people. He was interested in their work, their families, and their hobbies. “He was happy to support educational programs that will allow young people to begin their careers, make a living, and progress professionally,” shared Danforth. “He also had an appreciation for teamwork. Dad valued the expertise and contributions of every member of a working team and carried this through his retirement and his family life.” ■

ADVISORY BOARD 2023

Board Chair's Notes - October 2023

Change is upon us again as we say thank you to Stuart Nisbet for his leadership, and I assume the chair role of the Advisory Board. We also give a big thanks to our departing members and welcome new members to the Board. We seek to keep a relevant mix of experience and diversity in our board membership to help Dr. Swann maintain and improve the quality of the ISE program we all expect at NC State.

I am a fan of embracing change. It goes back to the core of my industrial engineering education. "Change" is all around us and I believe the ISE skills we learned in the program help us in many facets of our work and personal life. We have been called many things, change engineers, productivity engineers, efficiency experts, logistics experts, production managers, manufacturing engineers, presidents and CEOs.

"Change" today in the workplace, in education and in society seems to be speeding up day by day. The impact of artificial intelligence, process digitization, advanced manufacturing, climate change/risk, changes in global supply chains and others lead to complex problems that require the breadth of the ISE competencies to address. This is a time of opportunity for ISEs!

At NC State, I believe the department is taking key steps to maintain a highly sought-after program. The fantastic facility we now have at Fitts-Woolard Hall, the Center for Additive Manufacturing and Logistics, and the degrees offered, including the interdisciplinary programs and degrees, put NC State in a position of strength. We have expanded offerings and added to our outstanding faculty recently to build on our advantages, such as evidenced by the Masters in Engineering Management and adding sustainability expertise. Thanks to many of you for your philanthropic support. ISE alums have vital skills to contribute to our changing world, societies and enterprises positively. All ISE alums have relevant experience to share with students and faculty. I encourage active engagement with the department and students to ensure NC State ISE remains one of the top ISE schools in the country. The Board and the Department appreciate your support.

GO PACK!

Jeff Johnson, BSIE 1978



Jeffrey Johnson
BSIE, NC State 1978
ISE Distinguished Alumni 2017
Owner of JWW Energy

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 meets each semester.



Tony Blevins
BSIE, NC State 1989
ISE Distinguished Alumni 2018



Neil Brittain
BSIE, NC State 1994
Senior Director, Human Resources at Gilead Sciences



Damon Butler
BSIE, NC State 2002
President at Triangle Blvd
President at Intelligency



Tracy Doaks
BSIE, NC State 1995
ISE Distinguished Alumni 2016
President and CEO of MCNC



Candance Gingles
BSIE, NC State 1987
Director of Quality Engineering at Pfizer



Paul Griffin
Ph.D. IE, Texas A&M
Director of the Substance Use and Addiction Consortium



Tao Hong
Ph.D., NC State 2010
ISE Outstanding Young Alumni 2022
Distinguished Professor, UNCC



Angela Lanning
BSIE, NC State 1992
COO, Premier's Informatics and Technology Services Group



Tim McMahon
BSIE, NC State 1986
Managing Director, Accenture



Patrick Murray
BSIE, NC State 1988
Director, Global Consumer Sales Development, Intel Corporation (Retired)



Stuart Nisbet
BSCSC, NC State 1987
Chief Data Scientist at Cadient Talent



David Parker
MSM, NC State 1996
Co-founder and CEO of Dexios
Co-founder and CEO of ServeMore



Devon Person
BSIE, NC State 2010
ISE Outstanding Young Alumni 2021
VP of Supply Chain at Hanesbrand



Juli Trexler
BSIE, NC State 1997
ISE Distinguished Alumni 2017
VP, Global Business Partner Channel Sales at IBM

AWARDS and HON



PAUL COHEN

PAUL COHEN, Distinguished Professor Emeritus, received an Outstanding Engagement Award and Economic Development Partnership Award from NC State.



BRANDON MCCONNELL

BRANDON MCCONNELL, MEM director and assistant research professor, received an Outstanding Engagement Award from NC State.



CLAUDIA ALVAREZ ESPINO

CLAUDIA ALVAREZ ESPINO, ISE graduate student, received the Graduate Research Award from the Institute of Industrial and Systems Engineers.

AMIR HOSSEIN SADEGHI, ISE grad student, received the Drs. Biles, Parsaei, Zaloom Scholarship from IISE. Alumni donations helped fund the student membership required as a precursor for nomination.



