Missouri S&T Magazine Fall/Winter 2017

Missouri S&T Marketing and Communications Department

Miner Alumni Association

MISSOURI S&T MAGAZINE
FALL/WINTER 2017 VOL. 91 NO. 3

OUT OF THIS WORLD

MARS ROVER DESIGN TEAM BRINGS HOME INTERNATIONAL WIN

MISSOURI S&T MAGAZINE
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The HEART of campus is where memories are made.

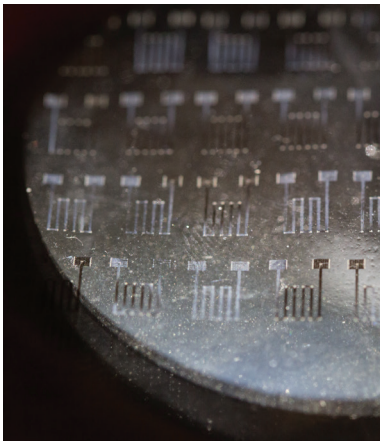
From the Student Union Building to the University Center to the Havener Center, Miners have been coming together for almost a century and a half to study or simply unwind.

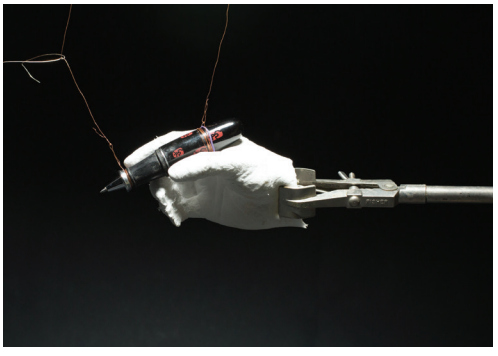
A lot has changed over those years but one thing remains the same:

The heart of campus is **you!**

As you consider your year-end giving decisions, we hope you'll remember the Miner Alumni Association. Your tax-deductible gift will make a difference — and make memories — for Miners today, tomorrow and for generations to come.

mineralumni.com/give





ON THE COVER

The Missouri S&T Mars rover, *Gryphon*, on the course at the 2017 University Rover Challenge. Photo by Mars Rover Design Team member **Kevin Verhofstad**.

AROUND THE PUCK

FEATURES

BEYOND THE PUCK

MISSOURI S&T BY THE NUMBERS

8,884

Students enrolled at Missouri S&T during the 2017 fall semester, which began in August.

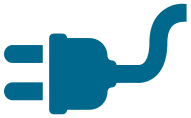
3.88

Average high school GPA of Missouri S&T's fall 2017 incoming freshmen.

2

S&T Formula SAE Team's finish out of 78 teams racing in Nebraska's Formula SAE-Lincoln this past summer.

4



S&T Formula SAE Electric Team's place at Formula SAE-Lincoln. The team took first in efficiency and second in cost.

8

S&T Solar Car Design Team's finish in the Formula Sun Grand Prix held in Texas in July.

2

Missouri S&T's Rocket Design Team's place among university teams competing in the nation's first Spaceport America Cup in June. S&T received the James Barrowman Prize for the most accurate flight prediction.

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

Make us laugh

What is the funniest incident or story you recollect from your time in Rolla?

*Historian **Larry Gragg**, Curators' Distinguished Teaching Professor emeritus of history and political science, recently posed this question to our readers and on social media. Here are a few of your answers.*

In 1969 the Miners won their Homecoming game. The crowd was so shocked that they began to boo rather than cheer.

The reason was that we students didn't know how to celebrate a victory, but we did know how to drown our sorrows.

Lee Austin, CE'71
Libertyville, Ill.

In 1965, to retaliate for an earlier firecracker attack by graduating seniors, done while we slept, my roommate and I planned a counter-attack.

A few days after the attack, at 3 a.m., we snuck into their house. Since their room was locked, we went to the common bathroom and planted several M-80s, suspending them with string and using lit cigarettes for fuses. We scrambled back home in time to listen to the loud explosions. In the morning, we heard that the seniors and their landlady were literally blown out of bed. Lesson taught: don't mess with UMR undergrads.

Larry Mikelionis, ChE'67
Johnsburg, Ill.

