MechSE

2026 MAGAZINE

You can come home again

Making MechSE a family affair

Twisting, creeping, bending, and breaking since 1890, p. 6

On the Ball: Research innovations debut at the World Cup, p. 32



Contents

02 You can come home again: Making MechSE a family affair

06 Twisting, creeping, bending, and breaking since 1890

08 Undergraduate News

12 Graduate News

16 Research and Faculty News

26 Alumni News

32 On the Ball: Research innovations debut at the World Cup

MechSE at Illinois

Department Head
Nenad Miljkovic

Communications & Advancement
Julia Park
Rachel Berry
Taylor Parks
Kendra Wolf
Steve Zahos

Additional Contributors
Heather Coit
Michelle Hassel
Vince Lara-Cinisomo
Michael O'Boyle
Mary Timmins
Lois Yoksoulian
Fred Zwicky

Designer
Jillian Nickell

Join our social networks!

@illinoismechse
@mechse.illinois
@illinoismechse
@illinoismechse
@IllinoisMechSE
@Mechanical Science & Engineering at the University of Illinois

Check out tons of online-only content for this issue:
go.mechse.illinois.edu/magazine-2026

FROM THE DEPARTMENT HEAD



Nenad Miljkovic
Founder Professor
Department Head

Nenad Miljkovic

Dear alumni, students, and friends of MechSE,

I am honored to write to you in my role as MechSE's new department head, effective August 2026.

When I joined MechSE in 2014 as a new assistant professor, our communications team interviewed me about my academic background and what brought me to the University of Illinois. I had been recruited after earning my PhD from, and subsequently working as a postdoc at, MIT. In the article, I was quoted as saying, "I've always known Illinois was a powerhouse. It's a fantastic school, and it was just too good of an opportunity to pass up. I would have been kicking myself for the rest of my life if I didn't take it."

While those early days of choosing my path and launching my career as a new faculty member seem like a lifetime ago, my belief in the excellence of MechSE at Illinois is evergreen. My colleagues in the department and in The Grainger College of Engineering continue to do groundbreaking research that directly impacts society and the planet, and our students still inspire me in the classroom with their ideas and wisdom.

I am humbled by the 11-year legacy of my predecessor and friend, Anthony Jacobi, and I hope to continue the work he did to increase our excellence at every level and elevate our research impact and research intensity. The MechSE department is already filled with extraordinary people and ideas. My goal is to build on that foundation by fostering a culture where collaboration and bold thinking drive us toward discoveries that matter. I am incredibly excited about the opportunities that lie ahead for our great department.

I look forward to working closely with all of you to continue to earn your loyalty and deepen the pride in your alma mater.

I invite you to reach out to me at nmiljkov@illinois.edu. I would love to hear from you!





You can come home again

Making MechSE a family affair

The wide-ranging expertise of MechSE's alumni, faculty, students, and staff encompasses incredibly varied fields. However, adding another layer of depth is a less prominent side of MechSE: its family ties. We explore the stories of five of MechSE's own, each of whom treasure the tradition of a family legacy.

By Taylor Parks

Get to know each family in the coordinating videos!

go.mechse.illinois.edu/familyaffair



▲ *Bill Giese on graduation day in 1997 with his late grandfather, standing outside his Stoughton Street apartment*

Julia Giese

As a high school student, mechanical engineering senior Julia Giese came to the Illinois campus as a summer camp attendee through the Worldwide Youth in Science and Engineering (WYSE) program. Her participation in camp solidified her decision to pursue mechanical engineering.

"I was motivated to choose mechanical engineering because I have always loved solving problems using a creative approach," Julia said. "I specifically chose Illinois because it is one of the top engineering schools in the nation, while also being close to home, so it seemed like a no-brainer."

Once on campus as a student, Julia became involved with Illini VEX Robotics. "I most enjoyed the immeasurable experience I gained from this team, especially when just starting out in school," she said. "I also made great friends and was so fortunate to receive guidance from my teammates with much more experience than I had at the time."

Julia credits her father, Bill (BSME 1997), with introducing her to aspects of engineering that later helped guide her decision. "I was lucky enough to have a dad in mechanical engineering, and he always encouraged us to work hands-on and provided us with all the resources we could need," she said.

"I was naturally drawn to mechanical engineering and design as a whole," Bill recalled. "Growing up in Illinois, the U of I felt like a very obvious choice [for school]. It has an incredible engineering program."

Bill has worked for nearly 28 years with the global manufacturing company Illinois Tool Works (ITW), which has headquarters in Glenview, Illinois. He was recently promoted from Division Vice President/General Manager to Group Strategy Director for ITW's welding segment.

"My career has taken a path toward management and leadership in manufacturing, and my Illinois degree helped shape that," Bill said. "I can't say enough how grateful I am that [Julia] is going to the U of I and that we're currently living in Illinois."

This past summer, Julia interned for the second time at Miller Electric Manufacturing in Appleton, Wisconsin. She is also excited that her brother, Billy, joined her in MechSE this fall.



▲ *Julia Giese*

"The most special part about going to the same school as my dad is the better understanding we have of each other," Julia said. "If I need someone to run an idea past or even just to talk about classes and daily life, I know he is always there to not only listen but understand."

Jillian Kouzmanoff

With an uncle who studied electrical engineering and a grandmother who graduated from MechSE (then Mechanical and Industrial Engineering), the University of Illinois was a familiarity in the life of ME senior Jillian Kouzmanoff from a young age. Like Julia Giese, Jillian was personally introduced to the campus as a high school student, when she attended the aerospace engineering summer camp hosted by WYSE.

"After [camp], I knew that this was the place I wanted to be," she said. She was not alone in finding Illinois to be the right place — both her brothers have attended the U of I as well, with Max recently graduating with a degree in econometrics and Quincy currently studying business agriculture.

For the Illinois native, the legacy of her late grandmother Maurita Kouzmanoff (BSME 1979) was also a guiding factor. "Growing up, I was inspired hearing about my grandma and what she did," she said.

Once on campus, Jillian became heavily involved in the Illinois chapter of the Society of Women Engineers (SWE), serving this past school year as director of their outreach committee. She also performs thermal experiments for a space manufacturing research project with professor Sameh Tawfick.

Jillian's uncle and electrical engineering alum Jeffrey Kouzmanoff has supported her journey. "He's been an awesome tutor and mentor for me," she said.

Maurita studied mechanical engineering at the U of I while her oldest son studied electrical engineering.

"It must have been tough," Jillian's father, Keith, said of his mother's experience. "She raised six kids and worked full-time to go back to school. She felt extremely proud to be a mechanical engineer."

"I'm taking the same classes that she took," said Jillian. "I might even be seeing some of the people she met. I feel really connected to her and a lot more connected to my family as well."



Jillian's grandmother and ME alum, Maurita Kouzmanoff, with her husband James ▼



▲ *Jillian with her brother Max (BS LAS 2026) at his graduation in May*

Evan Tonarelli

Mechanical engineering junior Evan Tonarelli found it natural to carry on his family's legacy and follow in his father's footsteps to pursue engineering at Illinois.

"My dad got me into engineering," he said. "He worked construction and he would work on projects at home on the weekends with me by his side. When I started thinking about what I wanted to do after high school, I knew I should follow my dad and go to Illinois."

Hailing from north-central Illinois, Evan's maternal grandfather, Donald Janka, and father, Darren Tonarelli, both studied engineering at Illinois, graduating from civil engineering in 1962 and general engineering in 1995, respectively.

Once on campus, Evan became a member of the U of I chapter of the American Society of Mechanical Engineers (ASME), joining the product development sub-team. His team collaborated on a project supported by the Illinois Assistive Technology Program (IATP) to prototype an open-sourced, 3D-printable, gear-driven mechanism that can sweep a white cane back and forth while mounted on a walker.

In addition to IATP, Tonarelli partnered with the machine learning startup Avea Robotics (accepted into the Y combinator in spring 2026), for which he co-led a team of 15 students over this past academic year. They developed Dextera, a four-fingered robotic arm with 14 degrees of freedom.

Evan carries a legacy that includes not just his father and grandfather, but two uncles as well. His maternal uncles Ronald Janka and John Kowalski also studied mechanical engineering at Illinois, graduating in 1989 and 1991, respectively. "I've always been close with my uncles," he said. "As I got into high school, I wanted to learn more about their careers."

In particular, Evan cites Kowalski's work ethic as an impactful model for his own upcoming career.

"Being able to witness someone being so dedicated and turning their dedication into real success made me feel that if I work hard in MechSE, I can achieve really meaningful results," said Evan.

Evan interned this past summer with Constellation Energy at their Dresden Clean Energy Center in Morris, Illinois.

"I'm proud of [him] and I think he's doing great things," Kowalski said of Evan. "He's got a great future ahead of him."



▲ *Evan, third from right, and Zachary Yashar, left, with fellow MechSE students at an ASME event on campus.*



▲ *Evan's uncle, John Kowalski, on his graduation day in 1991*



▼ *The Tonarelli family at an Illinois football game in fall 2024. Evan's father Darren is in the foreground; Evan is second from right*

Kevin Wandke

Back in high school, teaching assistant professor Kevin Wandke (BSME 2019, MS ECE 2022, PhD ECE 2024), did not predict just how far he would go in MechSE. Or, for that matter, the state of Illinois.

"I actually really wanted to get out of the Midwest," said Kevin, who grew up in the Chicago suburbs. "But when I toured the Illinois campus, I really enjoyed it. I also had a family connection. MechSE ended up checking all the boxes for me."

Kevin's family connection runs deep — his grandfather Norman Wandke (BSME 1950), aunt Adrienne Adams (BSME 1982), father Norman Wandke Jr. (BSME 1984) and cousin Christopher Wichlac (BSME 2024) all passed through the department. Chris' parents also attended the U of I, as did another aunt and Kevin's brother Alan, who studied computer science.

Overlapping with family as a student made for a particularly special time. "It was a lot of fun getting to see Chris while he was here, and my aunt and uncle when they would come to visit," Kevin recalled. "My brother was also on campus at that time, so we had quite the family cohort down here."

Kevin began to look for a teaching faculty position after earning his PhD. "I really appreciated the freedom in teaching that Illinois offered — I felt that I could innovate in the classroom as opposed to follow the same structure that has always been taught."

Kevin's family demonstrates the breadth of expertise encompassed by a MechSE education,



▲ *Kevin with his dad Norman Jr. on his PhD graduation day, 2024*

▼ *A Wandke family Illinois tradition*



with his relatives branching into various careers in industry. Norman Jr. (now retired) designed and manufactured X-ray tubes for the imaging solutions company Dunlee. Wichlac joined Continental Tire's rotation program, recently settling into an industrial engineering position. Adams (retired) moved to Florida to work for the electric utility Florida Power & Light (FPL).

The Wandke family's connection to campus begins with Kevin's grandfather, a WWII veteran who attended Illinois following his term of service.

"My dad always thought that Illinois was the best deal," Norman Jr. recalled. "When I was a kid, he always loved to make things and fix things. He'd bring things home for me to take apart too."

Indeed, the family continues to value their longstanding relationship with the U of I.

"Having attended such a historical, amazing institution for engineering was fantastic," Wichlac said. "I'm so proud. Every time [my company gets] new hires from the U of I, I'm so excited because I just love our school."

Now having taught for the last two years, Kevin cherishes the opportunity to connect with students. "In some of my classes, I get to learn all my students' names and be an educator who cares about educating and cares about them," he said. "I have a fulfilling sense that I'm in a position to enact change and make things better."

Zachary Yashar

As a high school student, ME senior Zachary Yashar found mechanical engineering to be the perfect combination of his two favorite subjects — physics and shop class. He was also familiar with the field through his dad, Dr. David Yashar, a two-time MechSE grad (BSME 1997, MSME 1998). David currently serves as deputy chief of the Building Energy and Environment Division of the Engineering Laboratory at the National Institute of Standards and Technology.



▲ *Zachary with his mom Shawnna (BS ChE 1998) and his dad David (BSME 1997, MSME 1998) on campus for fall 2025 homecoming*

"I looked up to [my dad] a lot, which definitely influenced my decision," the Virginia native said of coming to Illinois.

Like Tonarelli, Zachary became involved with ASME as a freshman, serving as its president this past academic year.

"Being president has been very exciting and rewarding," he said. "I've loved getting to meet and connect with people and become more involved in the department."

He also joined the Illini Solar Car mechanical sub-team as well as the space RSO Liquid Rocketry, where he discovered an interest in aerospace propulsion as an engine team member.

For David, Illinois was also a family affair. "Illinois was the first school that I was really interested in," said the Chicago native, noting that his older brother also attended the U of I and studied materials science. "I only applied to Illinois. I got in and that was that."

He also met his wife, Shawnna, while on campus. "We both worked as lifeguards for the pool at Kenney Gym," he recalled. Shawnna studied chemical engineering before continuing into law.

"The fact that I'm at the same school that both my parents went to has meant a lot to me," Zachary said. "They get to come back and show me the places that they used to go."

He interned this past summer in the Automation, Robotics, & Controls group at Los Alamos National Laboratory in New Mexico.

"I think [Zachary] very naturally gravitated toward mechanical engineering, and I was happy to foster it," David said. ◆





▲ *Zachary in front of Mechanical Engineering Lab*

◀ *Kevin, second from right, with his brothers Ryan and Alan and dad Norman Jr., on the Quad in 2007*



Twisting, creeping, bending, and breaking since 1890

A compilation of TAM publications circa 1970. Photo MechSE archives

By Taylor Parks

One hundred years since the end of the tenure of the first department head of Theoretical and Applied Mechanics (TAM), the program is still one of international significance.

Early on in the university's history, the College of Engineering (now The Grainger College of Engineering) recognized the need for students to learn mechanics, or the branch of science that focuses on forces and deformations. When the Department of Theoretical and Applied Mechanics was officially organized in 1890, Arthur Newell Talbot became its first department head, remaining in the role until 1926.

University-wide enrollment for the 1889-90 school year included 337 undergraduate students. By the 1926-27 academic year, the College of Engineering alone had grown to 1,684 students.

Watch the TAM video:

go.mechse.illinois.edu/Illinois-TAM



Arthur Newell Talbot, TAM's founder and first department head. Photo reproduced from "Celebrating TAM's First 100 Years" by professor emeritus James Phillips

As a student in civil engineering at Illinois, Talbot (1857-1942) maintained a grade average of 98 throughout his studies — a record that was unmatched for many years after. He graduated in 1881 and served on the engineering faculty for 57 years.

Talbot's family described him as having devoted his life to the advancement of engineering education and to the science and practice of engineering. He was known for his inspired teaching and took great satisfaction in seeing former students go on to distinguished careers.

