



Missouri S&T Magazine Spring 2019

Missouri S&T Marketing and Communications Department

Miner Alumni Association

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MISSOURI
S&T
MAGAZINE

SPRING 2019 VOL. 93 NO. 1

Success in

ARTS,

SCIENCES

and

BUSINESS

24 HOURS OF GIVING BACK

MINER GIVING DAY

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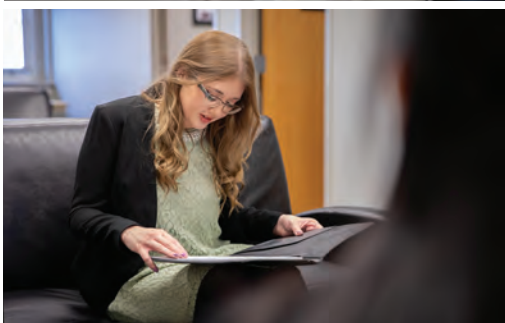
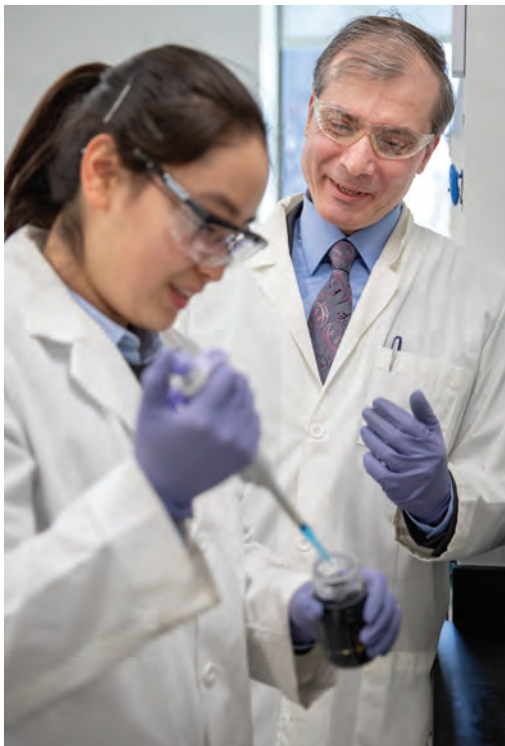
Join us at
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or text
FinishStrong to 91999
to make your
gift on Giving Day.



Mark your calendar and make a difference on Wednesday, April 24 — **Missouri S&T's first Giving Day!**

All contributions will go to Finish Line Scholarships, which support students who are within two semesters of graduating but have financial need disrupting their studies. With your help, these Miners in the home stretch can cross the finish line. And that's a win-win for Miner pride.



CORRECTION

Ronald H. Jansen, EE'79, was mistakenly included with the memorials on page 47 of the Fall/Winter 2018 issue. Mr. Jansen is alive and well. We regret the error.

AROUND THE PUCK

5 **Bo Mahaney: Personal compass navigates military career**

Samuel "Bo" Mahaney, Hist'85, is a major general in the U.S. Air Force.

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This biological sciences student and Miner football player tutors elementary school students.

7 **Crushing it for science**

Replacing the liquid in aerogels with gas makes them lightweight and strong.

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Six seniors were chosen to speak during commencement. Here's what they said.

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Chemicals in a plant's surroundings build up in its tissues and alert scientists to nearby contaminants.

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Carey Bottom, Chem'72, MS Chem'75, PhD Chem'79.

MISSOURI S&T BY THE NUMBERS

Earth orbits veteran astronaut **Janet Kavandi**, MS Chem'82, logged during her space flight career. Read more about Kavandi on page 42.



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Missouri S&T students and staff members who spent "a day on, not a day off" performing service projects throughout Phelps County on Martin Luther King Jr. Day of Service.

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Miner football 2018 regular-season finish. Only the third 10-win campaign for the Miners in the history of the program, it was the best recorded by any college football team in Missouri in 2018, and led to a bowl game invitation.

14

Awards Missouri S&T received from the Council for the Advancement and Support of Education during the CASE District VI conference, held in Denver in January. Awards included a Gold Award for the Fall/Winter 2017 issue of *Missouri S&T Magazine*, which featured the Mars Rover Design Team.

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Record number of employers recruiting at S&T's Spring Career Fair, held Feb. 19.



Miner Disc Golf Club's finish in the Missouri Collegiate Disc Golf Championship held in Columbia this past fall. The win qualified them for the national championship held in March in North Augusta, S.C.

MISSOURI S&T MAGAZINE

Missouri S&T Magazine is written, edited and designed by the staff of the Missouri S&T Marketing and Communications Department and the Miner Alumni Association.

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Q&A

MINERS GOT GAME

What was the most memorable sports team during your time on campus?

As part of his research for the S&T 150th history book, Larry Gragg, Curators' Distinguished Teaching Professor emeritus of history and political science, asked you to share your memories. Here are a few of your answers.



“No question: the 1959, '60, '61 rifle team. We fired against the best and won almost every time. Our equipment was worn out, the ammo was not the best, but we still hit Xs. I know of no other Rolla team with a better record.”

Chuck Dohogne, MetE'61
Rancho Palos Verdes, Calif.



“The Miner football teams of the two seasons described in the 1950 and 1951 *Rollamo* were the most memorable for me. Playing in the ROTC band on the sidelines, it seemed perfectly natural to have a championship team under the leadership of coach **Gale Bullman**. Quoting from the *Rollamo*, “The conference record of the 1949 Miners is the record of a true champion. Meeting and decisively defeating every other team in the Missouri Intercollegiate Athletic Association, the Miners are undisputed titleholders.” The next year, the *Rollamo* reported: “This year in Miner gridiron history may be proclaimed the most successful one since 1914. The Miners broke a 35-year jinx by defeating the Washington University Bears. This is the second straight year that Rolla has taken the MIAA conference crown. It is also the first time a Miner eleven has participated in a Bowl game, this year playing in the **Corn Bowl** against Illinois Normal in Bloomington, Ill., on Thanksgiving Day of 1950. The Miners won, 7-6.”

Bill Patterson, PetE'53
San Antonio, Texas

“The basketball team traveled to Springfield, Mo., to play a game in March 1971. I went as the color announcer for radio station KMSM 88.5 as we broadcast the game that night. And for the first time in many years we won! As a celebration of major proportion, the team was taken to a steakhouse for a great meal — and we were invited since we also were on the team bus.

Coach (**Billy**) **Key** was a class act.”

David G. Sizemore, EE'71
San Diego, Calif.

“To me the swim team was the most memorable team — a bunch of rank amateurs with no scholarships who nonetheless did very well in MIAA swim competitions. I knew the 1973–74 team the best. Swimmer **Allen Fails** (ME'74) was a friend of mine, a fellow ME, and a guy who shared my cynical, sarcastic sense of humor. I also knew **James Entwistle**, (PetE'74) known as ‘Twit.’ Some of them lived together in an old white house southeast of campus. One night in October 1973, nine of us piled into Entwistle’s metallic green 1964 Chevy Impala station wagon to see The Grateful Dead at Kiel Auditorium in St. Louis, my first big name rock concert and a night I will never forget, both for the music and the crowd. We made it back OK. The football and basketball teams got all the press. But the swim team members were the best guys to know.”

Ron Corradin, ME'74
St. Paul, Minn.



“UMR wrestling.”
Doug Eden, PetE'88
Chatham, Ill.

“1956 Miner football team.”
Ken Jobe, GGph'60, CE'66
Virginia Beach, Va.





POST-SEASON PRAISE

In its first post-season bowl game in 68 years, the Miner football team defeated Minnesota State University-Moorhead 51-16 on a rainy Dec. 1 afternoon in Excelsior Springs, Mo. Quarterback **Tyler Swart**, a petroleum engineering student from Dickinson, Texas, and defensive end **Tershawh Wharton**, an engineering management student from University City, Mo., were named game MVPs. Photo by Lisa Graham

FENWICK STEPS DOWN, DRURY TO LEAD MINER FOOTBALL

Tyler Fenwick, who led Missouri S&T's football program to its first post-season victory in 68 seasons during the 2018 campaign, stepped down in January to accept the head coaching post at Southeastern Oklahoma State University. He led the Miner program for the past six seasons and had a record of 37-29.

S&T defensive coordinator **Todd Drury** was named the new head coach after running the Miner defense for the last three seasons. Offensive coordinator **Andy Ball** will serve as associate head coach. Assistant coaches **Michael Burton** and **DJ Bland** will also remain on the Miner staff.

Drury joined Missouri S&T's staff prior to the 2015 season as the defensive line coach and became the team's defensive coordinator a year later. A 2009 graduate of Evangel University, Drury remained with Evangel as a graduate assistant coach at the conclusion of his playing and then moved on to Midland University as the linebackers and special teams coach, returning to his alma mater for two seasons before joining the S&T coaching staff.

A GOLDEN REUNION

The Class of 1969 will celebrate its 50th anniversary at the Golden Alumni Reunion May 21–22 at Hasselmann Alumni House. In addition to reconnecting with fellow classmates, alumni will tour their departments and learn more about what is happening on campus today. The highlight of the event is a grand recognition ceremony, where class members receive their 50-year pins and certificates. If you are a member of the Class of 1969 and have not received your invitation, or if you are from another class but would prefer to celebrate your Golden Alumni Reunion with the class of 1969, contact the alumni office at alumni@mst.edu or call 800-JO-MINER (800-566-4637) for more information.

NEW LEADER AT THE HELM OF S&T'S RESEARCH, GRADUATE PROGRAMS



An expert in multi-agent systems and artificial intelligence is now leading Missouri S&T's research efforts. **Costas Tsatsoulis**, former dean of the College of Engineering at the University of North Texas, joined S&T as vice chancellor for research and dean of graduate studies on Sept. 4.

"In Missouri S&T, I see all the necessary ingredients that will allow us to rise to new levels of excellence," says Tsatsoulis.

An electrical engineer, Tsatsoulis became UNT's engineering dean in 2008 following a 20-year career at the University of Kansas. At KU, he served as chair of electrical engineering and computer science from 2004 to 2008 and director of the Intelligent Systems and Information Management Laboratory from 1997 to 2003.

Tsatsoulis' research focuses on multi-agent systems, case-based reasoning, machine learning and intelligent image analysis. He is the author of 25 journal articles and 79 published conference and workshop papers and is co-editor of the textbook *Analysis of SAR Data of the Polar Oceans* (Springer Verlag, 1998). He holds one U.S. patent for an automated data entry system.

Tsatsoulis holds a Ph.D. in electrical engineering from Purdue University in Lafayette, Ind.

Photo by Christopher Parr, U.S. Air Force



BO MAHANEY: PERSONAL COMPASS NAVIGATES MILITARY CAREER

U.S. Air Force Maj. Gen. **Samuel “Bo” Mahaney**, Hist’85, might just dispel your preconceived notions of military commanders.

Mahaney began his military career as an electronic warfare navigator in the Air Force. Today Mahaney, a two-star general originally from St. James, Mo., is chief of staff for Air Mobility Command (AMC) headquartered at Scott Air Force Base in St. Clair County, Ill.

The 107,000 men and women of AMC in active duty, Air National Guard, Air Force Reserve and civilian service provide airlift, aerial refueling, air mobility support and aeromedical evacuation across the globe. Mahaney says he leads by optimizing staff, prioritizing mission demands and enabling the AMC commander to make decisions “at the speed of war” to provide rapid, global

mobility for America’s armed forces and humanitarian support worldwide.

“I truly have a love of country and take nothing for granted,” Mahaney says. “Our freedom isn’t free. We can’t take democracy for granted. That foundational belief is why I do business the way I do. The foundation keeps me there — I know what my purpose is.”

From his beginnings as a pilot, Mahaney had the opportunity to lead in groups that systematically grew larger: from squadron, to wing, to major commands.

“I didn’t think about getting promoted,” says Mahaney. “I do the best job I can in the job I’m in. The goal is not to achieve rank, but to take care

of everyone and make sure they have the best opportunity to succeed.”

Mahaney says he was born to build relationships with people, and this natural characteristic has been key to his success. He has faith in people to do the right thing, and says he believes in idea sharing, a practice he incorporates when he trains future commanders.

“I come to work every day looking to put forth the best ideas,” says Mahaney. “But the reality is, when people have better ideas than you, let them share them — move past your own and do what benefits everyone else.”

“When push comes to shove, not everyone is willing to do that,” says Mahaney. “As a leader, I’m willing to accept the ideas of the troops I command and allow them to be leaders.”

Mahaney leads with four tenets: take care of people, and they will take care of the mission; create a culture of respect; expect excellence; encourage feedback.

And after all this is done, Mahaney says he’s just happy to still be flying.



DESHAWN JONES: ON TOP OF HIS GAME

With intelligence, discipline and athletic prowess, **Deshawn Jones**, a junior in biological sciences and running back for Missouri S&T's football team, has amassed a coveted collection of athletic titles and records at S&T. But he has been raking in awards since grammar school. Jones grew up in inner-city Chicago, the middle child of three. He began to cultivate his work ethic as a kindergartner. Today, despite his demanding schedule, he willingly gives one afternoon a week during the school year to help children at a Rolla elementary school develop skills in studying, decision-making, teamwork and leadership.

"I know what it's like to need help with school work," Jones says. "I relied on my mother to help me at night after she worked long day shifts. I decided early on to take stress off her and learn to help myself, and this early development served me well in the long run."

When Jones was a teenager, his family moved to Country Club Hills, where he graduated third in his class and was voted the football team's most valuable player, Male Student Athlete of the Year and an Illinois State Scholar.

Jones received offers for full athletic and academic scholarships from nine universities.

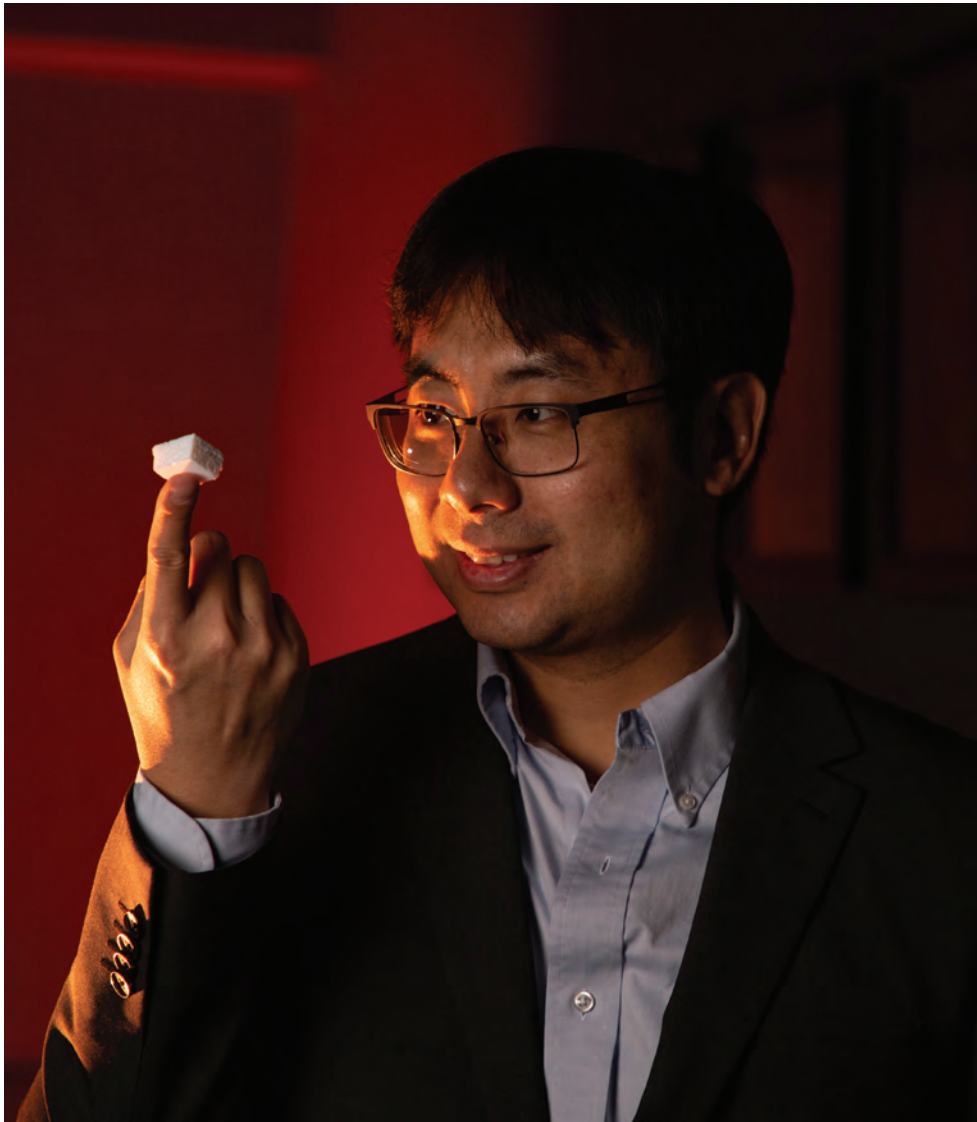
"I selected S&T because I liked the diversity there and the opportunity for cultural development," Jones says. "It presented an opportunity for me to connect with, learn and

respect different cultures, which will enhance my career as a medical professional."

Jones hopes to one day be a trauma surgeon. But before that, he wants to play professional football and save his salary to pay for medical school.

"I interact with Deshawn in my role as S&T faculty athletics representative," says **David Westenberg**, associate professor of biological sciences at Missouri S&T. "What impresses me most is what he is doing in the community by tutoring local students. I can't wait to see what the future holds for him."

"I know what it's like to need help with school work."



SARANGAPANI NAMED TO NATIONAL ACADEMY OF INVENTORS

Jagannathan Sarangapani, Rutledge-Emerson Distinguished Professor of Electrical and Computer Engineering at S&T, has been named a Fellow of the National Academy of Inventors.

This is the highest professional distinction accorded solely to academic inventors who have demonstrated a prolific spirit of innovation in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development and the welfare of society.