I was using the phone booth behind the movie theater on the main drag to call a girl to talk about an upcoming party weekend.

The telephone operator said, "Put your money in." I said, "I already put my money in." She said, "I didn't hear the phone go 'ding ding.'" I said, "I did put my money in." She said, "Do you expect me to believe that?" I replied, "I'm at a booth across the street from the phone company. Come across the street and see for yourself." She did and a bunch of other telephone operators were looking out the window to see history made. We put some money in, it didn't go "ding ding" and she gave me credit for what I put in. I talked my telephone operator into getting in the phone booth with me. That would have been my *Jeopardy!* story if I ever made it on to the show. That was one of the strangest things to happen to me at Rolla.

Richard Starke, MetE'71
Manteca, Calif.

SAVE-THE-DATE

All alumni, friends and guests are invited to attend the 110th St. Pat's pre-parade party on Saturday, March 17, 2018, at Hasselmann Alumni House, located at 1100 N. Pine St. Complimentary breakfast items will be served before the parade, along with a cash bar featuring beer, bloody marys and mimosas. Make plans to travel to Rolla for St. Pat's or attend one of the section events in your area. Help make the 110th celebration the Best Ever.

TO THE EDITOR

I just wanted to say that I was really excited to see the Missouri S&T alumni articles that focused on Miners in medicine! I graduated in 2008 with a degree in chemistry and even continued on to receive a master's in materials engineering and had a decade-long career in engineering at Boeing. I've talked to SO many Rolla alumni who now work in a huge variety of medical fields — obstetrics, occupational therapy and physician assistants — who continue to speak of their studies at S&T as laying a strong foundation for their medical studies. So when you posed the question, "Why don't we see more alumni doctors?" Well … there are a ton in the neighboring fields for sure. I'm now a physician assistant student at Saint Louis University. We have another Rolla grad in my class and the one ahead of us, and a couple in our faculty, including our program director. We always field a ton of questions about the change from engineering to medicine, and I've noticed that while I haven't studied traditionally in nearly 10 years, that foundational ability to learn, be inquisitive and find solutions is still as strong as ever, in addition to being resilient when it comes to the heavy course load that feels familiar as opposed to foreign. As a nontraditional student in her 30s (parent, career changer, etc.), a main concern was whether I had the academic ability to keep up. Clearly having gone to Rolla makes it a non-issue. So thanks for doing some articles on this; I think it's more common than expected and it's great to see some individuals highlighted for the non-engineering path!

Emily Sloan, Chem'08
St. Louis

MINER MOVE-IN

The Miner Alumni Association rolled out the red carpet at Hasselmann Alumni House on Aug. 12 for more than 1,000 freshmen, who kicked off Miner Move-In Day with a warm welcome from alumni and staff. "We were thrilled to see the alumni house filled with our newest Miners and their families," says **Darlene Ramsay**, MetE'84, assistant vice chancellor for University Advancement and executive vice president of the Miner Alumni Association.

A LIFE OF SERVICE, AT HOME AND ABROAD

Lydia Aiken has had a longtime interest in other cultures and compassion for people from different backgrounds. And when she graduates from Missouri S&T, she hopes to carry that compassion and understanding into a career with the U.S. Foreign Service.

The U.S. Foreign Service's 15,000 professionals carry out the foreign policy of the United States and aid U.S. citizens abroad.

Aiken, a senior in psychology with an emphasis in leadership, says that Missouri S&T has prepared her well for her post-college life and career.

This past July, she participated in a two-week study abroad trip to Nicaragua. During the trip, Aiken took immersive Spanish language lessons from Nicaraguan instructors and listened to guest lectures by local experts on Nicaraguan culture, history and technology. She even helped build a cooking oven for the local community. The trip was a requirement for Aiken's global studies minor.

"If I can get on Facebook and chat with somebody that's on the other side of the world, shouldn't I know something about them and their culture?" Aiken says.

For her capstone course, Aiken took Cross-Cultural Psychology with **Merilee Krueger**, associate teaching professor of psychological science. The course reinforced Aiken's long-held belief that just because some people are different than you, it doesn't mean you should fear them.

"My mom always said that I had no fear of people who were different," