



Industrial and Enterprise Systems Engineering ANNUAL REPORT 2017

INNOVATION
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IMPACT



ENGINEERING AT ILLINOIS

Message from Rakesh



Rakesh Nagi

Department of Industrial and Enterprise Systems Engineering
Head & Donald Biggar Willett
Professor Fellow, Institute of Industrial Engineers.

In October, **Rakesh Nagi was appointed as the interim director for Illinois Applied Research Institute (ARI)** headquartered in the University of Illinois Research Park. He will replace former director Jeff Binder, who accepted an associate director position at Argonne National Laboratory. ARI harnesses the considerable depth of creativity and scientific ability on the Illinois campus, and is the state leader in performing translational R&D for commercial and government mission-driven organizations.

Dear friends and family of ISE,

It's been a year of great changes and exceptional accomplishments at ISE!

Our continued improvements are reflected in our graduate and undergraduate *U.S. News and World Report* rankings, which in the past year have each risen three places to 12th in the nation in the category Industrial / Systems / Manufacturing.

It is now more important than ever for us to find funding from outside the state of Illinois to continue our upward trend and advance our flexible, focused curriculum that has launched our students into such a proliferation of careers.

Indeed, one of the unexpected joys of beginning this publication three years ago is seeing how much support and response it has generated among alumni, each of whom has a different story to tell about how their degree has served them.

Your experiences and your willingness to share those experiences is a true testament to the greatness of ISE. We are facing challenges never before seen at the University of Illinois, and are being asked to do more with less while creatively managing funding gaps that we did not create. We are only able to manage these gaps and look to the future with excitement because of your support. Your generosity bolsters ISE's Engineering Visionary Scholarship, allowing more students to receive financial aid, provides a breadth of experience and knowledge to our Engineer in Residence program, and provides authenticity to our recruitment efforts. We want students from all corners of the world to have an

opportunity to acquire a world-class education, and you are helping us to do this. In ISE, we don't see challenges. Rather, we see opportunities, and are confident that together we can overcome any obstacle that is put in our way. We thank you for supporting ISE's continued quest for excellence, and look forward to what the future holds.

Please enjoy this issue, and consider reaching out, or paying a visit. Our doors are open to you.

Sincerely,
Rakesh Nagi

NOTE THAT THROUGH THE END OF 2019, THE GRAINGER FOUNDATION WILL MATCH ALL DONATIONS UP TO \$25 MILLION TO ISE ENGINEERING VISIONARY SCHOLARSHIP (EVS) FUNDS, MAKING THIS AN OPTIMAL TIME TO DOUBLE YOUR SUPPORT FOR OUR UNDERGRADUATES.

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The Department of Industrial and Enterprise Systems Engineering (ISE) at the University of Illinois, Urbana-Champaign, *innovates* the engineering discipline with forward-thinking research and scientific discoveries; *serves* education, industry, and society; *educates* a new generation of leaders in general, systems, industrial, and financial engineering.

ISE Annual Report designed and edited by William Gillespie, with assistance from Annie Goetz, Madeleine Hubbard, Heather Jones, Dana Keck, Jessy Ruddell, Riya Sanjay, and Shawna Graddy.

Photography by L. Brian Stauffer, Heidi Craddock, Emmaline Fleener, Emily Scott, William Gillespie, and others.

This issue is dedicated to former student writer Emily Scott.

Readers, alumni, students: contact us at gillespi@illinois.edu

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FROM THE MANAGING EDITOR'S DESK

When I launched the ISE Annual Report in fall 2014, its nickname was “The September Issue.” Since you might be an engineer, I’ll go ahead and explain the joke: *Vogue*, the premier women’s fashion magazine, has an extra-large issue every September bursting with all the latest innovations in fashion. I thought what notorious *Vogue* editor Anna Wintour did with clothes, I would do with the equally-innovative if (maybe) not-as-glamorous research breakthroughs made by faculty in our department. And I did, but I never put the words “September Issue” on the cover—the joke was unsalvageable. This year, however, we are changing our publication cycle from fall to spring. While we still feature stories about fabulous faculty research that would make Ms. Wintour bitterly jealous, going forward we are striving for more student-focused content. My new nickname is thus “The Yearbook,” as this schedule will allow us to honor our senior class before they have already moved on to amazing careers or entered illustrious graduate programs (such as our own). A student-centered issue is also, by extension, an alumni-centered issue. And this is the part that would make Wintour reconsider engineering as a career. As the ISE community continues to do cool things faster than our—sadly (for us) graduating—star student writer Emily Scott can document, I continue to be contacted by (and discover on my own) the most amazing and diverse alumni. There are truly no limits to where you can take an ISE degree. Students, faculty, alumni: you are all stunning models. Take that, Anna!

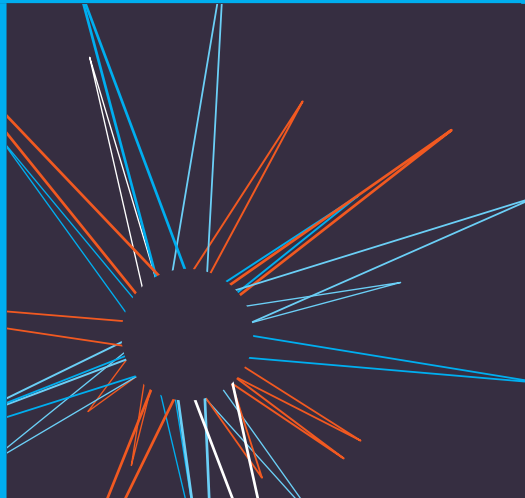


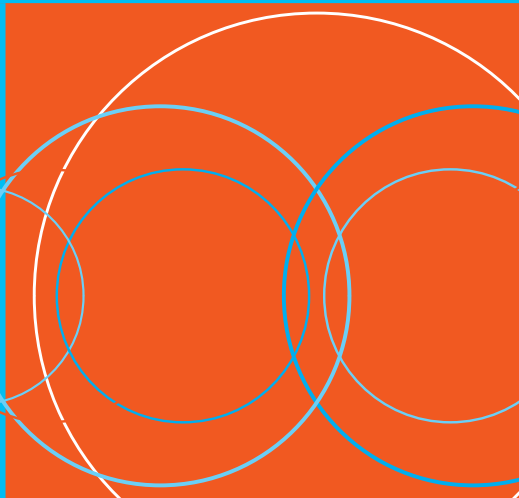
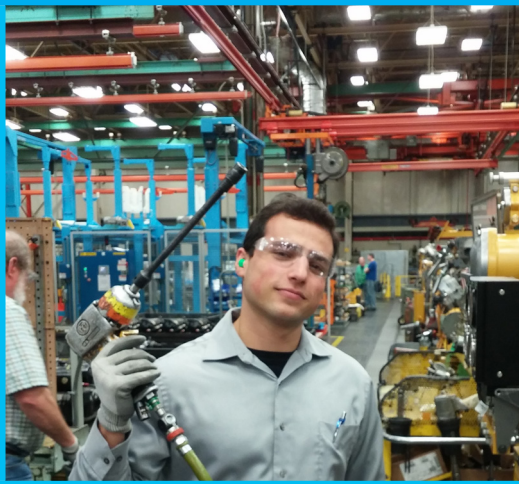
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ISE STUDENT NEWS





ISE UNDERGRADUATE FIONA KALENSKY

Emily Scott



THERAPALZ

Fiona Kalensky always had a tough time deciding whether she wanted to study nursing or engineering. Coming from a family of nurses and engineers, she had always been torn between the two.

Two years ago, as a biology major at Illinois, she began a design project for a student group, Design for America, where she was given two words to investigate: caregiver fatigue.

Those two words launched a project that would later develop into Therapalz, a startup she co-founded while still a student. Therapalz makes smart therapeutic companion animals to benefit the care of individuals with Alzheimer's and dementia.

Therapalz was recently selected as a finalist in the 2017 Cozad New Venture Competition, which encourages students on the Illinois campus to start new businesses.

Kalensky, now a junior, says launching a startup that merges technology and health care led her to transfer into ISE to major in Systems and Engineering Design (SED).

“What drew me into [systems and engineering design] was actually working on Therapalz,” Kalensky says. “I felt that I needed to push myself and have a better foundation of understanding the technology behind how things work.”

Kalensky has enjoyed learning about the University's entrepreneurial ecosystem and the business side of startup operations ever since Therapalz was accepted

into the iVenture Accelerator, the university's educational accelerator for student startups.

Kalensky says she never thought she would become an entrepreneur, and that it has been an eye-opening experience.

FOR FURTHER READING

READ THE FULL STORY ONLINE, INCLUDING VIDEO
<http://ise.illinois.edu/newsroom/article/fiona-kalensky>

THERAPALZ SITE
<http://www.therapalz.com/>

NEWS-GAZETTE
<http://www.news-gazette.com/news/business/2016-09-11/wired-fiona-kalensky.html>



At this year's Chittenden Health Care Symposium, distinguished alumna Carol Chittenden studies and Kalensky's research prototype with apparent approval. *Photo by Shawna Graddy.*

A few years ago, SED student Jason Yue spent a summer commuting back and forth between Champaign and Minnesota. He took 11 eight-hour bus rides, but instead of plugging in his headphones for the trip, he would talk to the people around him.

“I realized I love having conversations with people, but I wanted to do more,” Yue says. “I wanted to create memories for people that they’d remember.”

Interacting with faculty in the ISE department has been a meaningful part of Yue’s college experience and in the development of new projects.

While taking ISE professor Ray Price’s emotional intelligence course, he would meet Price after class each week. They would talk and journal about side projects Yue was pursuing.