Sarangapani holds 20 U.S. patents, and colleagues have cited his work more than 10,300 times, according to Google Scholar. His research on intelligent control systems can be applied to aircraft control, engine control, autonomous systems and robotics, manufacturing systems, automotive and chemical process control, and more. Small businesses and large corporations such as Boeing and Caterpillar have benefitted from these technologies, and Sarangapani has nurtured the next generation of students to pursue their inventions.

CRUSHING IT FOR SCIENCE

Want to build a better aerogel? You need to start by crushing them, say S&T researchers. Their findings were first published in August 2018 in *Soft Matter*, a Royal Society of Chemistry journal that focuses on the intersection of physics, chemistry and biology.

Aerogels are a diverse class of solid materials derived from a gel in which the liquid component of the gel is replaced with gas, making them lightweight and strong. The strong, flexible and ultralight materials are used in a wide variety of products, from insulation for offshore oil pipelines to parts for space missions. By crushing and indenting aerogels, S&T researchers have gained a better grasp on the gels' mechanical properties at the nanoparticle level and can provide insights into how polymeric aerogels can fail and become deformed.

"We looked at the deformation of polyurea aerogels at a very small scale — at the building blocks themselves," says **Chenglin Wu**, assistant professor of civil, architectural and environmental engineering at Missouri S&T. "The data that we have obtained has provided, for the first time, first-hand information on nano-deformation of nanoporous polymers, and will be useful in the design, optimization and engineering of polymeric aerogel and soft nanoporous materials."

Wu and his team identified four failure modes of aerogel structures. They found that material scaling properties depended on both the relative density and the secondary particle size of the gels. That means there is not a conventional power-law relationship between the aerogels.

"Our research could be applied to areas such as energy absorption in ballistic protection to biomedical implants and drug-delivery platforms," says Wu. "This work enables the rational nanoscale-up design of nanoporous polymers for a very wide spectrum of applications ranging from ballistics to biomedicine to space exploration."

S&T AMONG TOP 20 SAFE CAMPUSES

Missouri S&T was the state's only university to be recognized by the National Campus Safety Summit for increasing the safety and security of its campus community in 2018. Ranked 20th in the nation, S&T's University Police has worked the last two years on incorporating emerging technology into policing efforts.

"We are very fortunate to be on a campus and part of a university system that supports law enforcement and campus safety and security," says S&T Police Chief **Doug Roberts**. "Our department is a true team, and we are proud to be a part of this campus, the University of Missouri System and the Rolla first-responder community."

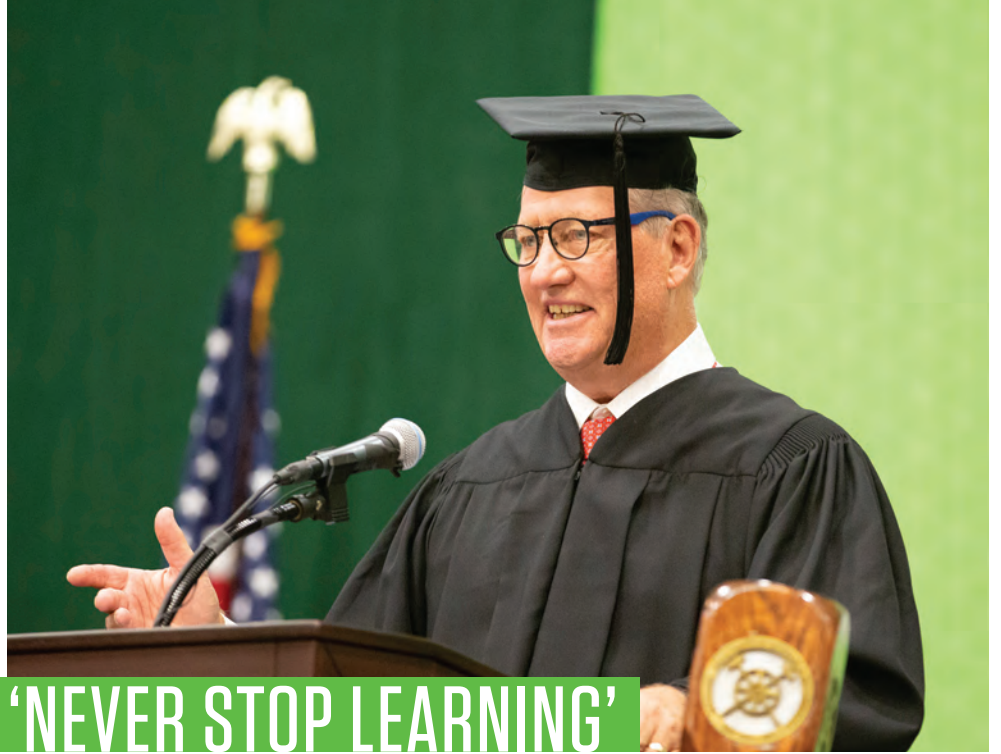
Among the noted changes is a system that now provides more than 200 cameras on campus that are monitored by University Police 24/7. Camera views are also shared with the local 911 call center.

"At the end of 2018, more than 200 cameras were operating on campus," Roberts says. "We are also adding a card access control system that will let police staff working in the operations room to monitor and remotely lock or unlock any door controlled by the new system by using a mapping program."

A DISTINCT HONOR

S&T presented the Award of Professional Distinction to three alumni during commencement ceremonies in December. The awards recognized the following graduates for professional achievement:

- **Ernest K. Banks**, ChE'81
- **David J. Schepers**, EE'75
- **David Charles Sextro**, ChE'82



'NEVER STOP LEARNING'

Stephen G. Suellentrop, PetE'74, MS PetE'75, delivered S&T's commencement address in December. Suellentrop, chairman of Hunt Oil Co. and Hunt Refining Co., encouraged graduates to never stop learning and to immerse themselves in their career passions.

"You must make a lifelong commitment to continued learning," said Suellentrop. "Continue to deepen your craft, become more of an expert, continue to learn and gain expertise in subjects outside your chosen discipline and broaden yourselves. This pursuit of learning in the fullness of time will bring you a much more informed perspective of your role in the various phases of your career."

During the ceremony, he was awarded the doctor of engineering, honoris causa.

"All of you have received the finest university education possible. Trust me. This is the truth. You have mastered your discipline and are ready for the next steps," said Suellentrop.



CELEBRATING DECEMBER GRADS

On Dec. 13, the Miner Alumni Association celebrated Grad Finale on the midway for graduating students at Hasselmann Alumni House. Students caught the carnival spirit playing dime toss, giant Jenga, Plinko and other games. Students selected Miner gear by redeeming game tickets at the prize table and dined on hot dogs, sliders and other classic midway munchies.



STUDENT SPEAKERS INSPIRE CLASSMATES

During December commencement ceremonies, six students addressed the graduates.

Dalal Abduljaleel, BSci'18, spoke of her journey as a refugee in Iraq to completion of her degree and recognized those who supported her along the way. "The most valuable principle I learned throughout my entire life is knowing who to ask for help when I needed it, and to accept the help when it's offered. When you help, support and love others, love will find its way back to you!"

Alyssa Snyder, PetE'18, drew parallels between a foundation that supports a building and the support that helped her succeed at S&T. "Wherever your journey takes you, I encourage you to find your own set of supports. Keep your family close (even as a real adult you can still call Mom), make connections with co-workers who will encourage you to move up, and lastly ... find yourself a place to relax on the weekends."

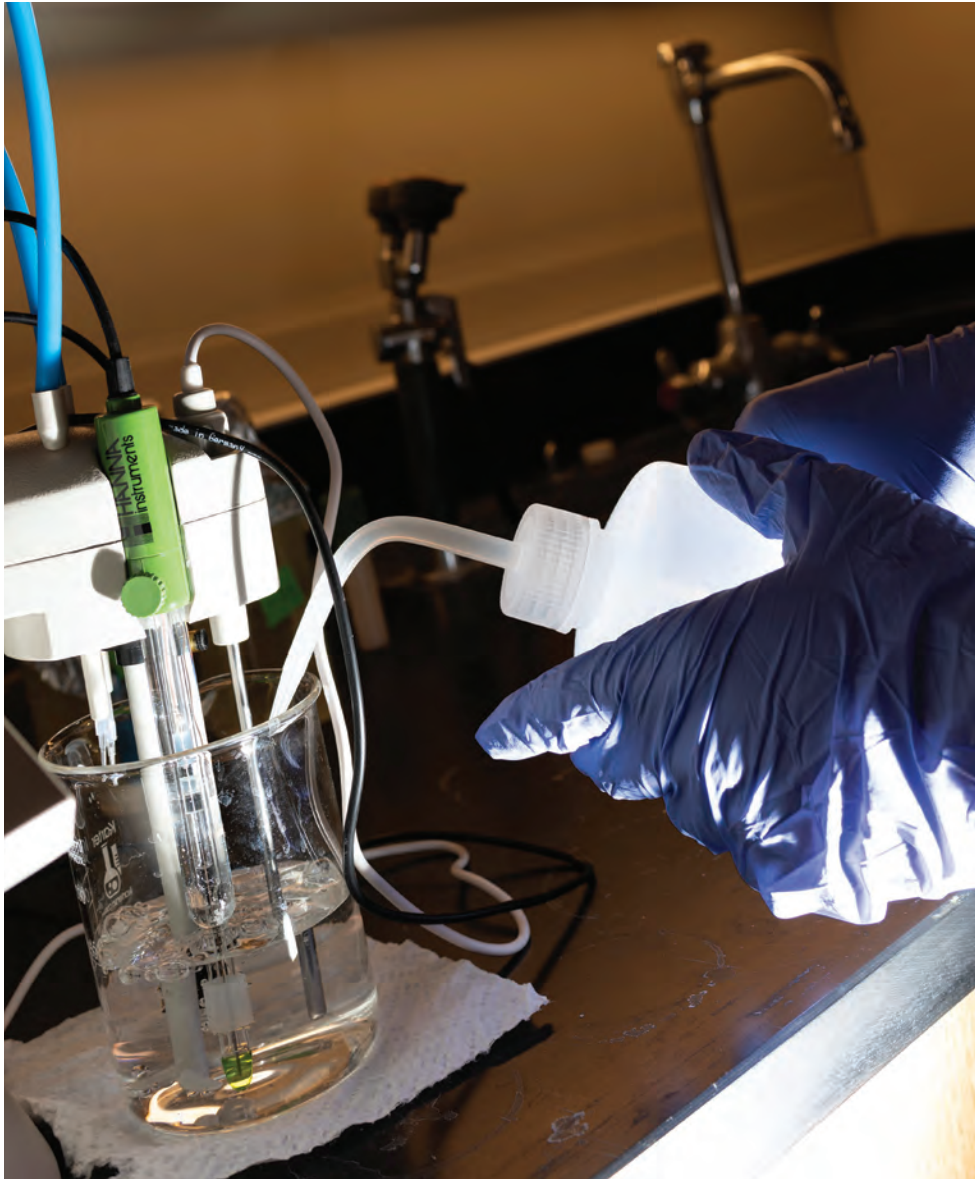
Ethar Alkamil, MS PetE'17, PhD PetE'18, spoke of inspiration. "As I've walked through Missouri S&T every day for the past five years, I've seen passion, creativity and greatness. I've been inspired by fellow students, faculty and staff — each with a drive to make the world better. My time here has given me even more power to pursue the infinite possibilities I have dreamed of."

Melanie Blasé, Bus'18, spoke of the relationships she built and her admiration for her advisor, **Cassie Elrod**, EMgt'03, MS EMgt'04, PhD EMgt'07, associate professor of business and information technology. "One person cannot change the world, but each one of us, like Dr. Elrod, is completely capable of changing one person's world. Simply choosing every day

to spread kindness or positivity could be all the difference, and I urge you to give it a try, and if you have a Dr. Elrod in your life — thank them."

Stanley Brown, a senior in aerospace engineering and mechanical engineering, thanked the people who invested in his success. "I've come to realize all the late nights prepared me for this very moment, not just professionally, but as a leader. I owe it to all the people who invested in me to walk the path they've paved for me and then push beyond those limits to extend the path for the next generation."

Oluwatosin Sanya, MBA'18, who trained as a medical doctor in her home country, Nigeria, urged her fellow students to keep moving and pushing their limits. "We are gathered here today because you all chose to push your limits beyond what you thought were your boundaries, and here you are today having pushed beyond one more major boundary. I encourage you, don't stop just yet! Believe in your potential. Keep pushing your limits, because your boundaries are limitless!"



WANT BETTER CONCRETE? DILUTE THE CEMENT

It's long been proven that adding nanoparticles to concrete improves strength and durability, but the cost of such processes has outweighed the benefits. Missouri S&T's **Hongyan Ma** is working on a safer, simpler and potentially more affordable method of combining nanoparticles with concrete.

Ma, an assistant professor of civil, architectural and environmental engineering, compares the technique to blowing bubbles into limewater.

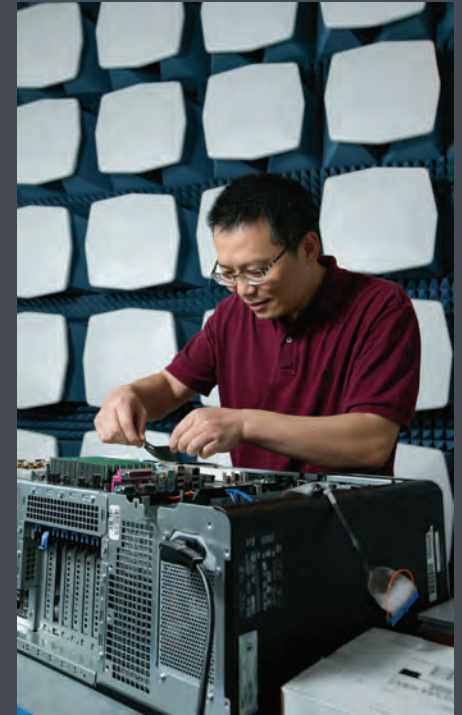
"Our method is to create calcium carbonate nanoparticles inside the concrete by blowing carbon dioxide into the highly diluted wet cement," says Ma. "The nanoparticles will be formed inside this part of the suspension in the presence of siliceous ingredients, and you use that to mix the concrete."

Previous attempts to add nanoparticles into fresh concrete were not successful because the superfine particles would always stick together — not disperse, says Ma. His method involves forming the nanoparticles inside the fresh concrete, creating an even disbursement.

A \$160,000 grant from the National Science Foundation will allow Ma to test his method through 2021. By then, Ma hopes to have the technology available to make it ready for existing concrete plants to use.

Ma's method would address another potential problem of working with nanoparticles in concrete — the fact that they are harmful to humans. Their harmful side effects include potential lung inflammation and heart problems, especially when dry nanoparticles are used.

"Our method is a wet method, so the workers and the laborers at concrete plants will not be exposed to the harmful nanoparticles," Ma says.



FAN NAMED TANG PROFESSOR

Jun Fan, an expert in electromagnetic compatibility and a member of the S&T faculty since 2007, became the Cynthia Tang Missouri Distinguished Professor of Computer Engineering on Oct. 1.

The Tang Professorship was established through a gift from software entrepreneur **Cynthia Tang**, Econ'85, who founded Insight Industries, a software consulting company based in Platteville, Wis., in 1987. She is also a member of the Order of the Golden Shillelagh, an emerita member of the Missouri S&T Board of Trustees and a 2011 Alumni of Influence inductee.

S&T ONLINE PROGRAMS GET TOP RANKINGS

U.S. News & World Report ranked 15 S&T online graduate programs among the best in the nation. The programs include S&T's online MBA program, 12 online graduate programs in engineering, and online graduate programs in computer information technology and business in information science and technology.



S&T STUDENTS FIND A HELPING HAND IN AVERY WELKER

by Hannah Ramsey-Standage

It isn't difficult to spot **Avery Welker** in a crowd. And the 6-foot-4-inch-tall S&T graduate student's broad smile and relaxed manner make it easy for him to make connections.

"I find it fun to talk and learn something new about a person," says Welker, PetE'16, MS PetE'18, pictured above with **Anna Ramirez**, a senior in petroleum engineering and secretary of Students Today, Alumni Tomorrow.

That genuine interest in other people — especially students — led him to apply to be the student representative to the University of Missouri Board of Curators. Missouri Gov. Mike Parson appointed Welker to the board in July 2018. He was sworn in at the board's September meeting at the University of Missouri-Kansas City. His term runs through Jan. 1, 2020.

During his days as an undergraduate student and resident advisor, Welker focused on helping his fellow S&T students succeed. Now, as student representative to the UM Board of Curators,

Welker is in a position to help even more students find success.

"The role I would like to fill is being a solid point that any student, at any campus, can come to and ask for help," he says. "Having been at Missouri S&T for a long time, I would know what direction to point a student in regardless of what campus they are on."

The most enjoyable part of the role for Welker so far has been learning about the support he has within the UM System leadership.

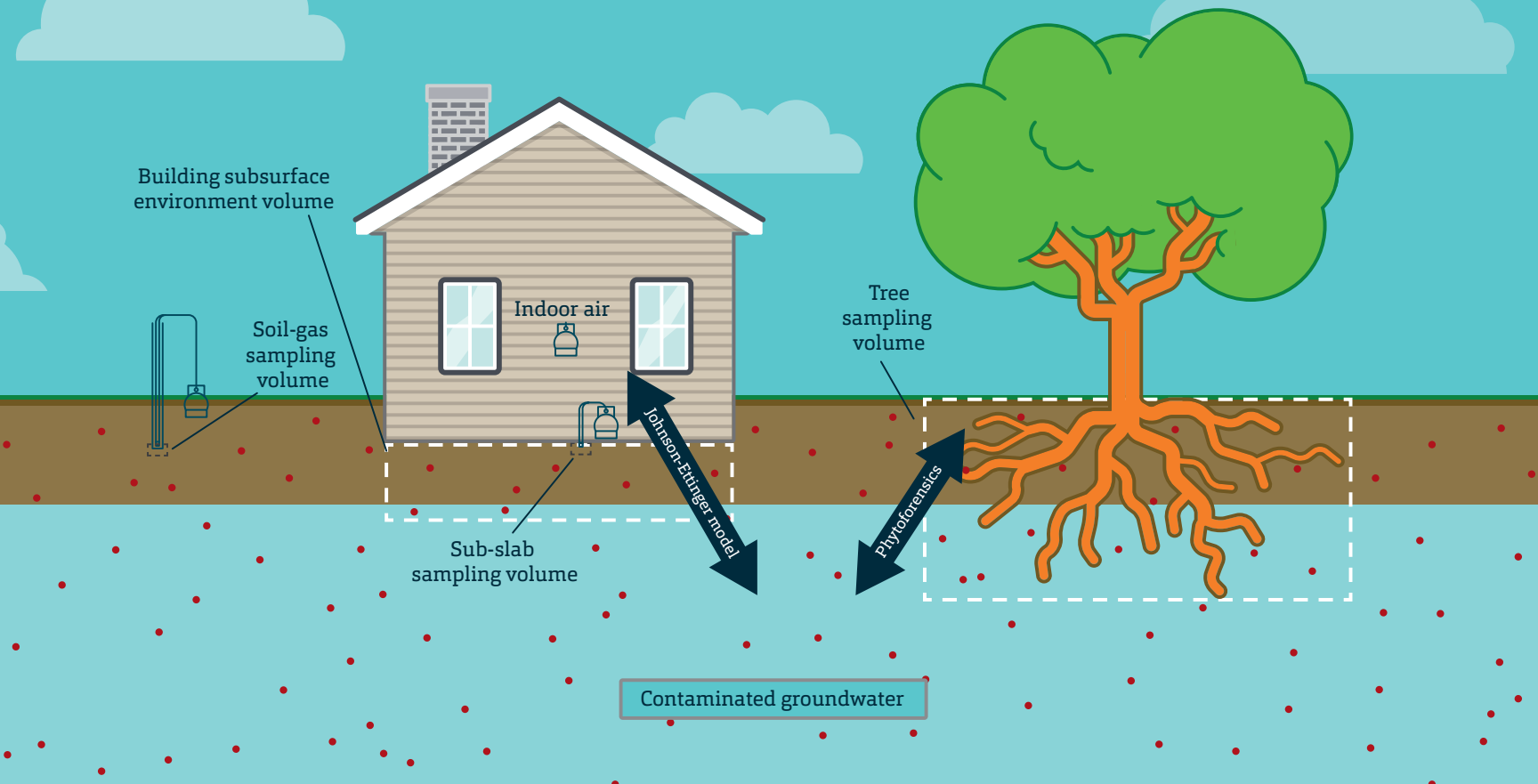
"Meeting a lot of new people and finding out just how much the system leadership truly cares about me and wants to help me succeed was incredibly encouraging," says Welker. "It has been really humbling to have so many important people that drive the university, take time out of their days to help me, give me advice and teach me about their departments."

Welker says he initially chose Missouri S&T because it offered a quality education in his discipline at an affordable price.

"The role I would like to fill is being a solid point that any student, at any campus, can come to and ask for help."

"Being eligible for in-state tuition and [Missouri S&T] having the program I wanted was a huge reason I decided on pursuing my bachelor's degree here," says Welker. "Once I was on campus, it grew into so much more than a good investment. The quality of education that I've been given in my program is one of the best parts of S&T."

USING PLANTS TO TRACK POLLUTANTS



Behold the common house plant, the front-yard shrub, the rhododendron around back. They brighten our lawns, increase our property values, even boost our mental and physical health by reducing carbon dioxide levels. They can also serve as witnesses to exposure to pollutants, a finding by S&T researchers that was published in the journal *Science and the Total Environment*.

Plants are “place-bound. They grow in one location and they interact with the soil, the groundwater and the surrounding air,” explains **Joel Burken**, Curators’ Distinguished Professor and chair of civil, architectural and environmental engineering at Missouri S&T. “They’re really masters of mass transfer. They harvest from those surroundings all the carbon,

all the water, all the nutrients they need. But chemicals in those surroundings also can accumulate in those plant tissues.

“So if we sample those plants, we’re actually sampling those surroundings. And by understanding the chemical exposure to plant pathways, we can also then understand the chemical exposure to human pathways,” Burken adds.

Doctoral students **Majid Bagheri** and **Khalid Al-jabery**, working with Burken and **Donald Wunsch**, the Mary K. Finley Missouri Distinguished Professor of Computer Engineering at S&T, used machine learning techniques and statistical analysis to help better understand how groundwater contaminants are absorbed by plant roots.

Their research builds on a three-year National Science Foundation grant awarded to Burken; **V.A. Samaranayake**, Curators’ Teaching Professor of mathematics and statistics; and **Glenn Morrison**, professor of environmental engineering, to study how pollutants absorbed by plants can move through soil and enter a building in a process known as vapor intrusion.

“By understanding the chemical interactions, we really have a potential to sample almost anywhere on the globe — especially the places that we inhabit. And by sampling that plant — a bio-sentinel — we may better understand how we’re exposed to chemicals, and how to better prevent that,” Burken says.



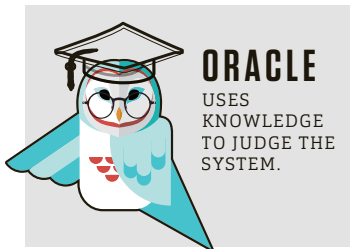
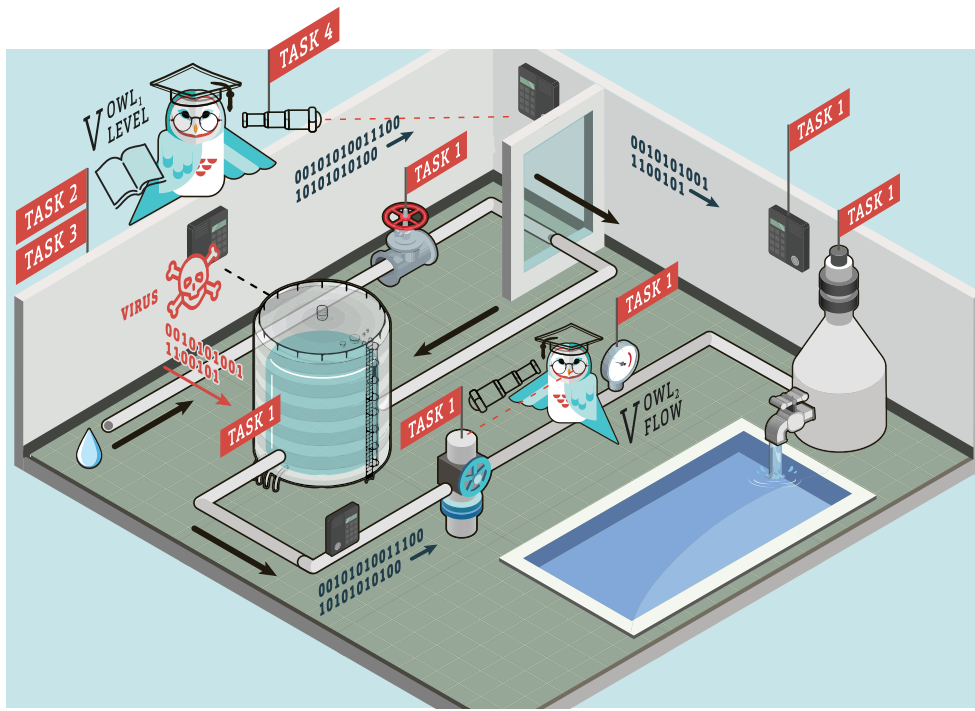
SNAKES, SHILLELAGHS AND SHAMROCKS, OH MY

What better place to celebrate St. Pat's than in Rolla? Alumni, students and the community gathered in March for the 11th Best Ever St. Pat's. Here are a few scenes from this year's celebration. See more photos from the weekend at photos.mst.edu.



1. St. Pat's Board alumni members met before dawn to paint Pine Street green.
2. The alumni association served breakfast to alumni and friends.
3. A photo booth complete with props gave visitors a memento from the weekend.
4. Chancellor **Chris Maples** and his wife, **Sara Marcus**.
5. Honorary Knights, including **Matt Coco**, CE'66, and **Kathy Voss** handed out beads during the parade.
6. Alumni and friends gathered at Hasselmann Alumni House before the parade.
7. Gary Hicks visits with Honorary Knights **Tom Green**, **Larry Thomas** and **Joyce Thomas**, Engl'78.
8. St. Pat, engineering management senior **Peter Doran**, and his court pose with the Queen of Love and Beauty, **Sami Smith**, a senior in chemical engineering.





- TASK 1** Defining domains and their interaction.
- TASK 2** Mathematics (prescriptive).
- TASK 3** Big data (responsive).
- TASK 4** State estimation.

BOOSTING CYBER-PHYSICAL SECURITY

A wide array of complex systems that rely on computers — from public water supply systems and electric grids to chemical plants and self-driving vehicles — increasingly come under not just digital but physical attacks. **Bruce McMillin**, professor and interim chair of computer science at Missouri S&T, is looking to change that by developing stronger safeguards for cyber-physical systems (CPS), thanks to a nearly \$1 million grant from the National Science Foundation.

The consequences of such attacks could be catastrophic and range from financial ruin to loss of life, says McMillin, the project's principal investigator. And the myriad access points to such data — from smart meters and security cameras to autonomous cars and wearable devices — only exacerbate the risks.

"The nation's critical infrastructure is increasingly dependent upon systems that use computers to control vital physical components," he says.

"The research aims to ensure that such systems 'do what they're supposed to do' despite an attack by building in defenses that make sure each component behaves and works well with others," McMillin adds. "The objective: produce from untrusted components a trusted CPS that is resilient to security attacks and failures."

Jonathan Kimball, Missouri S&T professor of electrical and computer engineering, and **Rui Bo**, an S&T assistant professor of electrical and computer engineering, are co-principal investigators. The research team also includes **Jennifer Leopold**, associate professor of computer science from S&T, and **Aditya Mathur**, a Purdue University computer science professor.

The project will test the more robust cyber-physical systems on a high-fidelity water treatment system as well as an electrical power test bed to align "concepts from distributed computing, control theory, machine learning and estimation theory to synthesize a complete mitigation of the security and operational threats to a CPS," McMillin says.

"The key difference from current methods is that security holes will be identified and plugged automatically at system design times, then enforced during run time without relying solely on secure boundaries or firewalls," he says.

The NSF grant includes an outreach component to develop educational games to introduce cyber-physical security concepts to children from kindergarten through eighth grade.

HONORING NEW ACADEMY MEMBERS

In October, 12 alumni and friends were inducted into Missouri S&T academies. Academy membership recognizes careers of distinction and invites members to share their wisdom, influence and resources with faculty and students. Some academies hold induction ceremonies in the fall, others in the spring.

Academy of Computer Science

John M. Brown, CSci'85

Academy of Mechanical and Aerospace Engineering

John L. Adams Jr., MS ME'85

David M. Baer, ME'84, MS EMgt'88

John L. Hampton, ME'85, MS ME'92

Kent E. Koederitz, ME'84

Robert R. Lankston, AE'85

Michael J. "Boots" Miller, AE'74

Robert M. Wagner, ME'93, MS ME'95, PhD ME'99

Scott R. White, ME'85

(inducted posthumously)

Academy of Miner Athletics

Jeff Cawfield, vice provost of academic support

Tanya Newkirk, LSci'89, basketball

Nancy Parks, EMgt'89, softball

SAVE THE DATE: HOMECOMING 2019

Homecoming 2019, which will be held Oct. 4–5, is the perfect time to return to campus to reconnect with former classmates and enjoy the Miner spirit! More details will be published in the summer issue of *Missouri S&T Magazine*. Make plans now to attend. For hotel information, visit mineralumni.com/homecoming.



MXENE DISCOVERY COULD IMPROVE ENERGY STORAGE

In spite of their diminutive size, 2-D titanium carbide materials known as MXenes are “quite reactive” to water, a discovery S&T researchers say could have implications for energy storage and harvesting applications such as batteries, supercapacitors and beyond. Their findings were published in 2018 in the American Chemical Society journal *Inorganic Chemistry*.

“The reactivity of MXenes toward water we’ve demonstrated not only changes the common perception about resistance of titanium carbide to hydrolysis in ambient conditions, but also points out the striking differences in chemical properties between bulk and 2-D forms of the same material,” says **Vadym Mochalin**, associate professor of chemistry at Missouri S&T and the principal investigator of this project.

One of the largest families of 2-D materials, MXenes are a few-atom-thick sheets with the structures of transition-metal carbides and nitrides. Their distinctive properties include high

electrical conductivity and the ability to disperse in water, a unique combination that earned them a nickname “conductive clays.”

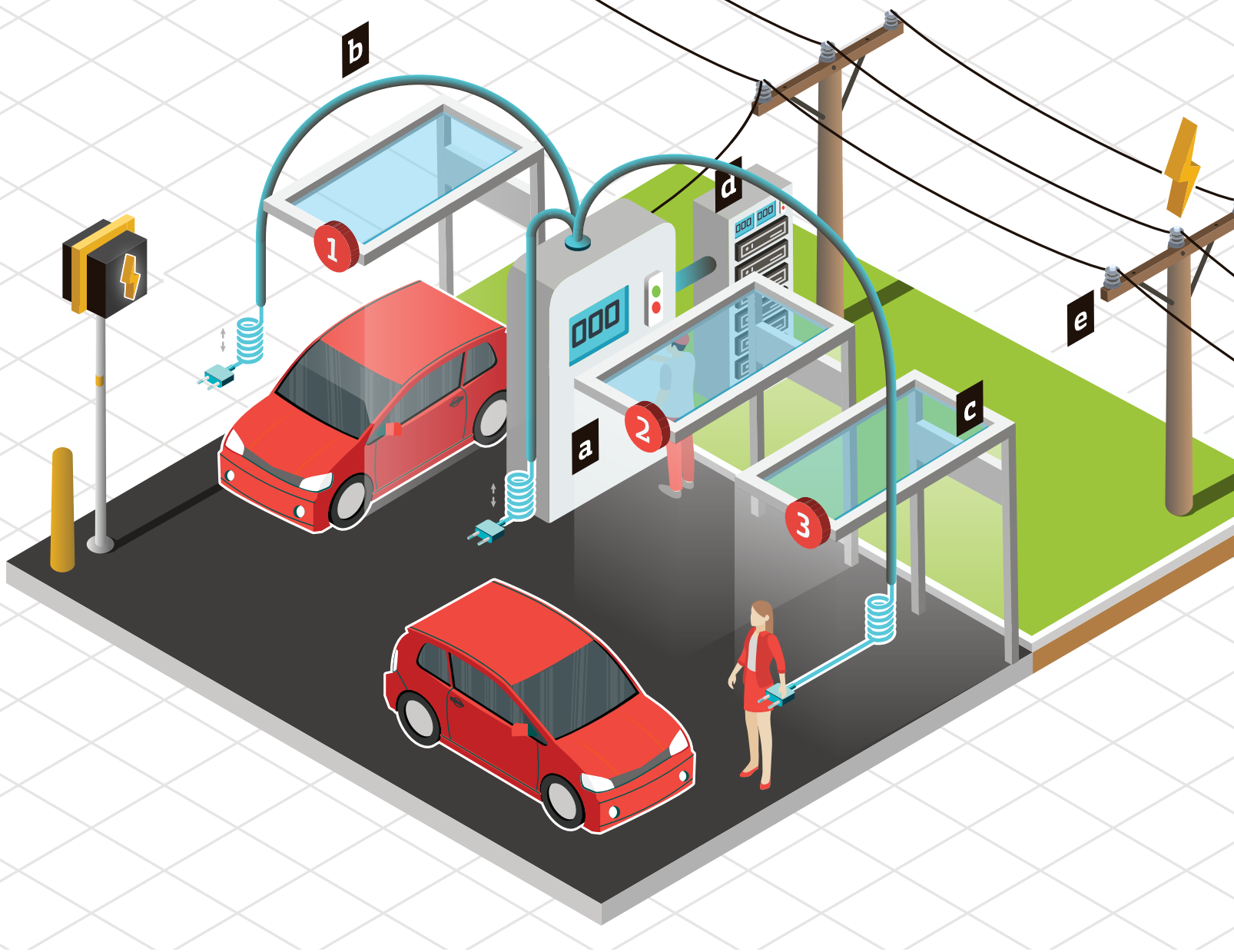
“Our new findings are important because now we know it is water itself rather than oxygen that MXenes need to be protected from during manufacturing and storage,” says **Shuohan Huang**, a doctoral student in chemistry at Missouri S&T and the paper’s lead author.

To arrive at their “water-only” conclusion, Huang and Mochalin systematically tested the hydrolysis and chemical stability of MXenes $Ti_3C_2T_x$ and Ti_2CT_x in water and non-aqueous colloidal solutions exposed to different combinations of oxygen and inert gas environments, as well as both oxygen and inert gas.

“It seems that in their 2-D state, transition-metal carbides are quite reactive,” says Mochalin. “With our result, we’re looking forward to follow-up studies of their rich chemistry in reactions

“It seems that in their 2-D state, transition-metal carbides are quite reactive.”

with water and other molecules, including organic compounds, as well as studies into MXenes’ possible catalytic properties.”



A FASTER CHARGE FOR ELECTRIC VEHICLES

One drawback of electric vehicles (EVs) is the time it takes to charge them. But what if you could plug in your EV and fully charge it as quickly as it takes to fill up a conventional car with gasoline? Missouri S&T researchers, in collaboration with three private companies, are working to make speedy charging a reality.

"The big problem with electric vehicles is range, and it's not so much range as range anxiety. People are nervous about not being able to get where they're going," says **Jonathan Kimball**, Missouri S&T professor of electrical and computer engineering. "With a conventional vehicle, you pull up, get gas, and in 10 minutes you're back on the road." Kimball is leading a team that received a \$2.9 million matching grant from the U.S. Department of Energy to develop

an extreme fast-charging system for electric cars over the next three years.

The project partners include Ameren, Missouri's largest electric power provider; LG Chem Michigan, a manufacturer of lithium ion batteries; and Bitrode, a St. Louis-based maker of laboratory-grade battery testing equipment.

Kimball says the group hopes to make electric cars more user-friendly by significantly reducing charging time. Most electric car chargers on the market today require anywhere from a few hours to overnight to fully charge a vehicle. Even Tesla's Supercharger stations take up to an hour to fully charge a car.

Kimball says there will be challenges to building these fast charging stations. The first challenge is whether the batteries can withstand such speedy charges. Overcharging

a lithium battery could lead to overheating and fire, he says, and even if that scenario is avoided, the battery could still be damaged and wear out faster.

Jonghyun Park, a Missouri S&T assistant professor of mechanical engineering, joined the team to help minimize the degradation to the lithium ion batteries.

"At extreme fast charging rates, lithium-ion batteries can be damaged severely due to the limited energy transfer properties of the battery materials," he says. "This not only degrades battery performance, but also causes a short circuit that can lead to a safety issue."

To address these challenges, the team will develop a model-based protocol for monitoring what researchers call the battery's "state of charge" and "state of health."

Conceptual charging station with three ports: **a** power converter, **b** cables to distribute power to vehicles, **c** sheltered charging location, **d** energy storage system (ESS), **e** 15 kV-class feeder that connects directly.

Joining this part of the project is LG Chem Michigan, which supplies lithium-ion batteries, from cells to packs, for both stationary and vehicle applications, and Bitrode, which develops and markets battery formation and laboratory test equipment.

Quickly pulling large amounts of electricity from the power grid is another challenge for researchers, says Kimball. He estimates that charging a lithium ion car battery in 10 minutes will take about 300 to 400 kilowatts, and adding several cars charging simultaneously could add up to more than one megawatt in needed power. In the Midwest, one megawatt hour of energy can power hundreds of homes for an hour.

Rui Bo, S&T assistant professor of electrical and computer engineering, says the sudden high current needed for fast charging would affect the power quality from the utility provider. That means it could affect other customers that also need power.

Bo and Kimball hope to bypass that instant pull on the electric grid by first connecting to a charged battery and then ramping up to connect directly to the 12-kilovolt distribution network.

In addition to Kimball, Park and Bo, the Missouri S&T team includes **Mehdi Ferdowsi**, professor of electrical and computer engineering, who provides broad expertise in electric-drive vehicles and their interactions with the power grid; **Pourya Shamsi**, assistant professor of electrical and computer engineering, who is experienced in high-power and medium-voltage converter design; and **Robert Landers**, Curators' Distinguished Professor of mechanical and aerospace engineering, whose expertise is in mechatronics and battery control systems. □



LIBRARY MARKS GOLDEN ANNIVERSARY

On Oct. 26, 2018, the Curtis Laws Wilson Library celebrated its 50th anniversary with food, music, giveaways and more. Several registered student organizations were on hand to mark the event, including KMNCR campus radio, which sponsored a tie-dye station that gave the first 100 participants a free anniversary T-shirt.

WOEEE PREPARES TO CELEBRATE 100 YEARS

Members of the Missouri S&T Amateur Radio Club, callsign WOEEE, are preparing to celebrate the club's 100th anniversary in 2023.

As a part of its preparations, current club members hope to connect with former members to update alumni contact information — even alumni who are no longer licensed — and collect stories from alumni about their times as active members. They also hope to identify anyone interested in helping to organize the anniversary celebration. Email w0eee@mst.edu for details.

WOEEE dates back as far as 1923 and is one of the oldest university-associated amateur radio clubs in the United States. The club has occupied various locations on campus since its inception, including the Jackling Gym, the Rolla Building, the Buehler Building and Emerson Hall, where the organization's "shack" currently resides in Room G-29/30.

The club provides a space for members to experiment with equipment, communicate with other enthusiasts and provide a public service. For more information about amateur radio, visit the club's website at w0eee.mst.edu or the national association's site at arrl.org.

Success in ARTS,

SCIENCES

and BUSINESS

By Mary Helen Stoltz, mhstoltz@mst.edu

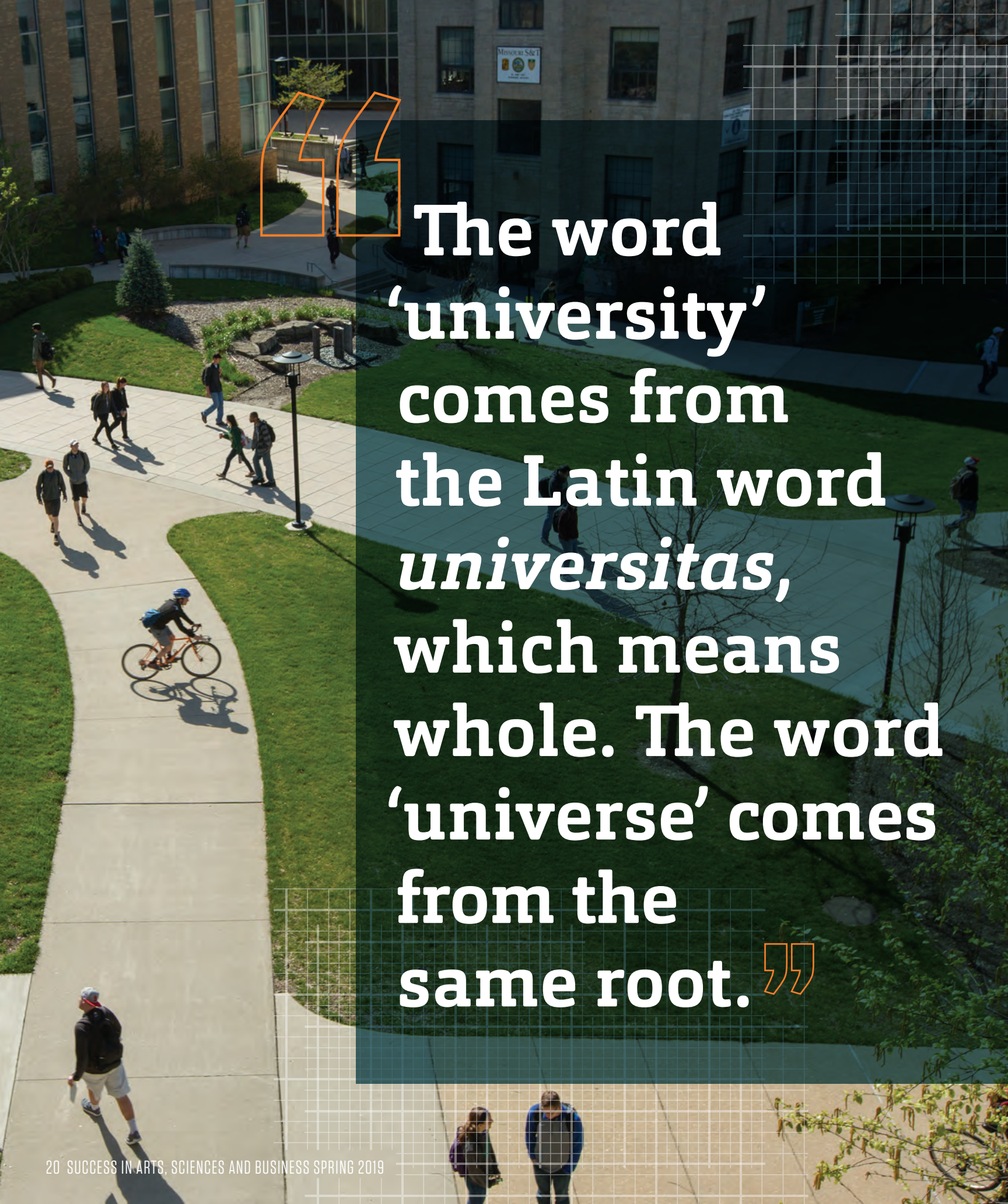
It's no secret that Missouri S&T is known for engineering. It's been that way since our founding nearly 150 years ago. The U.S. needed engineers to help fuel the nation's industrial expansion, and the Missouri School of Mines and Metallurgy — now Missouri S&T — was established in 1870 to meet that need.

In designing the school's original curriculum, founding Director **Charles P. Williams** sought to create "a school of technology" where students first learned pure sciences and mathematics and then applied their knowledge to practical problems. This was in keeping with the vision of **Daniel Read**, the University of Missouri president at the time, who said: "This school is to be a school both of science and of its applications: its purpose is to teach knowledge and art — first to know and then to do, and to do in the best manner."

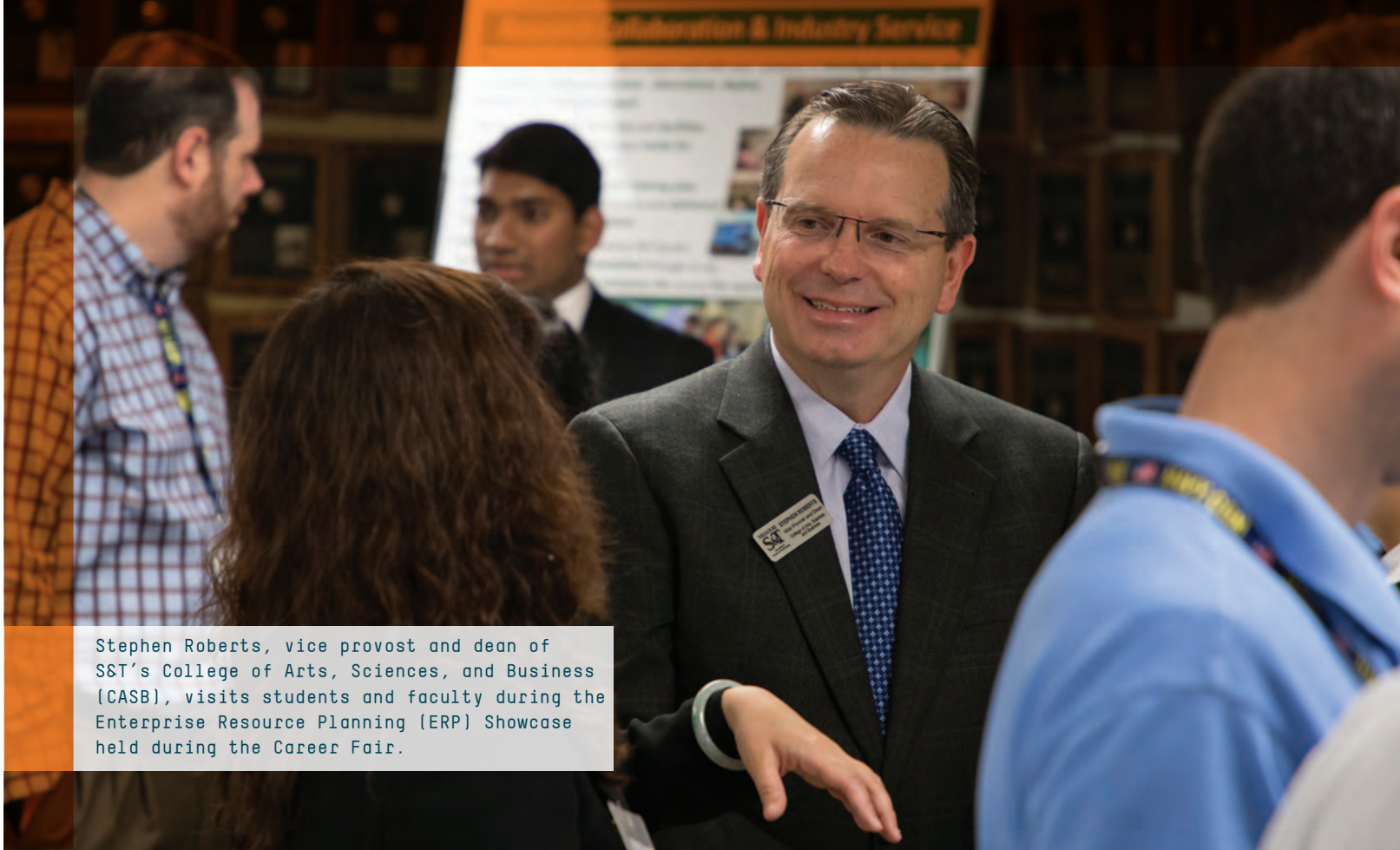
Today Missouri S&T's reputation for engineering — the "applications" part of Read's vision — still rings true for many. But the sciences help form the basis of our heritage of discovery, creativity and innovation, and have been integral to the course of study since our founding.





An aerial photograph of a university campus. A large, semi-transparent dark blue rectangle with a white grid pattern is overlaid on the right side of the image. Inside this rectangle, white text explains the etymology of the word 'university'. The text is enclosed in orange-outlined quotation marks. The background shows a paved walkway with several people walking and a person riding a bicycle. A brick building with a 'MISSOURI STATE' sign is visible in the upper left.

The word
'university'
comes from
the Latin word
universitas,
which means
whole. The word
'universe' comes
from the
same root.



Stephen Roberts, vice provost and dean of S&T's College of Arts, Sciences, and Business (CASB), visits students and faculty during the Enterprise Resource Planning (ERP) Showcase held during the Career Fair.

"Missouri S&T may be best-known for its science and engineering, but we are first and foremost a university," says **Stephen Roberts**, vice provost and dean of S&T's College of Arts, Sciences, and Business (CASB). "The word 'university' comes from the Latin word *universitas*, which means whole. The word 'universe' comes from the same root. Our job, as a university, is to provide that universe of academic opportunities; to educate the whole person across a broad spectrum of disciplines, to expose students to multiple cultural perspectives, to foster strong critical reasoning, communication skills and quantitative literacy, and to prepare students for sustainable careers in a rapidly changing world."

Degree programs in liberal arts, humanities and social sciences established in the 1960s helped transform Missouri S&T from a "school" into a full-fledged university. But even as early as 1878, the institution offered courses in foreign languages, bookkeeping and a preparatory program for teachers. And in 1893, according to historical records, Professor **Thomas Lewis Rubey** was teaching psychology, along with courses in history and grammar.

S&T's programs in business, the sciences, the humanities and liberal arts produce successful Miners who go on to careers in a wide range of fields, including education, scientific exploration, publishing, medicine, business, public service, writing and editing, and law.

And often, those careers are lucrative.

Counter to the narrative that liberal arts graduates can expect to struggle financially, the Andrew W. Mellon Foundation released a new study that indicates liberal arts grads actually earn competitive salaries.

Of course, the study doesn't claim these graduates will out-earn their engineering counterparts, but it does refute claims that a liberal arts education isn't worth the cost. It also notes the advantages of a liberal arts education in terms of learning to think critically, solve problems, communicate effectively, understand our world and contribute to making it a better place.

The study's authors, Catharine B. Hill and Elizabeth Davidson Piscreta, work for Ithaka S+R, which conducts extensive research on the economics of higher education.

Hill and Piscreta found that one reason liberal arts graduates earn competitive salaries is the diversity of fields they study. At S&T, liberal arts and business graduates have a further advantage, as STEM-oriented institutions were found to raise the economic outcomes of all their graduates.

Those humanities, liberal arts, sciences and business programs also provide essential knowledge to develop well-rounded students of all majors.

And well-rounded graduates are what today's employers are looking for.

A recent Cengage survey of more than 500 hiring managers and 150 human resources professionals lists "soft skills" like listening and effective communication among the top skills valued by employers. Similarly, a 2016 **engineering.com** article includes three so-called soft skills among the top five skills engineering recruiters and hiring managers are looking for. Not surprisingly, technical skills topped the list, but were followed closely by communication and interpersonal skills. Problem-solving and a combination of enthusiasm, commitment and motivation round out the list.

At Missouri S&T these skills are known as "core competencies," and career opportunities and employer relations staff members help make sure our students excel in them.

"S&T subscribes to the Eight Core Competencies put out by the National Association of Colleges and Employers, which include communication, problem-solving and teamwork skills," says **Will Zwickelmaier**, director of career opportunities and employer relations (COER) at S&T. "A major role of our office is to make sure that our students are prepared with these competencies to make themselves great employees and continue to make S&T an attractive pipeline for a competent workforce on top of a knowledgeable and skillful one."

That philosophy applies to all students, not just those in engineering disciplines. One common misconception is that employers don't



Will Zwickelmaier, director of career opportunities and employer relations (COER), at the Spring 2019 Career Fair.

recruit for sciences, business or humanities majors at S&T, which could make the post-graduation job search challenging.

Zwickelmaier says that isn't the case.

“It is our goal to add more employers seeking CASB grads to our on-campus engagement opportunities.”

“Companies regularly recruit CASB grads at the career fair,” Zwickelmaier says. “Most companies that come to our school seeking to hire CEC (College of Engineering and Computing) grads also have positions available for CASB majors, and many come seeking specifically CASB majors. It is our goal to add more employers seeking CASB grads to our on-campus engagement opportunities.”

S&T's career fairs, held twice yearly, continue to grow in popularity. Last fall's event drew a record 331 employers, many of which were seeking students from disciplines outside of engineering. COER is working to expand its opportunities for CASB students by providing access to employers in ways beyond traditional on-campus recruiting.

One example is Handshake, a custom digital tool that connects employers around the country directly with S&T students. While Handshake benefits all job-seeking students, it is especially helpful for those looking for jobs in sciences, business, humanities and liberal arts. Firms seeking those majors often recruit on a different timeline than most engineering and technology firms, Zwickelmaier says.

“Through Handshake, we can post jobs directly from employers to our students, and we vet every single posting,” he adds. “Students can use the application to build a profile that is visible to employers who are directly seeking our students. If students upload resumes into the system, we can provide employers digital books of all resumes when they call seeking to hire someone from a particular major.”

“There are a plethora of opportunities available to students that put them directly in arm's reach of employers who trust in our reputation as an institution,” he says.

COER recently surveyed employers who hire S&T graduates and found they most often seek new hires who show initiative, are personable team players and detail-oriented, and possess a good work ethic and strong communication and problem-solving skills. Those characteristics are developed through a broad education.

“We can't do that simply by requiring students to dive deeply into a single discipline,” says Roberts. “For students to graduate from S&T with the capacity to help solve the many serious and complicated challenges our society faces, they must have broad educational experiences that teach them how to approach and solve problems in many contexts and along many dimensions.”

Roberts is founding dean of CASB, and he takes pride in what the college offers to students of all majors.

“Majoring in a CASB program at Missouri S&T provides you with the very best of two worlds,” Roberts says. “You get the small liberal arts college experience while still being a part of a major STEM-focused research university. You get to enjoy a lot of close contact with and mentorship by professors, small upper-division courses with personalized attention, and incredible opportunities to conduct meaningful, original research as an undergraduate — often, even as a first-year student. I know that our students are being well served by the rich, exciting educational opportunities CASB provides.” □



COER career advisors meet with students for résumé reviews, practice interviews and individual advising sessions.



Students receive Career Fair and interviewing advice from employers at a COER employer panel.



Students and employers connect at the Spring 2019 Career Fair.

BEYOND ENGINEERING

Our graduates with degrees in the sciences, business, humanities and liberal arts find success in diverse careers, from traditional paths to cutting-edge industries. They thrive as civic leaders, educators, innovative thinkers and problem-solvers. Take a look at just a few of the industries and roles in which these S&T alumni have left their mark.

- **Mervin J. Kelly**, Phys 1914, who was president of AT&T Bell Labs during its peak inventive period from 1951 to 1959. Under Kelly's leadership, Bell Labs connected theoretical science with applied engineering to develop the solar cell, the laser and other innovations.
- **Gary Havener**, Math'62, a successful entrepreneur and philanthropist whose 2002 gift to S&T created the Havener Center.
- Novelist **Lora Roberts**, Engl'71, author of the *Liz Sullivan Mystery* series.
- **Joan Woodard**, Math'73, a retired senior executive for Sandia National Laboratories.
- Our NASA astronauts: **Tom Akers**, Math'73, MS Math'75; **Janet Kavandi**, MS Chem'82; and **Sandra Magnus**, Phys'86, MS EE'90.
- Successful physicians like Dr. **Paul Stricker**, LSci'82, Dr. **Karlynn Sievers**, Engl'96, LSci'96, Dr. **Christina Byron**, Chem'03, and Dr. **Selin Acar**, Chem'12.
- **Traci Walker**, Hist'00, director of digital service procurement at the White House.
- Missouri State Auditor **Nicole Galloway**, Econ'04, Math'04.
- Olympian **Tyrone Smith**, Hist'07, who represented his home country of Bermuda in the 2008, 2012 and 2016 Olympics in Beijing, London and Rio de Janeiro, respectively.
- **Jay Modi**, MBA'10, director of finance for Silicon Valley startup Peninsula Clean Energy.
- **Jeff Leng**, Bus'06, CSci'06, senior patent counsel at eBay.

What about you?

Did you get a degree in a field other than engineering? Tell us where your degree has taken you. Visit magazine.mst.edu/casb.

A bigger picture of academic success

By Delia Croessmann, croessmann@dmsst.edu



Ted Kelly, Econ '77



Paul Stricker, LSci '82



Cori Nelson, MgtSys '02

The core group of 12 alumni and friends who make up the Dean's Leadership Council (DLC) for S&T's College of Arts, Sciences, and Business (CASB) are recognized and respected in fields that span industries in defense, energy, information technology, medicine, manufacturing and academia.

They also serve as role models to the university community who are dedicated to strengthening CASB faculty and students through guidance, innovation and financial commitment. The six members featured below all share one belief:

Learning across disciplines is powerful.

DLC President **Ted Kelly, Econ '77**, is a principal and senior project manager of regulatory services at Burns & McDonnell in Kansas City, Mo., where he analyzes system operations and management, forecasts revenue requirements, develops rates, and completes strategic plans for utility companies. Kelly says his combined economics major and engineering management minor proved to be the optimum choice to begin a career in the consulting industry.

"Courses in calculus, statistics, macro- and microeconomics, natural resource economics, and management gave me a solid background and the tools to get started in my field," says Kelly. "CASB's programs today prepare students for many jobs, including consulting and business analysis. There are a variety of job opportunities for graduates with strong math and economic backgrounds in city government, public works, utilities and consulting.

Dr. **Paul Stricker, LSci '82**, works with young athletes in his pediatric sports medicine clinic in San Diego. As one of approximately 200 U.S. doctors board-certified in both sports medicine and pediatrics, Stricker represented the U.S. at the Olympic Games in Sydney, Australia. He is a past president of the American Medical Society for Sports Medicine and an author of numerous medical publications and a book on youth sports success.

Stricker believes that to be successful, a college education must fit the desires of the student.

"I had the desire to pursue sports medicine to tie in my athletics with science," says Stricker, a member of the Miner swimming team as a student. "A background in the CASB academic disciplines contributes to a well-roundedness that can be a great foundation for whatever students wish to pursue as they get more exposure to life and identify their passions.

“At a tough school like Missouri S&T, the entire package of academics and sports prepared me very well for success in many aspects of life, which is why I love continuing to be connected to the university.”

Cori Nelson, MgtSys '02, DLC secretary, is a senior data analyst at Cerner Corp. in Kansas City, Mo., where she has worked since graduating from S&T. She says the interdisciplinary intersection of human-computer interaction, or "user experience," is a current focus in Cerner's software development.

"As a CASB student, I took classes with mining and mechanical engineers and participated in group projects with electrical and computer engineers," says Nelson. "Having those kinds of shared college experiences and learning to communicate across disciplines lays a foundation on which careers in technical companies can be built."

Dean's Leadership Council members from the College of Arts, Sciences, and Business expound on the benefits of a broad, technically integrated education.



Steve Frey, MS Phys '86

Problem-solving skills serve them well.

Steve Frey, MS Phys'86, is a senior leader in the ISR Systems Group at L3 Technologies in Orlando. He works on strategy and development of systems that provide global intelligence, surveillance and reconnaissance through advanced defense and commercial aviation technologies.

“The systems people build today are complex. To make them effective, we have to balance a degree of difficulty and knowledge across a variety of scientific and technological disciplines.”



Carl Schmitz, IST '10

When Frey earned his master's degree in physics, systems engineering programs were scarce. Today he credits his physics education for giving him the broad background that allows him to understand biology, applied chemistry, optical science, thermal dynamics and software design — all subjects that help him solve complex technological problems and take new developments from the lab to production.

Carl Schmitz, IST'10, is a manager of supply chain information technology at Boeing in St. Louis and serves on the DLC's executive committee.

“Attending a predominantly engineering school enhances our problem-solving skills and ability to work in cross-discipline teams,” says Schmitz. “My degree in information science and technology built both the technical skills and business acumen required to interact with teammates across the company and ensure our solutions deliver value.”

“Technical companies require a wide variety of skills to turn concepts into reality,” says Schmitz. “How would you sell a product without marketing and communications support? What business can run without an accountant to keep track of the money? CASB graduates bring this essential knowledge — and much more.”

Pam Leitterman, Math'75, is retired from a 28-year career at Hewlett-Packard where she managed the company's customer experience program. Leitterman, who lives in Sunnyvale, Calif., is DLC vice president.

“Core analytical and synthesis skills are valuable to any business — whether developed in a science, information technology or engineering discipline or through written analyses of literature, history, philosophy or psychology,” says Leitterman. “Those skills can help you improve existing business processes or spot trends that can lead to new business opportunities.”

Also serving her second three-year term as president of S&T's Academy of Computer Science in the College of Engineering and Computing, Leitterman appreciates how her volunteer opportunities serve both colleges at S&T.



Pam Leitterman, Math '75

“My work in both colleges helps me better see the bigger picture of the overall university.”

“I hope I'm also enabling the cross-unit collaboration I think is so important in any organization or institution,” says Leitterman. □

SMART

technologies

By Sarah Potter, sarah.potter@mst.edu

WHERE PEOPLE AND TECHNOLOGY INTERSECT

Smart phones. Smart watches. Smart speakers. Smart appliances.

Smart devices improve people's lives every day. Advances in smart technology help people stay connected, find information and organize their lives along with numerous other benefits.

But these advances also bring a sense of unease and insecurity, such as concerns about privacy, personal data sharing and ethics.



Devices such as Google Home are learning about us in order to be more of a true companion, but are we ready to give up our privacy for these benefits? ”


Dark and bright

Fiona Nah, Missouri S&T professor of business and information technology, calls this dichotomy the dark and bright sides of technology.

“The dark side could be the frustration of being tracked without our knowledge, which is a privacy and security issue,” says Nah. “The bright side could be the benefits and entertainment — gaming, shopping, and making us more efficient. It goes both ways. Technology is becoming very smart. A smart device is almost like a companion, and there are benefits to that.”

She says we’re likely just beginning to see the ways that machine learning will help us in the future.

“In the machine learning era, we need to provide opportunities for machines and technology to learn before they can get smarter in serving and helping us,” says Nah. “An example is the use of a chat bot that is still limited in its functions and capabilities. Devices such as Google Home are learning about us in order to be more of a true companion, but are we ready to give up our privacy for these benefits?”



Fiona Nah

Professor of business and information technology



○ **Daniel Shank**
Assistant professor of
psychological science

David Wright
Associate professor of English
and technical communication

We're creating opportunities for faculty to work together, including for STEM faculty to work on teams with humanists and social scientists.

□ **Kate Drowne**
Associate dean for academic
affairs in the College of Arts,
Sciences, and Business



“We’ve heard some examples where people have actually turned off their smart home hubs because they didn’t realize potential problems.”

Rejecting smart systems

Daniel Shank, assistant professor of psychological science, is researching how people respond to smart devices in real-world situations. He and **David Wright**, associate professor of English and technical communication, outfitted Missouri S&T’s solar houses with a wealth of smart devices and then surveyed residents’ reactions to having the devices in the homes.

“Largely, they ignored them, turned them off and didn’t put any effort into understanding them,” says Shank. “It reinforces the idea that the devices are very gimmicky — not actually solving real problems that people are talking about.”

This year, Shank and Wright are using seed grant money from Missouri S&T’s new Center for Science, Technology and Society (CSTS) to continue their research on why people might “un-adopt” smart home devices such as Amazon Echo and Google Home.

“We’ve heard some examples where people have actually turned off their smart home hubs because they didn’t realize potential problems,” he says.

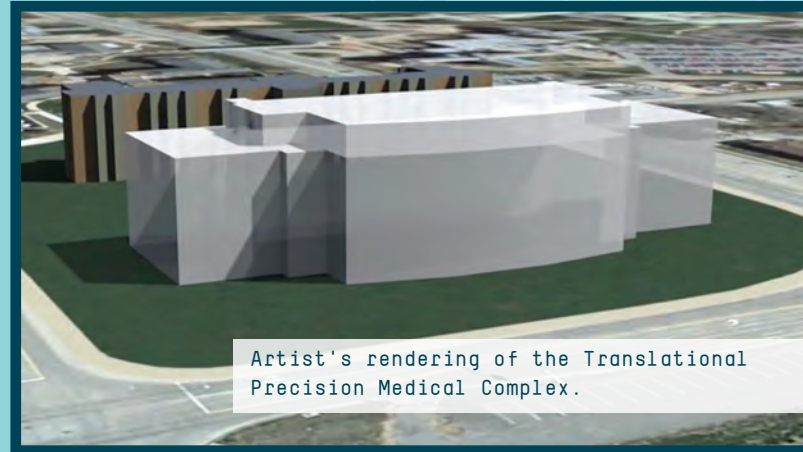
Shank has collected stories of home devices sharing private medical data to others in their home, making noises that were unprompted or gathering data when the device was not active.

Seed funding

More S&T researchers will continue exploring the intersection of people and technology thanks to the CSTS seed grants. **Kate Drowne**, associate dean for academic affairs in the College of Arts, Sciences, and Business, leads the CSTS. She says S&T has a long history of STEM-focused research centers, and the campus needed to add a societal connection.

“We’re creating opportunities for faculty to work together, including for STEM faculty to work on teams with humanists and social scientists,” says Drowne, who is also a professor of English and technical communication. “New technologies all have the potential to impact people’s lives, either for harm or for good. Researchers need to examine the significant ethical and moral dimensions related to science and technology in inclusive and thoughtful ways.”

She says the center’s goal is to launch small projects that are focused on collaborations between STEM faculty, humanists and social scientists that could result in larger, high-impact research proposals aimed at federal funding agencies. □



Artist's rendering of the Translational Precision Medical Complex.

Fuel for the PRECISION MOON SHOT

By Andrew Careaga, acareaga@mst.edu

The highest research priority for the University of Missouri System can be described as a kind of “moon shot” moment — an ambitious stretch that will require all hands on deck. And three CASB researchers will play an important role.

Unlike President John F. Kennedy’s call to put a man on the moon, however, this effort is firmly grounded in one of the great challenges of the terrestrial world: the challenge of “precision medicine,” or customized, personalized health care and medical treatment.

Precision medicine is the newest frontier in health care. This highly personalized approach to treatment considers individual genes, environment, lifestyle and other factors. For example, research on individual “microbiomes,” or the type of bacteria in a person’s stomach and intestines, suggests that certain medical approaches may help treat that person’s cancer. But someone with a different microbiome makeup may respond better to a different type of treatment. That’s precision medicine.

In his “Excellence Through Innovation” address last fall, UMS System President **Mun Choi** announced plans to invest \$50 million to support what he calls the Precision Medicine Initiative (PMI) and to help fund construction of the Translational Precision Medicine Complex to be built in Columbia.

Missouri S&T’s depth in certain areas makes it a key player in the PMI. Three of the five S&T researchers involved in the initiative are CASB faculty: **Amy Belfi**, assistant professor of psychological science, **Julie Semon**, assistant professor of biological sciences, and **Risheng Wang**, assistant professor of chemistry.

Belfi, a neuroscientist, is studying the effects of music and aesthetics on the brain. Her research may lead to greater understanding of how memories created by music may help Alzheimer’s patients. Semon’s research involves studies of how different types of stem cells may one day be used to treat various diseases. And Wang, who specializes in nanobiotechnology, studies the potential use of DNA nanostructures to deliver treatments directly to cancer cells in a more targeted fashion than chemotherapy or radiation treatment.

Just as the original moon shot relied on the efforts of hundreds of scientists, engineers, technologists and support staff, the PMI will also require the expertise of many. The contributions of Belfi, Semon and Wang are certain to make a difference.

ONE COLLEGE

six perspectives

Students in the College of Arts, Sciences, and Business open up about their lives as Miners.

From applied biology to technical communication, the College of Arts, Sciences, and Business (CASB) is home to a wide range of disciplines and fields. But talk with students in these programs and you'll soon discover these diverse achievers are alike in one major way: they each are exploring their intellectual curiosity and charting their own path.

Their highly individualized journeys are imprinted with the hallmarks of an S&T education, with practical experiences as varied as how to finance a world champion design team to how to inspire the next generation of mathematicians. It's this mix of skills and experiences that continues to draw a small but steady group of students interested in obtaining an education in the sciences, business, humanities or liberal arts to Missouri S&T each year.

And although it makes up a smaller percentage of the university's overall enrollment, CASB attracts students who are seeking academic success in a close-knit community.

In the classroom, this smaller number equates to more natural discussions between students and faculty. On our interdisciplinary student design teams, the addition of their diverse perspectives fuels collaboration and fosters innovation. As graduates, regardless of their degree, they discover a strong alumni network ready to welcome them into their community.

And for the six you'll hear from, they wouldn't have it any other way.



Mullin Evans

senior, psychology



Luis Ocampo

sophomore, information science and technology

PickHacks co-directors
Luis Ocampo (left) and
Christopher Gu brainstorm
hackathon logistics.

Why did you choose S&T?

Ocampo: When I toured, I discovered the information science and technology (IST) program. It was exactly what I was looking for in a major. I've always been interested in both technology and the people side of things. Most of the majors that I found were basically one or the other. When I met with the IST department supervisors, I was kind of sold on it. It's that kind of interdisciplinary major that I had been looking for.

See: I chose S&T because of their reputation for academic excellence. I had been told that the university was one of the best in the state for preparing students for work in the STEM field. I was also drawn to how much emphasis S&T placed on internships and full-time careers after graduation. This has turned out to be true in my case, as I've been an intern at Brewer Science for a little over a year now.



Jennifer See

senior, chemistry



Tyler Glidden

junior, applied mathematics

What are the advantages of pursuing your degree at S&T? What are the challenges?

Evans: Pursuing a degree in psychology has opened doors for me to prepare me for the future working world. One huge advantage I have had is the internship program — which has not only cycled me through professional interview settings but has placed me in the kinds of environments that I want to work in in the future.

Glidden: Math is incredibly hard, and I don't get to use a calculator. I have friends at other universities who are allowed calculators. They say, "Oh, it's kind of easy." And I'm thinking, "Oh, I have to do it by hand." But it makes you better, because you really learn how to do the math. There are no crutches. I feel like I'm going to be extremely prepared for where I'm going. In the short term, I want to teach in high school and coach pole vault. In the long term, I want to be a college professor, so I think that getting that full degree will help me get a master's and a doctorate, if I want to go that far. First, it's just getting that teaching degree and knowing a little bit about math.

Ocampo: Engineering is a huge thing here, but that doesn't devalue the CASB education. It makes you more marketable. Nowadays everyone is trying to go into STEM. A liberal arts education, a STEM background and being surrounded by all those people — it makes you a little more ready for the workforce.

Thomas: The information science and technology minor has been challenging for me. Learning how to code has been hard. But it is so beneficial. And it isn't part of the business programs at most other universities. That's why it is also a benefit. Making it part of the degree program at S&T is perfect because we have access to so many resources to get help.

What role have S&T faculty and staff played in helping you prepare for life after your undergraduate career?

Evans: The S&T staff I have interacted with have shown their dedication to helping students in so many ways. They have provided so many resources — from résumé help on campus, to job connections outside of campus — that I feel as ready as I can be to graduate. I have more understanding about the professional world, and I'm not sure I would've gotten these experiences anywhere else.

