

# ARIZONA ENGINEER

COLLEGE OF ENGINEERING

VOLUME 42

NUMBER 1

SPRING 2019

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in **QUANTUM**  
Computing

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THE UNIVERSITY  
OF ARIZONA

**Robust research and design training produce some of the best-prepared engineers on the planet, and a new dean ushers the college into the future.**

Leading  
the Way  
at the  
UA

I AM SO PROUD of the students, faculty and staff in the UA College of Engineering, more so now than ever. As an alumnus, professor and, most recently, interim dean, I am grateful for this extraordinary community.

The college has stepped up in the last year to help meet the university's leadership needs. Dean Jeff Goldberg became interim provost. The former assistant dean for finance and administration, Lisa Rulney, was selected as chief financial officer. And chemical and environmental engineering professor Kim Ogden is interim vice president for research.

**Academic Focus on Design**

Design Day 2019 was the largest ever – 616 seniors participating in 118 projects supported by 64 corporate and faculty sponsors. Thank you to everyone who makes this program one of the best in the nation, especially our industry sponsors and judges. And congratulations to the Class of 2019 as you transition to alumni!

We've defined content for the Engineering Design Program to ensure students are immersed in creative and entrepreneurial thinking every semester of their undergraduate years. They will all be prototyping real systems and preparing to meet the world's greatest challenges. Our graduates will be design engineers!

**Research for Today – and Tomorrow**

We are transforming research and graduate programs, too. Enrollment in online MS and ME programs is growing rapidly. Research is focused in areas such as hypersonic flight, for which one of two unparalleled wind tunnels has been completed.

Chemical and environmental engineering's Armin Sorooshian is leading a \$30M NASA program to investigate cloud-aerosol interactions that affect climate, air quality and human health. Dr. Marv Slepian, associate department head of biomedical engineering, was recognized as the college's da Vinci fellow and promoted to Regents' Professor. Plus, thanks to several members of our faculty, the UA is getting the first quantum sharing research instrument in the world.

**Welcome, David Hahn!**

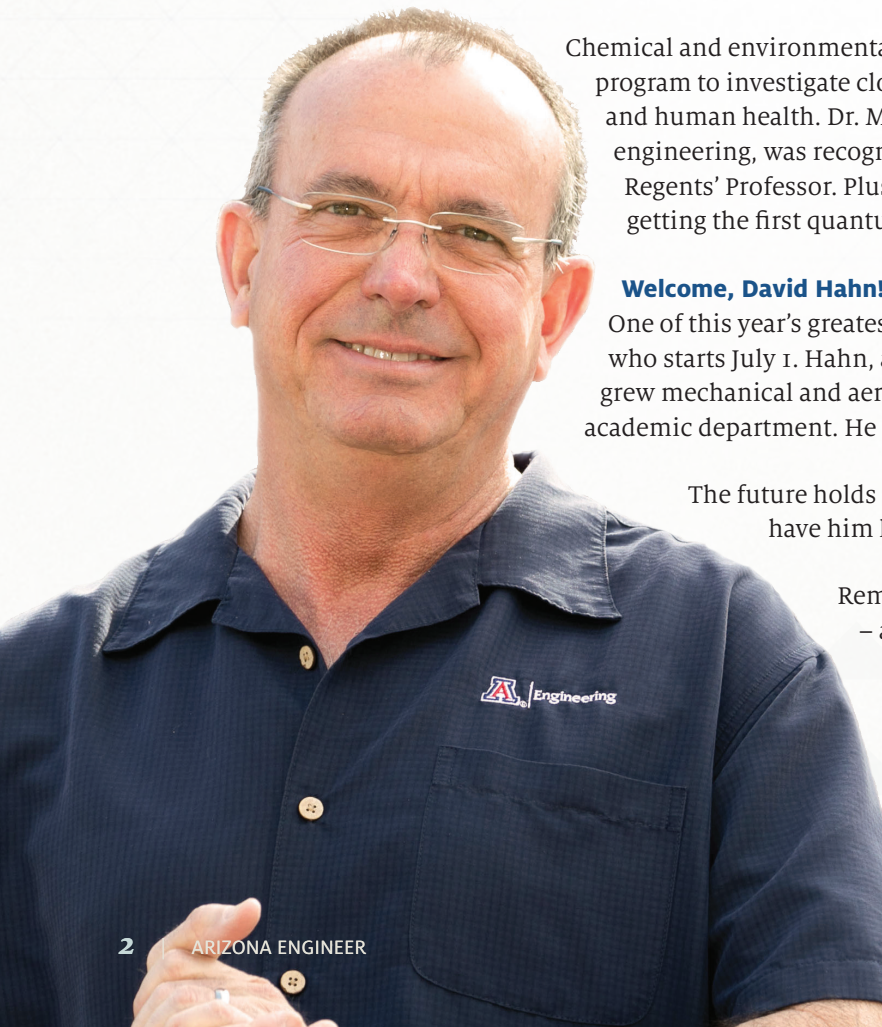
One of this year's greatest achievements has been the selection of Dean David Hahn, who starts July 1. Hahn, an expert in thermal sciences and laser-based diagnostics, grew mechanical and aerospace engineering at the University of Florida to its largest academic department. He also increased diversity on every front.

The future holds exciting possibilities for the college, and we're thankful to have him leading the way.

Remember, we're all Wildcat Engineers for life. So stay in touch – and Bear Down!



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# ARIZONA ENGINEER

COLLEGE OF ENGINEERING ▶ VOLUME 42 ▶ NUMBER 1 ▶ SPRING 2019



COVER PHOTO

New computing center will connect researchers across campus to quantum resources.

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Arizona Engineer is published twice a year for alumni and friends of the University of Arizona College of Engineering.

Stories in this print edition have been edited for length, and it is not feasible to include related multimedia such as photo galleries, video and audio files, and links to related websites. Visit Arizona Engineer online at [news.engineering.arizona.edu](http://news.engineering.arizona.edu) for full stories, news archive, people profiles, and photo and video galleries.

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# David Hahn Becomes Next Dean

**D**AVID W. HAHN, an engineer with more than two decades of experience in government agencies, national laboratories and higher education, joins the University of Arizona as dean of the College of Engineering on July 1.

Hahn has been with the University of Florida for 20 years, the last eight as chair of mechanical and aerospace engineering. During his time there, he grew his department to the largest at the university in terms of student enrollment and was recognized for his scholarship, mentorship and STEM outreach.

“My vision is to proactively recruit and retain a diverse student body, faculty and supporting staff,” he said. “For the UA College of Engineering to reach its full



David Hahn

potential, it will require a workforce reflective of our nation.”

Hahn, who has published more than 100 archival journal papers and holds 10 patents, is a fellow of the American Society of Mechanical Engineers, the Optical Society (OSA) and the Society for Applied Spectroscopy. He studied mechanical engineering at Louisiana State University, graduating with a bachelor’s degree in 1986 and a doctorate in 1992. He received the Alumni Achievement Award in 2014 from his home department.

“The college looks forward to strong collaborations with academic units across campus on large interdisciplinary research initiatives,” said the expert in thermal sciences and laser-based diagnostics.

## Kathie Melde Takes Her Seat in the ‘D-Suite’

**K**ATHLEEN “KATHIE” MELDE, who has been on the electrical and computer engineering faculty for 23 years, was appointed associate dean of faculty affairs for the College of Engineering. This is the first time in her years at the UA that a female faculty member has held a position in the dean’s office, and Melde is enthusiastic about contributing to the college’s continued progress.



Kathie Melde

“I’m really going to be an advocate for the faculty, to make sure their priorities and concerns are voiced to the college as well as to communicate back to the faculty in an effective way,” she said. “I would call myself ‘the people dean.’”

Melde is a fellow of IEEE and was a teaching fellow for the college from 2012 to 2014, among other accomplishments.

## Andy Harris Receives UA Alumni Achievement Award

**A**T THE UNIVERSITY’S 155th Commencement on May 10, Andy Harris, a 1987 chemical engineering graduate, received the UA Alumni Achievement Award.

Harris has excelled in the high stakes and often turbulent specialty chemicals industry, earning a reputation for personal and professional integrity and leadership. He is the CEO of Vantage Specialty Chemicals, a leading producer of naturally derived ingredients for the personal care, consumer care, food and industrial markets.



Andy Harris

## Mother and Daughter Graduate in Tandem

**NEDA AHMADI** was pregnant with her daughter, Ghazal Moghaddami, while studying social sciences 23 years ago at a Payameh Noor University campus in her home country, Iran.

“The learning process for me is like walking in a new world,” said Ahmadi. “Whenever I learn things I feel like I’m seeing a new aspect of the world, the same way people who travel to Europe or Australia or Hawaii to see new places might feel.”

The pair, who received their bachelor’s degrees at the UA’s 2019 Commencement, started their studies at Wichita State University in Kansas. Ahmadi chose mechanical engineering because she’s good at math and problem-

solving. Moghaddami chose biomedical engineering to combine her interests in math and medicine. They came to Tucson to join Moghaddami’s father, who works as a nurse practitioner.

From their first semester at the UA in a computer programming class together to their last, navigating separate capstone design projects, the mother and daughter have been study partners and carpooling buddies. Next up, Ahmadi hopes to get a job at Honeywell or a similar company, and then go back for more schooling. Moghaddami plans to apply to graduate school to become a physician’s assistant.

“Sometimes we think we’re really going to miss going to school with each other,” said Moghaddami.



Ghazal Moghaddami, left, graduated with her UA bachelor’s degree in biomedical engineering in spring 2019 – the same day her mother, Neda Ahmadi, received her bachelor’s degree in mechanical engineering.

## NASA SELECTS STUDENT-LED CATSAT MISSION

**An inflatable space antenna** designed by UA students is one of 16 small research satellites from 10 states that NASA selected as part of its CubeSat Launch Initiative. Over the next three years, the nanosatellites are expected to fly as auxiliary payloads aboard space missions.

“This is a great opportunity for students to get hands-on experience building a spacecraft and running a space mission,” said Tanner Campbell, an aerospace and mechanical engineering doctoral student serving as project manager for CatSat.

CatSat is about the size of a cereal box and weighs less than three pounds. The project’s inflatable antenna was designed for space probes to beam large amounts of data back to Earth.

“To do that, you need a large antenna, but those are too bulky to be carried on small spacecraft such as CubeSats,” explained Vishnu Reddy, the principal investigator of the mission and an associate professor at the Lunar and

Planetary Laboratory. “To overcome the problem, our students proposed a bold mission to test a novel inflatable antenna system in space.”

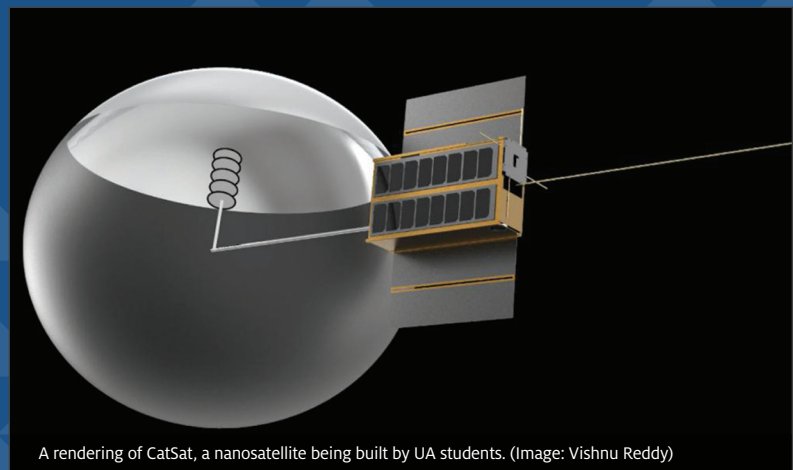
More than a dozen students from the Lunar and Planetary Laboratory, aerospace and mechanical engineering, astronomy, computer science, and systems and industrial engineering are participating in the project.

While CatSat is mainly a technology demonstration to mature the inflatable concept in Earth orbit, the ultimate goal is to fly such an antenna on an interplanetary mission exploring small bodies in the solar system.