“That was very critical in me falling in love with the ISE department, particularly because here’s a professor

who is taking the time out of his schedule to show you that he cares, that he is willing to go the extra mile to help you succeed,” Yue says.

A new opportunity then arose when Yue attended a screening of a documentary by filmmaker Ian Cheney. His professor introduced him to Cheney, and they started talking about documentary film.

“I just had a really good conversation with him about being at a pivoting point in my life,” Yue says. “I basically asked to work for him. While Ian was busy in the summer, he plugged me into his network of peers.” Yue ended up getting the opportunity to work in New York City for a summer on an upcoming TV show, “Soundtracks.”

His time in New York ended up being a pivotal stepping stone in shaping his career path.

Yue says the interactions he has had with people through his side projects wouldn’t have been possible without the help of the ISE department and faculty and staff, such as professor Richard Sowers and his advisor Heidi Craddock.

“U of I has been really great to me,” Yue says. “I really enjoyed and loved it here, and I wouldn’t trade it for any other experience.”

FOR FURTHER READING

READ THE FULL STORY ONLINE

<http://ise.illinois.edu/newsroom/article/jason-yue>

ENJOY SOME OF JASON'S VIDEO PROJECTS

<https://www.facebook.com/humansofChampaignUrbana/>

https://www.youtube.com/channel/UCX3nppnrBh-HfmgkZE_nPnA

<https://www.youtube.com/watch?v=H6m0meBfLHg>



‘This is a photo from my final day at the office with the 2016 Soundtracks team,’ Jason said. ‘Some of the greatest people I’ve ever had the opportunity to work with. Miss you guys!’

ISE UNDERGRADUATE JASON YUE

Emily Scott



ISE UNDERGRADUATE MATTHEW DUNCAN

James Boyd

Reprinted with permission from
the Illini Media Company



“I was scared,” Duncan says. “I came from a graduating class of about 55-60, and now [I’m in] a graduating class of about 7,000.”

On that day, Duncan became the first person from his high school, New Tech in Zion, Illinois, to attend Illinois. Matthew has grown a lot since being a frightened freshman who showed up to class too early.

A mutual friend encouraged Duncan to sign up for the National Society of Black Engineers (NSBE). After three years, he became the external vice president of NSBE.

Matthew attributes his strong work ethic to his track and field coach, Darnell Rios. It’s something he’s carried since.

He doesn’t skip class.

He doesn’t sit in the back row.

He doesn’t let skin color be the only thing a professor knows about him.

“You kind of gotta make sure you’re putting your work in on the side,” Matthew says. “I know a lot of other people working the same amount as me. I gotta find a way to get on the same level as them — if not better.”

Matthew calls this process “going ghost.”

He will disappear from the typical college social scene, skip parties, and bury himself in the library, ensuring that he excels in the classroom.

He knows all of those times he had to sit in the front row or “go ghost” will pay off. He knows that his entire family, including his mother, will be there to see him finish this journey.

“[It will be] the greatest achievement of my lifetime and the biggest investment I’ve ever made,” Matthew says.

Duncan’s parents, brother, and cousins all attended the University.



FOR FURTHER READING:

READ THE FULL STORY IN THE *DAILY ILLINI*
<http://longform.dailyillini.com/not-just-a-black-engineer/>

Photo by Ryan Fang, The Daily Illini

Department of Industrial and Enterprise Systems Engineering at the University of Illinois

Josh Weisberg first knew he wanted to study industrial engineering when he realized there was one thing about the airline industry that he found even more amazing than the fact planes can fly.

“The fact they can coordinate all these planes moving, the input and output of goods, the passengers, all these little baggage carts on the ground — that’s what blows my mind,” he says.

Now a senior, Weisberg says he’s enjoyed what he’s learned through his IE major at Illinois. His IE skills have even transferred over to his involvement in Illini 4000, a student-led non-profit organization that raises funds and awareness for cancer research.

Weisberg got involved with the organization during his freshman year after learning about Illini 4000 on Quad Day.

He grabbed a flyer from the group’s booth, thinking nothing of it until a week later when his friend mentioned Illini 4000 to him.



“I was like, wait, how did I not realize this when I saw it? How cool is it that you can bike across the country to raise money for cancer research?” he says. “That’s such an awesome adventure and so impactful at the same time.”

From the tamer East Coast to the flat Midwest to the challenging but rewarding West Coast paths, Weisberg says he loved every minute, and that the experience allowed him to grow closer with his fellow teammates.

Though his involvement in Illini 4000 gave Weisberg some of the most memorable moments of his college experience, he sees IE as what gave him the knowledge base to pursue new opportunities.

Weisberg’s interest in strategy and supply chains led to a job offer from Boeing. After graduation, he will enter the company’s business rotational program in Seattle.

FOR FURTHER READING

READ THE FULL STORY ONLINE
<http://ise.illinois.edu/newsroom/article/josh-weisberg>



Josh in front of the Rolls-Royce engine of the third Dreamliner ever built at the Museum of Flight in Seattle during his Boeing internship.

ISE UNDERGRADUATE JOSH WEISBERG

Emily Scott



Doug King presents Josh with the L. C. Pigage Award.

ISE UNDERGRADUATE DANA KECK

Emily Scott



Dana Keck's college experience has been marked by her close connections with the students, faculty and staff of ISE.

When she was deciding where she wanted to go to college, she knew she wanted to study engineering at a large university. She grew to love the tight-knit feel of the ISE department within the larger College of Engineering at Illinois.

"I like how it's a big school and I can do so many different things, and the College of Engineering is still big, but then you go to ISE and it's small and I know everybody's face," Keck says. "I walk into the senior design lab and pretty much know everybody, and I know all the staff and faculty."

Keck sees her college experience as one that was heavily influenced by the student-run Institute of Industrial and Systems Engineers, or IISE.

As vice president, Keck organizes external relations and professional development opportunities for the group, which includes planning corporate info sessions, career fair preps, LinkedIn workshops, and organizing Six Sigma and Lean certification workshops.

As her education progressed, Keck has grown interested in a career in manufacturing and continuous improvement. She previously interned with Hormel Foods, and she will be joining the company full time after graduation.

"I like the idea of improving things that are already set, rather than designing new things to begin with," she says. "I think it's really interesting how reducing the manufacturing time of something by even a small amount can equal thousands of dollars saved."

She hopes her career will lead her to a managerial role in manufacturing.

FOR FURTHER READING

READ THE FULL STORY ONLINE

<http://ise.illinois.edu/newsroom/article/dana-keck>



Dana Keck receiving the ISE Service Award from Richard Sowers

Department of Industrial and Enterprise Systems Engineering at the University of Illinois

Photography by Emily Scott, Emmaline Fleener, and others.

Coming from a family of engineers — both her dad and her sister are industrial engineers — it was always in the back of Goetz’s mind to pursue industrial engineering. She decided to attend Illinois for several reasons, but the engineering program was always a big draw. She came to Illinois as an undeclared engineering major and switched to industrial engineering because she liked its flexibility and the options the major offered. “I like that every person I talk to wants to do something different,” she says. “You can come in and make it your own.” Being able to pick courses that fit her interests was an added plus, and allowed her to realize her interest in manufacturing.

Through an internship with Hormel Foods this past summer, she found that she specifically liked working on continuous improvement problems within manufacturing facilities. “I really like that aspect of it, of seeing where the process is and where you can take it,” she says. Her internship focused on looking at the entire process of a facility. She worked with her supervisors to see how productivity could be improved in day-to-day operations. She likes the problem-solving that goes into continuous improvement.

“It challenges you to think in a different way,” she says. “You just have to look at the process in different ways, until you find something that’s different, and sometimes it’s the simplest thing.”

Goetz says her ideal career path would be to go into manufacturing engineering, and then transition into a role in management.

Goetz’s favorite class was IE 430, Engineering Economy, taught by Professor Rakesh Nagi, department head of ISE. “He was so personable and joked around with us and talked about his family, talked about his life. My favorite part was that I enjoyed the content, but I also enjoyed just sitting in class.”

She says it has been nice to be a part of the smaller, more tight-knit ISE community while still being able to enjoy the large Illinois campus. “It’s kind of that small world phenomenon. It’s nice to have a place that’s like home for us.”

FOR FURTHER READING

READ THE FULL STORY ONLINE
<http://ise.illinois.edu/newsroom/article/annie-goetz>



ISE UNDERGRADUATE ANNIE GOETZ

Emily Scott



Goetz addresses the IISE conference.



2016-2017 SCHOOL YEAR MEMORIES

WORLD EVENTS

SUMMER 2016 (MAY): Harambe the gorilla dies

SUMMER 2016 (JUNE 23): UK voted to leave the European Union; Brexit

FALL 2016 (NOVEMBER 2): Chicago Cubs win the World Series for the first time in 108 years; Green Street shut down for celebrations

FALL 2016 (NOVEMBER 8): Donald Trump is elected 45th president of the United States

FALL 2016: Pokemon makes a comeback with Pokemon Go; students could be seen across campus playing the game

FALL 2016: Celebrity deaths—Prince, David Bowie, Alan Rickman, Fidel Castro, Mohammad Ali, and Alan Thicke

FALL 2016 (NOVEMBER): The 117th element was named Tennessine

FEBRUARY 2017: Patriots make a comeback to win Super Bowl

SPRING 2017: Trappist solar system discovered

ON CAMPUS

2017: 150th anniversary of University of Illinois!

FALL 2016: Lovie Smith's first season as head coach of the Fighting Illini football team

SPRING 2017: John Groce fired as coach of Fighting Illini Mens Basketball

WINTER BREAK: Antonio's (popular pizza place on Green) closes

MARCH 2017: Green Street begins partial closure for new construction

APRIL 2017: Cracked opens up in place of Antonio's and sells breakfast bowls in addition to the original items of the beloved food truck

APRIL 2017: Post Malone gives free concert on the quad

MAY 2017: Unveiling of quintessential engineer statue

WITHIN ISE

JULY 2016: General Engineering changes its name to Systems Engineering and Design

IISE and ISGE merge to become IISE (Institute of Industrial and Systems Engineers)

Gamma Epsilon and Alpha Pi Mu merge to become Alpha Pi Mu

MOST POPULAR CLASSES: IE 430, IE 330, IE 310, GE 261, GE 400 (*this poll admits bias toward IE students)

MOST POPULAR PROFESSORS: Harry Wildblood, Doug King, James Leake, Carolyn Beck

POPULAR PLACES TO STUDY ON CAMPUS: Grainger, Room/Dorm, Union

MOST POPULAR SOCIAL MEDIA SITES: Instagram and Snapchat

POPULAR TV SHOWS (NETFLIX): Shameless, 13 Reasons Why

FAVORITE CULTURAL TRENDS

FAVORITE MUSIC: Divide (Ed Sheeran), More Life (Drake), Damn (Kendrick Lamar)

FAVORITE TV SHOWS/MOVIES: Shameless, The Office, Moana

-Assembled by Annie Goetz, Riya Sanjay, and the ISE Class of 2017



STUDENT GROUPS REPORT ON ACTIVITIES AND MANAGE COMPLEX MERGER

In July 2016, the ISE department changed the name of general engineering to systems engineering and design. With that name change came many changes for systems engineers in the department. The ISE student societies went through a transition year this year by merging from four groups into two. The Institute of Industrial and Systems Engineers (IISE) and Illinois Society of General Engineers (ISGE) merged to become IISE, one social, service, and professional society. Alpha Pi Mu and Gamma Epsilon, the IE and GE honor societies, respectively, merged to become Alpha Pi Mu. The two former GE societies were absorbed by the IE societies because the IE societies are local chapters of national organizations. The national organization of IISE changed its name in May 2016 from Institute of Industrial Engineers (IIE) to Institute of Industrial and Systems Engineers (IISE), coinciding with the GE name change.



ISGE: First row: Michael Liao, Mitchell Babendir. Second row: Jeremy French, Shaan Bhakta, Andrew Xu Not pictured: Julia Santos, Juliette Shesgreen

IISE CONFERENCE

This February, 20 ISE students traveled to the University of Illinois at Chicago for the annual IISE Regional Conference. Jigar Patel, IE senior, was among eight competitors in this year's technical paper competition. Patel won first prize, and will have the opportunity to compete at the national conference. His paper stemmed from his ISE senior design project.



SENIOR 100 X 2! JOSH WEISBERG & LARA FLASCH

BOTH EARNED A PLACE IN THE UNIVERSITY-WIDE SENIOR 100 HONORARY!

SENIOR 100 HONORARY IS A HIGHLY PRESTIGIOUS AWARD THAT RECOGNIZES THE MOST OUTSTANDING GRADUATING SENIORS— NOT ONLY THE MOST SUCCESSFUL STUDENTS ACADEMICALLY, BUT THOSE FOCUSED ON CAMPUS INVOLVEMENT AND SERVICE. THIS ALLOWS HARD-WORKING SENIORS TO BE ACKNOWLEDGED FOR THEIR COMMITMENT TO THE UNIVERSITY.

LEAN

Every year, the Illinois chapter of the Institute of Industrial and Systems Engineers hosts a Lean certification workshop at the department of ISE. The Lean methodology values minimizing waste and creating value to the customer. This way of thinking and operating a business applies to multiple industries. This year, thirty-one people earned their Lean Green Belt certification through IISE's weekend-long workshop.



IISE: Front row: Riya Sanjay, Dana Keck, Annie Goetz, Sona Kaul. Back row: John Mancinelli, Zander Berube, Tom Kukec, Lara Flasch



Alpha Pi Mu/Gamma Epsilon. First row: Kyle Kovitz, Jing Yu. Second row: Andrew Xu, Kovas Kulbf, Henry Doyle Not pictured: Annie Goetz.

GRADUATE STUDENT NEWS



KETAN DATE

Ketan Date developed a mathematical model to design efficient layouts for companies moving to new facilities. Date is advised by Rakesh Nagi.

FOR FURTHER READING

READ THE FULL STORY ONLINE

<http://ise.illinois.edu/newsroom/article/ketan-date>



PRANAY DEVNANI

Pranay Devnani won a best track paper at the 2016 Industrial and Systems Engineering Research Conference. Devnani, now at Apple, was advised by Deborah Thurston.

FOR FURTHER READING

READ THE FULL STORY ONLINE

<http://ise.illinois.edu/newsroom/article/viral-modeling>

HEE YOUN KWON

Hee Youn Kwon was selected to be a Mavis Future Faculty Fellow for 2017-18. Kwon, a Ph.D. student in systems and entrepreneurial engineering, is advised by Sheldon Jacobson.

FOR FURTHER READING

READ THE FULL STORY ONLINE

<http://ise.illinois.edu/newsroom/article/viral-modeling>

GAURAV SINGH

Gaurav Singh tied for best poster with “Soft Pneumatic Actuator for Arm Orthoses” at the 2017 Chittenden Health Care Symposium. Singh is advised by Girish Krishnan.

FOR FURTHER READING

MONOLITHIC SYSTEMS LAB

<http://monolithicsystemslab.ise.illinois.edu/modeling>

In the future, your coworker might be a robot.

But in this future, you wouldn't have to tell your robot coworker what to do. Instead, the robot would read your thoughts and know what you want.

This is what Illinois industrial engineering professor Thenkurussi Kesavadas has accomplished through his research that uses a brain-computer interface to control a robot. No one has ever studied brain-computer interfaces in this way, according to Kesavadas.

“The principle behind it is really breakthrough. Without specifically training a robot, the robot can come and help you, it can cooperate with you by knowing your thought process,” Kesavadas says. “We’re looking at the next generation of robots which is run from your thoughts.”

Kesavadas hopes this research could apply to the

Photography by Brian Bauer.



manufacturing industry, but it has several other potential applications, such as performing surgery or helping those who are disabled perform everyday tasks.

The experiment he developed with Yao Li, a graduate student in systems engineering, allows a robot to detect and pick up defective parts by reading brain signals from a human operator.

They used signals called Steady State Visually Evoked Potentials, or SSVEP. These signals emulate what you see — so if you are looking at a picture that is flashing at a specific frequency, your brain produces the same frequency.

In their experiment, the robot is trained to only pick up the signals that are emitted when the human operator sees a defective part.

Kesavadas imagines a different application for his brain-computer interface — unstructured environments that rely heavily on human knowledge.

He says the intersection of brain-computer interfaces and robotics could have several applications in the fields of medicine and rehabilitation. These systems could help the elderly, disabled, or those unable to communicate to perform everyday tasks.

Kesavadas believes his research could be applied to programming robots that know what the human wants before they want it — reading their thoughts that tell them they're thirsty and want a drink of water.

“I can definitely see that happening,” Kesavadas says.

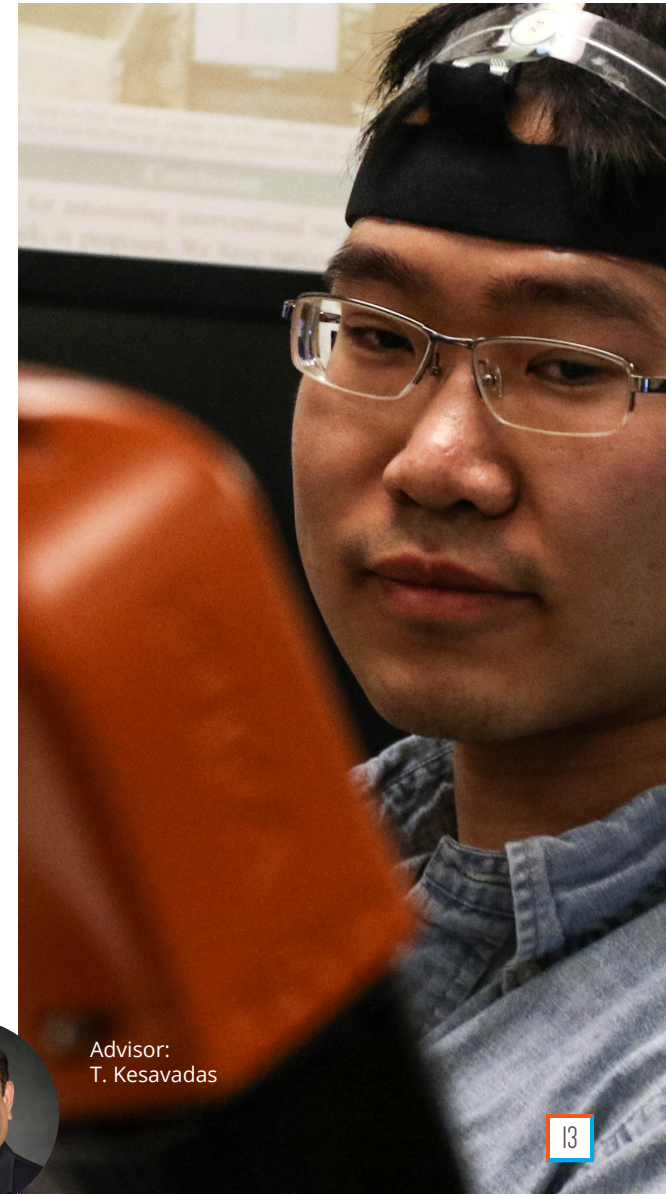
FOR FURTHER READING

READ THE FULL STORY ONLINE AT THE *DAILY ILLINI*
<http://longform.dailyillini.com/new-robot-co-worker>



Advisor:
T. Kesavadas

Emily Scott
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ISE GRADUATE STUDENT JOHN CONWAY

Emily Scott



Advisor:
Henrique Reis



Graduate student John Conway is pursuing new areas of research in nondestructive testing and evaluation through a prestigious fellowship from the American Society for Nondestructive Testing (ASNT).

Conway, who is completing his master's degree in systems and entrepreneurial engineering, is working on using nondestructive methods to detect high temperature hydrogen attack in carbon steel pressure vessels.

Some carbon steel pressure vessels hold hydrogen gas at high partial pressures and at high temperatures. Hydrogen can diffuse into the steel and bond with carbon in the steel, which creates methane — this is the problem known as high temperature hydrogen attack.

Because methane can't diffuse out of the steel, small microbubbles of high-pressure methane become stuck within the steel. The high-pressure environment can cause these microbubbles to grow and combine with each other to form larger cracks in the vessel.

Conway's research, which continues previous research by Professor Henrique Reis and ISE PhD graduate Megan McGovern, is focusing on using new techniques to detect these microbubbles before they become a problem.

Traditionally, a method called linear ultrasonics is used to detect the location of cracks after they are formed. This method involves sending a sound wave through the vessel that then reflects off the crack, pinpointing the crack's location based on the speed of sound.

Conway's research proposes using nonlinear ultrasonics instead — sending in two sound

waves that interact with each other to produce a third wave whose amplitude is proportional to the non-linearity of the material and the methane microbubbles that form before large cracks develop.

“The idea is to detect these microbubbles before they become problematic cracks,” Conway says. “If you can measure these non-linear waves at varying points along the thickness of a steel pressure vessel, you can characterize the damage within the pressure vessel wall based upon the received nonlinear scattered wave.”

Conway says this method of detecting high temperature hydrogen attack has not been used before.

As part of his ASNT fellowship, Conway will produce a publication for the society, which is funding his work.

Conway plans to complete his graduate studies this year, and hopes to someday work in an industrial research position in systems engineering.

“I'm looking at a wide range,” he says. “That's part of the benefit of this department — it gives you a wide breadth in terms of your career options.”

He says working with Professor Reis, his advisor, and fellow students in his lab has made for a beneficial experience in his studies.

“I've been surrounded by intelligent people and I've been able to benefit from that, and that's why I like it.”

FOR FURTHER READING

READ THE WHOLE STORY ONLINE AT:
<http://ise.illinois.edu/newsroom/article/john-conway>

Lohan presented his research on electro-thermal system design at the ASME 2016 International Design Engineering Technical conference.

His research with Professor James Allison was nominated for Best Paper Award at the conference.

“The idea behind the paper was to try and design circuitry in a new way for power electronics,” Lohan says.

Lohan combined strategies used by electrical and mechanical engineers into a system level optimization.

“In the paper, we demonstrated that performing combined system level optimization for electrical and thermal systems can improve performance more than conventional methods,” Lohan says.

They proved that performing model-based design optimization, which considers both electrical and thermal functionality, can improve the overall performance of the system.

The research relates to Lohan’s studies at ISE: design optimization for heat transfer, or figuring out how to cool devices efficiently.

“I spent most of my time designing heat sinks, but for that particular paper, I wanted to see if I could also incorporate other aspects of the problem, such as electrical functionality,” he says. “I was able to do that and it was really interesting to see how the results improved.”

In his current research, Lohan is working on advanced methods of designing heat transfer devices.

Typically, heat sink devices, which are used to transfer heat to a larger area, have fin-like structures that are used to transfer heat.

Lohan’s idea is to instead design freeform structures to be used in heat sink devices by using a methodology called topology optimization.

This methodology is used extensively in the aerospace industry for mechanical structures. For example, inside of airplane wings, the support structures are optimized to reduce the weight of the airplane wing and reduce cost.

“Using the methods I’m working on, we can develop freeform structures that significantly improve on the thermal performance of the heat sink,” he says.

“I think that’s one of the main initiatives in this particular research community — we know how to do it, and we do it really well, but how can we simplify things so other people can use it?” he says.

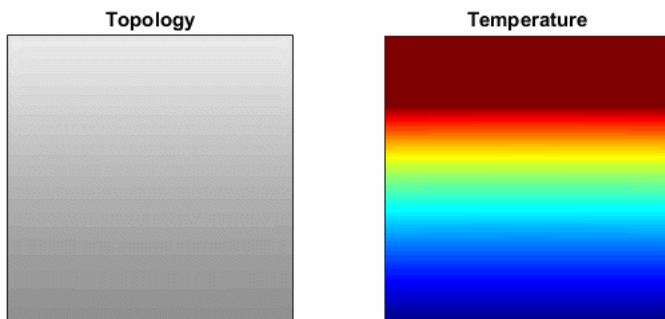
FOR FURTHER READING

READ THE FULL STORY ONLINE
<http://ise.illinois.edu/newsroom/article/danny-lohan>

COMBINED LUMPED AND CONTINUUM PARAMETER DESIGN OPTIMIZATION OF ELECTRO-THERMAL SYSTEMS.
<http://proceedings.asmedigitalcollection.asme.org/ceeding.aspx?articleid=2591640S0305048315001425>

ISE GRADUATE STUDENT DANNY LOHAN

Emily Scott



Heat spreader optimization in progress



Advisor:
James Allison



NEW ISE FACULTY ALEXANDER “SASHA” STOLYAR



ISE JOINED BY TOP QUEUEING THEORIST

Emily Scott

Alexander “Sasha” Stolyar joined the Department of Industrial and Enterprise Systems Engineering faculty as a Grainger Engineering Breakthroughs Initiative founder professor.

Stolyar is one of the world’s top queueing theorists, specializing in analysis and control of stochastic networks. He made fundamental theoretical contributions to the field. One of them is the introduction of the fluid limit technique for establishing the stochastic stability of queueing networks. This method has become a powerful tool in the stochastic networks theory. Another important contribution is the pioneering study of the MaxWeight scheduling algorithm in the heavy-traffic asymptotic regime – this work received the 2002-2004 Best Publication Award from the INFORMS Applied Probability Society.

Stolyar’s work has also made significant industrial impact, especially during his 16 years at Bell Labs Mathematical Sciences Research — he is an author of over 20 patents, with many solutions and algorithms implemented in real systems.

Stolyar’s current research is primarily motivated by the problems arising in big data processing and cloud computing.

“Cloud systems became my main motivation about 4–5 years ago. It happened very naturally, because these systems are of great practical interest and at the same time are rich sources of new models and problems in stochastic networks,” he said. “I also continue to be interested in other application areas, such as wireless communications and call/contact centers.”

Faculty photography by L. Brian Stauffer

FOR FURTHER READING

VISIT PROFESSOR STOLYAR’S FACULTY PAGE
<http://ise.illinois.edu/directory/profile/stolyar>

EDUCATION

PhD, Mathematics, 1989, Institute of Control Sciences, USSR Academy of Science, Moscow, USSR.

MS, Applied Mathematics, 1982, Moscow College of Transportation Engineering, Moscow, USSR.

ACADEMIC AND INDUSTRY POSITIONS

GEBI Founder Professor, University of Illinois at Urbana-Champaign, ISE Department, 1/2017-present

Timothy J. Wilmott Endowed Chair Professor, Lehigh University, ISE Department, 8/2014-1/2017

Distinguished Member of Technical Staff, Bell Laboratories, Mathematical Sciences Research, 3/2006-8/2014

Member of Technical Staff, Bell Laboratories, Mathematical Sciences Research, 8/1998-3/2006

Senior Staff Engineer, Motorola, Wireless Networks Research, 5/1997-8/1998

Senior Technical Staff Member, AT&T Labs-Research, Network Mathematics Research, 9/1996-4/1997

Lead Engineer, Motorola, Wireless Networks Research, 6/1992-9/1996

Research Scientist, Institute of Control Sciences, USSR Academy of Science, 2/1989-6/1991

INTERDISCIPLINARY APPROACH TO OPTIMIZATION

Emily Scott

New ISE faculty member Ruoyu Sun hopes his research can add to the understanding of algorithms used in fields such as artificial intelligence and optimization.

Previously, Sun worked for Facebook Artificial Intelligence Research studying neural networks, which are computational approaches to solving problems that are modeled on the way the human brain works.

Neural networks, also called deep learning, are used in artificial intelligence.

“I think artificial intelligence is the future,” Sun said.

His interest in this area led to his current research in non-convex optimization, an emerging field of study that involves solving problems that are more difficult to solve than convex optimization problems.

In convex optimization problems, there is only one solution, and the problem can be solved efficiently. But in non-convex optimization problems, multiple feasible solutions exist.



Popular websites that use complex recommendation systems.

“The goal of optimization is trying to find the minimizer or maximizer of the function — maximize profit or minimize cost. But this is only doable when the function is convex,” Sun said. “When it’s non-convex, there’s no general algorithm for doing that. We need to develop new tools to understand that.”

Sun hopes to better understand the theoretical background of non-convex optimization. In doing this, he hopes to help those in the field of artificial intelligence and deep learning, as these fields involve non-convex optimization problems.

He hopes to collaborate with researchers in several fields at the University of Illinois: “We all have the same goal; for example, to make big data useful for everyone,” he said. “I would like to have a multi-disciplinary view.”

He emphasizes this in his course, Advanced Topics in Continuous Optimization, which focuses on large-scale and non-convex optimization problems.

The approach to non-convex optimization that he takes in this course is unique because it is motivated by applications in machine learning, a field in artificial intelligence that allows computers to learn without being programmed.

“I’m hoping to see the different fields learn from each other. While I’m still grounded in optimization, I want to borrow ideas from other fields, and contribute to them as well.”

FOR FURTHER READING

VISIT PROFESSOR SUN’S FACULTY PAGE
<http://ise.illinois.edu/directory/profile/ruoyus>

NEW ISE FACULTY
RUOYU SUN



ISE FACULTY QIONG WANG

Emily Scott



After doing research at Bell Labs for over a decade, Associate Professor Qiong Wang joined the department of ISE in 2012. At ISE, he is carrying out a research agenda to address problems that arise from private business management and public policy development.

One area of his research involves developing control policies for assemble-to-order (ATO) inventory systems. The problem involves two related questions: how many components to order; and which customers to serve? Both decisions need to be made dynamically over time, in the absence of exact knowledge about future demands. The challenge is finding an efficient solution to balance the need to satisfy customers with the desire to reduce inventory costs.

Wang first encountered this problem at Bell Labs when he was helping its parent company, Alcatel-Lucent (now Nokia USA), to improve its supply chain performance. Optimizing an ATO system is a long-standing unsolved problem in the inventory literature. “So the topic combines the best of two worlds,” Wang says. “On the one hand, we want to attack a difficult problem to advance the research frontier. On the other hand, solving the problem also helps to improve the practice of inventory management.”

Wang has also done research on revenue management and pricing, which, like inventory control, aims at improving the performance of enterprise systems. Not surprisingly, much of his work is pertinent to the telecommunications industry where he used to work.

“In this industry, managerial decision-making not only is a business concern, but also has profound implications on public policy,” Wang observes.

The debate over net neutrality gives a strong demonstration of this observation. The basic issue is whether internet service providers (ISPs) should be allowed to provide services at different quality levels and charge customers accordingly. Whereas from the engineering perspective, there are clear advantages to differentiating customers based on the bandwidth needs of their applications, there are also concerns about whether the ISPs will exploit this flexibility to enhance their profits at the expense of societal and consumer welfare.

“The question has been passionately debated and the answer can be rather complicated,” Wang says. “Operations research can be a great help here by building models to quantify various tradeoffs involved, capturing economic incentives of different players, and applying mathematical logic to infer likely outcomes.”

While the subject matter of Wang’s research may vary, the underlying studies are united by a common theme: applying quantitative modeling and analysis to dissect and optimize real-world managerial and policy decision making. Many of his topics have traditionally been addressed by social scientists and legal scholars. Nevertheless, Wang believes that, equipped with an ever-growing arsenal of analytical tools, operation researchers and industrial engineers are in a unique position to provide novel insights and make substantial contributions in these domains.

FOR FURTHER READING

READ THE FULL STORY ONLINE
<http://ise.illinois.edu/newsroom/article/qiong-wang>

HAND-PICKED SPECIALTY CROPS 'RIPE' FOR PRECISION AGRICULTURE TECHNIQUES

Sharita L Forrest, Illinois News Bureau Education Editor

Timing the harvest and transport of highly perishable, hand-picked crops such as strawberries so these delicate products reach consumers at peak flavor and freshness is an intricate dance that partners Mother Nature with manual labor.

“The large machines used to harvest row crops such as wheat, corn, and soybeans provide a natural platform for improving efficiency,” says Sowers. “However, the story is radically different in high-value, hand-picked crops like strawberries, which may be many times more valuable per acre than corn. With hand-picked crops, precision agriculture lags significantly behind.”

“A hundred acres of corn may have a value of just \$800,000, while the same number of acres planted in strawberries may be worth \$7.5 million,” says Devasia Manuel, a recent Illinois alumnus. “Yet, strawberry harvesters use little to no precision agriculture techniques. It’s quite astonishing.”

Sowers and Manuel’s methodology is described in a paper published in the journal *Natural Resource Modeling*.

FOR FURTHER READING

READ THE FULL STORY ONLINE

<https://news.illinois.edu/blog/view/6367/469804>

“OPTIMAL TRANSPORT TO COLD CHAIN IN PERISHABLE HAND-PICKED AGRICULTURE.” NATURAL RESOURCE MODELING.

<http://onlinelibrary.wiley.com/doi/10.1111/nrm.12124/full>

TRAFFIC VISUALIZATION RESEARCH TO HELP CITIES MAKE DATA-DRIVEN DECISIONS

Emily Scott

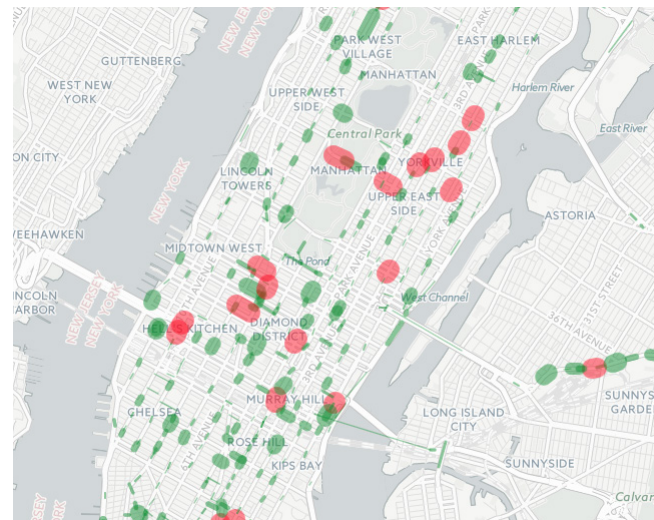
A research project co-led by Professor Richard Sowers from ISE and Mathematics and Professor Dan Work from Civil and Environmental Engineering and the Coordinated Science Laboratory has been awarded a seed grant from the Siebel Energy Institute. The grant, titled “Quantifying the Predictability of City-scale Urban Traffic,” could help cities better analyze traffic data and solve traffic-related problems.

“We convert the taxi data into traffic conditions similar to what you can find on Google Maps, and from there, we can answer all kinds of interesting questions about the city,” Work said.

FOR FURTHER READING

READ THE FULL STORY ONLINE

<http://ise.illinois.edu/newsroom/article/traffic-visualizations>



ISE FACULTY RICHARD SOWERS





JAMES ALLISON WINS NSF FACULTY EARLY CAREER DEVELOPMENT (CAREER) AWARD



**READ THE FULL STORY
ONLINE**

<http://engineering.illinois.edu/news/article/21790>

COMPLETE LIST OF ISE NSF CAREER AWARD RECIPIENTS

JAMES ALLISON (2017)

CAROLYN BECK (1998)

HARRISON KIM (2010)

NEGAR KIYAVASH (2011)

GIRISH KRISHNAN (2016)

RAKESH NAGI (1996)

SEWOON OH (2016)

DEBORAH THURSTON (NSF
PRESIDENTIAL YOUNG
INVESTIGATOR AWARD—
PREDECESSOR TO CAREER
AWARD, 1989)

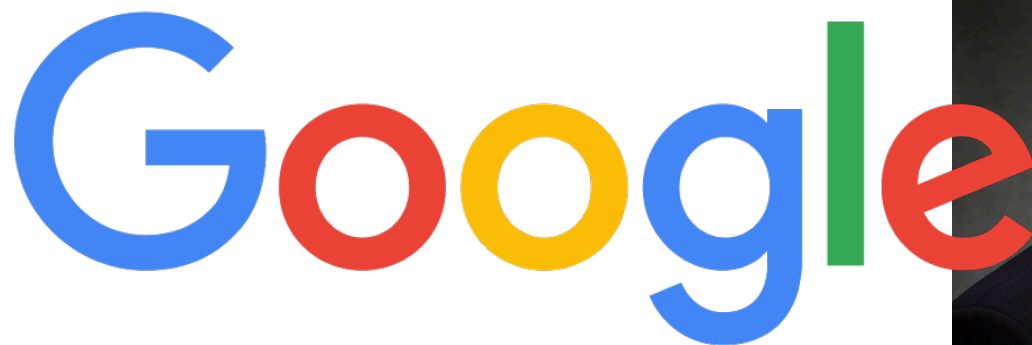


DUŠAN STIPANOVIĆ WINS BESSEL AWARD

Professor Dušan Stipanović has received the Friedrich Wilhelm Bessel Research Award from the Alexander von Humboldt Foundation's committee for mathematics, physics, and engineering for his research accomplishments in "control theory and calculus of variations." This prestigious research award is granted to only 20 applicants annually across all fields of research.

**READ THE FULL STORY
ONLINE**

<http://www.csl.illinois.edu/news/stipanovic-receives-prestigious-humboldt-research-award>



SEWOONG OH WINS GOOGLE FACULTY AWARD

**READ THE FULL STORY
ONLINE**

<http://ise.illinois.edu/newsroom/article/seewong-oh-google>

In his Engineering Law course, Joe Barich embodies what makes the ISE program unique among other engineering programs: learning the system of law and business within which engineering exists.

Barich realizes that patents, contracts, and intellectual property might be difficult concepts for an engineering student to grasp, but operating systems and computer programming might not be.

“I think in the modern world, aspects of the law creep into just about anything that you’re going to do,” says

Barich has been teaching the course since 2010. While getting a bachelors and masters in electrical engineering at Illinois, Barich took an engineering law course, which at the time was somewhat out of his comfort zone. He now is a practicing attorney in patent and intellectual property. With his background in both engineering and law, Barich is aware of the ways that engineers and lawyers think differently.

“It’s the system of rules under which the country is supposed to operate,” Barich says. “The first thing you need to know is how the operating system works. Then you can see how the individual ‘programs’ potentially interact with that operating system.”

