

ARIZONA ENGINEER

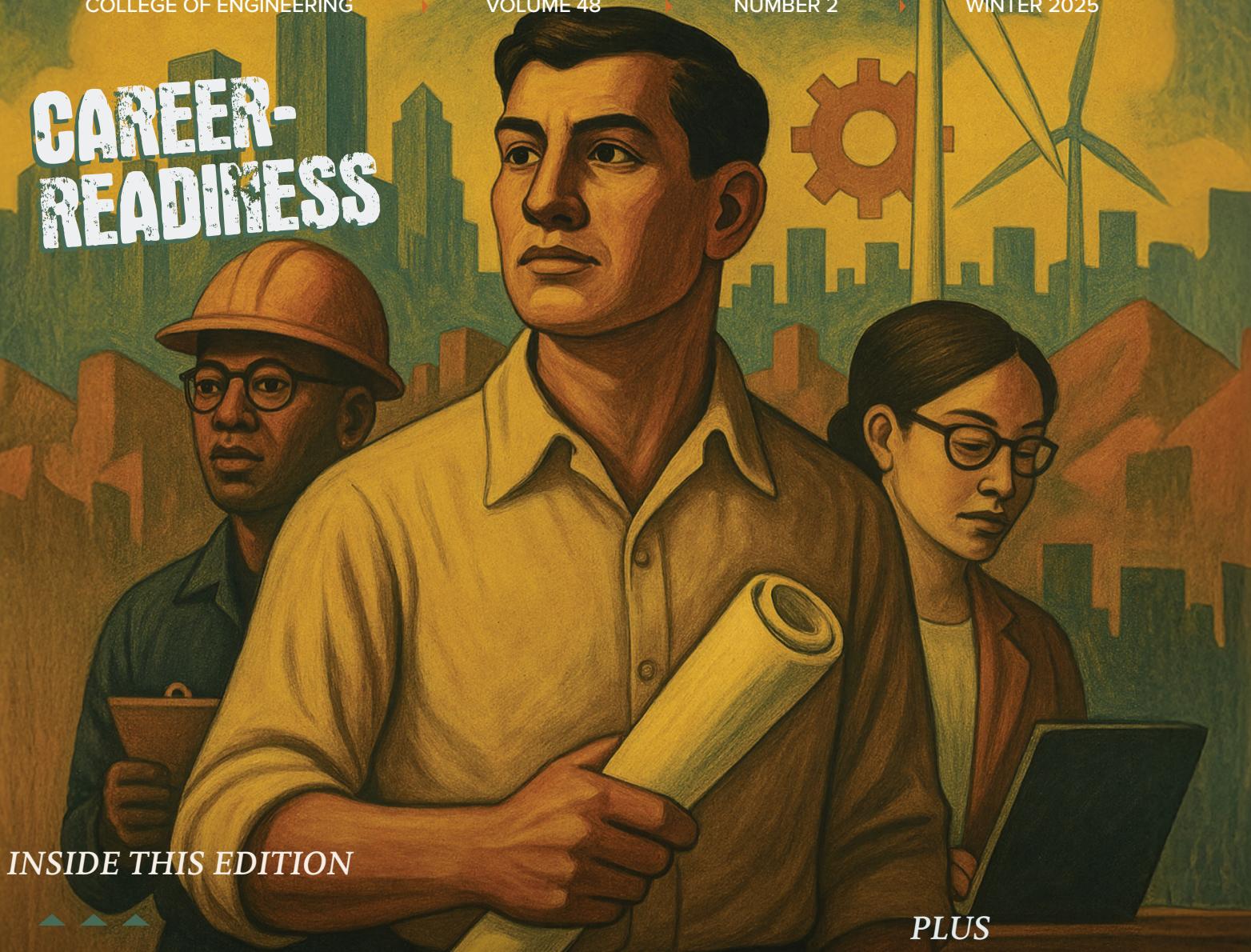
COLLEGE OF ENGINEERING

VOLUME 48

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WINTER 2025

CAREER- READINESS



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\$2.32M for spinal
bioimplant

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11 faculty join college – Educators contribute expertise in high-demand fields.



Wildcat Engineers lead a thriving labor force.



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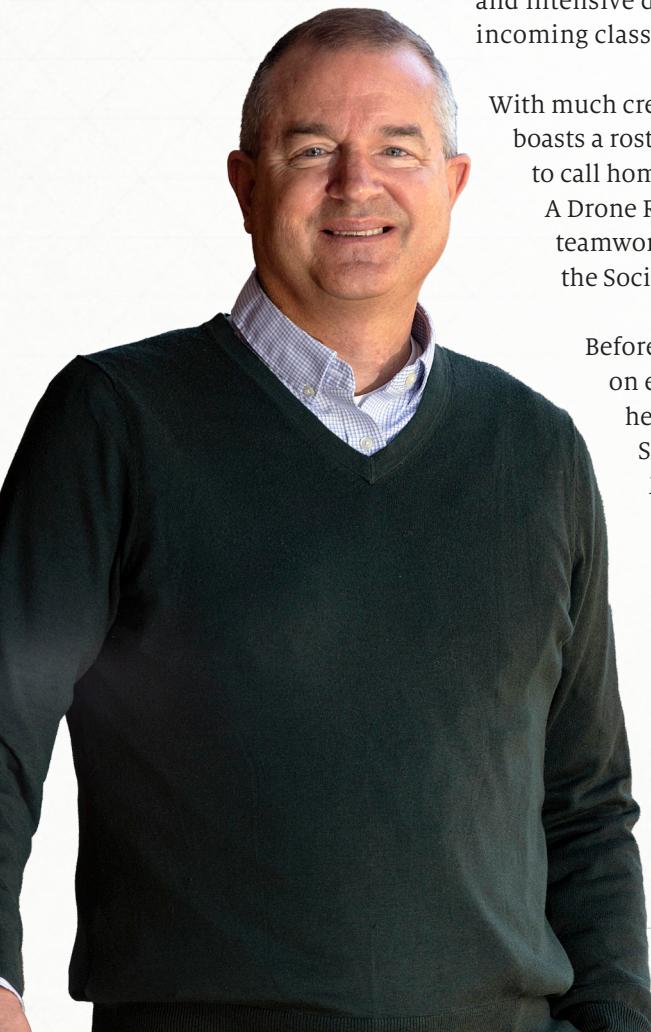
Some articles in this print magazine are edited for length.
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We respectfully acknowledge the University of Arizona is
on the land and territories of Indigenous peoples. Today,
Arizona is home to 22 federally recognized tribes, with
Tucson being home to the O'odham and the Yaqui. The
university strives to build sustainable relationships with
sovereign Native Nations and Indigenous communities
through education offerings, partnerships, and
community service.

Degrees yield life- changing careers

*Arizona
Engineering is
paving the way
for a high-tech
workforce.*



DEAR ALUMNI AND FRIENDS,

Reflecting on 2025, I'm proud to say that with your support, the college is setting the standard in modern workforce development. This issue of the magazine is all about how the college's experiential learning, door-opening industry connections, and economically pertinent degree programs pave the way from classroom to career.

Thanks to alumni, donors, partners and faculty, the road to career readiness has never been smoother.

Many hands fill job pipeline

From Day 1 to graduation day, the college provides countless industry-aligned opportunities. As David Shilliday writes in a guest column (*page 10*), this symbiotic relationship not only prepares students for the workforce but also connects companies with the brightest young minds.

First-year undergraduates start strong designing for the Solar Track Meet (*page 22*), while seniors crown their academic journeys with yearlong industry-sponsored projects. Invaluable experience in the Craig M. Berge Engineering Design Program combined with company internships is a winning combination. For example, Polymicro Technologies offered Tiffany Hudgins a full-time position while she was still working on her senior project (*page 11*). And three Flinn Scholars drawn to the college's welcoming community and intensive design and lab work were among those in this year's incoming class (*page 12*).

With much credit to the Engineering Student Council, the college boasts a roster of more than 50 clubs, at once a place for students to call home and a proving ground (*page 19*). Design-build clubs like the U of A Drone Racing Club combine engineering and sport, instilling the value of teamwork. Additionally, professional organizations such as Women in Mining and the Society of Hispanic Professional Engineers draw job recruiters to campus.

Before they even enroll, college-bound high-school seniors are gaining hands-on engineering experience at the U of A. High School ENGR 102 students get a head start on college courses. Interns in the KEYS (Keep Engaging Youth in Science) program tackled brain imaging and cancer drug delivery (*page 20*). Meanwhile, high schoolers in the Summer Engineering Academy explored semiconductors and mining, two of the state's fastest-growing industries (*page 27*).

Star faculty pay it forward

Faculty members, from well-connected professors of practice to world-renowned researchers, are teaching skills directly transferable to engineering jobs and giving students central roles in high-profile work. This year, the college welcomed 11 faculty members, all experts in areas that are stimulating economic growth – artificial intelligence, semiconductors and mining automation, for example (*page 24*).

Before they even enroll, college-bound high-school seniors are gaining hands-on engineering experience at the U of A.

Generous donors continue to help the college hire and retain outstanding instructors and researchers. We are especially grateful to the visionary Lederman family, which recently established the Frank L. and Daphna Lederman Professorships. Materials science engineer Xiaodong Yan and biomedical engineer Shang Song are the first to receive the three-year professorships, recognizing the excellence of our early-career faculty (page 21).

Across the college, graduate students are becoming pioneers alongside their mentors. Lin Li is working with assistant professor Song on a spinal cord bioimplant (page 14). And, Dilara Long is collaborating with professor Jennifer Barton on a miniature microscope to detect endometriosis (page 31).

Graduation is just the beginning

It was great seeing so many of you at the Homecoming Engineers Breakfast, honoring your successes, and hearing how you are inspiring today's students to make a difference in the world, and beyond (page 16). The support of the engineering community remains so inspiring.

You have helped strengthen academic programs, expand internship opportunities and open pathways in every engineering field. Your success affirms the college's career-readiness focus.

On behalf of the entire college, I extend our deepest gratitude to you for supporting the next generation of engineers.

Wishing you a safe holiday season and a very happy New Year,



David W. Hahn

Craig M. Berge Dean, College of Engineering

Experiential learning, door-opening industry connections, and economically pertinent degree programs pave the way from classroom to career.

Graduate students on university council lead goodwill effort

The university's Graduate and Professional Student Council fuels professional development efforts for graduate students across campus. College of Engineering representatives Mohamadreza "Reza" Ramezani (left) and Joanna Joseph (right) are creating an Engineering Ambassadors program to help graduate students connect with senior leadership. Representatives amplify student voices and ensure their concerns reach leadership. They also champion the CAPS for Cats program, which provides engineering graduate students with free mental health services.