AMIR HOSSEIN SADEGHI

JUNE TOBIN, ISE junior, received the Harold and Inge Marcus Scholarship from IISE. Alumni donations from this year's Day of Giving helped fund her student membership which made her eligible for nomination.



JUNE TOBIN

PAVEL "PASHA" KOPROV, ISE graduate student, received the Gilbreth Memorial Scholarship from IISE. Alumni donations helped fund the student membership required as a precursor for nomination.



PAVEL "PASHA" KOPROV



DANIELLE LEWIS

DANIELLE LEWIS, ISE senior, received the IISE Fellows Scholarship from IISE.

MARIA MAYORGA, Distinguished Chair in Operations Research and ISE professor, was inducted into the Research Leadership Academy at NC State University.

IORS



JULIE SWANN

JULIE SWANN, A. Doug Allison Distinguished Professor and department head, was elected president-elect of INFORMS, the largest association for the decision and data sciences. She will serve as president of INFORMS in 2024.



EMILY FANG

EMILY FANG, ISE undergrad, received the Student of the Year Award from the Applied Ergonomics Conference.

ARDRA PREMKUMAR, and **MALAVIKA REDDY KOLAGATLA** MEM graduate students, received the Best Engineering Management Project Presentation (People's Choice) Award from the MEM Program in the fall of 2022 and spring of 2023 respectively. **KEENAN SMITH**, and **MEGA VISWANATHAN**, MEM graduate students, received the Best Engineering Management Project Presentation Awards at that same time.



ANDRA PREMKUMAR



MALAVIKA REDDY KOLAGATLA



KEENAN SMITH



MEGA VISWANATHAN

OLA HARRYSSON, Edward P. Fitts Distinguished Professor, was inducted into the Research Leadership Academy at NC State University. Harrysson also received the 2023 Alumni Association Outstanding Research Award from NC State.

SARA SHASHAANI, associate professor, received the Modeling and Simulation Division Annual Teaching Award from IISE. She also received the Alumna of the Year Award from her alma mater Southern Cross University.



MARIA MAYORGA



OLA HARRYSSON



SARA SHASHAANI

“Teach a Person to Fish ...

...and you feed them for a lifetime” is the last line of a proverb most of us know. The key principle here is that long-term benefits outweigh short-term gains when teaching people how to do something themselves. This philosophy underlies and informs the new ISE Worldwide Societal Impact Endowment. Anonymous donors recently created the endowment to fulfill their desire to improve the world by adding industrial engineering process thinking and supply chain improvements in health and humanitarian work globally.

The fund—which ISE finalized at the end of 2022—has already begun its work, focusing on water-quality issues.

“The donors have made a positive transformational commitment to our work in the health and humanitarian space for our department,” said Julie Swann, A. Doug Allison Distinguished Professor and ISE Department Head.

“These two visionary philanthropists are earnest in their desire to help pioneer and implement systems that make positive impacts on human health and well-being, especially in Third World countries and among disadvantaged populations,” said ISE Director of Development Wanda Urbanska. Starting in 2023,

the endowment supported the Greater Good Initiative.

The Greater Good Initiative

The ISE Department launched the Greater Good Initiative to promote collaborations between academic institutions, non-profit organizations and the private sector to tackle complex social and environmental issues.

This spring, ISE collaborated with the Civil Engineering Department and the Water Sanitation Hygiene (WASH) Cluster to create a water-related seminar series. Greater Good has also begun a water research collaboration with Denmark’s Aarhus University, including international travel between the universities and partnerships with faculty and students.

The new ISE Worldwide Societal Impact Endowment will support high-impact experiential learning opportunities for students, including research that shows the impact of school interventions on the spread of diseases, senior design capstone projects related to water, and a humanitarian logistics class (ISE 513) that studies the impact of water disasters.

The program also seeks to create outreach and engagement programs



that extend to the broader community, such as field trips for students to water sanitation and treatment plants in Raleigh and Cary, NC, humanitarian logistics presentations for high school students at summer camps and an internship for a student at a non-profit organization related to water and health.

The new endowment aims to inspire the next generation of leaders and change-makers, equipping them with the tools and experiences they need to impact the world positively, in other words, teaching them how to fish. ■

You Can Help

For questions about supporting the ISE Worldwide Societal Impact Endowment, contact Wanda Urbanska at wmurbans@ncsu.edu, or you can contribute directly to the fund by visiting go.ncsu.edu/WSIE.