Barich uses analogies like this to compare legal terms to terms that engineering students might be able to grasp more quickly.

“I tell them to pretend it’s a program,” he says. “They need to read for every word, every comma, and pay attention to everything.”

FOR FURTHER READING

READ THE FULL STORY ONLINE
<http://ise.illinois.edu/newsroom/article/engineering-law>

IN 2012, JOE BARICH RECEIVED THE ALPHA PI MU & GAMMA EPSILON EXCELLENCE IN TEACHING AWARD, JOINING THE LEGACY OF AWARD-WINNING ISE INSTRUCTORS

SHARP TEACHING AWARD WINNERS
2017 R.S. SREENIVAS
2016 ALEXANDRA CHRONOPOULOU
2015 CAROLYN BECK
2014 DUŠAN STIPANOVIĆ
2013 HARRISON KIM
2012 R.S. SREENIVAS
2011 LIMING FENG

ENGINEERING LAW

JOE BARICH

Emily Scott



ISE ALUMNA TERRIE REED

Emily Scott



When Terrie Reed graduated from the University of Illinois with a bachelor's degree in social work, she started to think about her various interests — in systems thinking, health care, social work, and policy.

She spoke with Professor Judith Liebman about her many interests, and the conversation led her to a new career path.

“She connected a lot of dots that I never saw, and said ‘that all sounds like an industrial engineering degree,’” Reed says.

Reed was accepted into the industrial engineering master's program, which introduced her to the connection between healthcare and industrial engineering and inspired her to use this knowledge and experience as a basis for a non-traditional engineering career path.

Today, Reed is the senior advisor for unique device identification (UDI) adoption at the Food and Drug Administration. For over 10 years, she has had an essential role in moving the adoption of this system forward.

Until 2013, there was no national or international regulation specifying a requirement for UDI of medical devices, like there is a national drug code (NDC) to identify medications.

Reed led the development of a database repository, called AccessGUDID, that keeps track of standard device identification attributes, such as model numbers, sizes, device manufacturers and other critical information.

“UDI had never existed before,” Reed says. “My industrial engineering degree and experience provided a foundation for my role in the development of the UDI System.”

She says her industrial engineering perspective has allowed her to value the notion of design or systems thinking as part of this public health role.

With UDI, she is always in the process of understanding key aspects of the life cycle of a device. Her role involves dealing with all participants in device safety and supply chain — the manufacturers, healthcare providers, medical device registries, and the patient.

Today, the AccessGUDID database has over 1.3 million records, whereas just a few years ago, less than 100 people had ever heard of UDI, according to Reed.

“My introduction into industrial engineering was based upon the insights of a professor who didn't allow barriers to get in the way,” Reed says. “I think back on Dr. Liebman advocating for me to get into the industrial engineering program and saying ‘let's give this person a chance.’ I've taken that experience to heart, because I was able to use that opportunity and turn it into a successful career that seeks to improve public health from a systems point of view.”

Looking back on her career, Reed sees herself as always being in a role to advocate for change, coordination and collaboration.

“I'm proud to say I went to the U of I,” she says. “I liked how interdisciplinary the industrial engineering program was at the time, and continues to be. I think that was really helpful to see what was possible.”

FOR FURTHER READING

READ THE FULL STORY ONLINE

<https://news.illinois.edu/blog/view/6367/469804>

It's competitive to find that perfect tech gig, whether you are into content, a coder, or more of a business type. You need to have the right degree, make the right connections and commit to being a lifelong learner. I had the opportunity to talk to Facebook's Tasha Levy, who works out of the Chicago office in sales as the Multicultural Lead. She's part of Facebook's Global Marketing Solutions team, which helps top brands across the United States looking to engage African-American Affinity audiences.

Many people want to work in the tech space. What kind of background do you need to break into the field?

If you're a student, let's say you're in high school, let's start there. An affinity for science, engineering, or math, and those type of fields, are a great start for the technology phase, although it can be broader than that. There are business opportunities and a lot of different type of fields. But the majority of the possibilities are technical in nature. So programs that are related to science and math at a local level are helpful. And for college students, if you're a student interested in engineering or math, those fields align well with technology. Then, as an adult, if you're not in the field, but you want to get into it, start joining some organizations that support technology so that you can learn about what your skill sets are and how they can transfer over to technology. If you don't have the resources to join these organizations or to join numerous organizations, then some organizations have volunteer opportunities where you can go and volunteer for their event for free. Doing that allows you to learn about the technology field from a formal standpoint. But informally, it allows you to create a network within that space.

Tell more about building relationships. How should someone go about that?

I think building relationships should be in the top three things that they do. Yes, they should learn their formal instruction, but they should network because it has tremendously helped me in my career.

Walk us through your career.

Out of school, I worked for EDS (Electronic Data Systems) and at General Motors in La Grange, Illinois, as an industrial engineer...and then I decided that I wanted a career change and wanted to do something different. So I went back to the University of Illinois, where I got an MBA in marketing. After graduating from business school, I got in at *BlackVoices.com*, which was owned by the *Chicago Tribune*. I worked in marketing and sales. When AOL bought *Black Voices*, I went over to join the sales team at AOL... And now here at Facebook as a Multicultural Lead, focusing on African-American Affinity sales.

What drives you? Are you more passionate about sales or technology?

You know, I think I'm passionate about both. I've always had an affinity for technology, which is why I initially majored in engineering. I have a natural inclination to keep learning. Which is why I like digital, it's constantly changing. I've had careers where I work in multicultural and where I've also worked in a more general market. But I am passionate about multicultural marketing. And I love the Tech space. Just the constant changing and the newness that technology allows you to learn because it always changes.

**READ THE ENTIRE INTERVIEW
ONLINE AT CHICAGO DEFENDER**

<https://chicagodefender.com/2017/03/29/techroundup>

ISE ALUMNA TASHA LEVY

An interview with *Chicago Defender*
Executive Editor Shari Noland



TASHA LEVY, BSIE 1994

**FACEBOOK: MULTICULTURAL
LEAD, GLOBAL MARKETING
SOLUTIONS TEAM**



ISE ALUMNUS BRAD MOTTIER

Emily Scott



Mottier is giving back to the Department of ISE by sponsoring a student challenge that will encourage entrepreneurial innovation. Mottier says decided to give back to Illinois because he believes his education played a large part in the string of successes he has enjoyed over the last 35 years of his career. With the new student entrepreneurship challenge he is sponsoring, named the Mottier Innovation Challenge, he hopes a new generation of students will be driven to innovation.

Brad Mottier believes his general engineering degree from the University of Illinois played a significant role in preparing him for a career that has been marked by innovation. Today, he is Vice-President & General Manager, General Electric Company, GE Aviation, Business and General Aviation and Integrated Systems.

Mottier was the first candidate for the department's master's degree in general engineering. The project he decided to pursue for his thesis was designing an angle of attack indicator for general aviation aircraft. Angle of attack indicators provide a measurement of wing efficiency and can be used to optimize the airplane's performance and improve flight safety. Previously, angle of attack indicators had been used in military and commercial aircraft, but they were expensive, so Mottier focused on making the cost affordable for small, general aviation aircraft. He came up with a design that he used to earn his master's degree. Around 10 years ago, the Federal Aviation Administration recognized that angle of attack indicators would increase flight safety on small general aviation aircraft. The FAA encouraged companies to come up with ideas for developing indicators, and several companies began working on this problem. A number of these companies incorporated a methodology and design concept that was similar to what Mottier developed back in 1980. This design would only be the beginning of an innovative career for Mottier.

MOTTIER INNOVATION CHALLENGE in Systems Engineering

In 2010, he oversaw a team that would scale GE engine technologies to a smaller size so they could be used for business aircraft. This became the first new engine introduced into the large cabin aircraft marketplace in three decades.

Mottier was awarded the University of Illinois Distinguished Alumni Award in 2011. He was the second in his family to receive this award, as his grandfather, an engineering alum, did also.

FOR FURTHER READING

READ THE FULL STORY ONLINE

<http://ise.illinois.edu/newsroom/article/brad-mottier>



OVERGRAD



**RYAN HOCH: BSGE 2009,
FORBES 30 UNDER 30**

Ryan Hoch and Kevin Hoffman met while living in Scott Hall and taking the same GE 101 course.

Three days before he graduated, Hoch learned about Teach For America, a nonprofit organization that recruits recent college graduates to teach in low-income areas. He decided to apply and ended up teaching in St. Louis for two years.

There, the idea for Overgrad formed after Hoch asked his students if they wanted to go to college. “Ninety percent of them put their hand in the air,” he said. “Then I said, ‘Where do you want to go?’ And they said all the nearby, very good schools like Washington University in St. Louis and the University of Missouri.” Later, his students took the ACT standardized college placement test. The average score was a 15 and the average GPA was a 2.5.

“It was a really discouraging conversation to have, because these were juniors and seniors, so a lot of them didn’t have the credentials they’d be using to apply to college with,” Hoch said. Hoch reached out to Hoffman and asked if he wanted to help him with an idea.

Four years later, Overgrad has developed into a way to integrate technology to help students and their families navigate educational options that can be used to unlock economic opportunities.