He left not only a legacy of teaching but also one of outstanding research contributions to railroad engineering, structural engineering, sanitary and hydraulic engineering, concrete technology, and engineering education — many of which were recognized through honorary doctoral degrees and medals from national engineering societies. Indeed, the American Railway Engineering Association passed a resolution of appreciation and commendation of his work at its 1925 annual convention in Chicago.

Talbot's stellar leadership, prominent work ethic, and extensive academic and research contributions earned him a number of accolades both during his lifetime and posthumously. Notably, the department's Materials Testing Laboratory was renamed the Arthur Newell Talbot Laboratory during a special convocation in 1938 that Talbot attended. This was followed by a second convocation held at Illinois in 1941, this time by the American Railway Engineering Association to honor Talbot's services to the Association. More recently, MechSE has offered the annual Arthur Newell Talbot Distinguished Lecture as one of four endowed lecture series. The Talbot lecture series was originally endowed by Talbot's grandchildren and great-grandchildren to honor his memory and has run for nearly three decades.

Subsequent department heads included Melvin Lorenius Enger, who succeeded Talbot before going on to become Dean of the College of Engineering in 1934, and Fred B. Seely, who co-authored the textbook Analytical Mechanics for Engineers. TAM's final department head, from 2005 to 2006, was Nancy Sottos, now a professor of materials science and engineering and who just wrapped a term as head of that department.

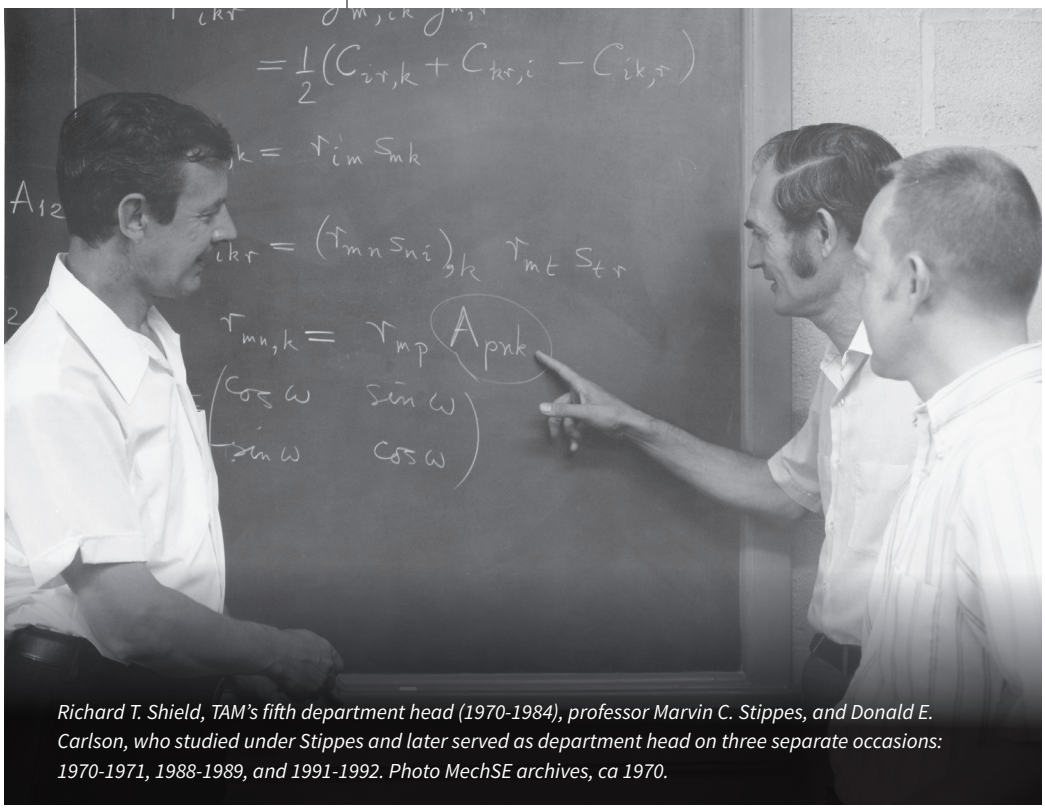
As many alumni will recall, MechSE was born 20 years ago, in 2006, when the TAM department merged with the Department of Mechanical and Industrial Engineering (M&IE). Today, MechSE's theoretical and applied mechanics PhD program is one of just three nationwide, alongside those at Cornell University and Northwestern University.

"The TAM program is very prestigious and well known," said associate professor Elif Ertekin. "I think that when people hear that you have a TAM degree from the University of Illinois, they'll know the background you have and the culture you're coming from."

The department's engineering mechanics program, an undergraduate precursor to a TAM MS or PhD, is also renowned on the world stage.

"Illinois is known around the world as a leader in engineering mechanics," said TAM alum and professor Petros Sofronis (PhD TAM 1987). "The experience that we have and the tradition that we set is unmatched." ◆

> ***"Theoretical and applied mechanics is a unique field that attracts students from mechanical engineering, applied mathematics, physics, as well as materials science backgrounds. It's very fundamental so it draws students from fundamental areas."***
>
> *- TAM alum and professor Huseyin Sehitoglu (PhD TAM 1983), who served as M&IE department head during the merger*



Richard T. Shield, TAM's fifth department head (1970-1984), professor Marvin C. Stippes, and Donald E. Carlson, who studied under Stippes and later served as department head on three separate occasions: 1970-1971, 1988-1989, and 1991-1992. Photo MechSE archives, ca 1970.

Undergraduate News

ME undergraduate program ranks #8 for 2027



U.S. News & World Report has ranked the University of Illinois as the #8 best undergraduate program in mechanical engineering. MechSE's bachelor's degree program consistently ranks in the top ten in the country.

The Grainger College of Engineering ranks #6 overall and boasts 10 undergraduate programs ranked in the Top 10.

MechSE's other rankings include a #6 graduate program in mechanical engineering and a #3 online graduate degree in mechanical engineering.

Check out all of the 2027 undergraduate rankings in The Grainger College of Engineering:

College: 6
Aerospace: 8
Agricultural/biological: 4
Bioengineering: 16
Chemical: 10
Civil: 3
Computer engineering: 6
Computer science: 5
Electrical: 5
Environmental: 6
Industrial: 11
Materials: 6
Mechanical: 8

Deane's leadership, involvement recognized with college award

Each academic year, The Grainger College of Engineering selects one student for the Andrea J. Culumber Memorial Award based on their leadership skills, enthusiasm, creativity and kindness. The award recipient is also someone considered to be innovative and encourages others to become involved on campus.

This year's winner was mechanical engineering undergraduate **Grace Deane**. The senior, who is also a James Scholar and Chancellor's Scholar, will earn a minor in business when she graduates in May 2027.

Deane is a member of the mechanical engineering honor society Pi Tau Sigma and engineering honor society Tau Beta Pi, from which she received the Outstanding Initiate Award and Scholarship last spring. She is also a member of Women in MechSE and has been active with the Off-Road Illini Baja SAE team and the Illinois chapter of the American Society of Mechanical Engineers.

"As an undergraduate student, I have tried my best to take advantage of every opportunity on campus to immerse myself in new experiences and to make new friends," she said.



Deane received the Andrea J. Culumber Memorial Award in April from Grainger College of Engineering Dean Rashid Bashir.

After graduation, Deane hopes to pursue a career in management consulting working on sustainable energy projects.

MechRef meets students where they are

For the past few years, associate professor **Mariana Kersh** has led an interdisciplinary collaboration to develop online reference pages for select MechSE courses. The initiative that began with MechSE has since scaled to include the departments of aerospace engineering, bioengineering, electrical and computer engineering, and materials science and engineering, and the Siebel School of Computing and Data Science. Fellow MechSE faculty **Matt West, Kellie Halloran, Tom Golecki, Brian Mercer, Nikhil Admal, Callan Luetkemeyer, Kevin Wandke**, and **Shelby Hutchens** have all contributed to the project.

Their mission is to "create quality and freely accessible online educational materials that enhance student curiosity and connection and create value for both student and instructor." The site's content was created using a Community of Practice model, which centers on instructors and staff committed to the collaborative development of educational resources.

"We are excited about our next steps in working with community partners to ensure that the pages are accessible and relevant for students within and outside of Illinois — in particular, those coming through our pathway programs," Kersh said. "It's been a lot of fun to work with a great team of creative and enthusiastic individuals, and we're ready to see where this goes next."



Collaborators from the MechRef team presented at the ASEE annual conference. From left: graduate student Mikayla Hoyle, West, Halloran, Golecki, Wandke, Mercer, and teaching assistant professor Ke Tang.

Startup seeks to make the great outdoors more accessible to wheelchair users



During his time as a student in mechanical engineering, recent graduate **Joshua Anderson** (BSME 2026) had a dream: to develop an affordable, adaptive mountain bike that could make outdoor experiences more accessible to people with disabilities.

"[The] mission is to get more disabled people outside," said Anderson, who uses a wheelchair himself. "That's a mission that I've been dreaming of and striving for my entire life."

Anderson recruited interested students including mechanical engineering junior Ivy Yoon to collaborate on the project. His team, which has since incorporated as the startup Koine Adaptive, developed an all-electric adaptive bike that has a maximum range of 80 miles, weighs just 64 pounds, and can be broken down to fit in the trunk of a car.

The team participated in the 2026 Cozad New Venture Challenge, where they won a residency prize from the Research Park incubator EnterpriseWorks for this fall.

"I was really lucky to get this opportunity, and I want to emphasize that anyone can do this," Yoon said of being a core member of the startup. "Getting to try out different things has helped me start narrowing down my career interests, and I encourage other students to do the same." ◆

Clockwise from bottom left: Anderson, Thatcher Beauchamp, then-marketing lead Grace He, Yoon, and Adam Syed with their adaptive bike.

The enduring legacy of Senior Capstone Design

Year after year, MechSE students exemplify The Grainger College of Engineering's reputation for excellence and innovation through high-quality Senior Capstone Design projects. This year, with innovative projects covering everything from investigating medical stent material to debuting new TAM classroom demonstrations, our students' solutions were relevant both to industry and the field of engineering education.

Mitigating a life-threatening condition with PedalPro ▶

A team of Carle Illinois College of Medicine (CI MED) students including Daniel Cheah, Christian Guerrero-Juarez, Jacob Prince, Kristy Lin, and project leader Michael Nguyen-Truong (MD 2026), called on MechSE's Senior Capstone Design to help bring their new innovation, PedalPro, to life.

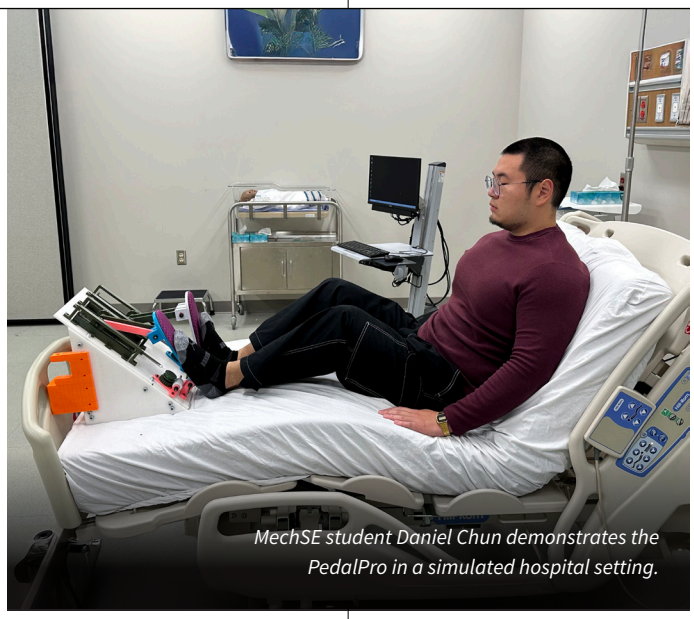
PedalPro is a low-cost pedal device that can be used by immobilized hospital patients while in bed. The adjustable pedaling platform allows the patient to actuate their legs at regular intervals to avoid the onset of deep vein thrombosis (DVT), or blood clots that can develop in the legs during long periods of immobility.

Two capstone teams worked with CI MED to bring PedalPro to its current prototype, with **Mary Chronopoulou, Daniel Chun, Daniel Kim**, and **Bella Tortorici** collaborating during the fall 2025 semester and **Jonah Matanky, Shiraz Bacamusa, Justin De Leon, Pranav Rao, Dylan Harkness**, and **Neil Thakker** working during spring 2026. Both teams were advised by associate professor **Mattia Gazzola**.

"PedalPro encompasses biomechanics and human movement, which was appealing to me," said Chun, whose motivation for the project comes from the heart. "My grandfather has mobility loss, and this is a product that could be used to help him gain more blood flow to his lower limbs."

The innovation garnered considerable accolades, with the fall semester team advancing to the semifinals of the Global Health Innovation Challenge Competition in Taipei, Taiwan, this past April.

"Our next steps will be to continue developing the device with enhanced comfort and engagement features for patients," Lin said. "Eventually, we hope to reach a testing phase for evaluation of safety and effectiveness."

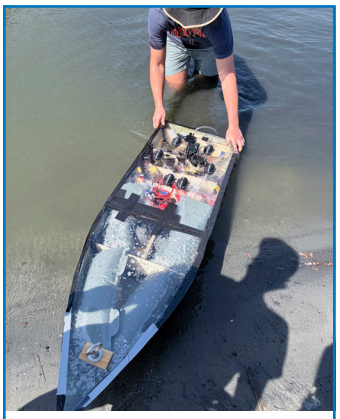


MechSE student Daniel Chun demonstrates the PedalPro in a simulated hospital setting.

Continuing to improve the electric propulsion boat ▶

Student teams continue to make improvements to the USS Illini, a boat powered by electric propulsion, competing once again in the Promoting Electric Propulsion (PEP) Competition hosted by the American Society of Naval Engineers. This year, the team competed for the first time in the autonomy division while also introducing three improvements over the previous year's design: a custom manufactured hull, an autonomous control stack, and use of a rudder. They finished fourth out of 17 teams.

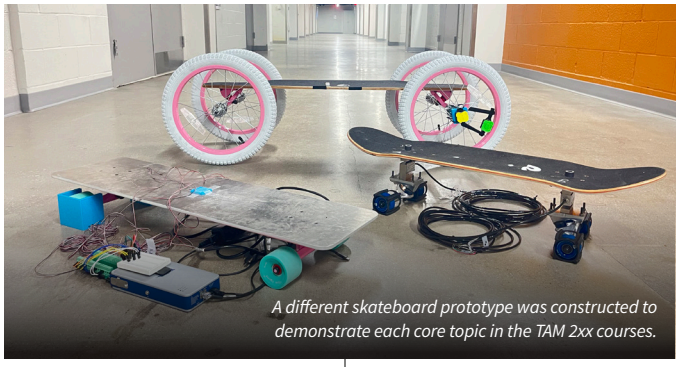
Team sponsor and MechSE alum **Bill Profilet** (BSME 1984) was impressed with how their collaboration and processes reflected those of engineers in the real world. "The interesting thing with [this team] is they really thought ahead on how to enable the team that comes after them next year to be able to learn from where they're at, take their lessons learned moving forward, and even improve on the project for the 2027 offering."