Glidden: I love the faculty. All the teachers are great. I've never had a truly bad professor. I've had ones that I didn't agree with a whole lot, but I think we've all had those. There's not one that I just truly couldn't work with.

See: I'm especially grateful to be a part of Dr. **Manashi Nath's** research group. She and her team of undergraduate and graduate students have helped me learn, grow and expand my horizons. From doing research on electrocatalysts to generate clean hydrogen fuel, to helping me present our work at research conferences, to showing me what graduate school will be like, I have learned so much from them!

How did you get interested in your major? What interests you most about the field?

Bahm: I came to S&T as an aerospace engineering student because my uncle, **Donald Bahm** (CSci'79) graduated from S&T. He worked for Honeywell and always had good things to say about

the campus. After two years, I realized aerospace engineering was not going to be my career. I took a course in technical communication to fulfill an elective and ended up really liking it.

Evans: What interests me most about psychology is how differently all of our minds work, process and change. It is interesting to hypothesize why someone may act a certain way when others may act in a "normal" way.

Thomas: I came to Missouri S&T as a dual major — engineering management and aerospace engineering — because I wanted to be a rocket scientist. Turns out I don't like engineering or advanced math. But the business side of engineering fascinated me. I still want to work with rockets, but now my goal is to be the CFO of NASA.

What is the most important skill you've had to develop as an S&T student?

Ocampo: Prioritization. As a freshman, my focus was just to launch myself into everything and see what stuck. But I started liking what I was involved in. One of the big things I figured out was to decide what I valued the most and what I wanted to pursue during my time as an S&T student.

Thomas: Time management and learning to say no. In high school, I was involved in a lot of electives and extracurricular activities, but they were part of the school day. Here, I still want to be involved in all those activities, but they're all outside my regular schedule. I also have a habit of taking on extra work if something needs to be done and no one steps up. But I can't do it all and still do well with my school work.

Photo by Bob Phelan



Téa Thomas

junior, business and management systems

How would you describe the value of an S&T education?

Bahm: It's hard to see the value of something until you get through it, but one thing that is valuable is the ability to take a critical look at something and share your perspective. People don't understand why in their English class they have to be able to talk critically about the books you read in class. But that skill — critical evaluation — can be applied to so many different areas outside the classroom.

Ocampo: I see college a bit differently. I think education is important, but the connections you make are more important. A lot of liberal arts majors are super genuine and passionate people. I think that connecting with those types of people is the value within the degree.

What advice would you give a high school junior who is considering pursuing a degree in one of the CASB fields?

Bahm: Don't just isolate yourself in CASB. Find ways to get involved with other activities. Take advantage of cross collaboration with College of Engineering and Computing students both in your classes and other areas. There are a lot more opportunities here than I was aware of when I started. And even after all my years here, I can still find new experiences. At S&T, there are opportunities to explore just about anything you're passionate about.

See: Talk to a professor whose research is interesting to you and ask to join his or her group. The FYRE (First Year Research Experience) program is a great way to get started in undergraduate research. The major you pick in high school — or even college in my case — may not be the one you end up pursuing and that is okay. Working will become a major part of your life, so go for the field that gives you purpose.

Thomas: Don't let yourself worry that people will think you're weird. It's ok. "I'm a business major at an engineering school" is a great conversation starter.



James Bahm,
TComm'18
master's student, technical communication

What would you like alumni to know about being a student in the College of Arts, Sciences, and Business?

Evans: Although not the focal point of the school's advertisement, these majors are very applicable to almost all fields. Knowing at least the basics of the various CASB majors can be beneficial in the workplace, and provide different insight.

Glidden: I want alumni to know that I can't wait to get out in the real world and see the true impact that S&T students are making. If I keep up the good work, one day I can look forward to working alongside you.

FYRE students display their research.



PRO event, Project X, during Opening Week.



2019 Mars Rover reveal.



Writing Center.

What are you doing outside of the classroom to strengthen your skills in teamwork and problem-solving?

Bahn: I have been working at the Writing Center since early in my undergraduate career. It really builds interpersonal skills. You have to have strong writing skills and be able to apply them to find ways to improve all types of writing, like résumés, cover letters, history papers, English papers and even job applications. But you also have to be able to hear a student's concerns and help them address those concerns.

Evans: I try to interact with more people than I normally would. I know that sounds simple, but when you push yourself to interact with people who are vastly different than yourself, you not only build relationships and know how to work together, you learn how to solve conflicts in mature ways.

Glidden: Being a PRO (preview, registration and orientation) leader gives me a lot of the soft skills that I never knew I didn't have — like talking to people, introducing yourself, making small talk and project planning. I think it's really going to help me along the way. But also, I'm a track coach at St. James. I teach pole vault. That's unique for my situation because what I want to do when I graduate is coach pole vault and teach math.

Ocampo: I have so many extracurriculars. For example, I run a hackathon here on campus called PickHacks. It's more on the technology community side of things. I really like seeing people learn about technology and that aha moment when a piece of code works or they build something.

See: Joining the First Year Research Experience (FYRE) program introduced me to research which is very much dependent on teamwork and problem-solving. After the FYRE semester was over, I've continued to work with the research group and continue to learn more and more.

Thomas: I am chief financial officer for the Mars Rover Design Team. As a CASB major, working with engineers like this is so important for people who want to work for a technology-related industry. There are so many opportunities to learn about things you didn't even know you were interested in. I have learned a lot from engineers, like manufacturing, and I've even made parts for the rover. But, engineers think they're right all the time, and while their ideas may work, they don't always look at the whole picture, like cost or feasibility. They need someone to keep them grounded and help them talk through problems. □

COME TOGETHER

With over 50 sections across the country, the Miner Alumni Association offers an abundance of opportunities for you to expand your professional and social circle. From sporting events to St. Pat's festivities, Miners like you get together year-round to connect and play. Don't miss out on the fun. Check out the events calendar at mineralumni.com/events.



Bay Area Section Happy Hour



SW Florida Section



McAnerney Hall Fall Getaway

LET YOUR VOICE BE HEARD

Your opinion matters to the Miner Alumni Association, which represents over 60,000 alumni. If you have comments, questions or ideas, please share them with your elected representatives listed below.

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To contact your representatives, go to mineralumni.com.

CLASS NOTES

SHARE A CLASS NOTE

Let your classmates know what you've been doing. Send us information about your professional and personal accomplishments — career changes or promotions, weddings, births and other news — and we will publish it in an upcoming issue. Email your update and a high-resolution photo (if available) to alumni@mst.edu.
Deadline:
Fall/Winter issue — July 15

PUBLICATION POLICY

We publish information submitted by alumni, news submitted by employers of alumni, and selected news stories that mention alumni and their affiliation with Missouri S&T. We are happy to announce weddings, births, promotions and other special occasions after they have occurred. We will print addresses if specifically requested to do so by the alumnus/alumna submitting the note and will mention a spouse's name if it is specifically included in the submission. We reserve the right to edit alumni notes and will use submitted print-quality photos as space permits. Due to the production time required for each issue, submissions may take up to six months to appear. Your patience is appreciated.

1943

Paul Rothband, ChE: "As Mary and I approach the end of our time, it is always refreshing and interesting to hear and learn something about the goings-on in Rolla. We no longer can travel and visit Rolla, but we have many pleasant memories of our time there. We do miss being able to attend the various meetings that we used to and being with many friends from the past." Rothband and his wife, Mary, celebrated their 75th anniversary on Feb. 27, 2018.

1951

John Griffith, CE: "In 1951, I was hired to become involved in designing and installing analog computers for real-time control of railway freight cars in a large classification yard. We had eight installations while IBM had one (for non-PR use). I decry the lack of internet security."

Howard A. Olson, GGph: "I have reached 90, and I'm still vertical!"

Elmer Packheiser, ME, compiled his life stories and photographs into a book printed using the online service Shutterfly. The book is titled *An American Life*.

1952

Mike Tarr, MetE: "We recently moved from Kansas City after 63 years to Westerville, Ohio, to live near our oldest son, **Gerald, MetE'80.**"

1954

Dale Emling, MinE: "My wife, Shirley, passed away on Sept. 24, 2017."

Jim Toutz, ME: "I lost my wife of 40 years and am turning into my 87th year soon."

1955

Campbell Barnds, EE: "We are proud of our son and grandson 'Pikes.' Grandfather, Alpha Kappa 1952; Paul, Beta Gamma at the University of Kansas; and Brandon, Pi at Washington and Lee. Once a 'Miner Engineer,' always a Miner!"

1957

Frederick Dietrich, EE, earned a Ph.D. from Ohio State University in 1968.

Russell Wege, PetE: "Life is good! I enjoy good health, have a vegetable garden and enjoy camping and fishing. My wife and I planned an eastern Mediterranean Bible cruise this past October."

1959

Edward Wakefield, CE: "Enjoying 20 years of retirement. Lynn and I cooled off in Wisconsin for the summer. All kids are doing well but scattered out from St. Louis."

1960

Bill Engelhardt, ME, retired in 2009 and has been actively involved in local projects including the United Way campaign and the Chamber of Commerce. He and his wife, Celia, helped establish Broken Arrow Farmer's Market, growing and selling produce. Engelhardt now spends a lot of time

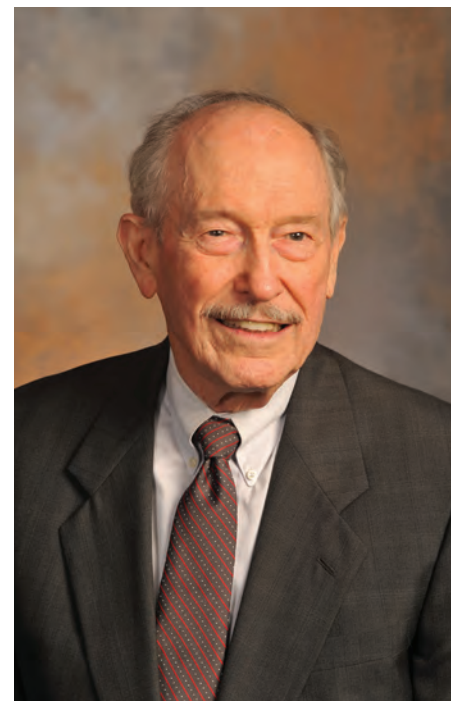
working at Lineaous Teaching Gardens in Tulsa. He is a regular blood donor and has surpassed the 32-gallon mark. He helped establish and regularly supports the Jackling scholarships at S&T.

Hossein R. Keshari, ChE: "I lost my beautiful wife, Diana Carol Wilson. She passed away on Sept. 29, 2017. We were planning for our 60th wedding anniversary the following November. Life is not the same without Mrs. Keshari."

Doug Munsell, CE: "We're up to 50 grandchildren and 18 great-grandchildren. God is so generous."

Jim Painter, ME: "I retired after 28 years from McDonnell-Douglas. I go golfing twice a week, and I'm enjoying the fruits of my labor. Thank you, MSM."

Kenneth Pendleton, MetE: "I moved to Indianapolis in 1967 and founded Universal Sales Engineering Inc. The primary products we sold were fluid power devices for automation. I sold the company in 1997 and retired. Indianapolis



BULLOCK PENS MEMOIR

Richard L. Bullock, MinE'51, MS MinE'55, released an online memoir series titled *From Hard Knocks to Hard Rocks: A Journey in My Shoes*.

The book describes Bullock's journey from an impoverished life on an Ozarks hill farm to life as a world traveler. It includes stories of Colorado avalanches and a Death Valley hike as well as his time in the Andes Mountains of Peru and the excitement of being the first engineer to evaluate a world-class gold mine in the Chilean Andes, at nearly 16,000 feet.

Bullock, an active mining engineer for 47 years, started his career on the S&T faculty, where he served for nearly 20 years.



Joe Brinkmann (right) receives the Industrial Demolition Award from RVA Group managing director Richard Vann. Photo courtesy of Jet Demolition.

SOARING PAST THE COMPETITION

Joe, MinE'81, MS MinE'82, and Liz, MetE'82, **Brinkmann**, owners of Jet Demolition, earned the Industrial Demolition Award at the 2018 World Demolition Awards. This is their second consecutive annual award.

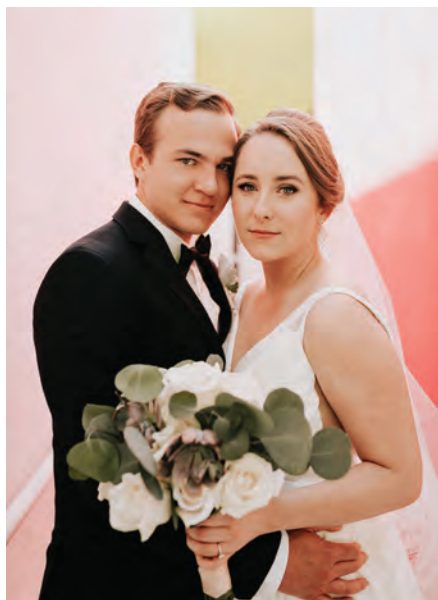
After graduation, the couple moved to Johannesburg, South Africa, where Joe founded a blasting consultancy company in 1989. After securing patents for shaped explosive charges, Jet Demolition was founded in 1994. Liz joined the company in 1996.

Jet Demolition, which develops and manufactures its own specialized tools and has 32 excavators in its fleet, focuses mainly on projects in Africa, but is considering expansion to India, the Middle East and South America. The company's "HammerJet" range of charges attracted the attention of mining conglomerates like Anglo American for partnerships and earned the company new projects.

"Very few companies such as ours have an in-house blasting capability, and invariably outsource this to a specialist," says Joe. "Not only do we have all our own equipment, but we do all of the work ourselves, which places us in a very strong position."

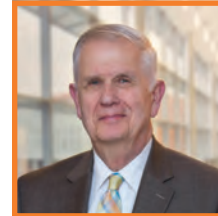
MINER UNION

Tom Dell'Orco, ME'15, married **Lauren Bigler**, CE'15, on April 7, 2018, in Scottsdale, Ariz. The couple resides in Houston.



was the logical place to locate a business that had Indiana and Louisville, Ky., as its territory. It has been a wonderful city to live in for the past 51 years. My wife, Linda, and I are enjoying both domestic and international travel and cycling and hiking wherever we are."

1961



Dave Maune, ME, was reappointed to the National Oceanic and Atmospheric Administration's Hydrographic Services Review Panel for another four-year term.

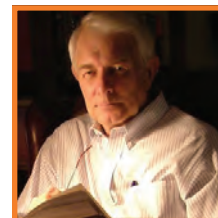
James Staley, EE: "I retired in January 2018 after 57 years as a professional. Thanks, MSM."

1964

Alan Kamp, CE, MS CE'66: "Illa and I are 50 percent owners of Branson Scenic Railway, which celebrated its 25-year anniversary in July 2018."

Michael Meehan, ChE: "Sue and I are enjoying retirement in Wake Forest, N.C."

1965



David Bergt, EE: "After 37 years tracking down

oil fields all over the world for Schlumberger, I retired in 2002 for a life of ease. Sixteen years later, I'm still working, now as an oil and gas consultant. Why? After fostering 33 kids through the years, my wife Jeannine and I decided to adopt a few when we were still in our early 60s. Now we're both 75 and for the second time we have teenagers, school registrations, Little League baseball games, proms and if I remember right, college somewhere ahead and coming soon. It keeps us young, and we'd do it all again, exactly the same."

Vibhakar R. Dave, MS Phys: "Glad to know about the progress of my alumni university."

1968

Jerry Thiessen, ChE, MS EMgt'74: "I had a great time with classmate **Ed Palmer**, ChE'68, visiting the AIChE students in April."

1969

Narong Yoothanom, PhD EE: "I had a chance to see my advisor, Prof. **Gabriel Skitek**, and his family 20 years ago. It was a splendid moment, indeed. After graduation, I joined the Chulalongkorn University in Bangkok, Thailand, served as the dean of the faculty of engineering for four years and served as a member of the University Council for eight years. After retirement in 2002, I joined the Sripatum University, a large private university in Bangkok, first as the



Fran Dunaway, Psyc'83, co-founder of women's undergarment company TomboyX, was featured in a 2018 Inc. 5000 article titled "Forget Amazon: These Are the 10 Fastest-Growing Companies in Seattle." TomboyX is No. 2. The company reported a three-year growth rate of 2,049 percent with \$5.4 million in revenues in 2017. Dunaway (left) is pictured with her wife and TomboyX co-founder Naomi Gonzalez.

dean of engineering and later a vice president of research affairs. I have also been appointed to serve as the University Council chair of the Kanchanaburi Rajabhat University."

1970

Dennis Jaggi, ME, owner of Flatrock Energy Advisors in Oklahoma City, was featured in a July 2, 2018, article titled "Midstream's Family Affair" in *Midstream Business* with son **Ryan Jaggi**, ME'01, owner of Brazos Midstream Holdings in Fort Worth, Texas; and daughter-in-law **Cindy Jaggi**, ChE'01, a senior vice president at EnLink Midstream in Dallas.

Dan Scott, MetE: "I had a tremendous honor bestowed upon me at the recent Society of Petroleum Engineers Annual Technical Conference and Exhibition where I received this year's Drilling Engineer Award for distinguished

contributions to petroleum engineering in the area of drilling engineering. It was an honor just to be nominated, and a truly humbling experience when I received the letter from Darcy Spady, outgoing SPE president. I have been fortunate to work with approximately half of the 40-plus recipients since 1984, and I am honored to be in their ranks. Most are icons in our drilling industry. To have your name in such distinguished company leaves you feeling good about people you mentored along the way and the impact you had."

1973

Donald D. Taylor, EE: "I retired after 37 years of working in system planning and system operation at Westar Energy (now Evergy after a merger with Great Plains Energy). There is no shortage of things to work on, maintaining almost 3 acres of more trees than grass."

1974

John Black, ChE, MS EMgt'80, retired as general counsel for the Springfield, Mo., city utilities in February 2018 and was elected Missouri State Representative, District 137, in November.

1977

Philip J. Boegner, ME: "After a 41-year career, I retired Sept. 1, 2018, to play more golf and travel."