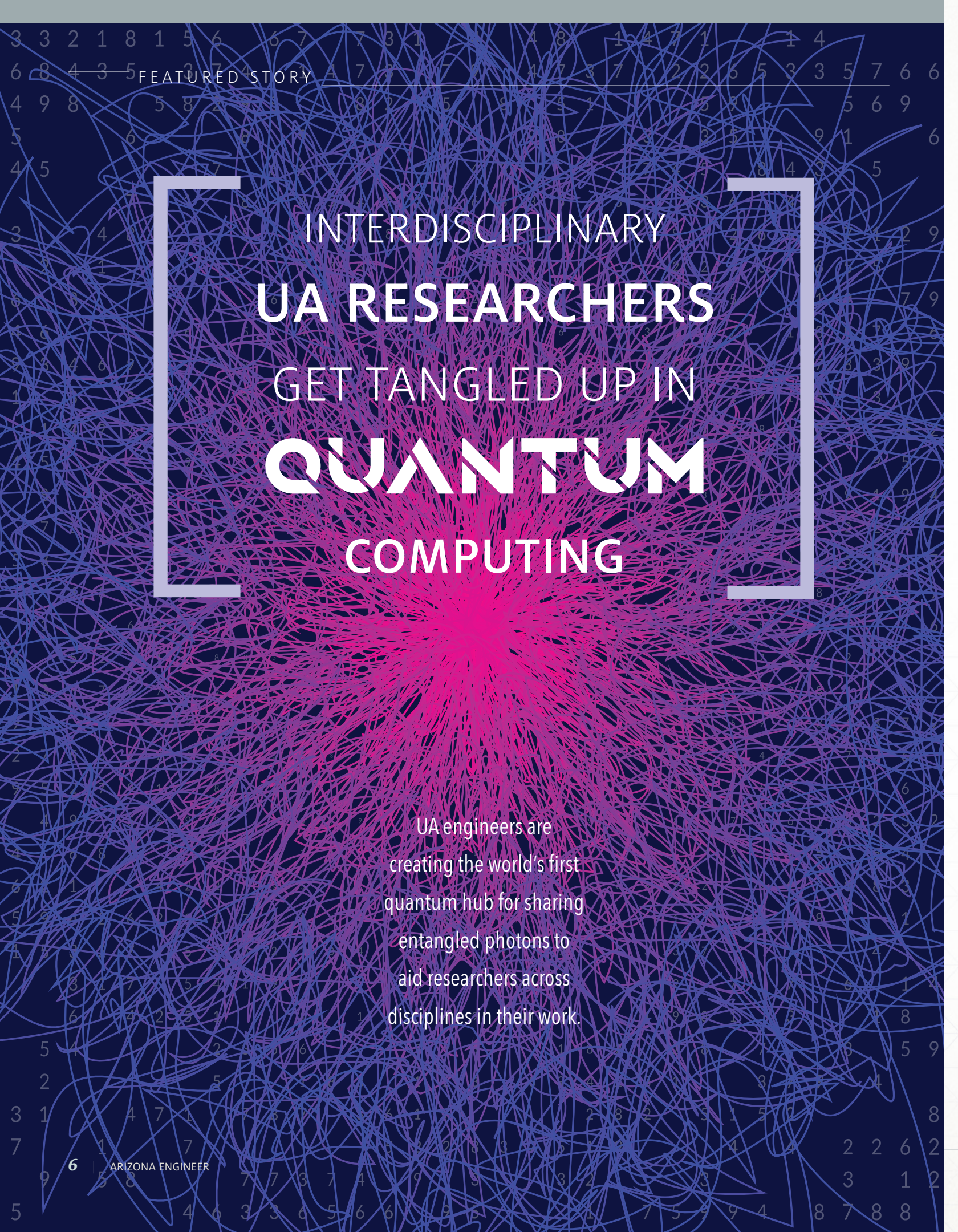
The spacecraft selected under the CubeSat Launch Initiative are eligible for placement on a launch manifest at no

cost, depending on availability. Launch opportunities include spaceflight missions led by NASA, other U.S. government agencies or commercial organizations, and deployments from the International Space Station.

Two engineering faculty members – systems and industrial engineering professor Roberto Furfaro and aerospace and mechanical engineering assistant professor Jekan Thanga – are leading the students who are building the actual spacecraft hardware on campus.



A rendering of CatSat, a nanosatellite being built by UA students. (Image: Vishnu Reddy)



# INTERDISCIPLINARY UA RESEARCHERS GET TANGLED UP IN **QUANTUM** COMPUTING

UA engineers are creating the world's first quantum hub for sharing entangled photons to aid researchers across disciplines in their work.

**GOOD NEIGHBORS** often share resources: a cup of sugar, extra lawn chairs or a set of jumper cables. Researchers across the University of Arizona's campus will soon be able to share a less common, but far more valuable, resource – entangled photons, or interlinked pairs of light particles.

With about \$1.4 million in funding – \$999,999 from the National Science Foundation and a 30% UA match – assistant professor of materials science and engineering and optical sciences Zheshe Zhang is leading construction of the Interdisciplinary Quantum Information Research and Engineering, or Inquire, facility. The center is scheduled for completion in 2021.

Co-investigators are Ivan Djordjevic, professor of electrical and computer engineering and optical sciences; Jennifer Barton, director of the BIO5 Institute and professor of biomedical engineering, biosystems engineering, electrical and computer engineering, and optical sciences; Nasser Peyghambarian, professor of optical sciences and materials science and engineering; and Marek Romanowski, associate professor of biomedical engineering and materials science and engineering.

A network of fiber-optic cables will connect an automated quantum information hub, equipped with ultrasensitive cameras, in the basement of the Electrical and Computer Engineering building to four other buildings on campus: Biosciences Research Labs, Mines and Metallurgy, Physics and Atmospheric Sciences, and Meinel Optical Sciences.

“It seems like science fiction,” said Barton, “but Zheshe is building a facility that will create quantum-entangled photons, and then deliver them via fiber optics halfway across campus.”

### **Making Deep Imaging Better**

A photon is the smallest unit, or a quantum, of light. While we can see the light of tens of billions of photons in a room lit by a lamp, the human eye and most microscopes can't see individual photons, and sometimes this too-small-to-see information is important.

For example, an imaging study of an organic molecule might emit a signal too weak for traditional cameras to detect, in which case the biomedical lab could send the photons to the quantum hub, where the ultrasensitive cameras will see things at a single-photon level. Or, the facility could send entangled photons to a lab already equipped with a two-photon microscope, which works even better with entangled photons than regular photons.

“Two entangled photons can be worth a million of their classical brethren, potentially allowing us to image deeper without harming tissue,” Barton said.

### **Doubling Up on Materials Probing**

Researchers will also be able to use entangled photons from the quantum hub as probes to determine the nature of unidentified materials.

The changes a material introduces to a photon, such as a change in color, provide clues to the material's identity. Even when they're separated by great distances, anything that happens to one photon in an entangled pair is transferred to the other. So, when one

entangled photon in a pair is used to probe a material, the material changes both photons.

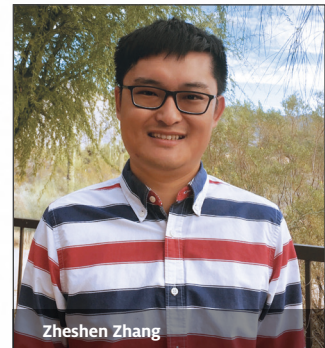
“Now you can perform a measurement on both photons to learn about the sample being probed,” Zhang said. “You can have twice as much information about the way the material is affecting the photon.”

### **Thwarting Hackers With Secure Codes**

The quantum hub will also provide entangled photons for work on quantum communication. Quantum communication is a secure method of sending and receiving data to preclude eavesdropping.

In it, entangled photons – sent in advance of a communication – are used as codes, or “quantum keys,” for decrypting transmissions. The very act of decrypting or reading the quantum keys changes their contents, alerting users that the keys for encryption have been compromised before they send communications.

Perhaps the best part of Inquire is that researchers don't have to be quantum information scientists to take advantage of the unique features of entangled photons.



“It seems like science fiction, but Zheshe is building a facility that will create quantum-entangled photons, and then deliver them via fiber optics halfway across campus.”

**JENNIFER BARTON**, *director of the BIO5 Institute and professor of biomedical engineering*



**Helping Hikers**—Laura Brubaker, Nicole Muchow, Sam LaMont and Benjamin Fletcher were on the winning team at Engineering Design Day 2019. They created a network of solar-powered beacons that connects to a mobile app and can help lost hikers find their way home.

## Sponsors Award \$36,250 in Prizes at Engineering Design Day

Top team helps lost hikers find their way home – one of many potentially lifesaving projects.

**THEY DROPPED THEIR** beacon system onto a concrete floor, submerged it in water and subjected it to extreme temperatures, and they won the \$5,000 grand prize at the University of Arizona's Engineering Design Day on April 29.

The Raytheon-sponsored team of five seniors created a mesh network of solar-powered beacons to deploy over remote areas, to transmit emergency signals from a lost hiker's smartphone app to

a central location. The beacons can withstand a 5-foot freefall, 30 minutes under a foot of water and temperatures ranging from minus 40 to 180 degrees Fahrenheit. The team designed the beacons, the app and a mechanism to drop the beacons from a drone.

"It's unreal," said team member and mechanical engineering major Sam LaMont of the win. "The second they said our name, it was just all the emotions at once."

Design Day 2019 brought 616 students – working on 118 industry- and faculty-sponsored capstone projects over the academic year – together to vie for \$36,250 in cash prizes. More than 120 industry judges, over 50 of whom were UA alumni, assessed the designs.

"Be inspired by these young engineers," said interim Dean Larry Head. "This is



**Ready for Liftoff**—Seniors demonstrate the drone they built for their capstone project on the UA Mall at Design Day.

"We'll probably sponsor another project next year to continue it. It's fun for them, and it's cheap for us. They exceeded my expectations."

**RICK CHURCH**  
engineer at Honeywell Aerospace



**Setting Their Sights**—A team of optical, mechanical and systems engineers created an optical alignment telescope for Ruda-Cardinal Inc.



the precipice. This is the beginning of some really great things.”

### Inventions With Lasting Effect

The top project wasn't the only lifesaving invention.

Winners of the ACSS/L-3 Communications Award for Most Robust Systems Engineering created a wireless body temperature sensor that integrates with implantable medication ports, such as those used by chemotherapy patients.

Another group designed a software system for a drone that flies into disaster areas and gathers information for first responders.

“I liked the challenge, and I like the fact that it's going to be used for humanitarian missions,” said Emanuel Inacio, an electrical and computer engineering, or ECE, major.

### From Classroom to Work World

Students across the board agreed that senior engineering design projects provide opportunities to put the theories they learn in class into action, and to learn some new skills along the way.

“I have never learned so much in my life,” said Christopher Hughes, an ECE senior on a team that designed an electric

propulsion system for a scooter. “I would spend entire weekends – 10-hour days – surface mount soldering and detecting currents and running motors. It's fascinating. It's frustrating. It's rewarding.”

Rick Church, an engines and power systems engineer at Honeywell Aerospace in Phoenix, said the team he sponsored, which created a method to measure the temperature of a rotor, took a first step toward solving a problem company engineers face every day.

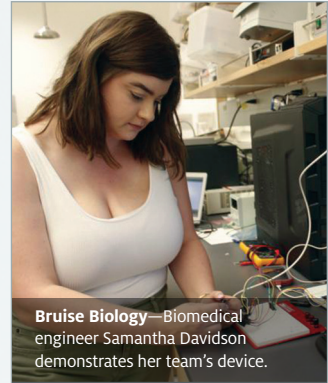


**Growing Stronger Tissue**—Electrical and computer engineering senior Xinyi Gu showcases her team's dynamic bioreactor for engineered cartilage tissue.

“We'll probably sponsor another project next year to continue it,” he said. “It's fun for them, and it's cheap for us. They exceeded my expectations.”

## Measuring Bruises to Fight Abuse

**A** **AN ALL-WOMAN** team won a competition prize for the first time in Design Day's 17-year history. The team created a device that measures the age of bruises to aid in child abuse investigations. For their efforts, they received the Ball Aerospace Go Beyond Award for Pioneering Design.



**Bruise Biology**—Biomedical engineer Samantha Davidson demonstrates her team's device.

Bruises change color over time, from blue to purple to green to yellow. So the team designed a specialized camera to determine the age of the injury by measuring the way it reflects light. Social workers and physicians can gently apply the portable device to take measurements and save the information to the device's memory card. In a future version of the device, the card will be inserted into a computer for data analysis.

“This project could potentially help people,” said team lead and biomedical engineering senior Samantha Davidson. “I felt like this was going to have an impact.”



**Firefighters**—Melvin Garcia, JT Nicol, Matt Avelar and Wesley Bohult were part of a senior design team that created an uncrewed aerial vehicle for use in combating wildfires.

## Fighting Fire With Full-Size UAVs

**W**ILDFIRES CAN HAVE huge costs, economically and in terms of human life. A team of aerospace engineering students were tasked with designing a full, 90-foot-wide uncrewed airplane with the ability to drop 5,000 gallons of fire retardant on a fire, and then fly back to a home base to refill the retardant three more times before refueling.

“I'm from Flagstaff, where forest fires were super common,” said senior JT Nicol. “I've had to evacuate my house before because of fires, so I especially wanted to be involved with this project.”

The project's sponsor, the New Nose Company Inc., is exploring what might become an entirely new way to combat forest fires.

# Researchers Use \$1.2M Grant to Treat Contaminated Water

Department of Defense funding enables a team led by Reyes Sierra to advance groundwater purification methods.

**F**OR DECADES, per- and polyfluoroalkyl substances, or PFAS, were used in everything from carpets to frying pans to firefighting chemicals for their ability to repel water and oil.

That was before they were found to contribute to cancer rates, low birth weights, immune system disorders and other health problems.

“Not only are the chemicals everywhere, and bad, but the advisory level established by the EPA is so extremely low that it makes it even more challenging to treat them,” said Reyes Sierra, a chemical and environmental engineering professor affiliated with the UA’s Institute of the Environment. “The University of Arizona is doing something about it.”



Using a \$1.2 million grant from the U.S. Department of Defense’s Strategic Environmental Research and Development Program, Sierra is leading the development of a new method for removing PFAS from groundwater.

One of the most widely applied methods for treating hazardous contaminants in groundwater is granular activated carbon, or GAC, adsorption. But it takes a lot of GAC to remove enough PFAS from water to render it safe, making the process expensive. Thus, the researchers are developing a new class of sorbents and water treatment processes that work better with PFAS.

“This is why I do my work. Environmental engineering research is an area in which you can really see the benefit,” said Sierra.

# Biomedical Engineer Works to Stop Cancer With Smartphones

DK Kang hopes to save lives in rural Africa with an affordable, portable and easy-to-use device.

**D**ONGKYUN “DK” KANG has developed a way for clinicians in rural African clinics to diagnose skin cancer.

The technology involves a microscope that creates high-resolution images viewable on an attached smartphone. These low-cost, easy-to-use, portable devices may result in earlier diagnosis, more effective treatments and lower mortality rates.

Now the biomedical engineering and optical sciences assistant professor, who also is a member of the BIO5 Institute and the UA Cancer Center, is using a grant of more than \$400,000 from the John E. Fogarty International Center to create a similar smartphone endoscope that screens for cervical cancer.

“His new cervical cancer point-of-care detection device will help ensure that no woman dies from this disease, which is imminently curable if caught early.”

**JENNIFER BARTON**, professor of biomedical engineering and director of the BIO5 Institute

“This disease is affecting women in their 20s and 30s and 40s – really young women who are just starting their families, who have kids,” said Kang. “It’s heartbreaking.”

Uganda bears one of the highest rates of cervical cancer in the world, and the mortality rate associated with the disease in East African countries is a dozen times higher than in the United States.

“Not only does he create novel biomedical optics tools, but he puts them to use to help the world’s most underserved people,” said Jennifer Barton, director of the BIO5 Institute, professor of biomedical engineering, and Kang’s mentor for the project. “His new cervical cancer point-of-care detection device will help ensure that no woman dies from this disease, which is imminently curable if caught early.”



From left, Esther Freeman, director of global health dermatology at Massachusetts General Hospital; Dongkyun “DK” Kang, UA assistant professor; and Dr. Aggrey Semeere, physician research scientist at the Ugandan Infectious Diseases Institute.



Attendees at the inaugural event for the new Arizona chapter of Women in Mining USA are all smiles.

## Distinguished Alumni Pay It Forward With Tips for Students

Equality and the art of good listening were top topics as nonprofit, energy and technology leaders spoke of their journeys.

The spring 2019 Lessons in Engineering Leadership speaker series brought noted alumni back to campus for three sessions of Q&As with students. They shared special memories of the University of Arizona and offered advice to students planning to follow in their footsteps.



Marla Smith-Nilson

Marla Smith-Nilson, a 1991 civil engineering graduate, talked about the allure of engineering, the difficulty of being a woman in the field and the value of diversity to any organization.

“From the beginning, it was about equality – gender equality – and creating opportunities for other people that were the same as I had,” said the founder and executive director of Water1st International, a nonprofit that supports sustainable water projects in some of the world’s poorest communities.

Susan Gray, a 1996 electrical engineering alumna, discussed enacting change, building strong teams and giving back to women in STEM. Gray interned at Tucson Electric Power during her undergraduate years and has risen to chief operating officer of UNS Energy and its subsidiaries, which include TEP.

“The joke now is that all of our interns are future VPs. You never know who the next VP is going to be,” she said.

Systems engineering alumnus Jerry Hunter, who earned his BS in 1988 and MS in 1990, focused on the unexpected trajectory of his career, managing organizations as though they are systems and, perhaps most importantly, learning to listen.

“You can really learn a lot about the way to make things right if you’re just listening,” said the senior vice president of engineering at Snap Inc.

## Alumna and Professor Makes Her Mark in Mining

A young professional award and Women in Mining USA chapter launch are among recent accomplishments for Rosa Maria Rojas.

**R**OSA MARIA ROJAS received the 2018 Outstanding Young Professional award from the mining and exploration division of the Society for Mining, Metallurgy and Exploration in March. The assistant professor of practice in mining and geological engineering is the first Peruvian awardee.

When she started studying mining as a freshman in Lima, there were only two other women in the program, among 200 men. Her first job was as the only female pit supervisor on a crew of 300 men at BHP’s Escondida mine in Chile, where she was significantly younger than the people she oversaw.

“I never felt like I was different,” she said. “But I had to work very hard to break the impression that I was not as capable as my male counterparts. You earn their respect bit by bit.”

Rojas spent several years working in South America before earning her MS in mining engineering at the University of Arizona. She returned to the UA in 2017 as program manager and lead professor for the department’s Mining 360 executive program.