Watch the video of the boat team!

go.mechse.illinois.edu/boatteam

Supporting departmental course development ▼



A different skateboard prototype was constructed to demonstrate each core topic in the TAM 2xx courses.

Multiple Senior Capstone Design teams had the opportunity to foray into engineering education by developing project and demonstration materials for other required MechSE courses. Teaching assistant professors **Kellie Halloran, Kevin Wandke**, and **Tom Golecki** each advised a team that focused on developing new content.

Halloran advised **Betty Escobedo, Adrian Marquez, Michael Milke**, and **Celeste Reynoso**, who focused on using a skateboard as the platform for statics, dynamics, and solid mechanics demos.

"I really loved that this team was excited about thinking through how to make the TAM course sequence more engaging," Halloran said. "They worked together really well."

Golecki advised seniors **Mayas Kumble, Catalina Sophia Murga, Nathan Stamper**, and **Megan Tang**, who came up with a trebuchet as the basis for their demo.

"We wanted a system that was mechanically rich but still intuitive at first glance," the team said. "A trebuchet naturally combines force balance, rotation, energy transfer, projectile motion, and structural deformation in a single device."

Wandke's team, including **Ian Chroniak, Christian Hausman, Aiden Lefler, Yule Lin**, and **Nick Skweres**, took a different approach, working on developing two new design and fabrication projects — a customized marble run and a walking parade float to carry it, respectively — for ME 370 (Mechanical Design I), which Wandke teaches.

"The first project is designed to grade students on their ability to follow a design process, which allows students who are struggling to manufacture a prototype to fail a bit more gracefully," Wandke said. "The second project is very performance driven, with engineering standards that need to be met."

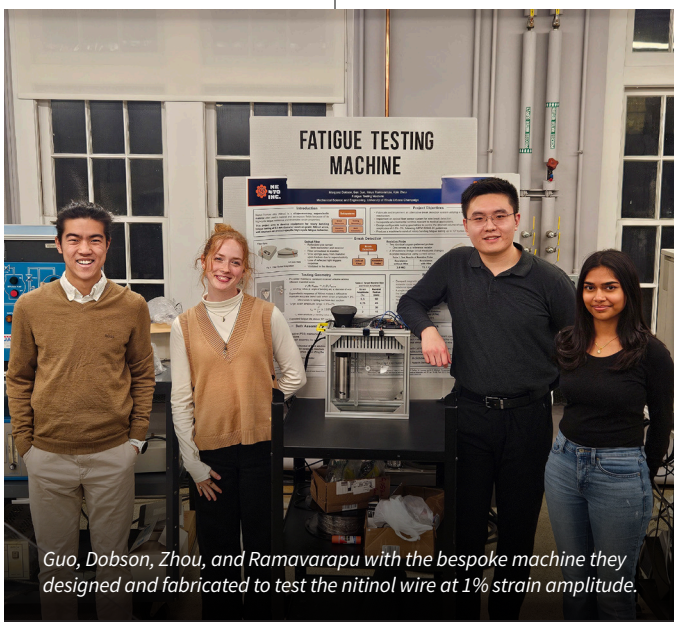
Developing novel test rig for nitinol wire ▼

Undergrads **Margaret Dobson, Ben Guo, Maya Ramavarapu**, and **Kyle Zhou** developed a novel testing machine for investigating strain-induced failure in nitinol, a shape memory alloy commonly used in medical devices such as stents and internal braces. To investigate fatigue life, the team's bespoke machine can be set to test the wire at 1% strain amplitude in human body-like conditions with an operating range between 3,000 and 12,000 rpm.

"The students were exceptional," said professor **Huseyin Sehitoglu**, who advised the ME 470 team and whose own research focuses on shape memory materials. "They made remarkable progress quickly and were very fast. Their skills complemented one another well."

Understanding nitinol's fatigue life, or the number of loading cycles it can endure before failure, is critical for its use in medical devices. This topic hits home for Dobson, whose father received nitinol stents after experiencing a heart attack.

"[Nitinol performance] is a very relevant topic in today's medical world," she said. "I want to know if my dad's stents will last the next thirty years. I'm glad I got to do some research on it and contribute to that field."



Guo, Dobson, Zhou, and Ramavarapu with the bespoke machine they designed and fabricated to test the nitinol wire at 1% strain amplitude.

How can your company benefit from sponsoring a student design project?

"It's really nice to see the bright young talent that has come up through the university. Every potential employer is looking for [skills that students learn during their Senior Capstone Design] — being able to think creatively, communicate well, understand a customer's needs, and deliver a solution."

Bill Profilet (BSME 1984) firmly believes in the importance of supporting our next generation of engineers. This past academic year, he was a contributing financial sponsor (with additional matching funds from Boeing!) for two Senior Capstone Design teams.

You too can sponsor a team from our #4 ranked program while addressing your company's proposed design challenge. Participating companies gain fresh perspectives on design issues, specific recommendations for resolution, invaluable access to recruit potential new hires, and world-class faculty expertise and resources. Everyone benefits from the open-ended, real-world, team-based experience.

Additionally, participating in our Industry Allies program means your company could host Tech Talks for students, post job openings on our internal listserv, participate in a MechSE-specific career fair, get highlighted on our high-traffic social media platforms, and have your company logo displayed on our website. The advantages are clear.

Contact Steve Zahos at szahos@illinois.edu or 217-300-6798 to get started.

Graduate News

Graduate program in ME climbs to #6

U.S. News & World Report's 2026 college rankings have placed the University of Illinois at the #6 spot for its graduate program in mechanical engineering. MechSE's MS/PhD program consistently ranks in the top ten in the country. Illinois' #6 spot is in a tie with the University of Michigan.

"Our graduate programs are exceptional. We offer a uniquely broad and integrated experience across the full spectrum of mechanical science and engineering, from fundamental discovery to impactful applications," said Elif Ertekin, associate professor, associate head for graduate programs and research, and director of mechanics programs.

> ***What I think truly sets us apart is our people: outstanding students, staff, and faculty whose collaborative, forward-looking work drives the strong momentum of our whole enterprise.***
>
> *- Elif Ertekin, associate head for graduate programs and research*



PPG-MRL Graduate Research Assistantship awardees announced


Tarandeep Singh Thukral


Nabila Ali

MechSE PhD student **Nabila Ali** (advised by MatSE assistant professor Marie Agathe Charpagne) and PhD student **Tarandeep Singh Thukral** (advised by MechSE professor Nenad Miljkovic) were among the five graduate students awarded a PPG-MRL Graduate Research Assistantship from the PPG Foundation to conduct research that is broadly related to coatings science and specialty materials. The award provides one year of support at 25% appointment and recipients receive a travel award of up to $2,000 to present their research at a conference.

In their partnership with Illinois, PPG and the PPG Foundation support a diverse set of students preparing for in-demand careers that will shape global innovation and cutting-edge technologies in areas such as polymer science and engineering, chemical engineering, materials science and synthetic organic chemistry. This fellowship enables graduate students focused on organic and inorganic coating within the Materials Research Laboratory.

Ahmed wins Research Live! competition

Mechanical engineering doctoral student **Asif Ahmed** won the 2026 campus-wide Research Live! competition. Research Live!, held this year on April 7, is an annual fast-paced event hosted by the Graduate College and is part of Graduate Student Appreciation Week. Ahmed is the first MechSE student to win in 10 years.
His winning presentation, "Cooling the Future by Bending Metal," focused on his research of advanced shape memory materials processing, characterization and zero-GWP solid-state elastocaloric thermal system design. Under the supervision of Founder Professor Nenad Miljkovic and in collaboration with NASA, Ahmed is developing next-generation refrigerant-free cooling technologies for aerospace and clean energy applications.

"I am deeply thankful to my advisor, professor Nenad Miljkovic, for his guidance, to our collaborator Dan Levick of Barrow Green, to my colleague Tayfur Rahman, and to all of my lab mates in ETRL who helped me throughout this project," Ahmed said.



Lee wins TechnipFMC Fellowship for sustainable energy research



In recognition of his research impact at the University of Illinois, graduate student **Beomhui Lee** was awarded a competitive TechnipFMC Fellowship for the 2026-27 academic year.

An ME doctoral student who is advised by MechSE assistant professor Lili Cai and teaching assistant professor Jiajun He, Lee earned his bachelor's degree in mechanical engineering from Korea University. His research at Illinois is focused on the electrochemical conversion of natural gas (methane) to make value added products, and the evaluation of environmental impacts and economic feasibility of natural gas storage systems.

Lee hopes to dedicate his career to making sustainable energy transitions economically feasible through a dual approach of experimental validation and computational simulation. The award will enable him to "devote more time to delving into nanopore-confined catalyst research related to oil and gas industry, and to utilize both experimental and simulation-based methodologies to achieve more profound insights."

Online ME master's program retains #3 ranking

MechSE's online mechanical engineering master's degree program continues to maintain its rank as #3 in the nation, according to data released earlier this year from *U.S. News and World Report*.

MechSE at Illinois offers a non-thesis professional Master of Engineering in Mechanical Engineering (M.Eng.ME) — now in its 12th academic year. The robust program prepares new engineers and those already in practice as they advance their careers and address societal challenges. Students can complete the degree entirely online as well as on campus, full-time or part-time.

The program serves approximately 100 students as of fall 2026 — with about half enrolled online — reflecting significant growth every year since its launch in 2015. The program has become known for the highly personalized support students receive from day one, no matter how they are enrolled in the program. Engineers with a professional master's degree from the University of Illinois are more competitive and see a greater starting salary and improved career trajectory over engineers who hold only a bachelor's degree.

In August, MechSE announced the appointment of associate professor **Craig Bradshaw** as the new faculty director of M.Eng.ME.

"I'm excited to step into this role to enhance the program's engagement with industry partners and to bolster our already incredible online component," said Bradshaw.



Seven ME graduate students named Mavis Future Faculty Fellows


1


2


3


4


5


6


7

1. Asif Ahmed (advised by Nenad Miljkovic)
2. Catalina Bastias (advised by Callan Luetkemeyer)
3. Pranto Karua (advised by Lili Cai)
4. Sena Pekol (advised by Huseyin Sehitoglu)
5. Srividhya Sridhar (advised by Shelby Hutchens)
6. Dongyoung Yoon (advised by Arend van der Zande)
7. Omar Zaki (co-advised by Nenad Miljkovic and Bill King)

An impressive group of mechanical engineering PhD students from MechSE was selected to the 2026-27 cohort of Mavis Future Faculty Fellows (MF3).

The MF3 program in The Grainger College of Engineering facilitates the training of the next generation of great engineering faculty, focusing on three main components of research, teaching, and mentoring. MF3 Fellows have an opportunity to develop and enhance their skills in these core areas through various professional development activities in preparation for a successful academic career.

Sridhar earns top honors at national adhesion science competition



MechSE doctoral student **Srividhya Sridhar** won first place in the prestigious Alan Gent Distinguished Student Paper Award by the Adhesion Society. The award is the highest recognition bestowed upon student researchers by the international society, whose mission is to promote the advancement and dissemination of adhesion science and technology.

Sridhar's winning presentation, "Multiscale, quantitative fractography of soft material failure," focused on the mechanics of soft fracture, or the tendency of stretchy or squishy materials to create new surfaces when subjected to mechanical loads. She is advised by associate professor Shelby Hutchens.

"Winning the award felt incredibly rewarding and affirming," said Sridhar, who is the first recipient in a long line of contenders from Illinois. "It felt rewarding not just on a personal level, but also as an opportunity to bring recognition to the institution and department that have been shaping my PhD journey."

"[Sridhar] demonstrated her unwavering pursuit of excellence through mastering her experimental technique first and continuing to energetically grow her skills in hypothesis formation and testing, computational modeling and analysis, and technical communication," Hutchens said.

Dentice wins DOE fellowship for nuclear materials research

Mechanical engineering doctoral student **Lucille Dentice** (advised by professor Janelle Wharry) was awarded a three-year graduate fellowship from the U.S. Department of Energy's Office of Nuclear Energy to experimentally characterize creep in radiation-resistant alloys.

Subject to the effects of irradiation, materials in nuclear reactors must withstand persistent corrosion and temperatures as high as 1,000 degrees Celsius. Under these conditions, reactor materials tend to experience creep, or slow stretching over time due to applied loads — which can lead to potentially dangerous failure.

"One of the fun things about doing experimental research on long-term problems like corrosion and creep is that you have to get really creative and think about how to study this in a reasonable time frame while also getting meaningful data that can be used to make predictions for future results and accurately plan for worst-case scenarios," Dentice said.

Over the first year of her fellowship, Dentice has focused on collecting and characterizing samples before transitioning into irradiation experiments.

"[By year three], I hope to get into the nitty-gritty details of the mechanisms we're looking at and how to design around them," she said. "I hope to bridge the gap between temperature- and deformation-related concerns and the properties that we need the materials to have — for example, by identifying an alloy that might be a good candidate but hasn't been studied extensively."



Investing in the future: Fellowship prepares researchers for faculty careers

Three researchers from The Grainger College of Engineering, including MechSE postdoctoral researcher **Hossein Kabir** (under professor Bill King), were named fellows of Purdue University's Trailblazers in Engineering program, an initiative to increase both the number and success of engineering faculty across the nation.

Trailblazers are selected for their outstanding scholarly achievements and their potential impact in broadening participation in engineering. It's expected that the fellows will one day blaze new trails with discoveries, innovations and social impact, and serve as role models for the next generation of engineers.

Kabir's current research lies at the intersection of advanced manufacturing and computer vision, focusing on high-precision inspection and automation.

"Building on the momentum and inspiration from the Trailblazers workshop, my experiences at Illinois have played a significant role in shaping my growth as both a researcher and mentor," he said. "Collaborating across multiple laboratories and accessing state-of-the-art facilities has enabled me to refine my research direction and expand my scientific perspective. The mentorship and guidance I have received from my former PhD advisor, professor Nishant Garg in civil and environmental engineering, and my current postdoctoral advisor, professor William P. King in mechanical science and engineering, have been instrumental in shaping my ambitions."