Mohamadreza 'Reza' Ramezani is a systems and industrial engineering PhD candidate.



Joanna Joseph is a mechanical engineering PhD candidate.

(From left) Biosystems engineering seniors Kaden Thomas and Petrea Houska, with mining engineering senior Michael Bass, meet their top choices among 111 project sponsors at the 2025 Craig M. Berge Design Day Open House.

RITE OF PASSAGE FOR ASPIRING SENIORS

Design Day Open House starts students on the last leg of their undergrad journeys.

WITH AN EYE toward prize-winning capstone projects and their dream jobs, 400 College of Engineering seniors got to know sponsors at the 2025-2026 Craig M. Berge Design Day Open House on Aug. 28 in the U of A Grand Ballroom. Eager to land one of his top picks among the 66 Interdisciplinary Capstone projects, Andrew Avalos arrived early.

"I'm super excited about getting my name out there to open doors," said the aerospace engineering major, who wanted to work on a drone disaster recovery system.

Avalos checked out a General Dynamics Mission Systems project to develop a drone platform that redirects distress signals to a U.S. Coast Guard frequency. Sandia National Laboratories, where Avalos landed a week later on match day, tasked students with developing a drone that senses and tracks other drones.

"The fact that you all come together to bring industry-relevant problems to our students and combine it with

years of mentorship experience is a game changer for their careers," David W. Hahn, the Craig M. Berge Dean of the college, told sponsors at the annual event.

Integrating AI for better results

Steve Larimore, Interdisciplinary Capstone lead instructor, went over artificial intelligence guidelines, explaining that students are encouraged to use AI for identifying similar projects and engineering standards.

"It is a way to do these projects faster and more accurately, gaining better results in the process," he said.

Several sponsors had already incorporated AI in their design requirements. Freeport-McMoRan's software project calls for AI to model data collection automation for leaching, a chemical process that separates copper from ore.

"Our current process ... is manual and that worked great when we had

10 samples, but now we have over 100," said Joanna Robertson, the mining company's director of metal recovery. "It's good to get a fresh perspective, and these engineering students are some of the brightest minds around."

Bringing a product to market

One first-time sponsor is looking to get FDA approval and commercialize its design.

Startup Senphonix is advancing a wearable sleeve sensor that monitors heart rate, respiration and temperature.

"It takes about 20% of a nurse's time to do that," said Mike Haldane, cofounder and CEO, "so it will be a huge time saver."



Aerospace engineering senior Riley Mayes says capstone projects set her up for career opportunities.



LATEST DEGREES STOKE HIGH-RETURN OFFERINGS

Programs with earnings potential range from AI- and business-oriented degrees to graduate certificates in semiconductor processing and digital engineering.

WORKING CLOSELY WITH industry and community leaders, the College of Engineering has broadened its online and on-campus technical offerings for undergraduates and graduate students. The newest economically aligned programs help fill the pipeline for high-demand jobs and support professionals seeking career advancement.

"The college continues to develop academic programs that offer modern, high-return opportunities for our students and community partners," said Kelly Simmons-Potter, associate dean of academic affairs.

From artificial intelligence and semiconductors to an integrated business degree, students are pursuing a range of popular skills.

One-stop shop for tech

With the foundational overlap in ECE's three core academic programs – computer science and engineering, electrical and computer engineering and software engineering – degree-seeking students can easily customize their high-tech journeys.

"The department offers the perfect combination of theory and application, and I love the flexibility to explore areas like radar signal processing, wireless communication and AI," said PhD candidate Shuting Hu, a wireless systems engineer at NXP Semiconductors.

Whether they're designing full-stack computing systems, conducting robotics research or integrating AI, undergraduates in the Department of Electrical and Computer Engineering master skills that translate to careers.

"I can map one-to-one the knowledge I learned in the classroom and knowledge I directly applied at my internships and now at my job," said 2024 graduate and three-time Nvidia intern Ashley Tittelbaugh, now an engineer with the computer chip manufacturer.

Where design meets business

The first and only program of its kind in Arizona, the BS in Integrated Business Engineering combines a comprehensive engineering education with the savvy business acumen for which the Eller College of Management is known.

Open for enrollment with classes beginning in fall 2026, the program boasts an equal split between engineering and business courses, with significant project work that combines the two.

"We need leaders who can translate technical expertise into real-world solutions," said David W. Hahn, Craig M. Berge Dean of the college. "This program is about teaching students to understand engineering systems and the business strategies that bring them to life."

Students in IBE hone strategic

management skills, bolster technical knowledge and make professional connections.

"They're going to be working with significant clients throughout their four years, getting exposure and opportunities," said Michael Kwinn, IBE program director and systems and industrial engineering professor of practice.

Upper hand in cybersecurity

Students hoping to join the fast-growing world of cybersecurity and intelligence can enroll in the Information and Intelligence Operations program, a Bachelor of Applied Science recently relocated from the College of Applied Science and Technology.

This experiential degree offers specialized academic tracks that focus on national security and prepare students for roles in law enforcement, defense and government.

Inroads for professionals

The newest degree programs bring the college's total number of tech majors to 18.

Additionally, for working professionals looking to boost earnings potential, U of A Engineering provides several graduate certificate and training options, including in areas such as semiconductor processing and mining engineering.

MINING SCHOOL A CRITICAL ECONOMIC HUB



THE STATE, COMMUNITIES, industry partners, alumni and individual donors are rallying behind the School of Mining Engineering and Mineral Resources as it expands programs and facilities to meet demand for workforce training.

STATE CONTRIBUTION

Arizona's legislature contributed \$850,000 toward a pilot mineral processing facility, marking the first phase of MiningWerx – a planned multimillion-dollar facility with classrooms, labs, surface and underground proving grounds.



"We haven't been discovering enough copper deposits and building enough new copper mines to supply the demand that is coming."

TIM SNIDER, former president and COO of Phelps Dodge

Emergency Response Drill.

Also in October, about 1,000 university students plus 200 high school and community college visitors attended the annual Mines for Limitless Minds (*page 8 bottom photo*). The career-discovery fair draws more than 40 mining companies to campus, including longtime partners Freeport-McMoRan and Lundin Mining, two of the event sponsors.

SAFETY FIRST

Additionally, the school, with Resolution Copper, launched an intensive safety program in June at San Xavier Mine to train employees. The school expects the course to be offered monthly in 2026 and involve additional companies.



"These are invaluable opportunities for students and professionals to combine theory, technical planning and emergency response in a real-world setting."

KRAY LUXBACHER, *Gregory H. and Lisa S. Boyce Leadership Chair of mining and geological engineering and executive director and head of SMEMR*

SNIDER GIFT

A \$1.5 million gift established the Timothy and Rhonda Snider Endowment Fund for SMEMR student scholarships and faculty research.

"Rhonda and I are very interested in helping first-generation kids who might not be able to pursue science or engineering education otherwise," said Tim Snider.

TRAINING & OUTREACH

Several 2025 events kicked the school's career training and community outreach into high gear.

Recent graduate Carter Brown (*page 8 top photo, far left*), an engineer for the Northern Star Pogo Mine in Alaska, returned to the U of A's San Xavier Mining Laboratory on Oct. 31 to coach teams participating in the Mine

"All of these students will graduate with a leg up on any other college of mines."

LESLEY "LES" PRESMYK, *Arizona State Mine Inspector and 1975 mining engineering alum (shown here advising students at the Mine Emergency Response Drill)*



GUEST COLUMN

by **David Shilliday**

*Vice President & General Manager,
Honeywell Aerospace
Advanced Air Mobility
Mechanical Engineering, BS '94*

*My Arizona engineering
education forged the
agility and resilience
I needed to build
something from the
ground up.*



Ties between Honeywell Aerospace and the University of Arizona College of Engineering – both rooted in courage and capability – run deep.

Honeywell, with more than a century of expertise in safety-critical aviation systems, and U of A Engineering, with a tradition of excellence that dates back to 1885, have a long history of working together to stay ahead of the curve in a constantly changing world. Providing systems that range from integrated cockpits and flight controls to actuation and turbogenerators, Honeywell makes the eyes, ears, brains, heart, lungs and muscles for aircraft to fly safely. The college is key to providing the talent to expand the company's adaptive workforce.

I credit an Arizona engineering education with instilling in me the agility and resilience to build something from the ground up. In just five years, Honeywell has brought online its Advanced Air Mobility (AAM) business unit, which I have led since 2023. This fledgling sector promises to transform how people and goods move: via electric and hybrid-electric vertical takeoff and landing aircraft – piloted and uncrewed. At the same time, the college is partnering with Honeywell and other companies to ensure ongoing industry alignment of its academic programs.

Industry-relevant education is key

Colleagues who turn challenges into opportunities make the strongest teams, and that keeps leading me back to my roots. Wildcat engineers are woven into every aspect of our AAM aspirations. We have Avishkar Madar (BS/ME 1999) on integrated avionics; Jon Jenkins (BS/AE 1997) on flight controls; Darrell Horner (BS/ME 1987) and Maira Garcia (BS/AE 2014) on electromechanical actuation; and David Morris (BS/ME 2010) on turbomachinery.

AAM's continued progress depends on the next problem solvers, or "futureshapers" as we call them. Honeywell is collaborating with the college to provide even more opportunities for industry-relevant educational programs that prioritize hands-on learning in real-life settings. We are funding research and sponsoring capstone projects that define clear pathways from education to industry.

This year, Honeywell is sponsoring six interdisciplinary design teams tackling challenges in additive manufacturing. Not only does the investment speed up time to market, but also the program introduces our team to some of the brightest minds coming out of the university.

Additionally, Honeywell's endeavors with the college span years of shared research breakthroughs, such as advances in quantum gyroscope technologies for autonomous vehicles. Industry-academic collaboration is even more critical in the high-volume world of AAM. The complexity of these vehicles requires agility, so AAM serves as a sandbox for upcoming transportation technology and applications. Everyone involved gains critical learning experience.

In short, this symbiotic relationship between industry and academia prepares students for an evolving job market and a changing world.

So, let's keep changing together!

ERGONOMIC DENTISTRY TOOLS SET STAGE FOR DREAM JOB



Industrial engineering senior **Tiffany Hudgins** (far right) lands a coveted industry position while guiding her capstone team to design an apparatus that alleviates chronic pain for dentists.