FOR FURTHER READING

READ THE FULL STORY ONLINE
<http://ise.illinois.edu/newsroom/article/overgrad>

OVERGRAD
<https://www.overgrad.com>

ISE ALUMNI RYAN HOCH AND KEVIN HOFFMAN

Emily Scott



OTHER NEW ALUMNI STORIES ONLINE

MANDY BRIGGS BSGE 2002
<http://ise.illinois.edu/newsroom/article/mandy-briggs>

DAN COUILLARD BSGE 2004
<http://ise.illinois.edu/newsroom/article/dan-couillard>

WENDELL HILDENSTEIN BSGE 1952
<http://ise.illinois.edu/newsroom/article/wendell-hildenstein>

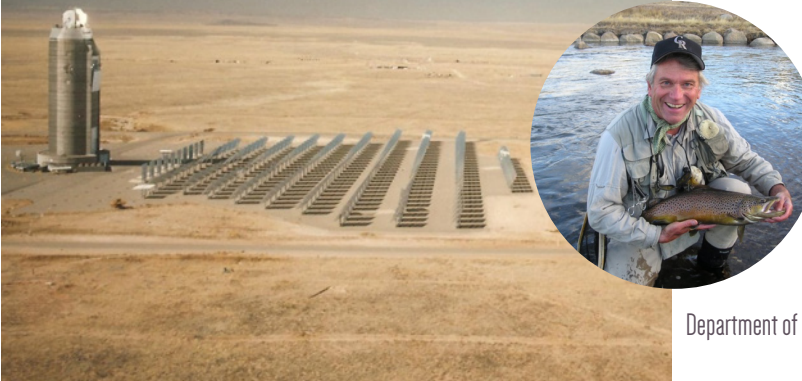
ISE ALUMNUS MARTIN BRZECZEK

Emily Scott



Brzeczek developed a gamma ray spectrometer on the Mars Observer spacecraft, a satellite launched in 1992 carrying instruments intended to study the geology and geophysics of Mars. The gamma ray spectrometer is on an extended seven-meter boom.

Brzeczek's molten salt electrical experiment: developing a receiver that could transfer solar energy into molten salt in order to generate steam to drive a small turbine.



Throughout his industry-spanning career, Martin Brzeczek was never bored.

Brzeczek came to Illinois in 1965, switching into the general engineering program from civil engineering when he grew interested in the business and project management side of engineering. One of his professors, Dr. Ron Placek, introduced him to the industrial side of engineering, which gave Brzeczek a new outlook on the intersection of engineering and business.

After graduating, Brzeczek took a job in Colorado with Martin Marietta, a manufacturing company specializing in launch vehicles, spacecraft, and research and development. The company merged with Lockheed Corporation in 1995 to become Lockheed Martin.

After many successful projects, he got a job in the aerospace industry within Martin Marietta, which allowed him to work on the Space Station.

“That’s where I got to understand all the various subsystems associated with a spacecraft, and that was key for a systems engineer.” Brzeczek says. “You really had to understand all of the subsystems before you could become a proficient systems engineer.”

After Brzeczek retired, he developed an introductory systems engineering course that has been used by several companies. It’s just one way that he has given testimony to his belief in the versatility of general engineering and the variety of career paths it can lead to, as it has for him

FOR FURTHER READING

READ THE FULL STORY ONLINE

<http://ise.illinois.edu/newsroom/article/martin-brzeczek>

On Kennda Lynch's first visit to the University of Illinois campus, everything changed. "It was the first place that I felt would let me explore everything," Lynch says.

In the summers, Lynch was working and exploring her career options. She interned at the Kennedy Space Center and was a cooperative education student with Boeing's International Space Station Program at Johnson Space Center.

After her graduation from Illinois, Lynch went on to work as a systems engineer for Lockheed Martin Space Operations at Johnson Space Center.

Today, Lynch is an astrobiologist working with NASA, exploring yet again. This time, she's exploring the

possibility of life on Mars and what this means for human exploration to the planet.

Lynch's work is also significant because one of the potential landing sites for NASA's 2020 Mars Rover mission is a paleolake basin called Jezero Crater.

"Our work in this field site could help NASA interpret what they are seeing, should we land at Jezero," she says.

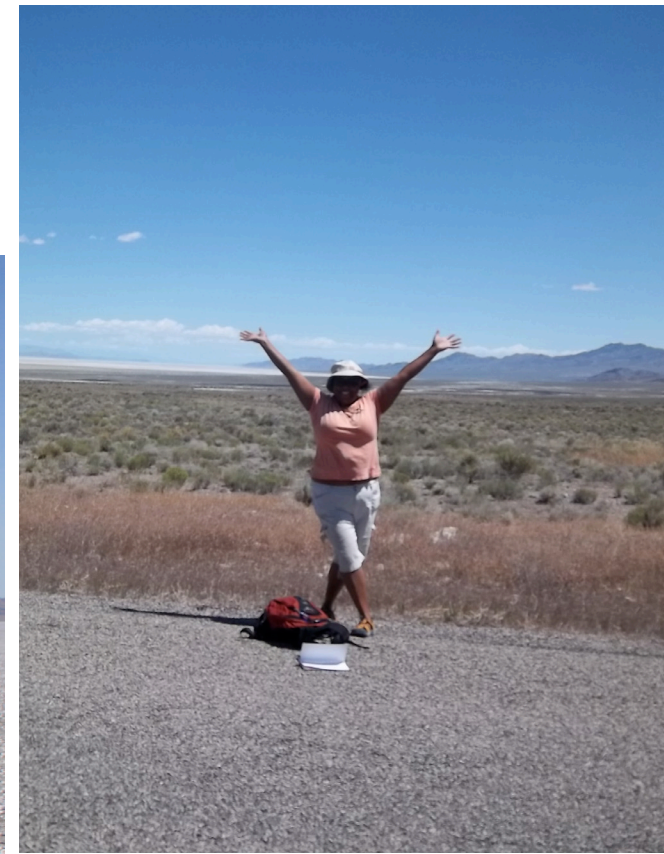
Additionally, Lynch is working on proposing a landing site for the first human mission to Mars.

"My life has just been wonderful, and it all started with being able to go to the University of Illinois, and being in the ISE department."

Lynch examining microbial mats in the Pilot Valley Basin, a paleolake basin in Utah. *Photo by NASA Astrobiology Institute.*



ISE ALUMNA KENNDA LYNCH



FOR FURTHER READING

READ THE WHOLE STORY ONLINE
<http://ise.illinois.edu/newsroom/article/kennda-lynch>

SENIOR ENGINEERING PROJECTS

FALL 2016

ACME FINISHING

Robotic Application for High-Volume Liquid Coating Line

Dusan M. Stipanovic, Advisor
Kyle Paige Kovitz
Cody McClintock
Melvin Octavian Santoso

BRIDGEWAY

Design Optimization for Dadant Product Work Cells

Sewoong Oh, Advisor
Arielle Loran Anderson-Venerable
Jordan Daniel Palmer
Kelsey Lynn Schreiber

Bernt O. Larson Award, Second Place

BUNN-O-MATIC CORPORATION

Experimental Study for Propane Refrigerant with Design Considerations

Scott A. Burns, Advisor
Brendan James Kelleher
Nicholas G Lindsey
Michael Christian Morrow

BUNN-O-MATIC CORPORATION

Experimental Study of Espresso Foam Production and Quality Enhancement

James V. Carnahan, Advisor
Martin Ignacio Giannetti Latuf
Carleasia Sarah Kengott
Patrick David Moynihan
Jason Eric Payne

CHEM-PLATE INDUSTRIES, INC.

Plating Process Analysis for Improved Efficiency and Cost Savings

Lavanya Marla, Advisor
Henry Blake Dominicis
Trevor Herbert Price
Naishadh Sambrani

CHIEF ENTERPRISES, INC.

Warehouse/Inventory Management and Optimization

Linwei Xin, Advisor
Lara Beth Flasch
Deniz Karaca
Patrick William Stubbs

Bernt O. Larson Award, First Place HARGER LIGHTNING & GROUNDING Refractory Mold Design Efficiency Improvement

Harrison Kim, Advisor
Abhishek Bada
Gerald Terrance Eilers
Matthew Aloysius Tenhagen

IMPERIAL ZINC CORP.

Zinc Ingot Stacking Palletizing System Design

Wayne J. Davis, Advisor
Abhas Bhargava
Jack Gordon Bossong
Jonathan Michael Brattin

JULIAN ELECTRIC CO. INC.

Development of a Scanning Utility for Receiving Data into ERP System

Doug King, Advisor
Connie Hong
Alexander Michael Moses
Benjamin Marshall Scott
Andrew Demetrius Sydor

MONAHAN PARTNERS, INC.

Lean Analysis for Monahan Partners

Liming Feng, Advisor
Annie McKenna Goetz
Ningjian Huang
Lucas W Sharkey

MORTON BUILDINGS, INC.

Logistics Optimization for Lumber Purchase and Transport

Xin Chen, Advisor
James Michael Gilbert
Jigar Patel
Wenwei Yu

MORTON BUILDINGS, INC.

Logistics Optimization of Regionally Located Construction Equipment

Karthekeyan Chandrasekaran, Advisor
Sean Patrick Kelley
Thomas Joseph Kukec
Jin Hwan Lee
Scott Patrick Shiro

NOKIA-US

Data Analytics and Lean Analysis for Improvement of Virtual Innovation Session Efficiency and Results

Deborah L. Thurston, Advisor
Ece Kalayci
Sona Alison Kaul
Hae Wook Lee

JUMP TRADING SIMULATION AND EDUCATION CENTER

Development of a Bluetooth Wireless Vital Sign Monitor for Post-OR Patient Transport (MedBit) - Phase 2

Carolyn Beck, Advisor
Dana Marie Keck
Tarik Koric

Anthony Lin

Michael Ray Muehlhauser

PRINCE CASTLE, LLC

Saber King™ Cutting Blade Cartridge Redesign

Henrique L. M. dos Reis, Advisor
Kevin Michael Burke
Joshua Eric Love
Stephen alexander Mysko

VAN VOORST LUMBER

Reel Component Manufacture Scheduling for Multiple Remote Assembly Plants

Qiong Wang, Advisor
Jason Derek Goldstein
Timothy Ryan Kosanda
Ryan Joseph Willenborg

SPRING 2017

BUNN-O-MATIC CORPORATION

Coffee Maker Redesign for Lime Tolerance and Reduced Lime Buildup

Dan Thompson, Advisor
Perla Paola Morales
Timothy Szaflarski
Tianqi Wu
Jing Yu

BUNN-O-MATIC CORPORATION

Energy Efficiency Design Improvements for Bunn Coffee Makers

Scott A. Burns, Advisor
James Joseph Africh
Jazmyn Jimenez
Michael Kim
Yining Wang

CATERPILLAR LAFAYETTE ENGINE PLANT

Assembly Process Design and Simulation for Caterpillar Engines

Niao He, Advisor
Shenghan Chen
Kyle L DeAtley
Nuttanon Siratanapun
Joshua Ian Weisberg

DREADNOUGHT TECHNOLOGIES, LLC

Experimental Study of Shot Pattern Scatter Improvement

James V. Carnahan, Advisor
Hannah Victoria DeYoung
Zhonghao Liu
cole connor murray
Samuel Joseph Rubin

DW FINE PACK

Intelligent Production Scheduler for Lean Press Operations

Qiong Wang, Advisor
Mitchell Forrest Babendir
Andrew Louis Doyon
Brian S Maxwell
Erkin Deniz Ontas

HARGER LIGHTNING & GROUNDING

Thermite Igniter Redesign for Cost Reduction

Harry S. Wildblood, Advisor
Tianshi Fu
Kevin Lewis
LIHUI SUN
Yunus Emre Yener

JULIAN ELECTRIC CO. INC.

Lean Material Flow for Production Support

Xin Chen, Advisor
Cynthia Kartika Hidayat

Yue Huang
Andrew Perutz
Alex Tazic

JULIAN ELECTRIC CO. INC.

Work Instruction Generation Process Improvement

Wayne J. Davis, Advisor
Patrick Joseph Daleiden
Rohan Roy
Michael Vincent Speranza

JUMP TRADING SIMULATION AND EDUCATION CENTER

Development of a Wireless Vital Sign Monitor for Post-OR Patient Transport (MedBit) Phase 3

Carolyn Beck, Advisor
Alexander L Kmiec
Ryan Patrick Somerfield
Michal Adam Witek
Jason Yue

MACLEAN-FOGG COMPONENT SOLUTIONS

Mundelein Development of a Scanning Utility for Receiving Data into ERP System

Sewoong Oh, Advisor
Yasemin Burcu Demirok
Thomas Joseph Jozefowicz
Kovas Kulbis
Charles R. M. Zine

MACLEAN-FOGG COMPONENT SYSTEMS METFORM GROUP

Hot Forging Tool Life Analysis and Improvement

Henrique L. M. dos Reis, Advisor
Sawyer Grant Hoffman
Lynsey Alexandra Howse
Nachiketa Pai
Erik Salinas

MORTON BUILDINGS, INC.

Shipping Logistics and Efficiency for Fabricated Parts Distribution

Lavanya Marla, Advisor
Brian Paul Boucher
Bora Refik Cukurova
Mehmet Kaan Serdar
Jordan Alexander Trajkovski

MORTON BUILDINGS, INC.

Trailer Loading Analysis for Shipping Efficiency and Cost Reduction

Linwei Xin, Advisor
Brandon Louis Dunn
Kurt Charles Fester
Matthew Michael Moukheiber
Patrick Nelson

NORTH AMERICAN LIGHTING

Material Handling Process Labor Improvements

Liming Feng, Advisor
Haruka Aoki
John Robert Keen
Kento Jann Tee
Jinhao Zhang

OSF HEALTHCARE SYSTEM

Centralized Pharmacy Layout and Operations Design for Implementation

Harrison Kim, Advisor
Brendan Conlon
Tyler Kim
Yang Lei
Elizabeth Templeton
Razvan Iulian Zaporozjanu

OSF - ROCKFORD CARDIOVASCULAR ASSOCIATES

Work Flow and Efficiency Improvement

Dusan M. Stipanovic, Advisor

Hyunseung Chung
Rachel Nicole Gonzalez
Gaurav Deepak Jagiasibava
Zixian Song
Fei Xue

PLOCHMAN, INC.

Bottle Paneling Reduction/Elimination

James V. Carnahan, Advisor
Dawei Li
Jocelyn Dawn Liang
John Anthony Mancinelli
Samuel Robert Trapp

TEAM CLEATGUARD

CleatGuard Engineering Design and Production Analysis

Girish Krishnan, Advisor
Erik Khamphouy
Aksel Meric
Arjun Subramanian

FALL 2013 SENIOR ENGINEERING PROJECT TEAM AWARDED PATENT!

Spartan Tool, LLC Jetter Hose Distance Counter Design

Anderson, Matthew
Dineen, Kevin
Thomas, Hannah

READ THE STORY ONLINE:

<http://ise.illinois.edu/newsroom/article/SEP-team-awarded-patent>

NEW ISE ALUMNI

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INDUSTRIAL ENGINEERING

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Kyra J. Grant
Yoonki Kim

DECEMBER 2016 GRADUATES

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Jason D. Goldstein
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Jordan Alexander Trajkovski
Joshua Ian Weisberg
Tianqi Wu

Yunus Emre Yener
Wenwei Yu
Jinhao Zhang
Charles R. Zine

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Marigold Flora MacDonald Bays-Muchmore (GE)
Alexander Robert Kite (GE)
Nathanial Brooks LaQuatra (GE)

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Hannah V. Deyoung
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Michael Dongsup Kim
Tarik Koric
Kyle P. Kovitz
Kovas A. Kulbis
Dawei Li
Nicholas Gene Lindsey
Joshua E. Love (GE)
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Perla Paola Morales Garcia
Matthew Michael Moukheiber
Patrick David Moynihan
Cole C. Murray
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Trevor Herbert Price
Samuel Joseph Rubin
Erik Salinas
Ryan P. Somerfield
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Matthew Aloysius Tenhagen
Samuel R. Trapp
Michal Adam Witek
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MASTER OF SCIENCE IN INDUSTRIAL ENGINEERING

Nrupa Chitley
Shouvik Dutta

Ninad Sancheti

MASTER OF SCIENCE IN SYSTEMS AND ENTREPRENEURIAL ENGINEERING

Naveen Kumar Sankaran
Kuocheng Wang

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Hari Bhagavatheeswaran
Jeeyeun Kim
Likhith Madamanchi
Haohao Qin
Ting-Yu Shih
Nitin Srivastava

MASTER OF SCIENCE IN SYSTEMS AND ENTREPRENEURIAL ENGINEERING

Danny Lohan
Gaurav Singh
Naveen Kumar Uppalapati

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Can Cui
Sanjana Jain
Varsha Ravi Prakash Kaushik
Ameet Mathew
Karthik Velusamy
Teng Wang
Ziying Xiang
Xini Yu

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DOCTOR OF PHILOSOPHY IN SYSTEMS AND ENTREPRENEURIAL ENGINEERING

Megan McGovern

DECEMBER 2016 GRADUATES

DOCTOR OF PHILOSOPHY IN INDUSTRIAL ENGINEERING

Ketan Hemant Date

MAY 2017 GRADUATES

DOCTOR OF PHILOSOPHY IN INDUSTRIAL ENGINEERING

Arash Khatibi

DOCTOR OF PHILOSOPHY IN SYSTEMS AND ENTREPRENEURIAL ENGINEERING

Anand Deshmukh



CLASS OF 2017: READY FOR LIFTOFF

THIS IS NOT THE ENTIRE CLASS. SEE PREVIOUS PAGE FOR ALL GRADUATES.



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ENGINEER IN RESIDENCE

Our students value and are inspired by interaction with our alumni. An Engineer in Residence will

- Spend approximately 7-8 hours on campus
- Speak to our GE 390 class
- Stay “in residence” for an afternoon and/or morning for individual appointments with students

CORPORATE PARTNERS

ISE Corporate Partners have access to outstanding students and faculty, can fill talent pipelines, and solve problems. Corporate partners receive

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If you're interested in becoming an Engineer in Residence or Corporate Partner, please contact Lee Zerrusen at lzerrus2@illinois.edu.



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We invite your company to participate as an Industry Partner in the Senior Engineering Program.

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STAY IN TOUCH

Please drop us a line to let us know how your career is unfolding.

We'd like to hear how you're doing. ISE graduates end up with myriad life paths. If you have a story you'd like to tell, feel free to reach out. Your colleagues, former mentors, and current and future students will all be excited to see which direction you've taken with your foundational ISE education.

If you'd like to reach out, send an update, receive ISE materials, order ISE gifts, or offer your story, please contact William Gillespie at gillespi@illinois.edu. Also please consider keeping us apprised of any changes in your physical or email address.

You can also follow the work of our excellent student social media directors online at <http://ise.illinois.edu/newsroom/follow-ise.html>



GOLD PARTNER: PRINCE CASTLE

Prince Castle has a long history of investing in ISE, including sponsoring senior design projects, hiring students, and providing internships.



BRONZE PARTNER: MOLEX

Molex has been active in hiring ISE students and has partnered with the department to increase its exposure to its talented student population.



BRONZE PARTNER: NORTHROP GRUMMAN

Through this partnership, Northrop Grumman is intent on discovering excellent talent to join their team.



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An anonymous donor has already given a new \$1 million gift to the initiative, which will be matched immediately.

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—Andreas Cangelaris
Dean, Engineering at Illinois

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SENIOR DIRECTOR OF
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