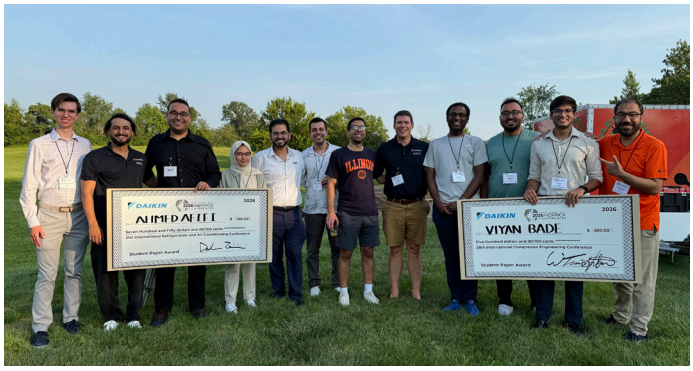
Three of Bradshaw's students recognized for authoring best papers

Research papers authored by three of associate professor Craig Bradshaw's graduate students were recently recognized as top among their peers.

During its annual conference, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) awarded PhD student **Shahzad Yousaf** the Best Paper Award of 2026 for "Development and performance evaluation of empirical models compatible with building energy modeling engines for unitary equipment," published in ASHRAE's peer-reviewed journal *Science & Technology for the Built Environment*. Yousaf was first author on the paper alongside coauthors Bradshaw, Rushikesh Kamalapurkar, and Omer San.

At the International Refrigeration and Air-Conditioning Conference, third-year PhD student **Ahmed Afifi** was awarded second prize for his paper focused on a vapor compression heat pump cycle with solution circuit. First-year PhD student **Viyan Bade** was awarded third prize in the student paper competition at the International Compressor Engineering Conference. His paper was on measurements of surface tension of refrigerant lubricant mixtures.

The competition is steep, with approximately 350 research papers submitted from around the world. The two conferences are part of a three-conference collection that take place simultaneously at Purdue University, referred to as the "Herrick Conferences."



All three students are involved in research as part of the Air Conditioning and Refrigeration Center, for which Bradshaw serves as the executive director.

Four from MechSE among record number of NSF Graduate Research Fellows

A total of 52 students, including 30 graduate students and 22 undergraduates, from the University of Illinois Urbana-Champaign have been offered Graduate Research Fellowships from the National Science Foundation (NSF). An additional 26 students have been accorded Honorable Mention.

Four MechSE students were among those 52: **Amelia Maria Korveziroska Honeyville, Amar Koric, Jason Robinso**n, and **Jordan Westphal**. Two more were included on the Honorable Mention list: **Aarav Shah** and **Annika Srinivasan**.

"The GRF is the premier federal fellowship for graduate students in STEM, and Illinois has a long history of success with it," said Ken Vickery, assistant dean for fellowships in the Graduate College. However, this year marks a milestone, for 52 is the highest number of awardees we've ever had — an institutional record. I congratulate all of this year's awardees and honorable mentions for their success with this wonderful fellowship."



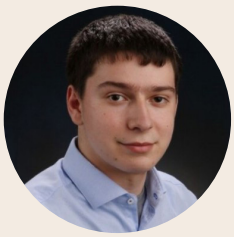
Amelia Maria Korveziroska Honeyville



Amar Koric



Jason Robinson



Jordan Westphal

GROUNDBREAKING RESEARCH

COPPER COLD PLATES COULD SLASH DATA CENTER ENERGY USAGE

Mechanical engineers have designed a more effective and energy-efficient technology for cooling computer chips. Published in the journal *Cell Reports Physical Science*, the researchers used a mathematical algorithm and advanced 3D printing method to produce pure copper cold plates that outperformed conventional cold plates and required less energy to run. If used to cool an entire data center, the technology would contribute only around 1.1% of the data center's total energy usage compared to more than 30% for conventional air-cooling methods, estimated **Behnood Bazmi**, first author and ME graduate student.

Direct-to-chip cooling systems consist of a cold plate that is attached to a computer chip. These cold plates have tightly packed metal "fins" that project out into the cooling liquid to maximize the surface area that is in contact with the coolant. Some direct-to-chip liquid cooling systems are already commercially available, but those systems prioritize manufacturing cost over performance. In this study, the researchers set out to optimize fin design to produce cold plates with maximal cooling ability.

Pure copper has a high thermal conductivity, but it's difficult to 3D print, so most cold plates are made of an aluminum alloy (AlSiMg) or stainless steel, which are not optimal for heat transfer. "ECAM can manufacture pure copper parts with very fine detail — down to 30 to 50 micrometers, less than the width of a human hair," said professor and department head **Nenad Miljkovic**.

When the researchers compared the cooling performance of an individual copper cold plate with the optimized fins to cold plates with conventional rectangular fins, they found that the optimized plate delivered up to 32% better cooling and reduced pressure drop (less effort to push fluid through the cold plate) by up to 68% while maintaining the same cooling performance. At the scale of an entire data center, this could translate into significant energy savings compared to both air-cooling and commercially available liquid-cooling systems.

"With our cold plates, data centers would only need to use 11 megawatts for cooling instead of 550 megawatts," Miljkovic said.

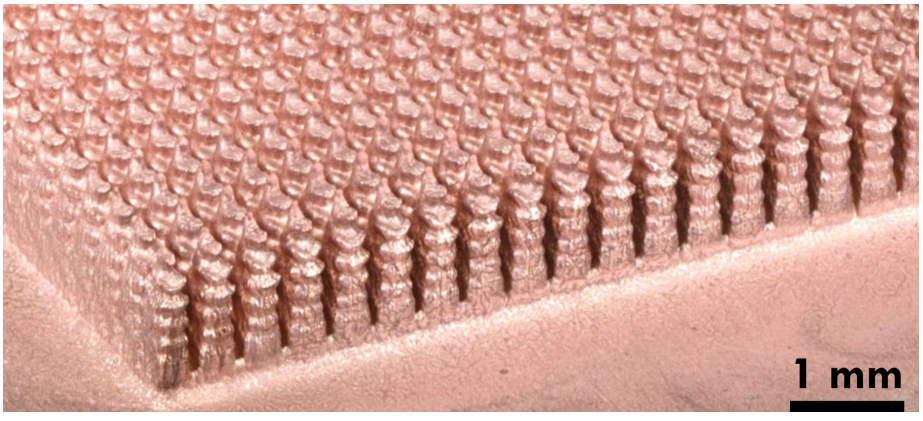


Photo of the fabricated topology optimization (TO) fin array on a copper base.



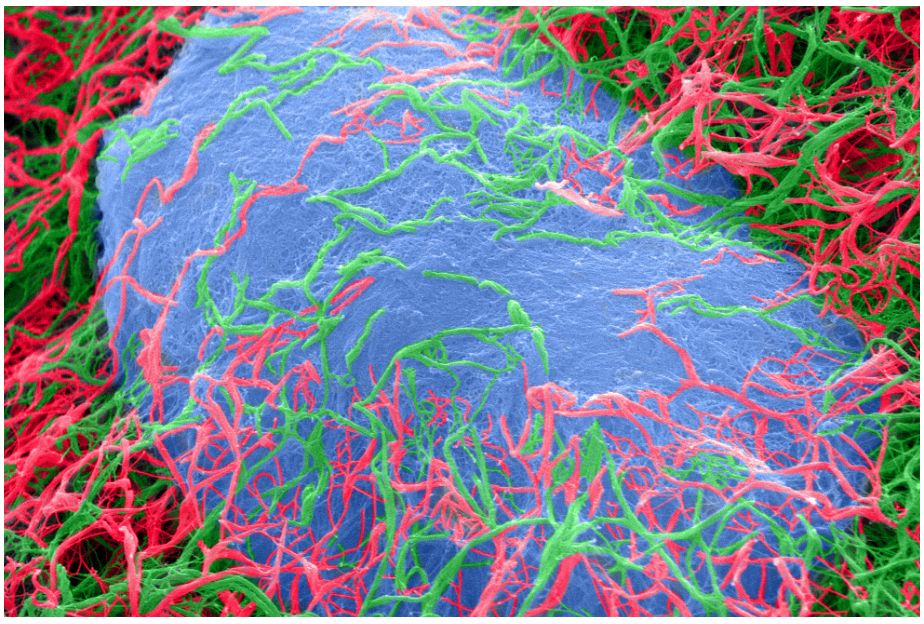
MORE STRUCTURAL PROTEIN CAN MAKE TUMORS SOFTER, THE INVERSE OF HOW LAB TUMORS ARE MADE, STUDY FINDS

Higher levels of the structural proteins collagen and fibrin around a tumor counterintuitively make the tissue softer — the opposite of conventional thinking, a new study shows. Researchers at Illinois found that the interplay of these proteins can make a vast difference in tumor structure and growth as well as how drugs pass through the tissue, key considerations for developing lab-grown tumors for drug development and personalized medicine.

"Collagen and fibrin have been used in tissue engineering for a long time as two separate proteins. But in our bodies, they are continuously interacting with each other," said MechSE professor **Bumsoo Han**, the leader of the study published in the journal *Acta Biomaterialia*. "Because most engineered tumor models overlook this interaction, they may misrepresent how real tumors behave."

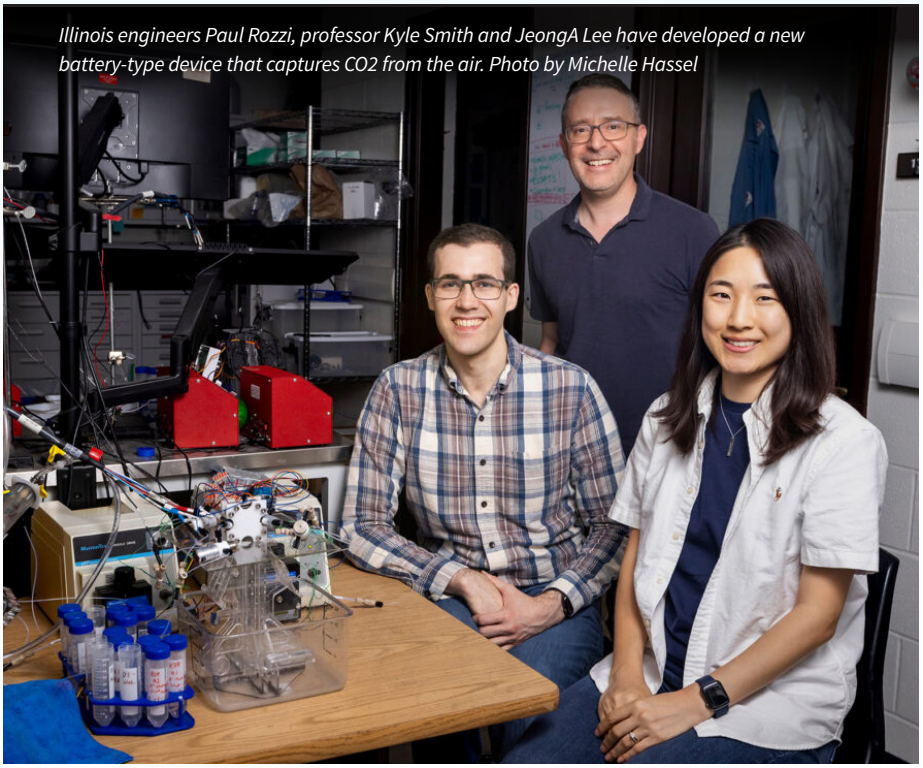
When tumors start to develop, they not only change the cellular composition of the surrounding tissue, but also change the protein composition. Requiring support as they form and grow, many cancers increase the amount of the protein collagen, which provides the main scaffolding connecting cells into tissue. Developing tumors also promote the formation of new blood vessels, but because they're immature, they start to leak — depositing the protein fibrin to form its own matrix in the tissue.

"When fibrin is added to an already constructed collagen scaffold, it does not add up nicely due to the space constraint," Han said. "Our study shows it is not only the amount, but how these two things interact, changing the mechanical property and eventually the tissue tumor physiology as well. When making tumor models for study, we need to take into account not only the cellular composition and protein amounts, but also the structure of the proteins and their mechanical properties, to get a complete picture."



A cancer-associated fibroblast cell (blue) embedded in networks of support proteins collagen (red) and fibrin (green). Colorized scanning electron microscope image by mechanical engineering graduate student ***Seamus Mellican****.*

> *By framing our process as a thermodynamic cycle in this particular space, we could see where energy was being wasted and how to redesign the cycle.*
>
> *- JeongA Lee*



Illinois engineers Paul Rozzi, professor Kyle Smith and JeongA Lee have developed a new battery-type device that captures CO2 from the air. Photo by Michelle Hassel

NEW ELECTROCHEMICAL DEVICE TARGETS CLIMATE CHANGE BY SUCKING CO2 OUT OF AIR

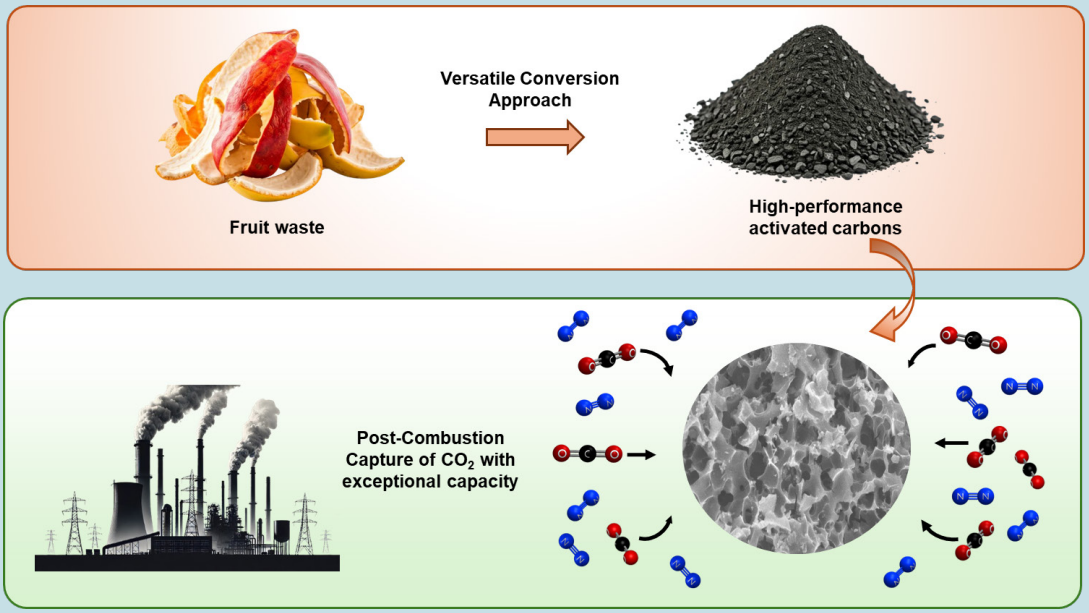
A new collaborative study between scientists at Illinois and Toyota focuses on direct air capture, a technology designed to reduce new emissions and remove carbon dioxide that has already accumulated in the atmosphere. Instead of using heat to absorb and release carbon dioxide, as many carbon capture methods do, the new method uses electricity and water-based chemistry within an electrochemical device.