1979

Dallas Kirk Lewis, Psyc, was inducted into the Northeastern Oklahoma A&M Athletic Hall of Fame in September 2018. Lewis, who played basketball at S&T, was named Female Athlete of the Year in 1979 and was the first female inducted into the S&T Athletics Hall of Fame in 1994 and the Broken Arrow Hall of Fame in 2002.

1984

Dan Engler, ME, was named chief operations officer at Graceland Fruit. He leads the company's operations and supply chain teams.

Linden R. "Linn" Evans, MinE, former president and chief operating officer of Black Hills Corp., became the company's chief executive officer on Jan. 1 and was appointed to its board of directors.

Doug Victor, PetE, was promoted to division vice president of human capital management and training for



Missionaries Jon and Carla Reinagel are pictured here with their children, Jariel, 6, Kyran, 8, and Alizah, 1. Photo courtesy of the Reinagels.

IMPROVING HEALTH IN MOZAMBIQUE

Jon, Phys'07, and **Carla**, Eng'07, **Reinagel** first traveled to the African nation of Mozambique as missionaries with Iris Ministries in 2008. They spent three years in Dondo, a community of 15,000.

After returning to the states for a few years, they are now back in Africa where they founded Equip Mozambique in 2014. The foundation supports leadership development, introduces technology and develops strategies to alleviate poverty.

They have begun several projects, including the "Fountain of Life" app, a free Christian resource that equips African churches with audio and text Bibles in multiple languages and dialects, recorded sermons and dozens of Christian books.

In 2016, the Reinagels helped found Restoring Hope sewing school to give widows and single mothers the skills to help them rise out of poverty.

"The sewing school teaches how to sew, then sells the products to pay for sewing machines for the attendees," says Jon. "When they graduate, they have a machine that they have earned with their own work."

In 2017, the Reinagels opened a Christian library, Biblioteca Beireano, and they are now developing a medical app that Jon describes as "Web MD for Mozambique with simple language and many pictures to help those who are not literate."

Learn more about the couple's work at equipmoz.org.



MUDDER-TOUGH MINERS

Five Miner alumni completed the 10-mile, 20-plus-obstacle Full Tough Mudder course in Wright City, Mo., in August 2018.

Tough Mudder is an endurance series created to test mental and physical strength within a team. The obstacles were designed by British Special Forces to trigger common fears, such as freezing cold water, extreme heights, fire and electricity.

Competing Miners include **Lindsey Dunstedter**, (right front) TComm'09; **Stephen Raper**, (center back) EMgt'85, MS EMgt'87, PhD EMgt'89; **Tara Stone**, (front row, second from left) TComm'09, MS TComm'12; **Rob Stodulski**, (back row, second from left) Psyc'97; and **Cole Thompson**, (back left) Hist'15.



SUMMER CAMPS

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CALIBRE Systems Inc. A retired senior Army officer, Victor joined CALIBRE in 2012.

1985

Mark Warner, GeoE, was named partner for Equis Group based in Singapore. He will handle management functions and fundraising activities.

1989

Wendy (Jutte) Eckman, EE, was named director of embedded controls design for Global Propulsion Systems at General Motors. Eckman joined GM in 2010 after spending 17 years with Ford Motor Co.

Steven K. Starrett, CE, dean of engineering at LeTourneau University, received the Professional Practice Ethics and Leadership Award from the American Society of Civil Engineers at the World Environmental and Water Resource Congress.

1990



Shannon Lambert, CE, MS CE'95, was named chief operating officer at Barge Design Solutions Inc. He previously served as director of the firm's Water Services Business Unit.

Lisa Lang, EMgt, PhD EMgt'96, president of the Science of Business consulting firm, received a Lifetime Achievement Award from the Theory of Constraint International Certification Organization (TOCICO).

Dave Masterson, EMgt, MS EMgt'93, was appointed general manager of Shelter Works in St. Louis. The company designs and manufactures fiberglass equipment shelters, enclosures and pre-fabricated buildings.

Bob Woodley, EE, MS EE'97, PhD EE'04, returned to S&T as an assistant teaching professor of electrical engineering after co-founding Triplet Tech Corp., which offers new technology and software solutions. He taught computer engineering and electrical engineering at S&T as an adjunct professor and previously served as principal scientist and director of scientific research for 21st Century Systems Inc. Woodley will focus on advising undergraduates, recruiting new students and senior design.

1991

Joseph Graf, EE, MS EE'92: "I am writing to provide some good news. I have been named a fellow at Rockwell Collins. It's always good to see how the alumni excel in this highly competitive marketplace."

Adam Watson, CE, recently took over as an area engineer for the western counties of the Missouri Department of Transportation's Northwest District office. He has been with MoDOT for nearly 30 years and says his focus is on safety.

1992

John Wagner, NucE, director of nuclear energy research, development and demonstration at Idaho National Laboratory, was featured in an article about the future of nuclear energy in an Oct. 30, 2018, issue of the *Idaho State Journal*.

1996



Gary Greene, CE, MS CE'05, PhD CE'06, associate professor of civil engineering at Trine University, received the Asphalt Pavement Association of Indiana's inaugural Outstanding Asphalt Industry Educator Award. Photo courtesy of Dean Orewiler/Trine University

1997



Jason Kirk, MS EMgt, a U.S. Army colonel, completed a three-year command of the

Jacksonville District U.S. Army Corps of Engineers. He led response and recovery efforts for hurricanes Matthew, Irma and Maria across Florida and Puerto Rico. He planned to retire in fall 2018 after 25 ½ years of service to settle in northeast Florida with his family.

1998

Keith Juedemann, CE, MS CE'08, was named vice president of sales and engineering at Valley Joist + Deck, an independent steel company that manufactures steel joist and deck product systems.

1999



Todd Hunt, ChE, a senior project manager in Burns & McDonnell's Construction Design-Build group, was promoted to principal.

2002



Seth Hanebutt, ME, manager of projects for Burns & McDonnell's Food and Consumer Products group, was promoted to principal.

Michael Puro, CE, president of Tri-States Operation for Poepping, Stone,



FUTURE MINERS

1. **Andrew Baughman, EE'04, MS EE'06,** and his wife, **Tessa (Russell) Baughman, ME'04, MS ME'06,** had a boy, Ollivander Christian, on Aug. 14, 2018.

- 2. **Christina Bockman, BSci'07,** and her husband, Sean, had a girl, Brooke Elizabeth, on Sept. 17, 2018.
- 3. **Taylor L. (Lenox) Dillon, EnvE'13,** and her husband, Nathan, had a boy, Levi Hamilton, on Aug. 12, 2018.
- 4. **Christopher Hutson, EE'07, MS EE'11,** and his wife, Brietta, had a girl, Maran Mae, on Sept. 11, 2017. Maran's uncle is **Derek Schluender, ChE'07.**
- 5. **Scott Marlin, CE'14,** and his wife, Rachel, had a girl, Rosalie, on June 21, 2018. Rosalie's grandfather is **Ron Marlin, CE'86.**
- 6. **Drew Taylor, MinE'10,** and his wife, **Ashley (Smith) Taylor, Bus'11,** had a boy, Derek Kenneth, on June 27, 2018.



KAVANDI NAMED TO ASTRONAUT HALL OF FAME

Photo credit: Gus Chan/The Plain Dealer

Veteran astronaut **Janet Kavandi**, MS Chem'82, has logged more than 33 days in space and orbited the Earth 535 times. This spring she was inducted into the United States Astronaut Hall of Fame in a ceremony at Kennedy Space Center Visitor Complex in Florida.

Kavandi, director of NASA's John H. Glenn Research Center in Cleveland, was selected as a NASA astronaut in December 1994 as a member of the 15th class of U.S. astronauts. She is a veteran of three space flights, serving as a mission specialist on STS-91 in 1998, STS-99 in 2000 and STS-104 in 2001.

Bach and Associates Inc. in Quincy, Ill., was featured in the Quincy *Herald-Whig's* 2018 20 Under 40 list.

Joshua Steele, GeoE, a U.S. Army captain who was killed in 2007 by a roadside bomb in Panjway, Afghanistan, was honored by U.S. Rep. Cheri Bustos of Moline, Ill. Bustos introduced legislation to rename the Alpha, Ill., post office as the Capt. Joshua E. Steele Post Office.

2003



Jeff Conar, MS CE, joined SM&E Inc. in Nashville as project manager. He previously served as director of civil engineering for Southern Land Co.

2004

James Duehning, CE, MS CE'13, a program manager for Burns & McDonnell, relocated to central Florida to help open a local office to support a capital improvement project from an Orlando utility. He was featured in the *Orlando Business Journal's* 2018 list of 40 Under 40 honorees.

Nicole Galloway, Econ, Math, was elected in November to a four-year term as Missouri

auditor. Former Gov. Jay Nixon appointed Galloway to the post in 2015 after the death of the former state auditor.

2005

Christian Dietz, MS EMgt, a lieutenant colonel in the U.S. Army Corps of Engineers, assumed command in July 2018 of the Corps' Walla Walla District. Over the years, he has served in many locations, including Germany, South Korea and Saudi Arabia. His

previous position was executive officer to the operations director, assistant chief of staff for Installation Management at the Pentagon in Washington, D.C.

2006

Lynell Gilbert-Saunders, PhD Chem, an associate professor of chemistry at Missouri Southern State University, received the 2018 Governor's Award for Excellence in Education.

2009



Tyler Johnson, Hist, BSci, was named an assistant director of admissions at Missouri S&T on May 1, 2018.

2010

Adam Stumpf, ME, owner of Stumpy's Spirits in Columbia, Ill., was featured in an article about St. Louis-area distilleries that grow all their own grains in the Sept. 21, 2018, issue of *FEAST Magazine*. The article notes that Stumpf started brewing beer as an engineering student at S&T.

2014



Ruili He, PhD CE, joined New England engineering firm Fuss & O'Neill as senior structural engineer. She specializes in bridge design and analysis.



Andrew R. "Drew" Shontz, GeoE, a principal engineering geologist with ECS Mid-Atlantic LLC, was promoted to vice president with the ECS Chantilly office, where he has worked since 2001.

2015



Dustin Pope, MS EMgt, an eight-year U.S. Army veteran who most recently managed facilities at Fort Hood, Texas, is now a project manager at Freese and Nichols' Treatment, Transmission and Utilities Group.



Danielle West, PhD Chem, joined the faculty of Southwest Baptist University as an assistant professor of chemistry. Photo courtesy of Southwest Baptist University.

2017

Dajae Williams, EMgt, a manufacturing engineer at the NASA Jet Propulsion Laboratory, served on the "They Got Now" panel at the Black Enterprise TechConnex Summit held in San Francisco in October.

2018

Shelby Robertson, CE, joined Hanson Professional Services Inc.'s Kansas City office as a railway civil designer. □



In August 2018, 27 S&T alumni and many spouses vacationed together for nine days at Glacier, Waterton and Banff National Parks. All alumni are Sigma Tau Gamma fraternity brothers. Those attending were: **Barry Baiotto**, NDD; **Carol (Schaffer) Beckman**, widow of **Steve Schaffer**, EE'75; **Art Bell**, ChE'72; **Bob Bellm**, ME'74; **Dave Birenbaum**, CE'78; **Ken Cropp**, CE'74; **Mark Evertowski**, ME'75; **Alan Funke**, NDD; **Gary Gerhard**, PetE'68; **Mike Gronek**, MinE'79; **Randy Hughes**, ME'76; **Bob Kostelnik**, ME'75; **Greg Kotys**, MetE'70; **Jim Martin**, AE'75; **Dave May**, EMgt'82; **Bryan McWeeney**, AE'72; **Mark Middendorf**, GGph'74; **Paul Moots**, ME'72; **Steve Moss**, ME'76; **Robin Murphy**, CerE'76, MS CerE'78, PhD CerE'85; **Sal Pagano**, PetE'73; **Darrell Robb**, NDD; **Rick Sauerwein**, CE'74; **John Scheumbauer**, GGph'74, MinE'75; **Mark Sicking**, AE'72; **Paul Sicking**, Math'76; and **Matt Stone**, PetE'81.

ERICKSON NAMED CURATORS' DISTINGUISHED TEACHING PROFESSOR

Kelvin Erickson, EE'78, MS EE'79, professor and former chair of electrical engineering at S&T, was named Curators' Distinguished Teaching Professor during commencement ceremonies in December.

Erickson first joined Missouri S&T in 1978 as a graduate research assistant in the Cloud Physics Research Center while working toward his master's degree. After earning his Ph.D. from Iowa State University, he later returned to the S&T faculty.

His research focuses on manufacturing automation, programmable logic controllers, plant-wide process control, model-based predictive control and system identification, and he is largely responsible for his department's program in factory automation and control and programmable logic controllers.



MINERS REMEMBERED

Missouri S&T Magazine will announce deaths when information is submitted by an immediate family member or published in a newspaper obituary. Notification of deaths that have occurred more than two years before the date of publication will not be published unless a special request is made by a family member. Yearbook photos, if available, will be included for alumni when families submit obituary information. Due to the production time required for each issue, submissions may take up to six months to appear. Your patience is appreciated.

of Theta Xi fraternity, Tau Beta Pi and Blue Key, played football for the Miners and was a member of the Jackling Jocks. Mr. Coolbaugh was retired from Vulcan Materials. (May 19, 2018)

John H. Kiesling, NDD, was a member of Pi Kappa Alpha fraternity. (Feb. 11, 2018)

Llewelyn N. Lodwick, ME (Feb. 7, 2017)



Edgar Thielker, ChE, was a member of Sigma Nu fraternity, Alpha Chi Sigma and Student Council and was on the Miner swim team. He served in the U.S. Army Air Corps and was retired from DuPont. (Sept. 23, 2018)

Donald Vandeven, EE (July 14, 2018)

1951



Raymond F. Cathcart, MS MetE, served in the U.S. Army, then went to work for Dow Chemical, retiring in 1983. After retirement, he founded a small bookkeeping firm. He was active in community theater as an actor, director and fundraiser. (Sept. 22, 2018)

there until retirement. (Jan. 24, 2018)



Alfons F. Uriwal, MetE, was a member of Sigma Nu fraternity and Student Council. A World War II Army Air Corps veteran, he received the Distinguished Flying Cross. Mr. Uriwal worked as a metallurgist and retired from General Dynamics tank division in 1989. (Oct. 10, 2018)

1950

Donald A. Branson, ChE (Feb. 24, 2018)



William E. Coolbaugh, MetE, was a member

1940

Charles P. Sturgis, EE (Oct. 20, 2018)

1941

Wayne J. Bennetsen, EE (July 11, 2018)

1942

Rex Hopkins, CE, participated in track and field. Mr. Hopkins served in the U.S. Army Air Corps during World War II and then worked as a professional engineer in private firms before joining the Missouri Department of Transportation in Springfield, Mo. He retired in 1983. He also worked as a surveyor and was the first chief of the Dunnegan, Mo., Rural Fire Department. (June 21, 2017)

1943

Leo Higley Jr., ME (July 19, 2018)

1944

Mitchell Azar, NDD (Feb. 5, 2018)

Robert W. Jamison, EE (Jan. 25, 2018)



Thomas J. Mazzone, ME, was a member of Phi Kappa Theta fraternity and retired as a design engineer with Ford Motor Co. (Dec. 2, 2017)

1947

Samuel H. Lyle, CE (July 17, 2018)

1948

Robert H. Appelbaum, GGph (Sept. 6, 2018)

Gerardo Joffe, MinE (July 9, 2018)

Pranlal G. Sheth, MS MinE, PhD MinE'53 (July 26, 2018)

1949



Charles W. "Bill" Bennett, ME, was a member of Sigma Nu fraternity, Tau Beta Pi, and choir and orchestra and was editor of the *Missouri Miner*. He served in the U.S. Army, working with the Army motion picture service in Germany. Mr. Bennett's mechanical engineering degree combined with radar repair experience from the Army landed him a job at IBM. He retired as an engineer with TRW Inc., then known as Space Technology Labs. He worked on the X-15 rocket plane and spy satellites, and his work was portrayed in the movie "The Falcon and the Snowman." (Oct. 5, 2018)



Harold C. Brehe, EE, a member of Triangle Fraternity, Blue Key and the St. Pat's Board, portrayed St. Pat in 1947. He was retired from General Dynamics Corp. (March 31, 2018)



Frederick T. Crossman, ChE, was a member of Triangle Fraternity, Alpha Chi Sigma and Student Council. After earning his master's degree, Mr. Crossman began a career in education as a math and science teacher at Willsboro (N.Y.) High School. Later he served as North Country Community College's first math professor, teaching



Donald J. Dowling, ChE, was a member of Triangle fraternity, Blue Key and Alpha Chi Sigma and played football for the Miners. He served as quality manager for Buckeye Cellulose. (Aug. 15, 2018)

Richard S. Gabrielse, ME (Oct. 12, 2018)

Robert H. Seip, GGph (April 16, 2017)

1952

Walter L. Gage, MetE (July 31, 2018)

Joe W. Grant, Phys (Sept. 18, 2018)

Howard W. Nunez, CE (Oct. 12, 2018)

Merril L. Stott, ChE (June 22, 2018)



William J. "Jack" Zenik, MetE, was a member of Triangle fraternity. He served in the U.S. Army during the Korean War, then worked at Reynolds Alloys until his retirement in 1991, serving as chief metallurgist for the last 17 years of his career. (Feb. 8, 2018)

William H. Zvanut, CE (March 2, 2018)

1953

Jarvis A. Hoppler, ME (Aug. 15, 2018)



Milan Lipensky, GGph, was a member of the Independents. He spoke seven languages and served three years in the U.S. Army Air Corps. Mr. Lipensky was a professional engineer, professional blaster, mining engineer, mining geologist, mineralogist, surveyor and realtor, and he owned an extensive mineral collection. (April 14, 2018)

1954

Thomas D. Crutcher, GGph (Sept. 5, 2018)

Conrad L. Neal, EE (July 2, 2018)

1955

Kenneth C. Kahre, ME (Feb. 13, 2018)

Zygmund S. Kosakowski, CE (Feb. 18, 2018)



Melvin A. Sharp, MetE, was a member of the Independents, Blue Key and the band. He served in the U.S. Army and worked for ASARCO at the Hayden,

Ariz.; El Paso, Texas; and Helena, Mont., plants. (May 9, 2018)

1956

William W. Schramm, EE, MS EMgt'71 (July 21, 2018)

1957

Carl Macios, NDD (March 24, 2018)

Richard R. Sanders, NDD (Aug. 20, 2018)

1958

Richard R. Furrell, CE (Dec. 16, 2017)

1959

Robert L. Moore, CE (April 28, 2018)

William J. Moses, ME (June 23, 2018)

Donovan K. Schoonover, ME (June 23, 2018)

Norman E. Winkler, CE (Dec. 10, 2017)

1960

James D. Coffman, EE (Oct. 27, 2018)

Donald A. Nenninger, EE (March 29, 2018)

1961

Ronald I. Bobbitt, CE (July 5, 2018)

Gregory A. Bruns, EE (Aug. 11, 2018)

1962

Jerry N. Cornell, ChE, MS EMgt'70 (April 13, 2018)

Marvin C. Goehman, ME (Oct. 18, 2018)



1. Dr. **Frank J. Kern**, professor emeritus of electrical engineering at Missouri S&T, died July 26, 2018. Dr. Kern, an S&T faculty member for 32 years, served in the U.S. Air Force and worked at the Oklahoma Gas and Electric Co. and the University of Oklahoma. He earned bachelor of science, master of science and Ph.D. degrees, all in electrical engineering, from the University of Oklahoma, in 1958, 1963 and 1966, respectively. Dr. Kern was a member of Sigma Xi, Tau Beta Pi, Eta Kappa Nu, Pi Mu Epsilon and IEEE. His research interests included perturbation bounds study and computer-aided design techniques for control systems.
2. Dr. **David Rich Hentzel Sr.**, professor emeritus of economics at Missouri S&T, died Sept. 12, 2018. Dr. Hentzel served in the U.S. Air Force during the Korean War. In 1967, he earned a Ph.D. in economics from Southern Illinois University and joined the S&T faculty. In his 40-year career, Dr. Hentzel specialized in money and banking, monetary policy, and economic development. In the 1980s, he collaborated in the economic revival of Cuba, Mo., and wrote *Apples and Shoes*, which detailed the economic history of the town as it evolved from its apple-growing agricultural roots to shoe factories to industrial parks. Dr. Hentzel began an innovative and controversial college education program in the Missouri state penitentiary system. He logged thousands of miles in the mid-1970s traveling from Rolla to Jefferson City weekly to teach the first college course at the prison, which later was expanded to more course offerings and eventually an early release campus program.