TIFFANY HUDGINS had no idea what graduation would bring when she began leading a 2025 Interdisciplinary Capstone team. But she knew she chose engineering to help people.

"I was still trying to figure out my place as an engineer," said the industrial engineering senior.

Making ergonomic dental instruments unlocked more than her confidence. The project led to an internship and full-time job with medical equipment company Phillips Medisize in Phoenix.

Gadget alleviates toll of dentistry

Using dental hand tools for up to eight hours a day takes its toll on the body. Between 64% and 93% of dentists, hygienists and dental students suffer from musculoskeletal disorders, such as carpal tunnel syndrome, reported the Academy of General Dentistry.

"People quit dentistry early because of chronic pain," said Dr. Jeanne Anne Krizman, lead dentist at Tucson

Biological Dentistry, a first-time project sponsor.

Instead of reimaging each tool, the team developed one apparatus that attaches to oral mirrors, scalers and probes to support the thumb joint and relieve pressure from gripping.

"This exposes them to industries not typically linked with engineering," said Krizman, project adviser. "I wanted to bring a fresh perspective to solve this problem, and these engineers are doing just that."

Unconventional path to success

Hudgins may not have known it at first, but she was on her way to a successful career.

"Tiffany was very shy when she first started, but that quickly changed," said faculty mentor Bert Schneider. "This team gave by far the most impressive presentation I've seen in my career."

The students showcased the device

at the Dec. 5 Craig M. Berge Winter Design Day. If the Institutional Review Board approves a study involving human subjects, an upcoming design team will continue the study.

For the last 25 years, the College of Engineering's two-semester Interdisciplinary Capstone program has culminated in a spring Design Day highlighting student projects. Last year, the college added a second option for the required Engineering 498 course and a winter Design Day.

Hudgins will spend a year and a half working with multidisciplinary teams at different Phillips Medisize company sites.

"It's really great to see an engineer find their place and get an amazing job," said Schneider, a 17-year U.S. Air Force veteran who spent 21 years in leadership positions at Raytheon, an RTX Business, before retiring and becoming a capstone instructor.

FLINN SCHOLARS FOCUS ON GOOD WORKS

Three undergrads find purpose in biomedical and aerospace degrees.

Flinn Scholars (from left) Roselyn Dorrell, Oliver Hoerth and Jeanette Mendoza set their sights on health care, disease treatment and space exploration.



THREE OF ARIZONA'S top students began their studies in the College of Engineering this fall as Flinn Scholars, bringing with them a passion for exploration and service.

"I knew I wanted to study engineering, somewhere I could jump into hands-on research and be part of a real community," said Oliver Hoerth, Flinn Scholar and W.A. Franke Honors College student.

Hoerth graduated from Paradise Valley High School in Phoenix as part of the CREST Bioscience Program. He is one of 10 2025 Flinn Scholars — some of the state's highest-achieving high school seniors — who began at the U of A in the fall on a full-ride scholarship.

For Hoerth, Roselyn Dorrell and Jeanette Mendoza, it's not just about the scholarship, it's about making a difference for Arizonans.

Two aim to advance health care

When Hoerth toured the U of A's biomedical engineering program and the Richard F. Caris Mirror Lab, he saw unlimited possibilities.

"It was really just an eye-opening experience, and I saw where I could do the research and make a tangible impact," said Hoerth.

He was particularly impressed with the wearable health monitors being developed in the lab of Philipp Gutruf, associate department head of BME. Hoerth, a BME major, plans to study and explore computer engineering as it relates to biological systems.

He is also excited to get involved in student clubs like the Biomedical Engineering Society.

"I was drawn to BMES because it would not only teach me essential soft skills such as resume writing, interviewing, leadership and networking," he said. "But it would also allow me to get further connected with other undergraduates."

Fellow Flinn Scholar and honors student Jeanette Mendoza plans to leverage her biomedical engineering degree to help people contending with diseases like those that afflicted family members.

"For me, it's always been important to connect what you do to who you are and what you've experienced. My goal is to find ways to help people with cancer, both for

prevention and during treatments," she said.

The Sunnyside High School graduate watched her friends and family members navigate lupus and cancer throughout her childhood.

In the Peter and Nancy Salter Medical Device Design Lab, students build and test wearable medical devices and sensors. And in a lab run by Shang Song, Frank L. and Daphna Lederman Professor and assistant professor of BME, students are encouraged to conduct research as part of the Cancer Engineering Initiative.

Self-starter looks to outer space

Honors student Roselyn Dorrell hails from Clifton, a town with a population of 3,845.

"In my hometown, there were no STEM programs whatsoever until I helped create them," she said.

"I started the robotics club at my high school. I wanted to create an environment for other kids who shared an interest in STEM but didn't have anywhere to go."

Now Dorrell is looking to the stars for inspiration in aerospace engineering.

"My goal is to find ways to help people with cancer, both for prevention and during treatments."

JEANETTE MENDOZA,
Flinn Scholar and biomedical engineering undergrad

"I grew up fascinated with the stars.

I would look up every night, wondering what was out there and dreaming of going up there, but I also loved to build stuff," she said. "Aerospace engineering is where my two passions collided."

Dorrell's family was instrumental in her decision to become a Wildcat. Her mother graduated from the U of A with a bachelor's in cellular and molecular biology and a master's in clinical systems leadership.

"My dad also loves space and would teach me about different constellations and stellar phenomena," she said.

Ultimately, Dorrell hopes to design rockets at the NASA Jet Propulsion Laboratory in California.

She plans to join student organizations that connect her with industry professionals – including the Society of Hispanic Professional Engineers, the Rocket Club, and American Institute of Aeronautics and Astronautics – while taking specialized AME courses.

NIH grants Shang Song \$2.32M for spinal bioimplant

PRESTIGIOUS AWARD RECOGNIZES BIOMEDICAL ENGINEER'S ADVANCEMENTS IN TREATING SPINAL CORD INJURIES.



Shang Song – Frank L. and Daphna Lederman Professor and assistant professor of biomedical engineering (shown here in the Song Lab) – supervises students who are investigating health care devices that speed injury recovery.

THE NATIONAL INSTITUTES of Health granted Shang Song a five-year Director's New Innovator Award of \$2.32 million to develop a bioimplant that treats spinal cord injuries and associated complications.

Song, Frank L. and Daphna Lederman Professor and assistant professor of biomedical engineering, is creating a closed-loop neuromodulation implant device expected to reduce pain from spinal cord injuries, improve motor recovery and promote spinal plasticity.

The device leverages neuroplasticity — the ability of nerve cells to reconnect and form pathways to perform body functions — to treat spinal column damage.

The Director's New Innovator Award is part of NIH's prestigious High-Risk, High-Reward Research program, which supports scientists' unconventional approaches to major challenges in biomedical and behavioral research.

"This research directly bridges technology and medicine. I'm learning how to integrate engineering tools like microfabrication, signal processing, and materials science with neuroscience applications."

LIN LI, biomedical engineering doctoral student

"The department is proud to see one of its youngest faculty win this prestigious NIH award," said Mario Romero-Ortega, head of the Department of Biomedical Engineering. "Her innovative work in regenerative medicine and organ-on-chip systems will contribute to uncovering new therapeutic options in these key areas."

To collect preliminary data for the project, Song received support from the College of Engineering and BIO5 Institute, of which she is a member, as well as \$200,000 from Eighteenth Mile Funding. The U of A's Technology and Research Initiative supports Eighteenth Mile Funding.

The first of its kind

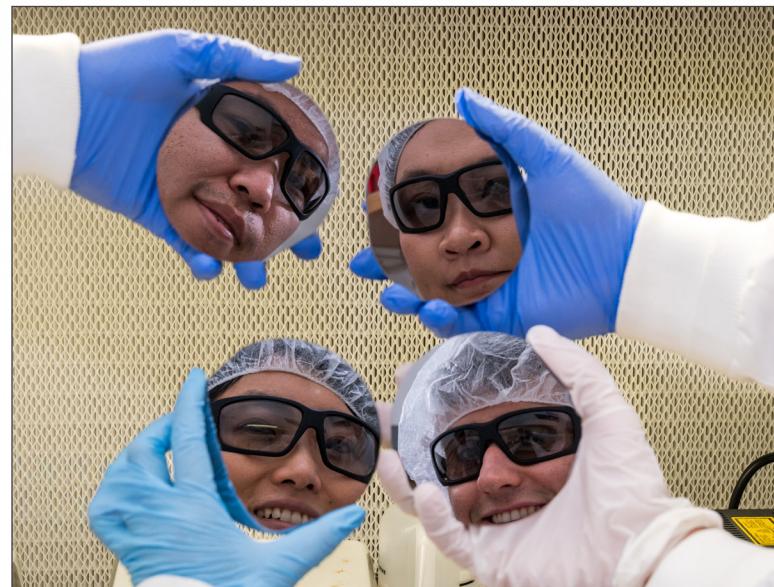
The American Association of Neurological Surgeons reports that more than 17,000 Americans annually suffer spinal cord injuries, which can lead to acute chronic pain and loss of motor function.

"Other neurological functions of the body, like heartbeat, breathing and bowel function, can also be affected," said Song. "Even in less severe cases, quality of life can be drastically lowered."

Presently, no treatment exists to repair spinal cord damage, according to the Mayo Clinic.

Song's implant uses electrical stimulation to promote neural learning and plasticity, forge neural connections, and retrain the nervous system.

"Traditionally, the spinal cord has been viewed as a hard-wired and passive conduit, merely relaying signals," she said. "However, this view is incomplete. The spinal cord has a remarkable ability to adapt, and that gives us the key to restoring its function."



Undergraduates and graduates, like biomedical engineering PhD candidate Lin Li (top left), shown posing with other students, design neuromodulation devices in the Song Lab.

The device encourages the spinal cord to find neural pathways that reduce pain while promoting motor recovery. With repeated stimulation, the spinal cord learns which signals improve movement and decrease discomfort.

It also incorporates FDA-approved biodegradable materials, which are adjusted depending on treatment periods and break down in the body naturally, eliminating the need for removal surgery and reducing the risk of complications.

Bridging technology, medicine

Lin Li, a biomedical engineering doctoral student in Song's lab, is helping develop the platform that sends electrical signals to the spinal cord.

"This research directly bridges technology and medicine. I'm learning how to integrate engineering tools like microfabrication, signal processing, and materials science with neuroscience applications," said Li.

"It's rewarding to know that advances in our system could improve patient quality of life after spinal cord injury."



HOMECOMING 2025

RED, BLUE AND TRUE

Engineering Wildcats honor military, reaffirm commitment to communities.



THE COLLEGE OF Engineering and its partners have 'Red, Blue and True' staying power.

"Our first-year retention rates are some of the highest on campus," David W. Hahn, the Craig M. Berge Dean, told 350 attendees at the 62nd Engineers Breakfast on Nov. 7.

Alongside remarkable growth, the college is remaining true to its purpose of steering students toward the nation's greatest needs.

As the college expanded academic and research programs to meet workforce demand, 900 first-year and transfer students started in fall 2025, many with an eye on the job market.

Saying, "Students who want to be entrepreneurs recognize the value of engineering," Hahn applauded the Integrated Business Engineering BS, a degree that fast tracks undergraduates into business. He also welcomed the Department of Cyber and Intelligence Operations, which relocated from the College of Applied Science and opens doors to defense and law enforcement job opportunities.

Additionally, Hahn updated alumni and

supporters on progress toward goals that affect economic growth, including a 160% jump in research expenditures over the last five years.

In keeping with a workforce training focus, Engineering Student Council President Rohini Ghosh praised the community for helping set up metallurgy internships at ASARCO, a copper mining, smelting and refining company in Tucson.

"Your generosity and commitment to future generations of Wildcats have shaped every opportunity that I had," said the W.A. Franke Honors College chemical engineering senior.

A college dedicated to the nation's needs

President Suresh Garimella, University Distinguished Professor in the Department of Aerospace and Mechanical Engineering, said the college has adapted well to meet national demands.

"I see the College of Engineering as integral to our strategic vision," he said. Engineering includes several disciplines historically aligned with priorities in the Office of Research and Partnerships: fusion energy, AI-integrated health care,



Keynote speaker **Jessica Schafer**, director of staff at U.S. Space Command and an aerospace engineering alum, tells breakfast attendees that the university's pioneering spirit is invaluable.

critical mineral mining, and space and national security.

Other speakers echoed the college's commitment to defense initiatives. U of A Foundation President and CEO JP Rocznia and keynote speaker Jessica Schafer emphasized Engineering's rapid response to military partnerships.

A 2002 aerospace engineering alum with more than 20 years of Air Force service, Schafer directs staff in the Department of Defense's U.S. Space Command. The college was the first partner in the division's Academic Engagement Enterprise, focused on workforce training and research in national security and space exploration.

"The vital research happening at the U of A makes it a valuable partner," said Schafer, adding, "The Space4 Center is working on novel AI techniques to improve space traffic."

Space4 Center is a \$7.5 million Air Force-funded, international endeavor tracking objects in space between Earth and the moon. Systems and industrial engineering professor Roberto Furfaro is the center's deputy director of engineering.

"It's crucial we protect and preserve space for continued use," Schafer said.



The Engineers Breakfast brings alumni, faculty and students under one roof to celebrate progress that takes a village.

Lacy Lecture hails ‘a different kind of mine’

Mining is not an either-or proposition. On the heels of the Engineer’s Breakfast, South32 Hermosa President Pat Risner delivered a bold message to a packed audience at the Center for Creative Photography: Mining can at once be clean, responsible and profitable.

“Sustainability is good business,” he said during the annual W.C. Lacy Distinguished Lecture.

Risner, with more than 30 years of experience in global operations and project development, stressed how South32’s Hermosa mine is redefining responsible mining. South32 is a global metals and mining company, headquartered in Perth, Australia. Presently Hermosa is the only advanced mining project in the United States that could produce two federally designated critical minerals important to improving energy storage – manganese and zinc – as well as silver and lead.

The 750-acre southern Arizona mine leverages electric underground vehicles to cut emissions, water recycling to conserve local resources, and real-time air quality sensors to protect workers and surrounding communities.

The W.C. Lacy Distinguished Lecture series honors Willard C. “Bill” Lacy, the first head of the Department of Mining and Geological Engineering formed in the mid-1950s.



“Mining today is about problem-solving and creativity as much as it is about resource development.”

PAT RISNER, president,
South32 Hermosa

2025 ALUMNI AWARDEES



Alumni of the Year Award

Susan Gray | Electrical Engineering, BS '96

Gray was an engineering student and collegiate swimmer when she started at Tucson Electric Power in 1994. Over three decades, she rose to president and CEO of TEP, UniSource Energy Services and their parent company, UNS Energy Corp. Gray helped found Women in Energy, a group that mentors and inspires women in the industry.

Bear Down Award

Don W. McDonald | Electrical Engineering, BS '65

McDonald spent 40 years in the semiconductor industry, including serving as chief operating officer and board member for Intense Photonics, a semiconductor laser design and manufacturing company. Since 2016, he has mentored more than 30 Interdisciplinary Capstone teams to success at Craig M. Berge Design Day. In June 2025, he and his wife, Sherry, committed \$1 million to fund scholarships and biomedical engineering capstone projects.



Advocacy Award

Sharon O'Neal | Professor of Practice

O'Neal spent 35 years at Raytheon, an RTX Business, where she directed more than 550 engineers and became the first female senior fellow engineer. Drawing on that experience, she built the software engineering program from the ground up. She also endowed the Wildcat Engineering Trailblazer Scholarship and founded the Math Science and Technology Funfest in 2003, which has reached more than 75,000 K-12 students.

HALL OF FAME: CLASS OF 2025



Jane Rider

BS Civil Engineering 1911
Arizona's first female engineer; endowed Jane H. Rider Scholarship



Desmond Kearns

MS Mining Engineering 1972
Former chairman, president and CEO of GeoBiotics



Greg Boyce

BS Mining Engineering 1976
Multiple CEO positions with Peabody Energy Corp., Rio Tinto PLC and Kennecott Energy; 2013 Alumnus of the Year



John Somerhalder

BS Chemical Engineering 1977
Former chairman, president and CEO of AGL Resources; supporter of Dean's Endowed Fund for Excellence in Engineering



Professional Achievement Award

David Shilliday | Mechanical Engineering, BS '94

Shilliday leads Honeywell Aerospace's Advanced Air Mobility unit as vice president and general manager, guiding the company's work in drone systems and urban air mobility. He has steered the division to secure more than \$10 billion in contracts with partners, including Archer Aviation, BETA, Wisk and Vertical Aerospace.

50 Engineering clubs help 'get a foot in the door'

THE ANNUAL College of Engineering clubs showcase invited students to explore shared interests and connect with peers from diverse academic backgrounds.

Club leaders on Sept. 9 packed the Bear Down Gym united around a common goal — attract members to the 50 organizations, an all-time high for the college.

Design, build, compete

The U of A Drone Racing Club where students design, build and race drones, made its debut.

"Our main goal is to have club members compete in collegiate championships," said club president Andrew Vanderah. "But most importantly, it's a great place to share our love of drones."

Vanderah, a mechanical engineering junior, said the club will be divided into four teams consisting of engineering and building, software and AI integration, flight and testing, and media and logistics.

Together, they will pilot a drone around a Collegiate Drone Racing Association obstacle course, hoping to reach the spring semifinals and vie for a cash prize and national recognition.

"We are looking forward to learning from each other and hopefully winning big," Vanderah said.

At another booth in the gym, the U of A NASA RASC-AL Launch

club asked students to set their sights even higher — space.

They recruited members to develop designs for NASA's Revolutionary Aerospace Systems Concepts - Academic Linkage Competition, which offers \$112,000 in prizes. Members will select one of four design themes for the competition: Mars communication technology, lunar sample return operations, power management, or infrastructure for a lunar economy.

"It's not every day that students get a chance to be involved in space exploration projects, especially as freshmen," said club president Ata Kolanci, an aerospace engineering junior. "We want every club member to feel engaged so they can do research and be a part of something cool."

Connecting fun with careers

Beyond competition-focused clubs, engineering students can forge industry connections in professional organizations like Women in Mining.

The club's exclusive guest speakers help members expand professional networks, and local mine tours offer real-world industry exposure.

"I joined to get my foot in the door," said Sam Bonaparte, club treasurer and mining engineering senior.

Club members also attend the Women in Mining National Conference, which will be hosted in Tucson this year.



The Women in Mining club encourages professional development with resume workshops and networking at the WIM National Conference.



Wildcat Formula Racing Club members work year round designing, refining and testing their car for the annual Formula SAE competition.



Over the course of a year, the U of A Drone Racing Club designs a drone to compete in the Collegiate Drone Racing Association's championship race.



The Society of Hispanic Professional Engineers runs a mentorship program in partnership with W. L. Gore & Associates, a global materials science company.

Summer interns tackle brain imaging, drug delivery at KEYS Showcase

Faculty help students advance technology to detect neurodegenerative diseases and battle cancer.

STUDENTS ADMITTED to the College of Engineering for the fall semester stood out at the BIO5 Institute's 19th annual KEYS Research Internship Showcase on July 18.

The event marked the culmination of the Institute's Keep Engaging Youth in Science (KEYS) program, which brought 65 high school students from 35 Arizona schools to the University of Arizona for summer internships in laboratory settings.

"KEYS is a great opportunity to show young minds, who are just starting to learn what biomedical research is, the state-of-the-art programs that we have built," said Nan-kuei Chen, associate professor of biomedical engineering and first-time KEYS mentor.

Two recent high school graduates mentored by Chen and Swarna Ganesh, assistant professor of biomedical engineering, capped their internships with poster presentations on technology aimed at diagnosing

neurodegenerative diseases and a drug delivery tool for cancer treatment.

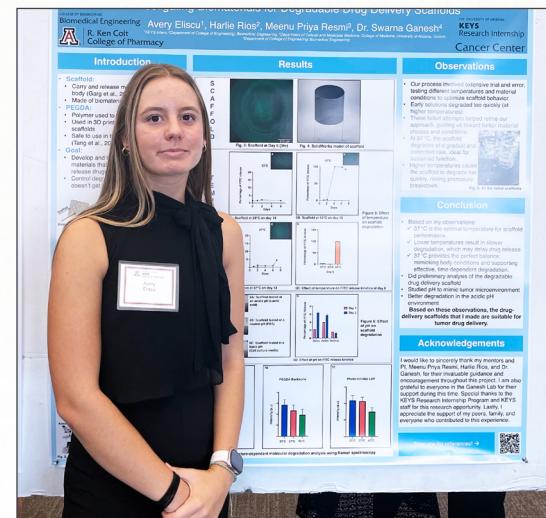
Scanning brain fluid to diagnose disease

Kapil Inguva from Arizona College Prep High School presented his research, completed in collaboration with Chen, exploring the relationship between cerebrospinal fluid flow and brain activity.

"I saw how cerebrospinal fluid was flowing through the brain, which can help with diagnosing and preventing neurodegenerative diseases like Alzheimer's and Parkinson's," Inguva said.

"KEYS is a great opportunity to show young minds, who are just starting to learn what biomedical research is, the state-of-the-art programs that we have built."

NAN-KUEI CHEN, associate professor of biomedical engineering



Avery Eliscu presents research on cancer-fighting drug scaffolds at the 19th annual KEYS showcase.

Inguva developed MATLAB code to extract biological information from 4D brain MRI data to create virtual models for analyzing differences in brain activity and cerebrospinal fluid volume.

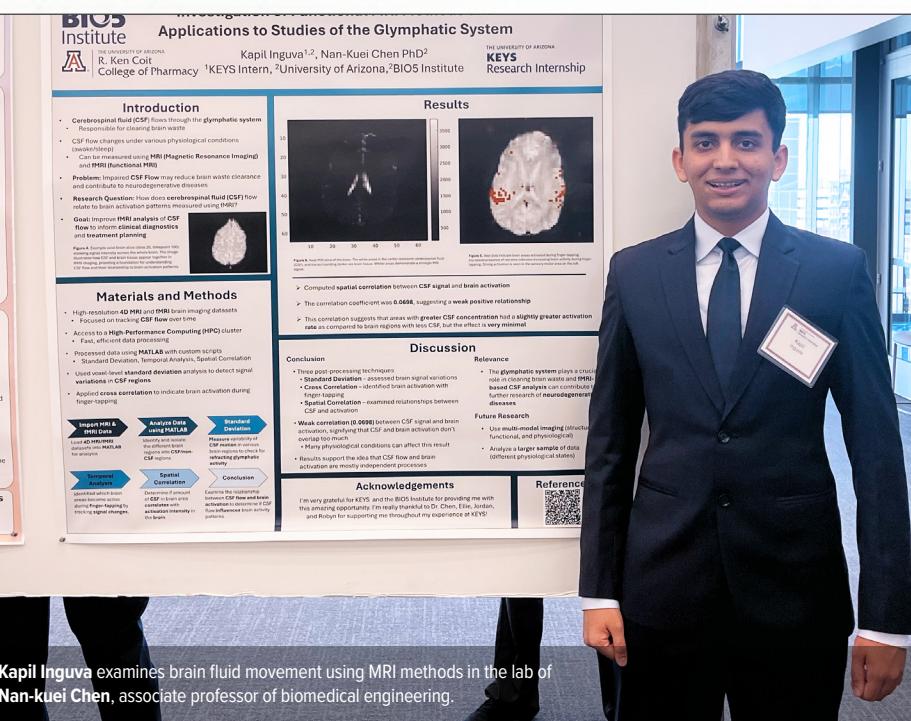
"Kapil's project is expected to produce new knowledge that links neuronal activity and the recently discovered glymphatic system, which is responsible for clearing brain waste and maintaining brain health," Chen said.

Delivering tumor-fighting drugs

Ganesh, also a first-time KEYS mentor, worked with Canyon Del Oro High School student Avery Eliscu to build scaffolds with synthetic polymers aimed at targeting tumors in the body.

"A scaffold holds a drug together and then delivers it to a tumor," Eliscu said. "We put the scaffold on a tumor, and the drug is slowly released as the scaffold degrades. Theoretically, the drug would get rid of the tumor."

Eliscu, who joined the university in the fall, plans to pursue a career in biomedical engineering and develop technology for cancer treatment.



Kapil Inguva examines brain fluid movement using MRI methods in the lab of Nan-kuei Chen, associate professor of biomedical engineering.

STRATEGIC GIFT CELEBRATES RISING STARS

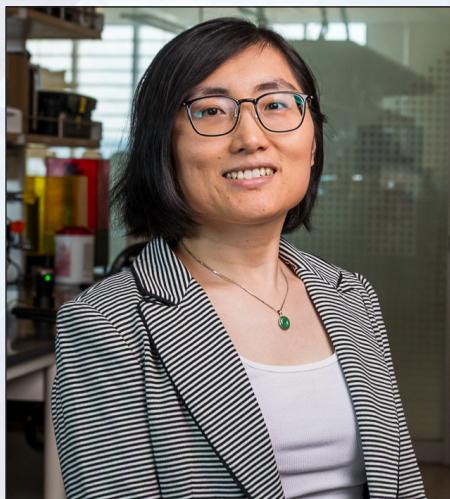
Shang Song, assistant professor of biomedical engineering, and Xiaodong Yan, assistant professor of materials science and engineering, are the first to receive endowed Frank L. and Daphna Lederman Professorships.

COLLEGE OF ENGINEERING

leadership selected assistant professors Shang Song and Xiaodong Yan as inaugural holders of the endowed Frank L. and Daphna Lederman Professorships. These three-year positions accelerate bold research in biomedical engineering and materials science.

David W. Hahn, the Craig M. Berge Dean, said it's exceptional to have an endowment of this kind.

"I'm grateful to Frank and Daphna for recognizing Dr. Song and Dr. Yan as rising stars," Hahn said. "This endowment provides critical resources to early-career researchers advancing strategic priorities such as quantum materials and biomedical engineering."



Assistant professor of biomedical engineering **Shang Song** designs organ-on-chip devices as part of the U of A Cancer Engineering Initiative.

Song, assistant professor of biomedical engineering, pioneers organ-on-chip systems. Yan, assistant professor of materials science and engineering, is a leading expert in quantum materials.

"A prime goal of this endowment is to

help attract and retain the best faculty, and professors Song and Yan are exceptional. They have accomplished a great deal in such a short time, and we can't wait to see what they do next," Frank Lederman said.

Identifying therapies for rare diseases

Song, a BIO5 Institute member with a joint appointment in MSE, leads the Song Lab in developing novel medical interventions. Her endowed funds will directly support students, providing rare opportunities to model organs on chips.

"We can build blood-brain barrier-on-a-chip, a microphysiological system that allows us to observe how neurotrauma and neurodegenerative diseases compromise the brain's natural defenses," she said.

The blood-brain barrier regulates the passage of nutrients between cerebral blood and brain tissue. Replicating this highly selective system on a chip allows Song and her students to test drugs that can pass through the barrier to combat neurological diseases like Alzheimer's.

Song, who also won the prestigious 2025 National Institutes of Health Director's New Innovator Award of \$2.32 million, will develop a bioimplant that initiates electric signals to repair spinal cord injuries (page 14).

"This funding will help us build a vibrant research and training community and push the boundaries of our field."

Creating quantum chips

Yan, who holds a joint appointment in the Department of Electrical and Computer Engineering and Wyant College of Optical Sciences, investigates



Xiaodong Yan, assistant professor of materials science and engineering, creates materials for quantum chips.

electronic and photonic devices based on two-dimensional materials, as well as neuromorphic computing.

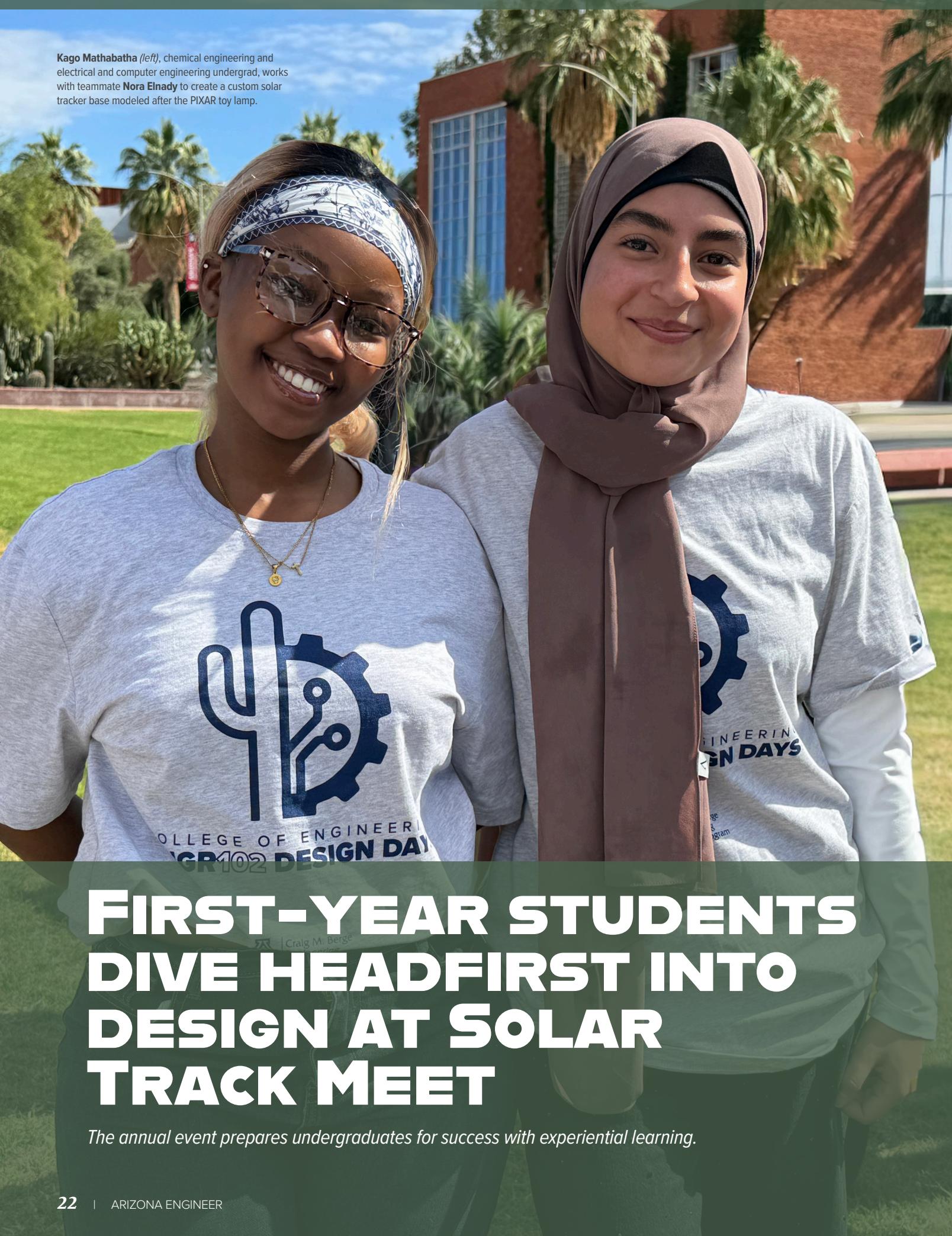
In September, he received a National Science Foundation CAREER Award of \$599,980 to build moiré synaptic transistors, which mimic the region of the human brain that combines memory, logic and parallel processing.

These brain-inspired chips are stable at room temperature, retain data without power, and consume just 20 picowatts – billions of times less power than existing neuromorphic devices.

The Yan Research Group will hire undergrads and grads to refine chip designs, scale up fabrication methods and integrate them into systems such as robots and wearable devices.

"This professorship will provide vital support to expand these efforts, train students in cutting-edge research, and strengthen the University of Arizona's leadership in engineering and materials science," said Yan.

Kago Mathabatha (left), chemical engineering and electrical and computer engineering undergrad, works with teammate **Nora Elnady** to create a custom solar tracker base modeled after the PIXAR toy lamp.



FIRST-YEAR STUDENTS DIVE HEADFIRST INTO DESIGN AT SOLAR TRACK MEET

The annual event prepares undergraduates for success with experiential learning.

STEADY ACROSS the college begin turning theory into action early on, starting with two Engineering 102B projects.

First-year students in the required course design and build autonomous trackers that follow the sun's movements and collect solar energy. Then they peer judge one another's projects at the annual Solar Track Meet. The second project, presented at Engineering Discovery Day in November, is a topic of their choice.

"I cannot wait to explore more design projects," said Derek Cadiz, a mechanical engineering major, who was among 560 participants gathered in teams of three or four at the University of Arizona Mall on Oct. 21 to present their trackers.

The college established the Solar Track Meet in 2022 with support from ongoing sponsor the Salt River Project utility company. In 2025, the event transitioned to the inaugural project for the four-year Craig M. Berge Engineering Design Program, which culminates with Design Day, where seniors showcase their year-long industry-sponsored projects.

"This event is the first step in understanding what engineering is really about," said Elizabeth Hutchinson, assistant professor of biomedical engineering and ENGR 102 instructor.

Going the extra mile

Some students went beyond those first steps and project

requirements. Kago Mathabatha's team integrated a 3D-printed, solar-tracker-powered custom lamp.

"This project was challenging because we had to learn code we'd never seen before and how to use a 3D printer," said the chemical engineering major minoring in electrical and computer engineering. "It was all completely new to us, but it was rewarding to bring our design to life."

Students first became certified in 3D printing to build at least one 3D-printed part. They programmed microprocessors, learned to store solar power and wired electronic microcontrollers.

"In the end, they wind up with this device that not only tracks the sun but can tell how much power is coming from the sun," said Joanne Robertson, adjunct lecturer and ENGR 102 instructor.

Among cash prizes rewarding teams for overall performance and best physical design, coding and design explanation were the SRP Innovation, Dean's and Instructor's Choice awards.

"This project was challenging because we had to learn code we'd never seen before and how to use a 3D printer. It was all completely new to us, but it was rewarding to bring our design to life."

KAGO MATHABATHA,
*chemical engineering major
minoring in electrical and
computer engineering*



At the October 2025 Solar Track Meet, first-year students present their team-designed autonomous solar trackers for peer judging.



11 faculty join Engineering to grow computer science, mining programs

Among the college's 11 newest faculty members are seven in the Department of Electrical and Computer Engineering, many focused on artificial intelligence, including the university's chief AI and data science officer. The School of Mining Engineering and Mineral Resources hired three faculty

in 2025, and the Interdisciplinary Capstone program one.

All have at least one goal in common: Prepare students to excel in today's workforce.

"They will grow our computer science

and engineering specialization, advance applied quantum networking research, and prepare students for careers in all engineering fields, including a much-needed mining workforce," said Kathleen Melde, associate dean of faculty affairs.

INTERDISCIPLINARY CAPSTONE PROGRAM

Fighter pilot mentors design teams

Col. Carey Jones, assistant professor of practice in academic affairs, mentors senior design teams as part of the Interdisciplinary Capstone program. She is dedicated to doing for engineering seniors what mentors did for her during three decades of service in the U.S. Air Force – as a fighter pilot, strategist and educator.

"Throughout my military career, they helped me focus on the right

objectives and gave me the tools to overcome significant challenges," said the highly decorated officer.

Jones, who did graduate work in aerodynamics and meteorology, has two military master's degrees – in military operational art and science and in strategic studies (grand strategy).

ELECTRICAL AND COMPUTER ENGINEERING

Multi-agent specialist leads research group

Assistant professor Jingdi Chen directs ECE's ANNIE (Agents, Novelty, Nurturing, Incentives, Exploration) Research Group. The group designs intelligent, efficient and interpretable multi-agent systems for collaborative, secure and fair decision-making.

"My research focuses on areas such as reinforcement learning, fairness, network optimization, cybersecurity and explainable AI," said Chen.

Her work has been published in NeurIPS, the Association for the Advancement of Artificial Intelligence, MobiHoc and IEEE Transactions. She has collaborated with partners such as Nokia Bell Labs and the U.S. Military Academy.

Chen earned a PhD in electrical and computer engineering and an MS in statistics from The George Washington University; she was a postdoctoral researcher at Carnegie Mellon University.

Optical engineer develops quantum networks

U of A alum Shelbi Jenkins joined ECE as an assistant professor following work in the private sector as an optical engineer. She specializes in the design of photonic devices and analytical models that advance quantum networks.

of Materials. She holds a U.S. patent for a magneto-optic magnetometer.

Among awards she has received is the 2020 Mary Jo Lake Memorial Fellowship in Optical Sciences. Jenkins earned a PhD and MS in optical sciences from the James C. Wyant College of Optical Sciences and a BA in physics from Willamette University.

Her work appears in IEEE JSAC, Optics Continuum, and Chemistry

 **ELECTRICAL AND COMPUTER ENGINEERING (cont.)**
University's chief AI officer advises CSE

David Ebert, associate vice president in the Office of Research and Partnership, is the Computer Science Engineering Endowed Innovation Chair. He advises ECE's computer science and engineering program.

"I am excited to help create an innovative program to evolve education, research and applications to be at the forefront of the field and position our graduates and faculty for future opportunities," said Ebert.

A U of A alum with a doctorate in electrical and computer engineering, Ebert has more than 30 years of experience in artificial intelligence, explainable AI, data science, visual analytics and human-computer teaming. He is an IEEE fellow and received the organization's Society VGTC Technical Achievement Award.



David Ebert, U of A's chief AI and data science officer

Cyberphysical protector prizes mentor role

Assistant professor Qingzhao Zhang combines software analysis, AI security and network design to improve safety and reliability of cyberphysical systems – technology that links computers to the physical world, such as in autonomous vehicles and industrial control systems.

Zhang, who has mentored more than 10 undergraduate and graduate

students while steering multiple research projects, is invested in the growth of his students.

Google, Cisco and General Motors are among the companies with which Zhang has worked. He earned a PhD in computer science and engineering and an MS in computer science from the University of Michigan, Ann Arbor.

Assistant professor aims for AI trustworthiness

Assistant professor Xiaolong Ma joined the U of A from Clemson University, where he was an assistant professor in electrical and computer engineering.

He has published more than 50 papers on AI, deep learning, computer vision, and edge computing, with a focus on making AI faster and more energy efficient. NSF and NASA support his research,

totaling more than \$2.5 million in funding.

Ma, who earned a PhD in computer engineering from Northeastern University, is particularly interested in exploring when learning is possible and characterizing the fundamental limits of learnability across a range of settings.



Xiaolong Ma, ECE assistant professor

Theorist appreciates departmental alignment

Assistant professor Changlong Wu, who previously served as a visiting assistant professor at Purdue University and a postdoctoral research associate at the NSF Center for Science of Information, said he was impressed by the college's investment in computer science and engineering.

"Since my research lies at the intersection of AI theory and information

theory, I felt this department was a great match for my work and an exciting opportunity to grow alongside the college's initiatives," said Wu, who holds a doctorate in electrical engineering from the University of Hawaii at Mānoa.

He has published about 25 papers exploring information theory and machine learning.

Collaboration central for computer scientist

"Higher education is not only about disseminating knowledge but also about shaping future professionals who contribute to society," said Diana Diaz, associate professor of practice.

Diaz is dedicated to getting students involved in research and mentoring them toward making a difference in the world. Previously, she was associate professor of practice in the U of A Department of Computer Science.

Prior to joining the university, she won a 2021-2022 teaching award at the University of Illinois, Chicago, and has contributed to 23 publications. She holds a master's and doctorate in computer science from Wayne State University and a master's in computer systems engineering from the University of the Andes in Colombia.



Diana Diaz, associate professor of practice in ECE



Samuel Lolon, SMEMR assistant professor of practice

Professional imparts real-world knowledge

“My goal is to integrate practical, hands-on experiences with rigorous academic training, while fostering interdisciplinary collaboration and engagement with industry,” said assistant professor of practice Samuel Lolon.

Lolon has more than 13 years of experience in strategic mine planning, underground design and ventilation modeling. He has worked on international projects with Freeport-McMoRan, Deswik and Golder Associates.

“Having worked in the industry here in Arizona, I recognize the state’s unique position as a hub for mining,” said Lolon, who earned a PhD in mining and earth systems engineering from the Colorado School of Mines. “The university is strategically placed to make a meaningful impact on both the industry and the broader community.”

“Having worked in the industry here in Arizona, I recognize the state’s unique position as a hub for mining.”

Rock mechanic advances safety

Assistant professor Bo Hyun Kim has 28 years of experience in surface and underground rock mechanics and ground control. Among awards he has received is the Society for Mining, Metallurgy and Exploration Rock Mechanics Award. He has worked with the NIOSH/CDC Spokane Mining Research Division, Itasca Consulting Group, MIRARCO Geomechanics Research Centre, and Korea Resources Corp.

The university’s status as a world leader in mining and the San Xavier

Underground Mining Laboratory were among factors that drew him out of the cold.

“After years in places like Canada and Minnesota... the mining heritage and desert setting sealed the deal,” he said.

Kim has authored or co-authored more than 120 publications and earned a doctorate in rock mechanics from Chonnam National University in South Korea.



Edward Wellman, associate professor of practice in SMEMR

Alum shifts focus to student success

For more than 25 years, Edward C. Wellman, associate professor of practice, has led global projects in rock mechanics, slope stability, underground mining and geotechnical analysis.

“I have met Arizona Engineering alumni in every corner of the world. I look forward to expanding those connections,” he said. “I enjoy watching students come together to solve difficult problems and helping them make connections that lead to internships and career opportunities.”

Wellman earned his doctorate in mining and geological engineering from the U of A. He has contributed to more than 15 peer-reviewed publications, including his first co-authored paper that documented the inaugural rover mission to Mars.

“I enjoy watching students come together to solve difficult problems and helping them make connections that lead to internships and career opportunities.”

High school campers explore fast-growing tech careers

Summer Engineering Academy participants head back to school with surefire intel on STEM employers looking to shore up the workforce.

THE COLLEGE'S 2025

Arizona Summer Engineering Academy gave about 130 middle schoolers and 300 ninth- to 12th -graders and recent high school graduates a real-life understanding of engineering fields in high demand, such as mining operations, hypersonic vehicles and semiconductor manufacturing.

"This camp lets me explore all types of engineering, which is super cool," said Josh Rabenou, who attended the Semiconductor Design, Fabrication and Application day camp.

Now in its 20th year, SEA's expanded hands-on programs for high school students include five camps spanning four days and two weeklong residential camps. Additionally, Cummings Aerospace sponsored a five-day camp that immersed middle schoolers in 3D design and printing, coding, and robotics.

Rabenou, a junior at University High School in Tucson, was among 50



Josh Rabenou, University High School junior

SEA scholarship recipients benefiting from Caterpillar, BOSCH and Arizona Giving Day donations.

The camp included a July 7 trip to the nearby ASARCO Mission Mine Complex, where students toured facilities against the backdrop of a 1,200-foot-deep open pit spanning 2.5 by 1.5 miles on 20,000 acres. ASARCO (American Smelting and Refining Company) has been producing copper in Arizona for more than a decade.

"Learning about the wide range of jobs within mining was a big takeaway for me," Rabenou said.

Tour guide Michael Landin

guided students through mining operations in full swing – giant drills, shovels and haul trucks.

"We need a hundred people right now at this facility," he said. "You get a job here, you have a career for the rest of your life because the mining industry isn't going anywhere."

Growth trend continues

Cori Dennis, SEA director and coordinator of high school outreach and summer programs, said the college expanded the academy's June and July offerings to tailor experiences to regional economic trends and accommodate rising attendance, like the middle school camp, which grew by 30% from 2024 to 2025.

"That enabled departments within the College of Engineering to be more specific on what they were teaching the campers," said Dennis, adding that the program is grateful for longtime supporters Bosch, Caterpillar, Intel and the U of A Applied Research Corp.

Other camp focus areas included transportation and infrastructure; energy and water; and light, optics and electronics.

"I especially like mechanics and electrical things," said Sophia Lau, a freshman at BASIS Scottsdale, who also attended the semiconductor camp.

Campers made lifelong connections not just with one another but also with professors, grad students and undergraduate mentors.



McKenna Athey, SEA counselor and biomedical engineer

Camp counselor and biomedical engineering sophomore McKenna Athey said that the camps provided a safe and supportive environment for many students to break out of their shells.

"When I was in high school, I felt like I needed somebody to guide me through engineering, so I wanted to be that for somebody else."



Summer Engineering Academy students, with ASARCO tour guide Michael Landin on July 7, explore daily operations at the Mission Mine Complex.



University joins STARFIRE Hub for inertial fusion energy

Materials scientist Horst Hahn leads efforts to overcome challenges around manufacturing technologies.

The Lawrence Livermore National Laboratory leads the IFE STARFIRE Hub, a fusion energy consortium that includes the University of Arizona.

THE UNIVERSITY OF Arizona has joined a national, multi-institution research hub to advance the manufacturing of technologies for safe, sustainable inertial fusion energy.

The IFE STARFIRE Hub is a public and private partnership established in 2023 with a four-year, \$16 million grant from the U.S. Department of Energy. Lawrence Livermore National Laboratory in California spearheads the effort to promote inertial fusion energy (IFE), science and technology. STARFIRE is one of three DOE-funded hubs focused on IFE.

IFE fuses hydrogen isotopes to produce abundant and clean energy. However, harnessing the fusion reactions that fuel stars requires scientists to overcome formidable barriers.

STARFIRE Hub membership positions the U of A to collaborate on IFE with other universities, national laboratories and businesses.

“The promise of fusion energy lies not only in its scientific ambition but in the transformative partnerships it inspires,” said Tomás Díaz de la Rubia, senior vice president for research and partnerships. “By aligning with the STARFIRE Hub, Arizona is advancing a bold vision that connects our institutional strengths with a national effort to accelerate fusion innovation, train the workforce of the future and deliver clean, abundant energy for generations to come.”

U of A leaders recently identified fusion energy as a research priority, and the Arizona Board of Regents has provided funding from the state’s Technology and Research Initiative Fund, or TRIF, to propel the university’s commercial fusion efforts.

Applying engineering strengths

Horst Hahn, a professor in the Department of Materials Science and Engineering and foreign member of the National Academy of Engineering, joined the university in March as a special advisor to Díaz de la Rubia and serves as strategic architect for fusion initiatives.

“The U of A offers a wide range of expertise, particularly in optical sciences, engineering and materials science. It’s a strong environment for launching initiatives aimed at tackling challenges on the way to commercialization of fusion energy,” Hahn said, noting that only a small number of U.S. universities are actively involved in fusion research.

Collaboration with hub members largely concentrates on engineering hurdles and scaling. Although experiments have demonstrated IFE’s promise as a safe and sustainable energy source, significant technological breakthroughs must happen before a fusion power plant can become operational, Hahn explained.

One challenge stems from IFE’s reliance on powerful lasers to create extreme heat and pressure within a fuel capsule containing hydrogen isotopes. The lasers are energized by arrays of laser diodes – semiconductor devices that amplify their intensity. Several advances in diode technology must occur to make large-scale, cost-effective power generation feasible. Better manufacturing processes and packaging, as well as testing for reliability and lifespan, are expected to reduce diode cost and increase production rates.

“This requires collaboration among experts across diverse disciplines, as well as active exchange between industry, national labs and academia,” Hahn said.

Eyeing a laser facility

Together with Tucson-based STARFIRE Hub participant Leonardo Electronics US Inc. and other industry partners, the U of A is exploring the possibility of building a diode-pumped laser research and training facility.

Component manufacturing is one of several fusion ecosystem issues STARFIRE Hub members are addressing. They’re also preparing and training a specialized workforce.

Students will benefit from STARFIRE’s educational offerings, including a graduate-level online course scheduled to launch in January 2026.

“The STARFIRE Hub is excited to welcome the University of Arizona to our constellation of partners. Strong academic collaborations are essential for advancing fusion technology and developing the next generation of fusion pioneers. Together, we are working to make fusion energy a reality,” said Tammy Ma, STARFIRE principal investigator and lead for inertial fusion energy at LLNL.

“The U of A offers a wide range of expertise, particularly in optical sciences, engineering and materials science. It’s a strong environment for launching initiatives aimed at tackling the challenges on the way to commercialization of fusion energy.”

HORST HAHN, MSE professor and U of A strategic architect for fusion initiatives

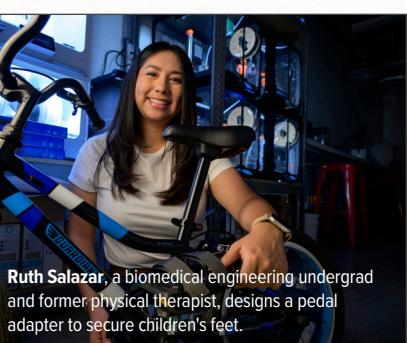


DESIGN FELLOW INSTILLS CONFIDENCE, SPARKS STUDENT CREATIVITY

ASSISTANT PROFESSOR OF practice Matthew Briggs, a design fellow who splits his time between the Engineering Design Center and the Health Sciences Design Space, helps students find their strengths. He encourages them to draw on their communities and experiences as they tap into expertise and resources on campus.

"My teaching philosophy has evolved to focus on building students' confidence with technology through hands-on experience. I want them to feel ready to run with an idea," said Briggs, who holds joint appointments in the College of Engineering and Health Sciences Design program.

Biomedical engineering student Ruth Salazar was wavering on her project for a class assignment. Under Briggs' guidance, she opted to put her physical therapy background to work creating bicycle pedal adapters for children with motor impairments.



Ruth Salazar, a biomedical engineering undergrad and former physical therapist, designs a pedal adapter to secure children's feet.

"I was overdoing it at the beginning," she recalled. "Professor Briggs said, 'You can make this simpler.' I took his feedback, added elements from other adaptive

equipment, and it became a beautiful project."

Salazar surveyed her former employer, the Children's Clinics for Rehabilitative Services, about the need for pedal adapters for children's bicycles, and she was off to the races.

"My goal is to spark creativity, teach practical skills, and build their confidence not just with the tools, but in themselves, their communities and their careers," said Briggs.

With Briggs' encouragement and mentorship, Salazar collaborated with the clinic to refine her design then 3D printed pedal adapters to keep the children's feet secure.

The 5,000-square-foot EDC makerspace houses not only 3D printers and scanners but also sewing machines, a plotter cutter, woodworking and metalworking equipment, and electronics gear – all the tools to encourage design exploration. Engineering students can access the center anytime, with a technician available Monday through Saturday to help bring their ideas to life.

"One of the therapists told me the toddler adapter worked wonderfully for a kid who had never been able to use the bike because the pedals didn't fit," said Salazar. "It was very special knowing I created something that helped someone enjoy a part of their life they hadn't before."

Jennifer Barton gets \$3M for tiny microscope to detect endometriosis

The minimally invasive device examines fallopian tubes to aid in early diagnostics and hasten treatment.

DOCTORS STRUGGLE TO diagnose endometriosis, a leading cause of infertility. This painful condition, which often goes undetected for years, affects more than 10% of women ages 15 to 44, according to the U.S. Department of Health and Human Services.

Jennifer Barton, who holds the Thomas R. Brown Distinguished Chair of Biomedical Engineering, is using a five-year, \$3 million award from the Eunice Kennedy Shriver National Institute of Child Health and Human Development to develop a microscopic imaging tool for detecting endometriosis.

In the condition, tissue similar to the uterine lining grows in places it does not belong, such as the fallopian tubes. Damaged fallopian

tubes can prevent egg and sperm from meeting, stop a fertilized egg from reaching the uterus, and lead to ectopic pregnancies.

"The fallopian tubes are one of those organs that nobody knows much about," said Barton, also interim vice provost for health programs at the University of Arizona and member of the BIO5 Institute. "Yet, they are where conception takes place."