The results of the study by associate professor **Kyle Smith**, Illinois graduate students **Paul Rozzi** and **JeongA Lee,** and Chip Roberts and Tim Arthur from the Toyota Research Institute of North America are published in the journal *Environmental Science and Technology*.

Most current carbon-capture technologies work at point sources — places like power plant smokestacks where carbon dioxide emissions are high. However, focusing on those sources does not resolve the amount of CO2 already mixed into the air. The team's study seeks to resolve the legacy of ambient carbon dioxide.

"What's innovative about our work is that we use proton-intercalation electrodes in what we call a cation-compensated cell," Smith said. "That design lets us operate in an alkaline range where carbon dioxide is much more soluble, which is crucial for making direct air capture practical."

"Our work with Professor Smith and the U. of I. team on electrochemical direct air capture provides useful insights into how materials, electrochemistry, and process design can be combined to address challenging CO2 separation problems," Roberts said. "This type of early-stage research supports Toyota's broader effort to explore innovative pathways toward long-term decarbonization."



Fruit and vegetable waste account for more than 50% of global food waste, making fruit peels a readily available source material for converting into porous carbon.

USE OF FRUIT PEELS FOR CO2 CAPTURE LAYS THE FOUNDATION FOR UTILIZING WASTE TO CAPTURE EMISSIONS AT SCALE

Teaching assistant professor **Jiajun He** and members of his research team published multiple articles within the past year detailing efforts to develop carbon materials from organic waste.

Mechanical engineering graduate students **Ho Kun Woo, Pranto Karua**, and **Wei Zheng**, postdoctoral researcher **Md Salauddin**, and MechSE assistant professor **Lili Cai** coauthored an article in *Separation and Purification Technology* alongside He and first author, PhD student **Sadman Sakib**. He and mechanical engineering PhD student **Beomhui Lee** published in *Environmental Science & Technology* soon after.

"We demonstrate a universal production method [for porous carbon] from fruit peel waste as well as the performance of the final material for carbon dioxide capture," He said. His publications came in the wake of his first-place finish in the Microtrac Scientific Challenge, a national competition in which he designed and fabricated functional porous carbon material from food waste. Porous carbon can be used to adsorb carbon dioxide gas, whether ambient or from direct sources such as combustion exhaust. The saturated material can then be used as a catalyst for converting the adsorbed molecules into usable products, such as formaldehyde or methane, by introducing an energy source like plasma.

"Instead of only asking, 'Does this material capture carbon dioxide well?' we ask, 'Does it actually reduce emissions once we account for cost, energy use, and scale?'" he said.

As his study continues, He aims to improve scalability and further reduce production-related costs and emissions with the goal of moving from proof-of-concept toward actionable pathways for large-scale, sustainable carbon capture that aligns with real industrial and waste management systems.

> *"Instead of only asking, 'Does this material capture carbon dioxide well?' we ask, 'Does it actually reduce emissions once we account for cost, energy use, and scale?'*
>
> *- Jiajun He*

> *It was really exciting to be able to work with people in Vietnam and to understand their educational experience.*
>
> *- Elizabeth Hsiao-Wecksler*



By integrating real-time monitoring with a user-friendly mobile interface, patients are empowerd to take an active role in their rehabilitation journey.

RESEARCHERS DEVELOP NOVEL WEARABLE KNEE REHABILITATION DEVICE IN INTERNATIONAL COLLABORATION

An international research team has been developing a low-cost, wearable wireless system design to monitor the human knee during rehabilitation.

The ongoing collaboration includes Illinois Grainger Engineering professor **Elizabeth Hsiao-Wecksler** (MechSE) and associate professor Girish Krishnan (industrial and enterprise systems engineering), Dr. Phuong Cao from Illinois' National Center for Supercomputing Applications, and assistant professor Mai Thanh Thai from the College of Engineering and Computer Science at Vietnam's VinUniversity (VinUni). Other coauthors include associate professor Thanh Nho Do and postdoctoral fellow Phuoc Thien Phan from the Graduate School of Biomedical Engineering at UNSW Sydney in Australia. The team recently published their findings in *Nature's Scientific Reports*. Graduate students Nhu An Phan and Sy Trung Ngo at VinUni are first authors on the publication.

The team's device, KNEESENSE, uses a custom-designed wearable hydraulic filament sensor to monitor the angle of the knee joint during real-time rehabilitation work.

"The key innovation of our work lies in the hydraulic filament sensing mechanism, which enables accurate knee angle monitoring while remaining soft, lightweight, and comfortable for users," Thai explained. "By combining a silicone tube with a spring-based structure, we can translate pressure changes into precise motion data without restricting natural movement."

Slated for funding through 2032, the project is supported by the VinUni-Illinois Smart Health Center, a collaboration between VinUni and the University of Illinois Urbana-Champaign. The purpose of the project is to conduct research on novel sensing and informatics with the goal of providing widely accessible health monitoring worldwide.

"This technology could be a game changer for patients who can use gamified biofeedback for rehab," Krishnan said. "It reduces burden on therapists and can be used to track gait changes among older adults."



Archean Sciences co-founders Austin Ellis-Mohr (fourth from left) and MechSE associate professor Mattia Gazzola (third from right) receive their grand prize at the Cozad Finals Event in April 2026. Photo by Holly Birch Photography.

STARTUP ARCHEAN SCIENCES WINS HISTORIC $100K GRAND PRIZE AT COZAD NEW VENTURE CHALLENGE

Archean Sciences, co-founded by MechSE associate professor **Mattia Gazzola** and electrical and computer engineering PhD student Austin Ellis-Mohr, won the Grand Prize in the Cozad New Venture Challenge at the University of Illinois. The top award includes over $120K in total funding and prizes: $100K from TechNexus Venture Collaborative, $10K Paul Magelli Innovation Award from Illinois Ventures, and $10K from Origin Ventures.

Testing treatments for neurological conditions (like Alzheimer's or Parkinson's) is slow, expensive, and often inaccurate because lab models often do not reflect how the human brain works. Archean Sciences is enabling faster, more predictive drug testing through the development of computing chips that contain real human neurons, which are extraordinarily energy efficient. Archean's biological computing system can run AI workloads at a fraction of the energy cost of conventional silicon chips.

"I think that besides the monetary prize, the real value of the program lies in the coaching and exposure to potential investors," Gazzola said. "We really had to 'rewire' our brains and learn a new communication language, very different from the scientific one we are used to. Cozad helped us sharpen our message and understand mechanisms we are typically not concerned with in academia." ◆

> *Besides the monetary prize, the real value of the program lies in the coaching and exposure to potential investors.*
>
> *- Mattia Gazzola*

MORE BREAKTHROUGHS

Nenad Miljkovic and postdoctoral researcher **Siyan Yang** reported the first experimental discovery of a previously unknown frost propagation mechanism — a "suspended ice bridge" — offering new pathways for anti-frosting surface design. Frost formation plays a critical role in many engineering systems, including air-source heat pumps, refrigeration systems and aerospace applications. At the microscopic level, frost mainly spreads through the formation of "ice bridges" that connect neighboring supercooled liquid droplets, enabling freezing to propagate rapidly across a surface. For decades, these ice bridges were widely assumed to grow along the solid surface. Largely based on conventional top-view imaging, this assumption shaped existing theoretical models and anti-frosting strategies. However, the Illinois team's study overturned this long-held view. ◆

Designing metamaterials consisting of engineered lattices whose geometry gives them unusual strength, flexibility, or energy absorption typically requires long cycles of trial-and-error simulation. It's even more challenging when there are multiple materials and where many different designs can produce similar mechanical responses, deemed unsolvable by classical computational design methods. **Seid Koric, Iwona Jasiuk**, their students, and researchers at the National Center for Supercomputing Applications (NCSA) have introduced a generative AI workflow that is trained on NCSA's DeltaAI high-performance computing system to reverse the process. Instead of starting with a design and predicting what it does, the method starts with the desired stress-strain curve and generates candidate multi-material architectures that can deliver it. The approach adapts video diffusion models, which are best known for producing images and videos for animated clips on social media. Their finding opens doors to impact-energy absorption for automotive and aerospace applications, soft-robotics actuators that undergo large deformations, and bio-inspired materials that mimic tissue-like mechanics for implants, prostheses, and tissue engineering. ◆

Computer numerical control (CNC) has long played a critical role in manufacturing. Yet the fundamental approach underlying CNC use has remained unchanged for decades. **Placid Ferreira, Jorge Correa Panesso, Shiv Kapoor**, and their team are shaking up that status quo. They've introduced the Cloud-Direct NC (C-DNC) framework, representing a fundamental rethinking of how machine control is done. "We came to the conclusion that one has to have a much more sort of integrated view of how things are done, rather than 'this is done in software outside the machine; this is done on the machine.' And we developed and implemented an architecture which seamlessly... recruits cloud resources, it recruits client resources, it recruits embedded systems resources, and integrates them together to define a really seamless flow of information." The ultimate result will be that machines gain "the potential to be much smarter." Additionally, Ferreira's students **Shivam Garg** and **Aryan Shroff** are commercializing one application of the framework through a new venture called ToolBit, which has already won several startup competitions. ◆

IN MEMORIAM:

Joseph Bentsman



MechSE professor **Joseph Bentsman** passed away February 23, 2026. He was 74.

Bentsman joined the University of Illinois Urbana-Champaign as an assistant professor in 1985, where he remained for more than 40 years. He was actively engaged in his research and teaching until his passing. His research utilizing control theory, modeling, and software development impacted a variety of industries and areas, including the laser chemical vapor deposition process, continuous steel casting, and automated electrosurgery.

Growing up in Soviet Belorussia, Bentsman drew initial interest in engineering from his father, who worked as an electric drives control engineer, as well as from tinkering with tube amplifiers for his garage rock band in which he was the lead singer. After completing his undergraduate degree at Byelorussian Polytechnic Institute (BPI) in Minsk, he was drafted into the Soviet Army, where he served from 1973 to 1975. During his service, he built automated power stations in Siberia, including one of several stations with enormous antennas that supported the Apollo-Soyuz project.

Upon completing his military service, Bentsman joined the Kirov Machine Tool Factory Design Bureau in Minsk as a full-time electric drives control engineer, all while earning his master's degree at BPI.

In addition to his career in engineering, Bentsman maintained a lifelong love of music, having studied classical music as a child and later moving on to guitar and drums in his high school rock band — ultimately honing his skills in piano rock. His adventures with music continued during his time in service. "In 1973, when I was drafted into the Soviet army to serve in a Siberia military base, I was invited to sing folk songs in a base choir over the weekends and I also organized my own rock band there," he said in a 2022 interview.

Throughout his career in academia, he established a custom of playing a version of Jailhouse Rock — which he referred to as "Joe's House Rock" — for his PhD students upon completion of their defense. In an on-camera interview from 2023, he performed the song and spoke with passion and playfulness about the role of music in his life.

Bentsman's contributions to science, engineering, and education had a profound impact on MechSE as well as the broader university community. He will be missed. ◆

Listen as Bentsman reflects on his musical experiences for the 2023 MechSE Magazine feature "MechSE's 'Underground' Music Scene."

MechSE announces new department head **Nenad Miljkovic**

The Grainger College of Engineering has named Founder Professor **Nenad Miljkovic** the new Head of the Department of Mechanical Science and Engineering, effective August 16, 2026.

He succeeds Richard W. Kritzer Professor Anthony M. Jacobi, who has served as department head since 2015.

Miljkovic takes the reins of one of the world's premier engineering departments at a time of substantial growth in student enrollment as well as a juncture in crucial areas of research impacting society, including artificial intelligence, autonomy, digital manufacturing, thermal and fluid science, sustainable energy solutions, and more — all of which are fundamentally supported by the fields of mechanical engineering and applied mechanics.

"Nenad brings a compelling vision to his new role as department head. His deep commitment to a data-driven leadership approach combined with a strong emphasis on people, culture and shared governance, as well as a drive for excellence, are essential to the long-term health and standing of the department and the college," said Rashid Bashir, dean of The Grainger College of Engineering.

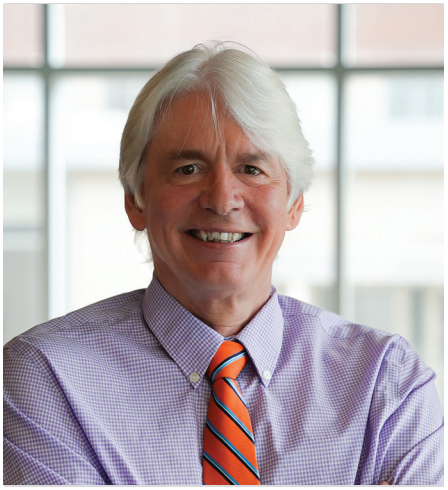
Miljkovic earned his PhD in mechanical engineering in 2013 from the Massachusetts Institute of Technology. He joined MechSE as an assistant professor in 2014 and was promoted to associate professor in 2019 and professor in 2022. Prior to becoming head, he served as director of the Air Conditioning and Refrigeration Center (ACRC) at Illinois and currently holds affiliate positions in the Department of Electrical and Computer Engineering; Institute for Sustainability, Energy, and Environment (iSEE); Materials Research Laboratory; and the International Institute for Carbon Neutral Energy Research (I2CNER).

Miljkovic leads the Energy Transport Research Lab at Illinois, one of the largest and well-funded research labs in the college, supporting more than 60 graduate students and postdoctoral researchers. His group contributes transformational efficiency enhancements in energy, water, agriculture, transportation and electronics cooling by fundamentally manipulating heat-fluid-surface interactions across multiple length and time scales — with applications in solar thermal energy conversion, data center cooling, building energy systems, and electrification.



Among other achievements, Miljkovic has co-founded four companies based on research conducted in his lab: Helix Earth Technologies, NovoLINC, ThermalPixels, and CAPSLocks. He has also created a path for dozens of other companies, working with researchers in his and other labs, to develop world-changing technologies to improve building energy efficiencies to ultimately slow the effect on climate change. His leadership of ACRC over the last six years resulted in discoveries in the HVAC space that have led directly to translational impact in the industry.

11 years of leadership and a legacy that remains



During his 11-year tenure as MechSE department head, **Anthony M. Jacobi** demonstrated exceptional vision, integrity, and dedication in transforming MechSE into an internationally recognized leader in education, research, and community engagement. His strategic leadership strengthened every dimension of the department — from faculty, staff and student success to diversity, financial stability, and external partnerships around the world.

Under his direction, MechSE recruited 29 tenure-system and teaching faculty and worked diligently to successfully nominate numerous faculty for award recognitions, leadership roles across campus, and prestigious named appointments.

In collaboration with the Office of Graduate Programs and Research, he helped enrich and improve the research environment for MechSE's graduate students by revising the PhD curriculum and qualifying exam to better reflect the increasingly interdisciplinary nature of modern research programs, and by introducing the department's first professional master's degree program — the master of engineering in mechanical engineering (M.Eng.ME) — a program that's grown exponentially over the last decade and whose online component now ranks #3 in the country.