Karl G. Leonard, CE, was a member of Theta Xi, the Spelunking Club, Student Council, Student Union Board, the Honors Association, the Society for Mining, Metallurgy and Exploration, and the American Institute of Mining, Metallurgical and Petroleum Engineers. He was a licensed professional engineer. (June 13, 2018)

Allan N. Sheppard, Math (Aug. 8, 2018)

1963

Theodore J. Dressel, CerE (July 30, 2018)

Clifford E. Miller, CE (July 15, 2018)

Ross H. Pfeffer, NDD (Sept. 23, 2018)



George R. Schillinger, CE, was a member of Phi Kappa Theta, Blue Key, Chi Epsilon, the Newman Center, the American Society of Civil Engineers and the Residence Hall Association. He worked for Southwestern Bell Telephone in Oklahoma, the Kansas City District Corps of Engineers and the Department of Commerce. After retiring, he started a home-inspection business in Kansas

1964

Hardin T. Abrams II, EE (July 27, 2018)

Donald R. Eagleman, Math (June 28, 2018)

Gunther A. Helm, CE, was a member of the Independents, Blue Key, Chi Epsilon and the band and worked on the *Rollamo*. He served in the U.S. Army Corps of Engineers 1955-75, retiring as a decorated lieutenant colonel. Later, Mr. Helm became a licensed professional engineer and worked until 1989 as a quality control nuclear engineer for Virginia Electric and Power Co. (Aug. 21, 2018)

Ronald C. Wittenauer, CE (Sept. 25, 2018)

1965

Richard H. Belz, ME (Oct. 13, 2018)



Ronald A. Rusch, CE, MS CE'69, was a member of the Pershing Rifle Drill Team, the Independents, the Newman Center, Army ROTC, Student Council, the American Society of Civil Engineers and the Residence Hall Association. He worked for Southwestern Bell Telephone in Oklahoma, the Kansas City District Corps of Engineers and the Department of Commerce. After retiring, he started a home-inspection business in Kansas

City. He was active in the American Society of Home Inspectors, serving a term as national director. (July 17, 2018)

James I. Sparks, ME (Sept. 4, 2018)

1966

Francis J. Cuzze III, EE (July 17, 2018)

William C. Ford, CE, MS CE'72 (Sept. 15, 2018)

Frederick Gronlund, MinE (March 2, 2018)



Clyde R. "Bob" Hensley, ME, was a member of the Society of Automotive Engineers. He served in the U.S. Army in Korea then began his career with Cities Service Gas Co. Mr. Hensley retired from the Williams Companies as manager of gas control in 1995 and became active in the Oklahoma film industry, appearing in several independent films. (July 8, 2018)



James B. "J.B." Peterson, EE, was a member of the Independents, Intercollegiate Knights, Student Council, Tau Beta Pi, Phi Kappa Phi, Eta Kappa Nu, Phi Eta Sigma and Student Council. He served in

the U.S. Air Force for 20 years, retiring as a lieutenant colonel in 1986. Mr. Peterson was director of the Tomahawk Missile program for McDonnell Douglas, vice president of engineering and retired vice president and general manager of Boeing Phantom Works. In 1994, he received an Award of Professional Distinction from S&T. (Aug. 5, 2018)

Howard H. Sussman, EE (Aug. 23, 2018)

1967

William R. Jones, ME (Oct. 4, 2018)

James E. Riggs, MS Math, taught high school math for 31 years, including algebra, trigonometry and physics, at East Prairie, Mo. He later served as assistant principal at East Prairie High School. (April 5, 2018)

Victor H. Simon, Phys (May 20, 2018)

Van A. Weissflug, EE (May 20, 2018)

1968

Richard E. Sharp, CE, MS CE'69 (Aug. 27, 2018)

Donald J. Vejvoda, EE (Jan. 26, 2018)

1969

Gerald W. Rister, ME (Aug. 25, 2018)

1970

Stephen R. Close, ChE (July 18, 2018)

John L. Mundwiller, CE (Aug. 15, 2018)

Raymond C. Swoboda, ME (Sept. 29, 2018)

William M. Vogel, MS CE (June 20, 2018)

1971

Roger D. Parkes, EE (Oct. 1, 2018)

1973

Philip B. Weddle, CE, MS CE'76 (June 15, 2018)

1974

John G. Walsh, EE (Sept. 30, 2018)

Stanley T. Yount, ME (June 28, 2018)

1975

John M. "Mike" Land, Chem (Sept. 13, 2018)

John T. Sickman, CE (June 17, 2018)

1978

Nicholas S. DeLarber, Engl (July 2, 2018)

1983

Marina Angela Arizpe-Jones, EMgt (Aug. 19, 2018)

1984

Christopher E. Pope, ChE (June 12, 2018)

1985

Robin Ann Crowley, EMgt, was a member of the American Society of Engineering Management. (Sept. 24, 2017)

1986

Kenneth Omer Zerkel, EMgt (July 31, 2018)

1987

Bradley Jaye Cash, CE (May 28, 2018)

1992

Scott Brunk, EE (Sept. 15, 2018)

1995

Darrell E. Roberts, MetE (Sept. 25, 2018)

Jeffrey Smith, CE (Sept. 4, 2018)

1996

Richard William Budinger, MinE (June 27, 2018)

Richard Lee Marsh, EMgt (Sept. 22, 2018)

2006

Tavis Bryant Galantowicz, EE (March 7, 2018)

FRIENDS

Virginia Aml, wife of the late Harold Aml, CE'43 (Dec. 29, 2017)

Herbert Baden (Sept. 26, 2018)

Charlotte Bayer (July 4, 2018)

Carolyn Becker, wife of the late Alan A. Becker, MS CE'49 (April 27, 2018)

Helen M. Berger, wife of the late Frank C. Berger, PetE'51 (Feb. 1, 2017)

Andy Chaloupka (April 23, 2017)

Carol Clark, wife of the late Larry G. Clark, CSci'65 (July 17, 2017)

Betty W. Creech (Feb. 6, 2018)

Laurie Durbin (July 17, 2018)

Ruth Dutton, wife of the late Donnell Dutton, ME'35 (Sept. 4, 2018)

Jindra Dvorakova (Sept. 21, 2018)

June Edwards, wife of Charles L. Edwards, ME'57, MS ME'60, associate professor emeritus of mechanical engineering at Missouri S&T (July 10, 2018)

Shirley Elaine Emling, wife of Dale Henry Emling, MinE'54 (Sept. 24, 2017)

David V. Eppelsheimer (Oct. 8, 2018)

Lance Corbett Feyh, former communications specialist in marketing and communications who served as associate editor of *Missouri S&T Magazine* (July 12, 2018)

Charles R. "Ray" Gilliam, former member of the S&T custodial and landscaping services staff (Sept. 17, 2018)

Marie Happel (Aug. 29, 2018)

Sandra Hatchett, wife of the late James A. Hatchett, former S&T security guard (Aug. 27, 2018)

Peggy Stevens Hill (Oct. 2, 2018)

Clarence Hodge (Oct. 14, 2018)

Ruby Hufstедler (Aug. 6, 2018)

Donald Johnsen, retired custodian at Missouri S&T (Oct. 8, 2018)

Mae Karnes (July 20, 2018)

Nancy Mengel, wife of the late William K. Mengel, MinE'50 (July 7, 2018)

Marlan Dieth Montgomery, retired custodian at Missouri S&T (July 21, 2018)

Hugh Anthony O'Connor, who earned a graduate certificate in mining engineering in 2014 (July 22, 2018)

Anna Ratcliff, wife of the late John J. Ratcliff, CE'49 (Aug. 29, 2018)

Sandy Sands (March 14, 2018)

Betty Schowalter, wife of the late Kenneth A. Schowalter, ChE'42 (Dec. 21, 2017)

Robert F. Schramm, father of **Jeff Schramm**, Hist'92, associate professor of history and political science at Missouri S&T (Aug. 23, 2018)

Edna Solomon, wife of the late Russell Solomon, MetE'35 (July 6, 2018)

Steven Wayne Swiney, a junior in computer engineering at Missouri S&T (July 6, 2018)

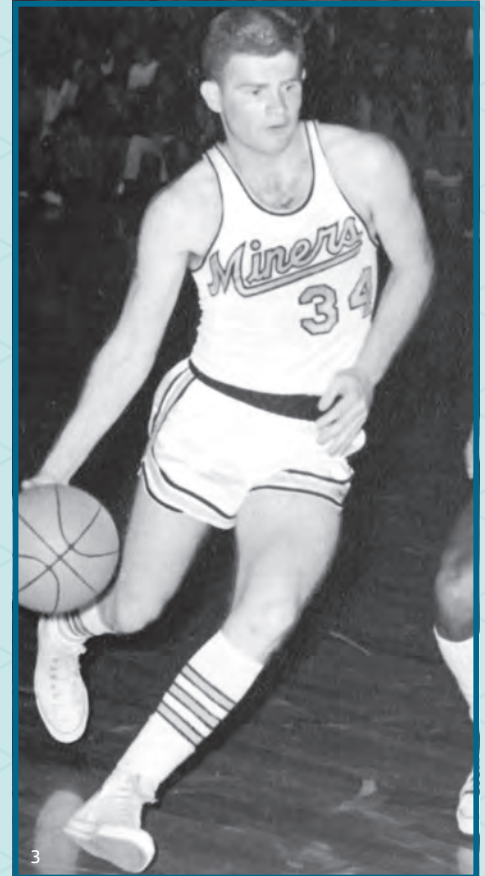
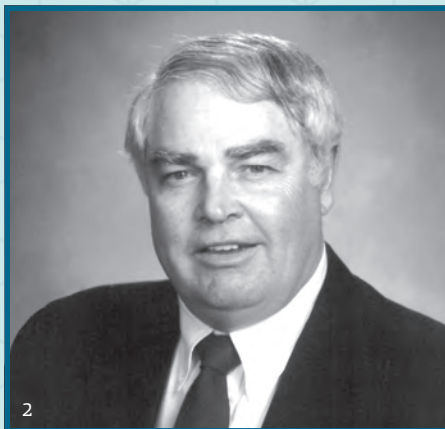
John R. Weber, retired power plant operator at Missouri S&T (July 15, 2018)

Hilbern O. Whitson (July 19, 2018)

Kathleen Wieland, wife of the late Warren R. Wieland, CE'50 (Oct. 26, 2017)

Stella Yiannos, wife of the late Peter N. Yiannos, ChE'56 (May 23, 2018)

Ida Vay Ponzer, wife of Henry L. Ponzer, CE'60 (Feb. 6, 2018) ■



1. **Dr. Edward E. Hornsey**, MinE'59, MS MinE'61, PhD MinE'67, professor emeritus of basic engineering and engineering mechanics at Missouri S&T, died Sept. 27, 2018. He served on the faculty for over 30 years, and also briefly served as director of admissions.

After earning bachelor of science and master of science degrees at Missouri S&T, Dr. Hornsey joined the U.S. Bureau of Mines. He later returned to S&T to earn a Ph.D. and joined the university's faculty in 1967. He retired in 2001.

While at S&T, Dr. Hornsey co-wrote three editions of the university's materials testing laboratory manual and developed several software programs used in materials testing courses. He was a member of the Missouri Society of Professional Engineers and served as president of the society's Rolla Chapter from 1976 to 1977.

2. **Joe Keeton**, former Missouri S&T coach and member of the Miner Athletic Hall of Fame, died Oct. 5, 2018. Mr. Keeton spent 22 years on the coaching staff at S&T, serving as head coach of the university's wrestling program for 17 years and head coach of the track and field programs for two seasons. He also served as the offensive line coach for Miner football during the 22-year span. Mr. Keeton was named Missouri Intercollegiate Athletics Association "Coach of the Year" in wrestling and, while serving on the

football staff, helped lead the Miners to three MIAA football championships. The Miners won MIAA titles in 1977, 1980 and in 1983. Mr. Keeton was inducted into the Miner Athletic Hall of Fame in 2015 as an individual and is also a member of the Hall of Fame with the three aforementioned championship football teams.

3. **Randy Vessell**, Eng'69, a former basketball player for the Miners and member of the Miner Athletic Hall of Fame, died Friday, Oct. 12, 2018. Mr. Vessell led the Miners in scoring in each of his final three seasons. In his final season, he became the fifth player in program history to reach the 1,000-point mark for his career and finished his playing days as a Miner with 1,063 points. He was a two-time all-conference selection in the Missouri Intercollegiate Athletic Conference and also served as a team captain and earned the team's most valuable player honors in his last two seasons. Upon graduation, Mr. Vessell joined the U.S. Army and then had a 31-year career as an assistant professor in the parks, recreation and tourism department at the University of Missouri-Columbia. During his professional life, he continued to serve as a member of the Missouri Army National Guard. In 1989, Mr. Vessell was inducted into the Miner Athletic Hall of Fame.



Carey Bottom, who began routine lap swimming after the loss of his wife, is pictured at the nearby natatorium on the Indiana University - Purdue University Indianapolis campus, where many U.S. Olympic and national championship swimming and diving trials are held.

Photo by Liz Kaye

INSPIRING THE NEXT GENERATION OF CHEMISTRY PIONEERS

Carey Bottom, Chem'72, MS Chem'75, PhD Chem'79, chose Missouri S&T because it was close to home, strong in science and relatively small. "I wasn't keen on big universities," says Bottom, who grew up in Waynesville, Mo. "At smaller schools, you're more connected to professors. You can roll up your sleeves and get involved."

And that's exactly what happened in a chemistry special projects course one summer.

"That class had a huge influence on my career," says Bottom. "I had the chance to conduct research under the guidance of a biochemistry professor."

Bottom spent the summer and beyond studying a mysterious purple compound excreted by a fungus — an anomaly because the excretion was usually yellow. "It took years to isolate and characterize it, with instrumentation

much less advanced than today," says Bottom, who published his findings as a young research chemist in the journal *Phytochemistry* in 1975.

Last year Bottom established the Carey and Christine Bottom Endowed Scholarship for Undergraduate Research in Chemistry. This past summer, the first recipient, **Rachel Nixon**, a junior chemistry major, spent 10 weeks conducting research on DNA nanostructures with the potential to deliver anti-cancer drugs to target cells.

"I'm very thankful for Dr. Bottom's support," says Nixon. "It allowed me to concentrate on my research."

Bottom was pleased to see his gift's impact.

"I'm proud to support Rachel's work, especially since it has applications in cancer drug delivery," says Bottom, whose wife, Christine, died of a rare form of cancer in 2013. "Students jump to a

new level when they have the freedom to learn through research. That's how I found my calling."

After finishing his Ph.D., Bottom joined Bristol-Myers and went on to a 35-year career, primarily in the pharmaceutical industry. He worked for Marion Laboratories and Schering-Plough before leaving Big Pharma for the startup sector, where he guided a number of emerging companies before retiring in 2014.

Bottom holds U.S. patents, has published widely in scientific journals and was honored by the Food and Drug Administration with the Commissioner's Special Citation.

"The FDA award was a big deal and hugely beneficial to the pharmaceutical industry," says Bottom, who led a study of a gelatin capsule quality problem. "I and a colleague in Switzerland were the first 'civilians' (non-FDA employees) to receive the award."

Sara McCauley (pictured below), a junior in chemistry who plays violin, and **Chloe Wisser**, who plays viola, performed "Three Duets for Violin and Viola" by Ludwig van Beethoven, arranged by Hermann Pagels, during the 2019 Performing Arts Showcase, held on March 7 at Leach Theatre.





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