“I feel like I’m making a greater impact on the community than I was as an engineer in the mine,” she said.



UA professor and alumna Rosa Maria Rojas, right, poses with her husband Jose Quispe – also a UA alumnus – and her SME Outstanding Young Professional award.

Rojas also led the recent launch of Women in Mining USA’s Arizona chapter, for which she serves as president. The organization aims to attract, retain and advance women in mining, as well as educate the public about the industry.

“Diverse teams make for better results in terms of ideas and profit,” she said. “As companies increase diversity and inclusion in our industry, everyone prospers.”

# Supporters Gather at da Vinci Dinner

Faculty, staff, students, alumni and friends come together to recognize exemplary engineers of past, present and future.

**T**WAS THE NIGHT before Design Day, and all through the grand ballroom at the Westin La Paloma Resort & Spa, engineers gathered to celebrate the ingenuity of the profession at the college's annual da Vinci Circle Dinner.

Supporters of the da Vinci Circle give \$2,500 or more per year to UA Engineering unrestricted funds. Contributions are made to the da Vinci Circle Fund, the Dean's Engineering Annual Fund and departmental general funds. Each year, one exceptional faculty member is selected as a da Vinci fellow

and receives a one-time grant of \$10,000.

In his remarks at the April 28 dinner, 2019 fellow Dr. Marvin J. Slepian, associate department head for biomedical engineering and founder and director of the Arizona Center for Accelerated Biomedical Innovation, thanked his mentors and supporters and

spoke about the importance of instilling the values of the great Leonardo da Vinci.

"My goal with this award is really to spread enthusiasm for the values of creativity, ingenuity in engineering and critical thinking," he said.

Past deans Jeff Goldberg and Tom Peterson attended the event, as did the college's recently announced dean, David Hahn. Interim Dean Larry Head, who earned all three of his systems engineering degrees at the UA, greeted the crowd and said he believed Hahn would make an ideal leader for the college.

Another alumnus, Armin Sorooshian, professor of chemical and environmental engineering and recipient of a five-year, \$30 million NASA grant in 2018 to study the way aerosols affect cloud formation, gave the keynote speech. According to the World Health Organization, he said, aerosol particles lead to more deaths worldwide than any other environmental threat, including unsafe water.

"I am humbled to be the PI of this major NASA mission, and the best part for me is having resources to recruit several new graduate students who will have the once-in-a-lifetime experience to go on this five-year ride with me," he said.



Dr. Marvin J. Slepian

# Scholarships Increase Capacity for Greatness

Attendees at 2019 scholarship reception celebrate the accomplishments of engineering students and the generosity of the college's partners.

**M**ICHAEL MARUM, a 1976 UA civil engineering alumnus, made it clear in his remarks at the College of Engineering's annual scholarship reception March 22 that he believes in the university's capacity for greatness. Maybe someday, he said, UA researchers will discover a cure for cancer, educate a future astronaut or lead a \$1 billion voyage to a distant asteroid.

"Wait a minute," said Marum, who helped establish the Aileen Primero Memorial Scholarship. "All of these things are happening. Dr. Jennifer Barton is closing in on a very early detection model for cancer cells. This university has produced six astronauts. And at 10 a.m. on Dec. 3 this past year, this university led a NASA spacecraft on a \$1 billion mission to arrive at Bennu. Accomplishments of the scholars make this world a better place."

Some scholarship recipients, including aerospace engineering doctoral students Parisa Footohi and Ali Hassani, biomedical engineering undergraduates Monique Martinez and Melissa Requist, and mechanical engineering senior Jake Spaulding, spoke about what the financial assistance meant to them.

"Having that scholarship really drove home being able to push through to the finish line," said Spaulding, who was in the U.S. Army before he started college and is going on to work as a test engineer at Ball Aerospace in Colorado. "And they say you can't get your dream job out of college."



Monique Martinez



Jason Keatseangsilp

► **2010s**

**Jason Keatseangsilp**, BS/BME 2017, is a member of the Team USA Tennis Wheelchair World Team Cup squad. He traveled to Tel Aviv, Israel, in May 2019 to compete in the premier wheelchair team competition in the world.

After graduation, **Dakota Haines**, BS/MSE 2016, worked as an operations manager for Intel Corp. Now, she's a materials, process and physics engineer in the Boeing Global Services division. "I am always interested in helping engineering graduates of the University of Arizona!"

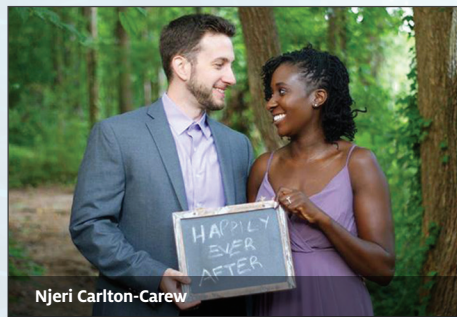
**Rosa Maria Rojas**, MS/MinEng 2013, re-established an Arizona chapter of Women in Mining USA to promote diversity and inclusivity in the mining industry. She also received the Outstanding Young Professional award from the Society for Mining, Metallurgy and Exploration's mining and exploration division.



J. Ramon Gaxiola-Camacho

CONACYT, the government agency in charge of promoting scientific and technological activities in Mexico, recently recognized **J. Ramon Gaxiola-Camacho**, MS/CE 2015 and PhD/CE 2017, as a "National Scholar Level 1." The organization also awarded him a grant to determine the reliability of the

country's building code, particularly for seismic-resistant structures.



Njeri Carlton-Carew

**Njeri Carlton-Carew**, BS/ChE 2010, received her master's degree in chemical engineering from Howard University in 2013 and now works as an environmental engineer for the Environmental Protection Agency. She and her husband married in Cozumel, Mexico, in May 2019.

► **2000s**

**Ronson Chee**, BS/CE 2008, MS/CE 2010 and PhD/CE 2017, founded Riley Engineering in 2018. He named the 100% Native American-owned civil engineering firm in honor of his late grandfather and late nephew. After experiencing the hardships faced by Native Americans firsthand, he dedicated



Ronson Chee

himself to helping improve living conditions on the Navajo Nation.