Seeing inside narrow, squiggly tubes

Doctors need advanced tools to see what's happening inside the narrow structures.

"They are not just straight tubes," Barton said. "Inside they have folds, called plicae, that pile up on each other."

Barton, who holds joint

"The fallopian tubes are one of those organs that nobody knows much about. Yet, they are where conception takes place."

JENNIFER BARTON, *Thomas R. Brown Distinguished Chair of Biomedical Engineering*



Dilara Long, a biomedical engineering doctoral student and MD-PhD candidate in the College of Medicine – Tucson, publishes study using Jennifer Barton's falloposcope to image cilia wave patterns.

beat out of sync in damaged fallopian tubes.

MD-PhD candidate a linchpin

"The people who really do the work are my students," said Barton.

Dilara Long, a biomedical engineering doctoral student and MD-PhD candidate in the College of Medicine – Tucson, has generated data that shows OCT can precisely measure the frequency of cilia beating in human tissue samples.

The results were published in July 2025 in *Lasers in Surgery and Medicine*, the journal of the American Society for Laser Medicine and Surgery Inc.

"We have shown that optical coherence tomography imaging can reveal the location and beat frequency of surface and hidden fallopian tube cilia, potentially advancing understanding, diagnosis and management of reproductive disorders," said Long.

As a next step, Barton's team is applying machine learning algorithms to isolate cilia motions from the movement of the scope and patient.





At the 2025 Arizona Transportation Institute Summit, U of A assistant professor Tejo Bheemasetti shows data on the number of battery-laden electric vehicles on the road.

NAU NORTHERN ARIZONA UNIVERSITY



UNIVERSITY ENGINEERS FAST-TRACK ARIZONA ROADWAY IMPROVEMENTS

The state's three public universities came together at the Arizona Transportation Institute Summit to discuss progress with speeding up much-needed roadwork and reinforcing the workforce.

THE STATE IS looking toward safer, more durable roads within the next few years, thanks to the Arizona Transportation Institute's fast-tracked infrastructure research.

"For us, the development of AZTI is a lifesaver," said Greg Byres, state engineer and deputy director for transportation with the Arizona Department of Transportation, or ADOT.

Researchers from the state's three public universities are tackling challenges ranging from electric vehicle infrastructure to safety management.

AZTI launched in 2024 with the University of Arizona at the helm. The tri-university consortium includes faculty members and students in the U of A College of Engineering, Arizona State University and Northern Arizona University. With funding from ADOT, the Federal Highway Administration and the Arizona Board of Regents, AZTI has initiated more than 18 projects, some of which are already nearing completion.

Researchers presented their findings on Aug. 8 at NAU during the institute's second annual summit.

Qualifying decisions with data

College faculty members Tejo Bheemasetti and Mingfeng Shang from the Department of Civil and Architectural Engineering and Mechanics were among those with projects close to the finish line.

Assistant professor Bheemasetti is using ADOT vehicle data to assess whether electric vehicles – which, because of their battery packs, are significantly heavier than gas-powered cars – are putting more stress on roads. For example, GMC's Hummer EV typically weighs about 9,000 pounds, putting it at about 3,000 pounds more than the comparable Sierra pickup.

The data analysis is expected to help ADOT better predict maintenance needs and costs as more EVs hit the road.

"We want to find out what impact this has on roads," said Bheemasetti. "It's long overdue."

Assistant research professor Mingfeng Shang interviewed transportation departments across the country to establish the best ways to modernize ADOT's data management systems.

"This effort will lead to more efficient and transparent transportation decision making," said Shang. "Better-governed data enables more responsive public services, smarter infrastructure investments, and ultimately a safer, more equitable transportation system."

Making workforce a priority

To help ensure strong civil engineering and transportation workforce development, at least one student is working on each project alongside faculty members, explained Yao-Jan Wu, director of AZTI and professor of CAEM. Further, primary investigators are required to contribute to K-12 outreach.

"I hope to continue my career in Arizona after graduation," said Gabriel Geffen, a civil engineering doctoral student working with Shang. "This project has helped me gain a deeper understanding of the state's transportation landscape."

SUMMER TRACK

Systems engineering major Diana Thomas-Gonzalez never considered math her strongest subject. When her first year as an engineering student proved challenging, she turned to the College of Engineering's resources for support. She found her lifeline in an annual summer program.

Summer TRACK – a two-month program offered between students' first and second years – is part of ENGAGED, a suite of services designed to promote student success and retention.

"You get food, make friends, and a leg up by exploring your interests and industry while also getting ahead in classes," she said.

Thomas-Gonzalez and 30 other students fast-tracked their academic skills with a physics and calculus course, as well as a career development class. This perk connects participants with college alumni. Architecture firm GLHN Architects & Engineers, manufacturer RE Darling, and construction company McCarthy Building Companies joined the program's industry tour schedule this year.

Thomas-Gonzalez was particularly enthused by the Northrop Grumman workplace culture. Alumni dazzled her with fun activities and a variety of job opportunities within the company.

"It showed me that as long as I have grit and good company, I can succeed at becoming an engineer."

Chemical engineers at the U of A's Water and Energy Sustainable Technology Center lead a Summer TRACK tour.



Students visit a McCarthy Building Companies site to see how civil engineers design and strengthen infrastructure.

► 2010s

Adam Sedgeman, MS/CE 2013, was promoted to vice president of Hunter Contracting, an Arizona-based civil engineering company that builds and maintains state roads and critical infrastructure. Sedgeman will integrate digital tools across the company.



within their organizations to improve productivity. The book condenses three decades of Keating's work in technology, leadership and entrepreneurship.

Ram Nagulpally, MS/ME 1984, was named senior vice president of Extreme Event Solutions, part of strategic data analytics and risk assessment firm Verisk Analytics. He joined Verisk in 2012 and has served in various roles, most recently leading the global catastrophe model validation team. The company has clients in insurance, natural resources, financial services, government and risk management. The Extreme Event Solutions department developed the Verisk Wildfire Catastrophe Model used in California's review process.



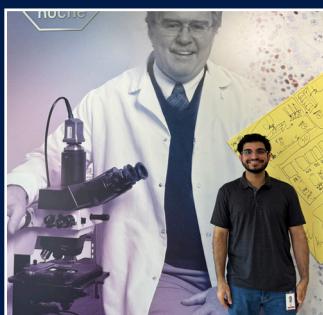
► 1980s



Kathy Gallup Keating, BS/CompE 1987, authored a book that was published in 2025. "Liquid: How CEOs & CTOs Unlock Flow and Momentum in Complex Systems" explores how leaders navigate the hidden systems

U of A ENGINEERING INTERNS

Each summer on social media, the college highlights students who pursue summer internships.



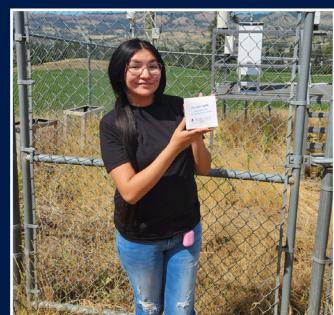
Amir Haghiri, biomedical engineering graduate student, was a research and development intern for Roche Tissue Diagnostics.



Mechanical engineering undergrad **Sage Patzer** interned at Intel's clean room.



Ashlyn Campisi, systems engineering major, was a product support engineer at Caterpillar Inc.



Biosystems engineering major **Caydence Palmer** conducted air quality research at the Institute for Tribal Environmental Professionals.



Mechanical engineering senior **Henry Calkins** was a project engineer for the offshore energy company Subsea7.



Marcel Lopez, aerospace and engineering major, was a manufacturing and supply chain intern at GE Aerospace.



Environmental engineering major **Sarah Sharp** interned with consulting firm SCS Engineers.



Somto Brian Ike, a biomedical engineering undergrad, interned with Roche Tissue Diagnostics.

Industry change begins in the classroom

Philanthropy opens doors for tenacious students to tackle bold ideas

Every day, I watch our alumni, partners, and faculty come together to shape students' education and their futures. At the College of Engineering, preparing students for the workforce isn't a goal - it's a promise. With your support, the college's reputation for upholding that promise is stronger than ever.

This edition of the alumni magazine demonstrates that promise in action. In these pages, you met students like Gabriel Geffen and Dilara Long, who work alongside groundbreaking faculty members Mingfeng Shang and Jennifer Barton. You also discovered how a capstone project from the Craig M. Berge Engineering Design Program launched industrial engineering senior Tiffany Hudgins' career. These stories highlight a simple truth: Workforce success starts with opportunities created in the classroom.

Donors like the Snider family make these opportunities possible. Their gift funds mining education scholarships for first-generation students. Gifts like theirs – and yours – help the college recruit and retain leading faculty to make the next life-changing discoveries and mentor the world's next engineers. Endowed Frank L. and Daphna Lederman Professors Xiaodong Yan and Shang Song, for example, create hands-on research opportunities that change lives inside and outside the lab.

Investing in future leaders

The college continually evolves degree offerings to better serve students and industry. The Bachelor of Science in Integrated Business Engineering, developed in response to industry demand for graduates who can navigate both disciplines, helps students gain the skills and confidence they need to lead in emerging industries. With faculty expertise

in artificial intelligence, the Department of Electrical and Computer Engineering's degrees in computer science and engineering and software engineering offer undergraduates direct paths into tech fields.

Whether it's a club that asks members to design technology for outer space or a summer camp that introduces high schoolers to STEM job opportunities, the college builds a talent pipeline that starts early and grows stronger every year. With your partnership, we equip students to lead, revolutionize and improve the human condition.

Thank you for helping our students succeed. Your time, insight and investment make a difference.

I look forward to sharing more of these stories with you and to building what's next together.

Happy Holidays!



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CALLING ALL ALUMNI!

Where has life taken you since graduation? We'd like to know and so would your college classmates. Please email us with details (no more than 300 words) and be sure to include the following information:

- Name and year you graduated
- Major
- Degree (BS, MS, PhD, etc.)
- Details of your activities

We'd also be interested to see – and share – pictures of your family, your latest work project, that boat or hot rod you just finished building in your garage, or your blossoming gardens. Vacation photos are great, too. We'll publish your news and photos online and in the next print edition.

Please send your email to
classnotes@engr.arizona.edu

BEEN IN THE NEWS LATELY?

Let us know if you've been getting some media attention. Just email the link, and we'll keep spreading the news on the college website and in social media.



SEE HOW PHILANTHROPY
FUELS WONDER