Jacobi's focus on promoting excellence and diversity in education and leadership resulted in a significant increase in the hiring of women to our tenure-system faculty — the highest in the department's history — as well as an expansion of the recruitment and retention of women graduate students.

He was also instrumental in securing generous gifts from our friends and distinguished alumni. One that is especially meaningful to him is the Alva L. and Sandra R. Addy Headship, a named gift that will enable future MechSE department heads to support students and faculty in incredibly impactful ways.

The $41M transformation and naming of the Sidney Lu Mechanical Engineering Building stands as one of Jacobi's most important and long-lasting legacies. The major expansion and renovation, which includes the most extensive maker space on campus – the Jackson Innovation Studio – enabled new levels of creativity and innovation and undeniably bolstered the international prestige of the department. ◆

Welcome New Faculty



Teaching assistant professor **Jorge Correa Panesso** (MSME 2013, PhD ME 2017) joined MechSE's faculty in August 2025. The new role marks a continuation of Correa's relationship with MechSE, which first began when he came to campus as a graduate student advised by Tungchao Julia Lu Professor Placid Ferreira.

As an undergraduate student at EAFIT University in his native Colombia, Correa had a research mentor who was a MechSE alum.

"He shared with me what a great institution the University of Illinois was and the impact that Illinois had had in engineering," Correa recalled. "It made me fall in love with the idea to come to the U.S., and particularly to Illinois."

During his PhD, he investigated methods for interconnecting manufacturing machines to the internet to create architectures for an industrial Internet of Things.

Following his graduation, Correa continued collaborating with Ferreira for nearly two years as a postdoctoral researcher. He then branched into industry, returning to Colombia to found startups including the software solutions firm Cohesive Manufacturing. He also worked as a consultant on topics related to technology implementation for transportation strategies and policies.

Correa later came back to campus as an adjunct lecturer for Mechanical Design I (ME 370) and Computer Aided Design and Manufacturing (ME 451) — courses he'd taught as a teaching assistant in graduate school.

"I needed to grow in my experience and my ability to develop technological projects and to lead others," he explained. "Once I'd gone into industry, I had a different sense of how to teach people in a way that reflected actual experience. The second time that I came [to Illinois], it felt more natural for me to be in a classroom, giving away that knowledge."

In addition to teaching, Correa is also collaborating with Ferreira, professor Sameh Tawfick, and industry partner Foxconn Interconnect Technology (FIT) to redesign machinery for optimal insertion processes which happen in microelectronics and connector-based electronics.

Correa hopes to collaborate with fellow faculty to align manufacturing courses into a cohesive learning pathway and create a foundation for a master's degree program in digital manufacturing.

"I want to broaden the spectrum of students who are interested in a career in design and manufacturing, and to teach in a way that bridges the gap between those two topics," he said.



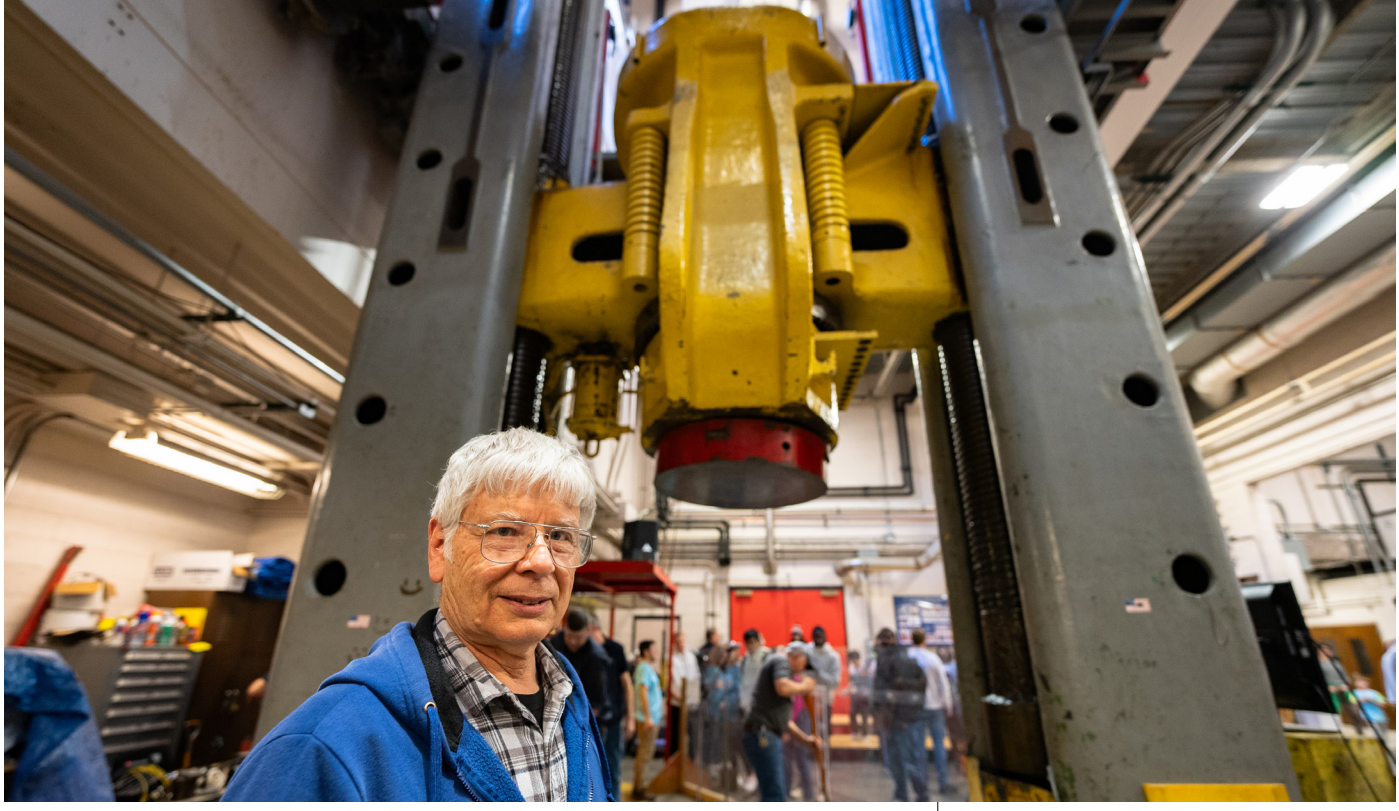
Alireza Ramezani joins MechSE as an associate professor from Northeastern University in Boston, where he led the SiliconSynapse Lab. Ramezani and his research group design bio-inspired robots. His research emphasizes hardware design, modeling, and closed-loop feedback control, with an overarching goal to develop mobile robots capable of operating in environments where existing systems face the risk of complete immobilization. Ramezani earned his PhD in mechanical engineering from the University of Michigan in 2014.



Lyle Regenwetter is a new assistant professor. He earned his PhD in mechanical engineering from MIT this past May. He develops principled, generalizable, and data-efficient artificial intelligence methods for engineering design. He focuses on generative models, optimization techniques, and rigorous benchmarks that can create, evaluate, and refine complex engineering systems while respecting physical and design constraints, with the goal of building AI tools that help engineers explore better solutions faster and more reliably. Regenwetter is excited to be back in Urbana-Champaign, having earned dual bachelor's degrees in mechanical engineering and electrical engineering from Illinois in 2020.



Kenneth Shaw joins MechSE in October 2026 as an assistant professor. He earned his PhD in computer science from Carnegie Mellon University earlier this year. His research focus is on dexterous manipulation in robotic hands, development of AI policies for dexterous hands using human demonstrations from internet videos, teleoperation, and simulation. ◆



CREATING A LASTING LEGACY

Jim Phillips' time in MechSE spans five decades and counting

By Taylor Parks

Professor emeritus and registered professional engineer **James W. Phillips** was a staple in MechSE long before it had its name.

Born in Washington, D.C., Phillips earned his bachelor's degree in mechanical engineering from the Catholic University of America and his master's degree and PhD in engineering from Brown University.

"At first, I wasn't even sure that I wanted to go into teaching, because there were other opportunities at research labs," Phillips said, recalling his interest in Sandia Corporation and the GM Research Institute. However, a nudge from his professor at Brown, William N. Findlay, who had previously taught in theoretical and applied mechanics (TAM) at Illinois, encouraged Phillips to consider teaching. At the time, Illinois faculty included some notable names that Phillips recognized.

"I had some idea about Illinois' presence in the area that I wanted to pursue," Phillips said. He joined TAM in 1969, which at the time was a standalone department.

For his first semester, Phillips taught statics and dynamics and strength of materials. Later, he taught intermediate solid mechanics, mechanical behavior of materials, and experimental stress analysis, as well as Senior Capstone design. He also introduced the first-year course TAM 195 [Mechanics in the Modern World].

In 1982, he took over the late professor Harry Wetenkamp's industrial testing program. The testing was typically performed in the Talbot Laboratory crane bay and often required the use of the three-million-pound universal testing machine, which was retired in 2022. Not long after he elected to run the program, he realized he would need more than a PhD to have credibility with industry clients. Phillips passed the PE exam in 1983 and continued to take on commercial work for the next 40 years, ultimately serving more than 100 different companies and performing more than 2,000 different calibrations and tests.

In 1985, Phillips was asked to serve as associate head to take over some of the administrative duties within the department. "I had taken an interest in departmental affairs, particularly the graduate program and alumni affairs, that were not in the strict line of teaching and research," he said.

Phillips continued to serve as associate head into the new millennium, at which time ideas were beginning to form for an entirely new challenge: the possibility of merging TAM with the Department of Mechanical and Industrial Engineering (M&IE).

"This was a very complicated issue that can be boiled down principally to critical size and to overlap between activities, particularly in research," he said of the common ground shared by the two departments. "In simple terms, some TAM professors had become very applied in their research, and some ME professors had become more theoretical."

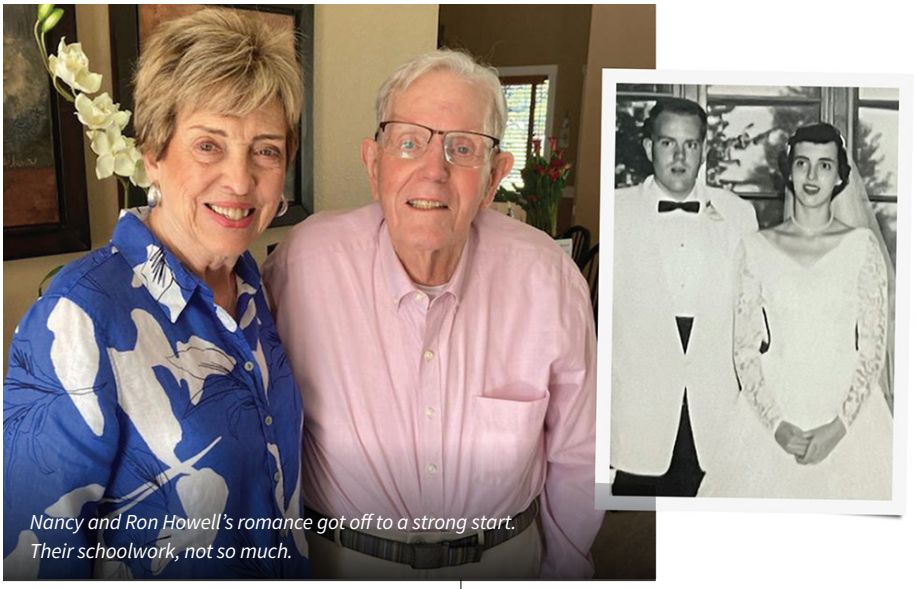
Discussions surrounding a potential merger began around 2003, with Phillips serving on a committee of M&IE and TAM faculty that was tasked with determining how the departments might make the merge.

Today, 57 years after he first came to campus and 15 years after he officially retired, Phillips remains active in MechSE.

He helps facilitate activities in TAM 195, assists with concrete testing in TAM 324/CEE 300 [Behavior of Materials] and with the strain gage and photoelasticity labs in TAM 456 [Experimental Stress Analysis]. He often advises design teams in ME 470 [Senior Capstone Design]. Phillips also continues to advise MechSE undergraduates.

"The experience that our undergraduates gain puts them in a wonderful position to pursue work in industry or to continue at the graduate level for advanced training," he said of the curricula in engineering mechanics and mechanical engineering. "They have the privilege of picking what they would like to do. That's the most important thing — to pick something that they're interested in and can get involved with and enjoy." ◆

Alumni News



Nancy and Ron Howell's romance got off to a strong start. Their schoolwork, not so much.

Thermodynamic Duo

It was the end of DKE Hell Week, 1955. The hazing outrages at the fraternity house had been crowned by a fire at the top of the staircase. **Ron Howell** (BSME 1958, MSME 1959, PhD ME 1967) recalled how he and the other pledges had to douse the blaze with water that they carried mouthful by mouthful up the stairs. "And then," he said, "we had to sleep on the cold pile of ashes."

But Howell's luck was turning. His blind date for the pledge dance was Nancy Anderson, a student in the College of Education. At the dance, her earrings pinched her lobes. Could he just slip them into his pocket? He could. The next day, he brought them over to her digs at Evans Residence Hall and asked for another date. Three weeks later, they'd been together every evening, and he was flunking thermodynamics because he hadn't turned in his assignments. Ron threw himself on the mercy of the professor, who relented, eventually awarding his errant student a C.

The couple married while still undergraduates. Ron went on to faculty posts at the Missouri University of Science and Technology and the University of South Florida. Nancy taught elementary school for 17 years and worked on a grant to help at-risk high school students. Since 2000, they have lived in Meridian, Idaho, near their children and grandchildren, including son Timothy Anderson Howell, also an Illinois alum. A couple of years ago, Ron was diagnosed with Parkinson's disease and now lives in a long-term care facility. Nancy remains in good health and still plays golf. In August 2026, the couple celebrated their 70th wedding anniversary.

But to return to that first semester together, when Ron was tanking in thermodynamics, it's interesting to know that Nancy, too, went briefly south. "I got a D in geography," she said. And it's fascinating to learn that Ron's teaching and research career was grounded in — thermodynamics. "Thermodynamics was an interesting experience, and as I got further into my undergraduate work, I just kept on with it," he said.

Three MechSE alumni elected to NAE

Three alumni were elected by their peers to the National Academy of Engineering (NAE) for 2026, one of the field's highest professional distinctions. The Grainger College of Engineering had nine total faculty or alumni selected for the prestigious honor.

Academy membership honors individuals who have made outstanding contributions to engineering research, practice, or education. Members are also recognized for pioneering new and developing fields of technology, making major advancements in traditional fields of engineering, or developing and implementing innovative approaches to engineering education.