**Rashad Robinson**, BS/AE 2005, works as an engineering specialist with FedEx Ground, where he develops methods to improve productivity and recuperate financial loss after peak shipping season. He enjoys traveling with his wife, tutoring and mentoring.



Rashad Robinson

**Adrian Arvizo**, BS/CompE 2001, retired from the U.S. Navy in December 2018 after 20 years of service, specializing in cybersecurity and information warfare. He currently works as a consultant for Obzen, a cybersecurity advisory firm.

► **1990s**

**Susan Gray**, BS/EE 1996, was an intern at Tucson Electric Power while she was a UA undergraduate. In 2019, she was promoted to senior vice president and chief operating officer of UNS Energy and its subsidiaries, including TEP.

**David West**, BS/CE 1995, recently brought his 23 years of experience to Matrix Design Group as their Arizona water resources practice lead. He's also a registered professional engineer in six states, a certified floodplain manager and a certified stormwater manager with a focus on sustainability, transparency and accountability.



David West

Nevada's governor appointed **Kristina Swallow**, BS/CE 1994, as director of the state's Department of Transportation, saying that her 25 years as an engineer and public servant make her a perfect fit for the role.



Todd Zuercher

**Todd Zuercher**, BS/ME 1992, decided to pursue mechanical engineering at the UA because of his passion for automobiles. Now, after 20 years working at Motorola/General Dynamics and six at ViaSat, he has published his

first book, "Ford Bronco: An Illustrated History of Ford's Legendary 4x4."

► **1970s**

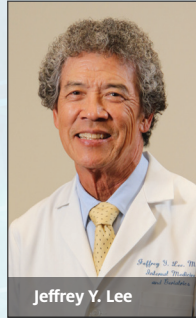
**J. Philip "Phil" Barnes**, BS/ME 1978, recently started his 38th year working at Northrop Grumman. He has authored papers on electric flight, aerodynamics, propellers, the dynamics of gears, Keplerian orbits and dynamic-soaring flight. He also frequently mentors engineering students on their capstone projects.



J. Philip "Phil" Barnes

**David J. Soukup**, BS/SE 1976, was named a fellow of the American Society of Mechanical Engineers. He's worked on the ASME staff for more than 30 years, currently serving as the managing director, governance. He is also an adjunct professor at New York University's Tandon School of Engineering.

**Jeffrey Y. Lee**, BS/AE 1970, was the first MD in the U.S. to be board certified in geriatrics in 1988. He closed his private, solo practice of internal medicine and geriatrics in 2018 after 40 years. His wife and daughter are both UA alumnae. "My engineering foundation made me a better MD. Life is good."



Jeffrey Y. Lee

► **1960s**

**Teruo "Terry" Ishihara**, PhD/ME 1969, was teaching at Monterey Peninsula College when his fifth child was born, and he decided to further his education at the UA. He went on to work for Rose Polytechnic Institute and Northern Arizona University, and started a mechanical engineering program at Saginaw Valley State College.

**Scott C. Roberts**, BS/ChE 1969, retired from Royal Dutch Shell in 2008 after 35 years. He has served on the board for the National Action Council for Minorities in Engineering and is



Scott C. Roberts

passionate about helping young people expand their potential. He has lived and worked in several states and other countries, but Arizona remains his favorite.

**John O'Hara**, BS/EE 1960, has retired after spending 55 years with the National Security Agency. Key career accomplishments include processing the first transmissions from the lunar surface and pioneering signals intelligence satellites. He has been married to his wife, Merrily, for 61 years.

► **1950s**

**Weldon Vlasak**, MS/EE 1958, has spent his time since retirement investigating the electrical properties of atoms. He has written several books on the subject, including "The Secret of Gravity," "The Electric Atom" and "The Birth of an Atom."



J. Wesley Miller

**John Wesley Miller** left the university in 1955 after studying electrical engineering and went on to found John Wesley Miller Cos., which built some of the nation's first environmentally sustainable homes. In 2019, he received the Association of Energy Engineering's Legend in Energy award.

**Samuel "George" Kravis**, BS/ME 1950, is a Navy veteran of World War II. "Since then, I've had a very successful 50-year career for which I most heartily thank the UA, for a preparation the likeness of which there was no equal."



George Kravis



**FROM THE ARCHIVES**

Thanks to Jay Binder, BS/ChE 1996; Sheldon Davis, PhD/ChE 1999; Wayne Seames, BS/ChE 1979 and PhD/ChE 2000; and Jost Wendt, former chemical and environmental engineering department head, for helping us identify the mystery engineer in the last edition's archive photo.

Cathy Freeman, formerly Cathy Timper, BS/ChE 1996, is pictured using a sample probe to measure particle distribution in the research furnace located in the basement of the Harshbarger Building.

# Connections That Make a Difference

*"Hello! My name is Margie Puerta Edson, and I am the senior director of development and alumni relations at the UA College of Engineering."*

HUNDREDS OF UA Engineering Wildcats were among the thousands of students who became University of Arizona alumni on May 10, 2019, as they participated in the annual convocation and commencement ceremonies across campus. These events mark the end of the student journey and the beginning of what we hope will be a lifelong connection to the UA and the College of Engineering.

Staying connected means you will be among the first to learn about important changes at the university and within the college and departments – through email alerts, newsletters and invitations to events like Homecoming and the engineering speaker series. Staying connected means you will have opportunities to make your voice heard when the college contemplates setting a new direction or even hiring a new dean.

In fact, the college is grateful for the assistance provided by alumni who served on the dean search committee and to those who attended the public forums that helped UA leadership identify and select our new dean, David Hahn, who will begin his tenure on July 1. Still more alumni have been involved in the philanthropic feasibility study and provided valuable input on the plans for the proposed Engineering Design Center. Alumni are also serving on the college's Industry Partner Board and on departmental advisory boards.

These are just some of ways alumni stay connected to the college and with their fellow Wildcats, long after graduation.

As we begin a new era under the leadership of Dean Hahn, there will be additional opportunities for alumni

near and far to connect with the college in ways that make a difference. Your participation and expertise are highly valued. While each alumni journey is unique, every Wildcat shares a common and lasting bond with the institution that made all those experiences possible.