STUDENTS SUPPORT FANG IN THE BEST WAY POSSIBLE

Since 1988, Walter Clark Chair and University Alumni Distinguished Graduate Professor of Operations Research and Industrial Engineering at NC State University, Shu-Cherng Fang has mentored hundreds of students in the ISE Department. In honor of that dedication, former students have created the Shu-Cherng Fang ISE Graduate Student Endowment to recognize Fang's commitment in a way that he loves the most—supporting other students.

For Fang, mentoring students goes beyond the classroom and even university borders and involves helping them to understand the “big picture” of life. “We were fortunate to spend several years in Fangroup, where we got married, received our doctorate degrees, and landed our first job offers,” shared former students Tao Hong (OR Ph.D. 2010) and Pu Wang (ISE Ph.D. 2010). “Dr. Fang is more than an academic advisor. His mentorship has empowered our personal and professional growth, leaving an indelible mark on our lives.” Fang believes in the philosophy of becoming a whole person. “Life has many, many faces,” he said. “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 — listen to your mind!”

Although Fang has achieved enormous success on a global scale and earned many professional accolades throughout his career (including last year's dedication of a special issue of the Journal of Uncertain Systems in honor of his 70th birthday on June 14), he knows his own formula for genuine success. “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 important problems,” he confided. “Under Dr. Fang's guidance, I learned the art of conducting research, mentoring students and embracing the pleasures of life,” confided Qingwei Jin (ISE Ph.D. 2011). Fang also knows how to keep things in perspective. “If I put all my time into my research, I could have done better,” he declared. “But life is more than that.” When asked what it means to him that his students put together this endowment, he answered with his characteristic humility: “Most Grateful!”

The new endowment will honor a top-performing graduate student in ISE and OR with an award that confers prestige and a cash stipend. In addition

to Dr. Fang's ground-breaking work in Operations Research and Industrial Engineering at NC State, his work has impacted faculty and students at Tsinghua University, Fudan University, Chiao-Tung University and many others worldwide. “We hope this endowment helps and inspires next generations of ISE and OR students to reach new heights,” said Hong and Wang.

Finally, please join us in wishing Shu-Cherng Fang a “Happy Birthday” today (June 14th). If you want to support the Shu-Cherng Fang ISE Graduate Student Endowment, please visit the NC State Advancement website. ■



To learn more about Shu-Cherng Fang and his prestigious career, visit <https://www.ise.ncsu.edu/blog/2015/06/30/faculty-profile-shu-cherng-fang/>.

SUPPORTING ALL NORTH CAROLINIANS

ISE alum Tammy Montgomery established an endowment to provide financial support for undergraduates from our state's underserved rural counties

A new scholarship endowment to benefit future generations of ISE students has been established by ISE alum and first-generation college student Tammy Montgomery. The David L. Montgomery ISE Scholarship Endowment, named after her father, will provide financial support to help ISE students—with a preference for undergraduates from our state's underserved rural counties—receive a life-transforming education at NC State's ISE Department. "As a land grant institution, part of our mission is to ensure that we serve the people of North Carolina," explained Julie Swann, ISE department head. "It is an excellent example of helping prospective students living in many different communities."

Montgomery, originally from Eastern North Carolina (Bladen County), named the endowment after a man who had never stepped foot in a college classroom and yet was the smartest man she had ever met. Montgomery's dream

has been to provide opportunities for deserving students like the one she received at NC State. This passion was evident from the very beginning. "Getting to know Tammy and working with her to create this new endowment has been extremely moving and meaningful to me personally," shared Wanda Urbanska, ISE's Director of Development. "I am moved by her appreciation for her home department and the desire to honor the memory of her late father in this way. Tammy exemplifies the best of the best!"

The beauty of the endowment is that it will give opportunities to many students in the future. "Like all endowments, this is the gift that keeps on giving," explained Urbanska. "Once it is actualized, scholarship support will be available in perpetuity for undergraduate students pursuing an ISE education."

Many ISE alums have had the experience of being the first in

their family to go to college or of helping to put themselves through college by working. This kind of endowment will resonate with them. An engineering education is an excellent return on investment, although it can be expensive in the short term. It is critical that ISE is accessible and affordable for all. "Tammy Montgomery's endowment and others help us recruit a broad and diverse student population to NC State, said Swann.

ISE students and alums are often known as "people-oriented." "I love that Tammy Montgomery is giving back by helping the future generation of ISE "people," confided Swann. ■

DONOR LIST

The Edward P. Fitts Department of Industrial and Systems Engineering at NC State is grateful to our donors for their generous support. This list represents donations between **July 1st, 2022 and June, 30th 2023**. While we make every effort to be accurate and thorough, it is possible to accidentally omit or misspell a name. Please contact 919.515.7237 with any additions or corrections.

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ALUMMS UNITE!

In 2015, the ISE Department started a private, alumni-only LinkedIn group to give ISE, OR, IMSE, EO, FFM and MEM students, alums, faculty and staff a place to communicate and keep up with what is going on with the programs.

Over the years, it has grown to almost 1400 members who are:

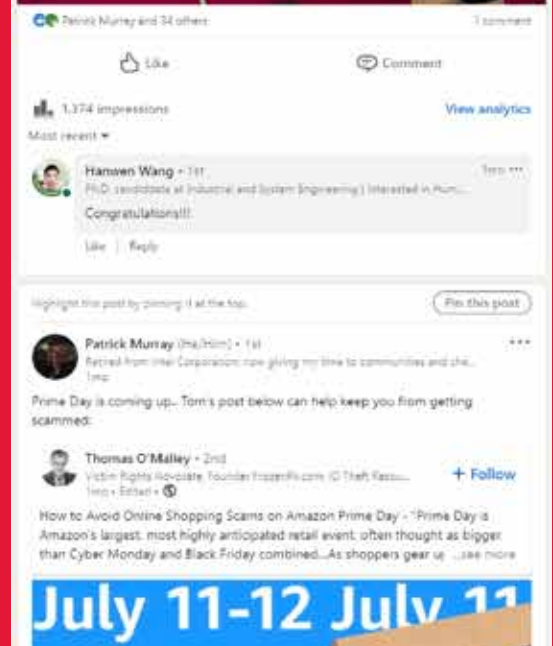
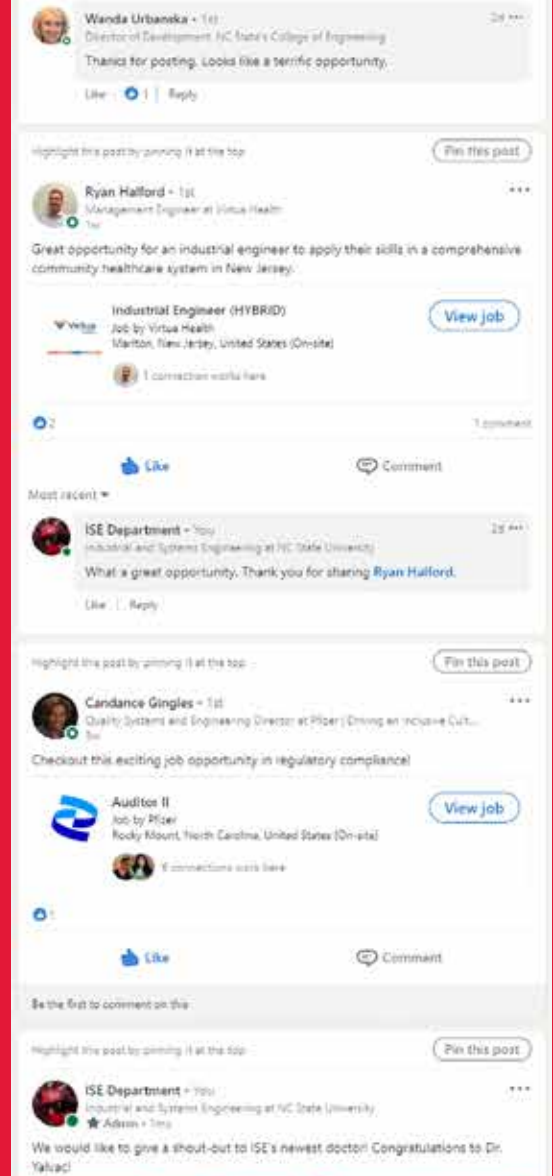
- Networking with each other
- Posting job opportunities for their fellow alums
- Sharing work and personal success stories
- Asking work and school-related questions
- Asking for and sharing career advice

ARE YOU A MEMBER?

If you are an alum, student, faculty member or staff member who has yet to join the group and would like to take advantage of the benefits that the group provides, visit <https://www.linkedin.com/groups/8285397/> and click on the **JOIN** button. Once we quickly verify each request, you are ready to start.

ARE YOU A FRIEND OR PARTNER OF THE PROGRAMS?

First, thanks for your support. Second, we would love to have you as a member of our ISE LinkedIn page, <https://www.linkedin.com/school/9403353/>. Click the **FOLLOW** button in the upper right-hand corner, and you are in. No approval is needed.





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