David L. McDowell (MSME 1981, PhD ME 1983), Regents' Professor Emeritus, Georgia Institute of Technology. *For microstructure-sensitive computational modeling of engineering alloys and methodologies for computational materials design*.

Juan Gabriel Santiago (MSME 1992, PhD ME 1995), Charles Lee Powell Foundation Professor, Stanford University. *For advancing micro-scale transport and applications of microfluidic systems*.

Karen Thole (BSME 1982, MSME 1984), Director of the National Security Institute, Penn State University. *For contributions to gas turbines through the development and deployment of innovative cooling technologies*.

"NAE members are among the world's most accomplished engineers. This recognition reflects the extraordinary impact of their work and underscores the strength and reach of Grainger Engineering and U. of I.," said Rashid Bashir, dean of The Grainger College of Engineering. "I'm incredibly proud of our amazing community on campus and around the globe."



Below: Sol is a wheelchair-mounted visibility light designed to increase safety in crowded or low-light environments. (Photo courtesy of Carter Schott)

Right: Carter Schott, founder of Innovative Independence

Schott is rethinking assistive technology and designing independence

Carter Schott (BSME 2025) is the founder of Innovative Independence, a venture dedicated to designing assistive products that center around the real, everyday needs of wheelchair users. His work blends engineering, empathy, and lived experience into products that aim not just to function, but to empower.

Schott, now a graduate student in the Gies College of Business, is affected by a disease called spinal muscular atrophy, a form of muscular dystrophy. He has limited mobility and has used a power wheelchair since he was four.

"Living in Beckwith [Residential Support Services on campus] and being immersed around other students with disabilities was a big deal for me," he said. "Seeing how people adapted differently and where existing solutions were lacking encouraged me to think like a designer. This encouraged me to think about real-world usability rather than theory, which is something that impacted Sol."

Sol, his flagship product, is a wheelchair-mounted visibility light designed to increase safety in crowded or low-light environments.

"Sol started with a basic but essential problem statement: visibility," Schott said. "I realized the difficulty that wheelchair-bound people faced in being seen in crowded or poorly lit spaces, such as our campus environment. There was no solution that was both effective and well-designed, so I set out to create one."

Schott noticed early on that many assistive technologies met functional needs but fell short in aesthetics, usability, or user experience.

"I also saw a disconnect between existing assistive products and the needs that people actually had in their daily lives," he said. "There was a lot of old or poorly designed technology out there. I wanted to make products that people would be excited to use, that would enhance their lives without making them feel like they were compromising."

Collaboration has also played a crucial role in shaping his approach. At Illinois, disciplinary boundaries blur — especially when solving complex human-centered problems.

"Working with individuals from different fields, like engineering, design, and healthcare, has been very important," Schott said. "This ensures not only that the solution you are coming up with is technically viable, but also 'usable' and 'meaningful.'"



Shah discusses rise of 'electrostate' and global energy shifts with students

Energy expert **Jigar Shah** (BSME 1996) spoke with students in a nuclear, plasma and radiological engineering course during a recent class session focused on global energy transitions and policy.

Shah's discussion introduced the concept of the "electrostate," describing a shift in which electricity — particularly from decentralized and renewable sources — plays an increasingly central role in economic and geopolitical systems. He emphasized that the global energy transition is being driven not only by climate concerns, but also by economic factors, system resilience, and national energy security. In this framing, decarbonization emerges as a secondary outcome of broader structural changes.

A significant portion of the discussion focused on cost trends in clean energy technologies. Shah noted that the cost of solar power has declined by approximately 97% over the course of his career, with wind energy and battery storage showing similar downward trends. These reductions have contributed to rapid adoption, particularly in regions where traditional energy infrastructure is unreliable or limited.

Shah also highlighted how geopolitical disruptions can accelerate energy transitions. Policy approaches were also discussed, particularly the debate between subsidizing clean energy technologies and implementing pricing mechanisms that reflect the full societal costs of fossil fuels. The conversation addressed the concept of "energy agency," referring to the increasing ability of individuals and communities to generate and manage their own energy.



McGregor is young leader in manufacturing

Davis McGregor (PhD ME 2022) was named a 30 Under 30 Honoree by Advanced Manufacturing for 2025. McGregor, who studied under professor Bill King, is now an assistant professor of mechanical engineering at the University of Maryland, College Park.



Two-fold service: Rutkowski works to enable the clean energy transition and give back to MechSE

Last fall, **Michael Rutkowski** (BSME 1989) was named vice president of the MechSE Alumni Board, and the role is fitting. He has served on the board for the last five years.

Rutkowski is the Regional Global Practice Manager for the Great Lakes region of 1898 & Co, the business and technology consulting arm of Burns & McDonnell.

"We provide professional services to energy infrastructure owners, operators, and developers," said Rutkowski, whose team works with more than 40 clients each year. "We help companies make decisions about where they invest in energy infrastructure, what type of infrastructure it involves, and how to plan for that infrastructure in the most cost-effective, expedient way possible."

Rutkowski's journey as an engineer began as a family affair — his parents and brother all attended Illinois. "I knew I wanted to be an engineer, so Illinois was an easy choice," Rutkowski said. "It was actually the only school I applied to. I'd always planned on following in the family footsteps and going to a great place."

Following his graduation, Rutkowski worked as a field engineer for General Electric before taking a position as senior engineer at Sargent & Lundy, during which time he also completed his MBA in finance at Northwestern University.

In 2019, Rutkowski became Senior Vice President of Research & Technology Development at GTI Energy before transitioning to 1898 & Co. in 2023.

During his 30+ years in the energy industry, Rutkowski has found fruitful opportunities to support students.

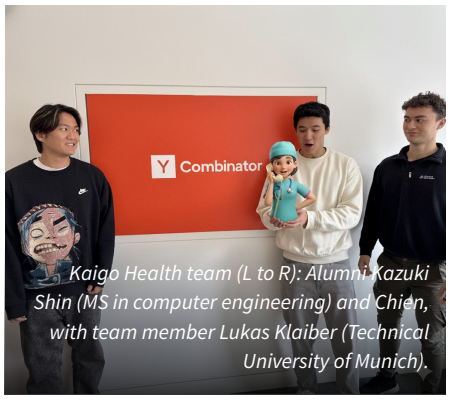
"When recruiting new members to my team, I've always made sure that Grainger Engineering was included," he said. "I became connected with the MechSE Alumni Board through recruiting, and I was at a point where I wanted to give back."

He also previously sponsored Senior Capstone Design teams and just recently became involved with the new Grainger Engineering Chicago Advancement Board. Speaking from experience, Rutkowski notes the benefit of a mechanical background for young engineers interested in the energy field.

"Mechanical engineering is broad enough that you work with many different elements of a system and develop a solution that puts all those components together," he said. "You may not be the single expert in any one of those components, but if you have enough understanding of how the system works, as well as how to solve a problem, you can be very confident that you'll put together a solution that works. We're looking for that problem-solving skillset on our team."

Grainger Engineering startups led AI innovation in Y Combinator cohort

U of I alumni and students are leading the AI revolution following their success in Y Combinator's Fall 2025 cohort. Students or alumni from The Grainger College of Engineering co-founded seven of the eight startups that successfully completed the highly competitive accelerator program, bringing AI innovation to industries from construction and filmmaking to healthcare and cybersecurity.



Kaigo Health team (L to R): Alumni Kazuki Shin (MS in computer engineering) and Chien, with team member Lukas Klaiber (Technical University of Munich).

One of these alumni is **Peter Chien** (BSME 2022) co-founder of KaigoHealth, which uses AI to transform outpatient care management specifically for older adults. Kaigo's AI care agents help healthcare providers stay connected with patients between visits. The platform handles routine outreach, monitors progress, and escalates when human attention is needed, helping care teams scale support substantially without scaling headcount. The result is fewer re-admissions, higher quality scores, and healthier patients.

Y Combinator, known for backing companies like Airbnb, Instacart, Reddit, DoorDash and many more, has invested in over 5,000 companies that have a combined valuation of over $800 billion since its inception in 2005.



India's largest retailer now led by MechSE alum

Jeyandran Venugopal (MSME 2000) was named President and CEO of Reliance Retail Ventures Ltd (RRVL), India's largest retailer. Before joining Reliance Retail, Venugopal served as chief product and technology officer at Walmart-backed Flipkart, where he led teams across product, engineering, design, data science, IT, security, and infrastructure. His earlier career also includes senior leadership roles at Myntra, Jabong, Yahoo, and Amazon Web Services. ◆

Tanner recognized for out-of-this world service

By Taylor Parks

As a college student, mechanical engineering alum **Joe Tanner** (BSME 1973) decided to learn to fly. Little did he know at the time just how far the desire to explore the skies would take him.

"I like to say that I made three great professional decisions," Tanner said. "One was to go to Illinois. The second was to join the Navy, and the third was to take a job as a pilot at NASA."

Now fully retired, Tanner was inducted into NASA's Astronaut Hall of Fame on May 16, 2026, alongside fellow astronaut Tom Akers.

Inductees are selected by a committee of Hall of Fame astronauts, former NASA officials, flight directors, historians, and journalists and must meet certain criteria including having made his or her first flight at least 15 years before induction and having orbited Earth at least once. Tanner and Akers joined 97 astronauts who preceded them as inductees. The ceremony was held under the retired space shuttle Atlantis, currently on display at Kennedy Space Center.

For the mechanically inclined Danville native, studying engineering at Illinois was a natural choice. "I was also accepted to Michigan State University, but I just couldn't justify going there when a great school was right next door," he recalled. Tanner's decision ran in the family — his father had also studied at the U of I and his older brother was a student athlete on the swim team.

Tanner also swam with the team throughout college, specializing in short- and middle-distance freestyle, and served as team captain during his junior and senior years.

As a student, Tanner also took flying lessons in his father's Cessna. "I started to become interested in flying and considered pursuing it as a short-term career in the military," he said. "I figured I could be an engineer after that. It turned out that I never went back."

After graduation, Tanner followed in his father's and brother's footsteps and enlisted in the Navy. He earned his Naval Aviator Wings in 1975 and was stationed in California, flying the A-7E Corsair II. He was assigned to a squadron that deployed on the USS Coral Sea and completed a cruise in 1977, and afterwards moved to Pensacola to instruct in the TA-4 Skyhawk.

Following active duty, Tanner applied for the astronaut class of 1980 but didn't receive an interview. Still, the allure of the astronaut program never dimmed. Tanner continued to fly each month with the Navy Reserve and worked odd jobs including as a supervisor in the base area



Photo of Tanner taken during his last flight before retiring from NASA in 2008. Image courtesy of Joe Tanner.

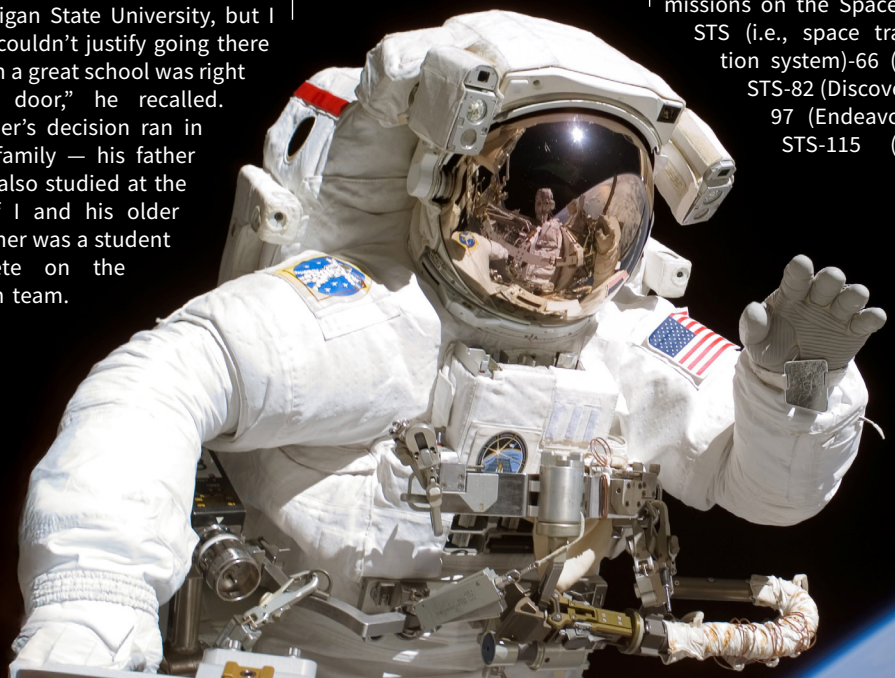
of a ski resort as well as in construction and carpentry. He applied to the astronaut class of 1984 and, again, did not receive an interview. This time, however, he accepted a position as flight instructor, marking the start of his career at NASA.

Tanner continued applying to the astronaut program through 1990 without being selected. "I wasn't going to apply at all in 1992, because I was getting older," he said. "But then I thought, all they can do is say no."

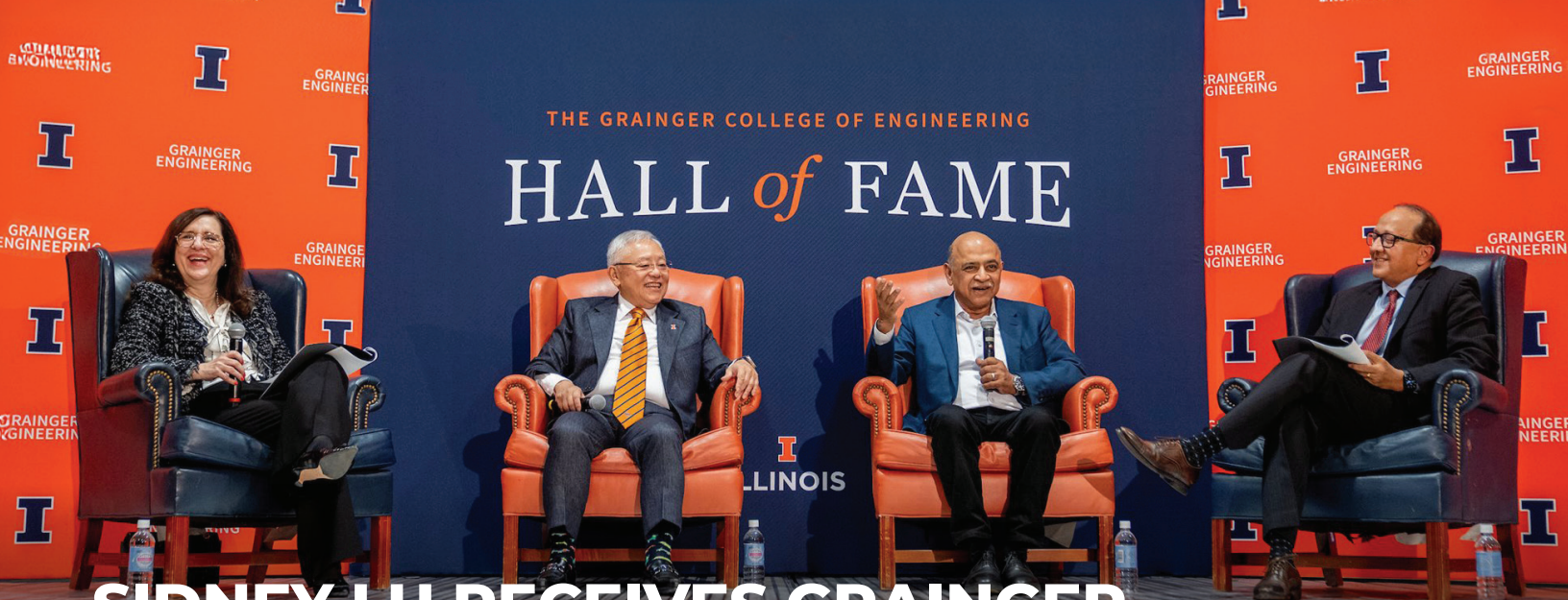
His perseverance was rewarded. Selected to Group 14 of that class, he would go on to fly four missions on the Space Shuttle: STS (i.e., space transportation system)-66 (Atlantis), STS-82 (Discovery), STS-97 (Endeavour), and STS-115 (Atlantis). These missions focused on studying Earth's atmosphere, servicing the Hubble Space Telescope, and two International Space Station assembly missions, respectively. Tanner completed seven extravehicular activities (EVAs), or spacewalks — two on the telescope and five on the space station.