**Bear Down and Go Cats!**  
Margie Puerta Edson



**Margie Puerta Edson, CFRE**  
*Sr. Director of Development @ Alumni Relations*  
520.626.0572 | puertaedson@email.arizona.edu

## CONGRATULATIONS, CLASS OF 2019 HALL OF FAMERS



**Joseph Gervasio**  
*BS Civil Engineering, 1957*



**William J. Harding**  
*BS Engineering Mathematics, 1969*  
*MS Systems Engineering, 1970*



**Raymond J. Oglethorpe Jr.**  
*BS Electrical Engineering, 1966*



**Charles G. Preble**  
*BS Mining Engineering, 1956*

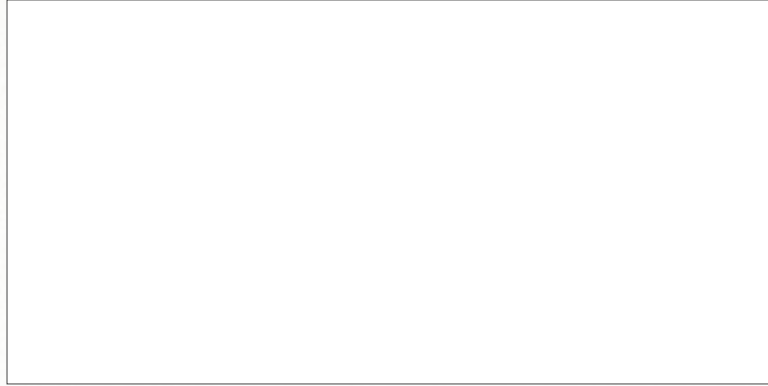


**George E. Shirley**  
*BS Civil Engineering, 1965*  
*MS Engineering Mechanics, 1968*



**Gene E. Tobey**  
*BS Electrical Engineering, 1959*  
*MS Electrical Engineering, 1961*

The University of Arizona  
College of Engineering  
P.O. Box 210072  
Tucson, AZ 85721-0072



## 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 (about 300 words) and be sure to include the following information:

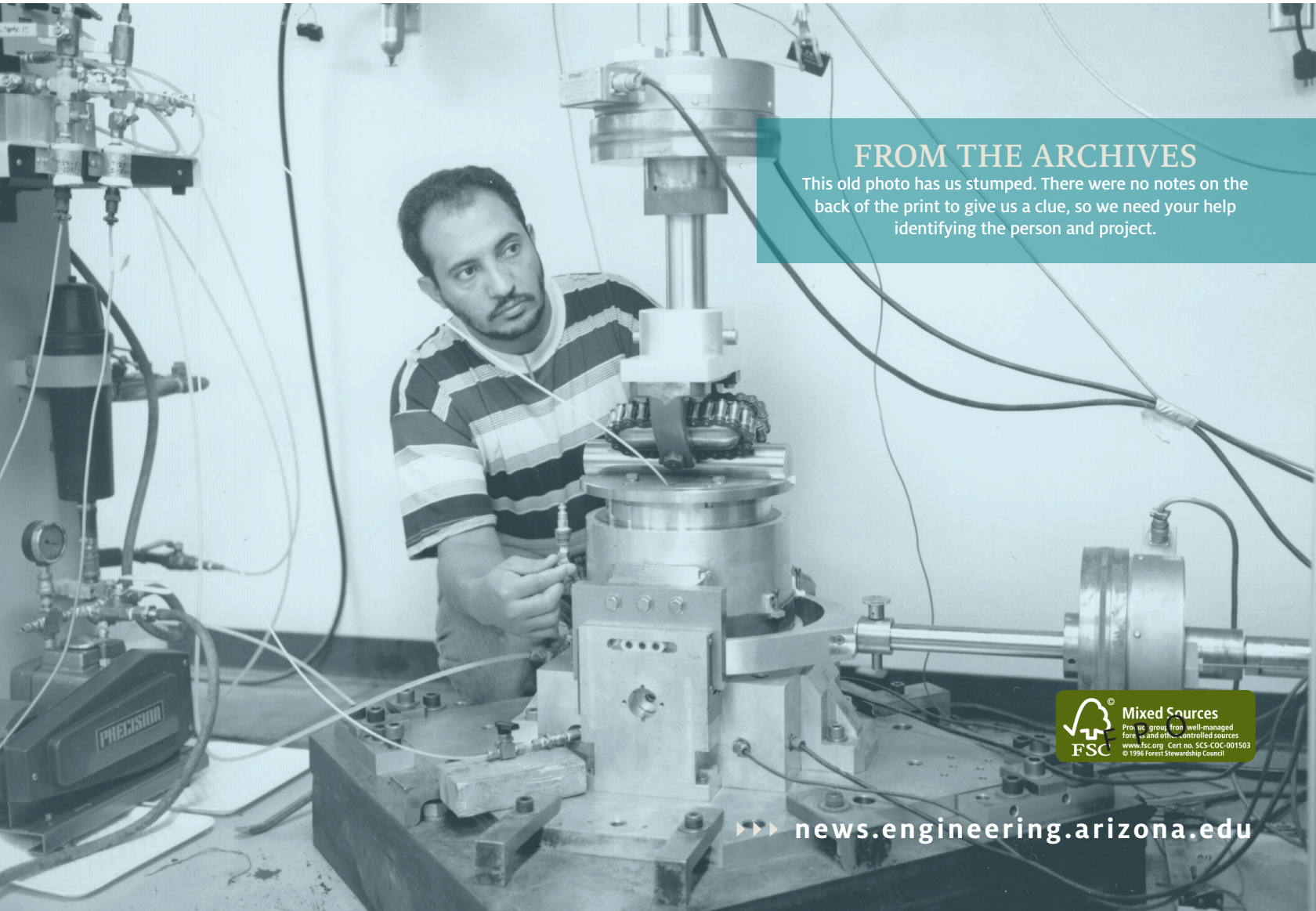
- Name and year you graduated
- Major
- Degree (BS, MS, PhD, etc.)
- Details of your activities

We'd also be interested to see – and share – pictures of your family, your latest project at work, or that boat or hot rod you just finished building in your garage. 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](mailto:classnotes@engr.arizona.edu)

## BEEN IN THE NEWS LATELY?

Let us know if you've been getting some media attention. Just email a link to us and we'll continue to spread the news via the college website and social media sites.



## FROM THE ARCHIVES

This old photo has us stumped. There were no notes on the back of the print to give us a clue, so we need your help identifying the person and project.