He logged 1,069 hours in space before retiring from NASA in 2008. He then became a teaching professor in aerospace engineering at the University of Colorado Boulder, where he taught graduate students for eight years and found joy in mentoring students.

"I tell students that they might become engineers, or they might go off and do something completely different. The skills they learn in the engineering curriculum will help them wherever they go." ◆



"I like to say this is my 'Hi, Mom' photo," said Tanner. Image courtesy of Joe Tanner.



SIDNEY LU RECEIVES GRAINGER ENGINEERING HALL OF FAME HONOR

Left to right: co-moderator Mary T. McDowell, computer science alum and technology business leader; Sidney Lu; Arvind Krishna, chairman and CEO of IBM; and Rashid Bashir, Dean of The Grainger College of Engineering

Last fall, distinguished MechSE alumnus **Sidney Lu** (BSME 1981, BS Math 1981) was inducted into The Grainger College of Engineering Hall of Fame. He was recognized for his extraordinary business leadership that revolutionized global electronics manufacturing while maintaining a steadfast commitment to engineering innovation and educational advancement.

In addition to Lu, recipients included Arvind Krishna, Chairman and CEO of IBM (MSEE 1987, PhD EE 1991), and Peter Sauer, the Grainger Chair Emeritus Professor of Electrical and Computer Engineering, who was honored posthumously.

Lu is a globally esteemed business leader and the founding Chairman and Chief Executive Officer of Foxconn Interconnect Technology, Ltd. Headquartered in Taiwan, FIT is a world-leading provider of high-precision electronic interconnect components, with R&D and manufacturing operations spanning Asia, Europe, and the Americas — including a key research facility at the University of Illinois Research Park. In recent years, the company has further expanded its footprint into high-growth markets, notably India, the Middle East, and Africa.

Additionally, the Center for Networked Intelligent Components and Environments (C-NICE) at Illinois is a $100M partnership between Grainger Engineering and FIT that serves as a global hub for the intelligent technologies driving manufacturing plants, medical environments, autonomous vehicles, and smart homes of the future.

While FIT is widely recognized as a core manufacturing partner for Apple devices, its impact extends far beyond consumer electronics. Under Lu's leadership, the company has achieved significant advancements in strategic sectors such as 5G AIoT, EV mobility, and audio technologies.

Lu, along with his two brothers, left Taiwan to pursue higher education in Illinois, where he quickly distinguished himself through exceptional academic discipline — completing an extraordinary 58 credit hours in his first year, nearly double the average course load of a typical freshman.

That same level of rigor and determination fueled his rapid rise at Hon Hai Precision Industry Co., Ltd. (Foxconn Technology Group). Starting as a design manager for connectors, Lu swiftly advanced through the organization. Within 18 months, he was leading a team of 60 engineers.

Over the following years, he assumed increasing responsibilities, eventually managing an entire business unit encompassing both design and manufacturing. By 2003, he was appointed head of the entire connector and cable division. He later served as Executive Vice President of Hon Hai and General Manager of its Network Interconnection Group (NWInG).

Throughout his tenure, Lu played a key role in reshaping the company's engineering and operational capabilities. He championed the integration of scientific analysis and total quality systems across product development and manufacturing processes. Under his leadership, Foxconn's connector group rose from an unranked position to become one of the top global providers in the computing-related connector and cable sector. Today, FIT ranks among the world's top four connector manufacturers.

Lu has also served on the Board of Directors of Hon Hai Precision Industry Co., Ltd., the parent company of Foxconn, where his strategic insight was instrumental in guiding the corporation through a pivotal period of transformation — helping solidify its position as a global leader in contract electronics manufacturing.

In 2011, in recognition of his professional accomplishments and contributions, Lu received the MechSE Distinguished Alumni Award, and in 2015, was recognized with The Grainger College of Engineering Alumni Award for Distinguished Service.

In 2014, to honor his mother's visionary support and steadfast belief in the power of education, Lu established the Tungchao Julia Lu Professorship in MechSE. When he was informed of the department's Campaign to Transform MEB project, he immediately became its biggest champion. He pledged $12M to fund the east wing addition, stating a desire to invest in MechSE students' education and innovation. In 2019, in recognition of his transformative total contributions of $21.5 million to the project, MEB was renamed the Sidney Lu Mechanical Engineering Building. ◆

Watch the Fireside Chat, a conversation with Lu and Krishna

2026 Alumni Awards

MECHSE DISTINGUISHED ALUMNI AWARD

Established by the Alumni Board in 1968, this honor recognizes our alumni who have established careers and have served in a professional and technical capacity to honor the department and the university. To date, more than 200 of our deserving alumni have received this award.



Frank A. Sanders
(BSME 1990)
Corporate Vice President & General Manager of Global Supply Chain Operations, Intel



Kendra Sharp
(PhD TAM 2001)
Dean, School of Engineering, Santa Clara University

MECHSE OUTSTANDING YOUNG ALUMNI AWARD

Initiated in 2015, this award recognizes alumni who graduated from MechSE less than 10 years ago and who have embodied the department and university's values in their professional careers.



Jin Tae Jimmy Kim
(MS TAM 2015, PhD TAM 2020)
Assistant Professor, Department of Mechanical Engineering, Pohang University of Science and Technology, Korea



Hamid Jafarnejad Sani
(PhD ME 2018)
Assistant Professor of Mechanical Engineering, Stevens Institute of Technology



Kenny Swartz
(BSME 2014 (Bronze Tablet), MSME 2016, PhD ME 2021
Computational Optimization Engineer, Lawrence Livermore National Laboratory



GRAINGER COLLEGE OF ENGINEERING ALUMNI AWARD FOR DISTINGUISHED SERVICE

Li San Poh
(BSME 1998, BA Econ 1998)
Senior Vice President of Changi East Systems for Changi Airport Group in Singapore; member of the Singapore Parliament since 2020; chair of the Government Parliamentary Committee (GPC) for Sustainability and Environment; and member of the GPC for Transport

Poh was awarded for a distinguished military career as an Air Force pilot, and for her advocacy work for the citizens of Singapore as a member of the Singapore Parliament.



Read more about the career achievements of our award winners

On the Ball

Innovative yet practical solutions like high-tech soccer cleats and large-scale passive cooling film reflect the broader impact that translational research developed in MechSE can have beyond campus — including on the global stage at the FIFA World Cup.

From the Lab to the World Stage: Cooling technology helps FIFA and the city of Houston beat the heat



Research developed in the lab of MechSE professor **Lili Cai** helped address extreme urban heat through a high-profile deployment at the 2026 FIFA Fan Festival in Houston, Texas.

This summer, SolarMantle, a startup spun out of Cai's research, partnered with the FIFA Sustainability Team and the city of Houston to deploy its passive cooling film on public infrastructure ahead of one of the world's largest sporting events.

As cities worldwide face increasingly frequent and intense heat waves, passive daytime radiative cooling offers a promising approach to keep surfaces significantly cooler under direct sunlight, mitigating heat buildup and improving thermal comfort without consuming electricity. The FIFA deployment provided an opportunity to demonstrate these benefits under demanding real-world conditions.

Treated roofs measured more than 40 degrees cooler than adjacent untreated metal roofs, highlighting the technology's potential to improve public infrastructure resilience while reducing cooling demand in hot climates.

The successful deployment was built on years of research and technology translation at Illinois. Graduate student **Yoon Young Choi** played an important role in scaling the manufacturing process for large-area cooling films through the Illinois Innovation Voucher Program, helping bridge laboratory fabrication with commercial production. The manufacturing and field deployment were led by **Aman Mehta**, principal engineer at SolarMantle and a MechSE alumnus (BSME 2024) who began working on the technology as an undergraduate researcher in Cai's laboratory.

"It was incredibly rewarding to stand on that rooftop in Houston and realize that research we worked on as students at Illinois was now solving a real problem for a major city," said Mehta. "That's what engineering should do — take ideas from the lab and create tangible impact in the world." ◆





The Science Behind World Cup Shoes: Illinois friction tech debuts

Postdoctoral scholar Asif Rashid, graduate student Charlie Whealton, and King



Shoes with surfaces that stay smooth for low-speed agility and instantly morph into high-friction grips for control over powerful kicks.

They sound like something that soccer players can only dream of, but they're here. The Predator line of Adidas cleats — known for giving players precision ball control — now incorporates Nanostrike+ surface mesh with microstructures that instantly adapt to the player's movements.

The shoes were worn in the 2026 World Cup by players from England, Germany, and Spain — and they were only possible because of tech from The Grainger College of Engineering.

Almost 20 years ago, mechanical science and engineering professor Bill King, an expert in manufacturing technology, developed techniques for manufacturing polymers with engineered surfaces that have a powerful feature: controllable friction.

Today, the Adidas shoes incorporate pillar-shaped microstructures made with the technology developed in King's lab. As a result, the friction between the shoe and the ball changes depending on the force applied by the player.

"My lab first worked on polymer microstructure fabrication back in the mid-2000s when the science was quite new," King said. "Since then, it has grown into a mature technology used in healthcare, transportation, and now athletic wear."

When King first began researching polymer microstructures, it was in the context of microelectronics fabrication. However, he realized that it was possible to scale the technology in a way that makes microstructures feasible for consumer products.

"Engineered surfaces are amazing because they lead to new material properties not possible with traditional chemistry and materials science," King said. "Properties like engineered friction performance are only possible through the mechanical design of microstructures. The key obstacle has always been how to manufacture these microstructures at scale. Manufacturing is the bridge to unlock surface engineering."

The initial stage of the work received government support for potential applications in transportation and defense. However, after King's lab published the results, he was contacted by industrial manufacturers interested in scaling up the technology.

In response to this commercial interest, King founded the company Hoowaki, which has focused on developing healthcare applications exploiting the self-cleaning, hydrophobic and gripping properties of King's engineered surfaces. Now, athletic wear makers have also taken note.

The performance gains from microstructure surfaces — controllable friction, repelling water and self-cleaning in dirty conditions — have been in development for several years, and the Adidas shoes with micro-pillars are the first to come to market.

According to Hoowaki CEO Ralph Hulseman, the collaboration with King and the University of Illinois gave the company a foundational understanding of micro-engineered surfaces.

"Together, we were the first team to build the fundamental engineering principles of micro-engineering surfaces, which allowed us to develop computational models for customized designs, as well as scalable manufacturing technology," Hulseman said. ◆

Grainger College of Engineering
UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

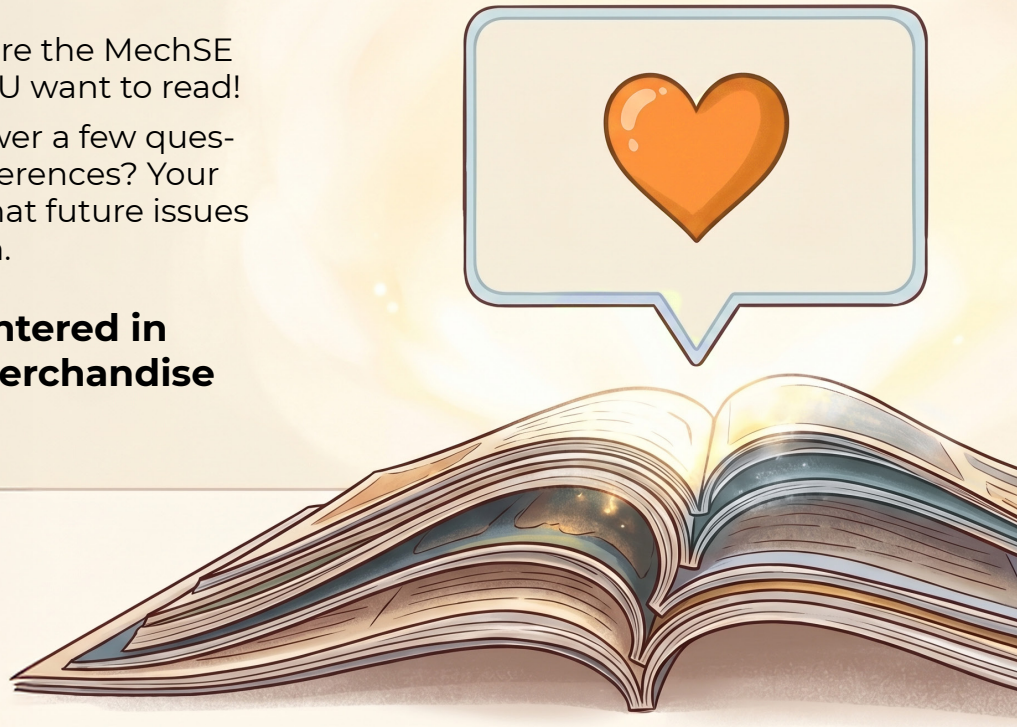
Department of Mechanical Science and Engineering
1044 Sidney Lu Mechanical Engineering Building
1206 W. Green Street
Urbana, IL 61801-2906

HELP SHAPE WHAT COMES NEXT

Hey reader! We want to make sure the MechSE Magazine is full of the stories YOU want to read!

Can you spare 4 minutes to answer a few questions about your readership preferences? Your feedback helps us determine what future issues of the magazine should focus on.

As a thank you, you'll be entered in a drawing to win Illinois merchandise valued at $75!



go.mechse.illinois.edu/magazine-readership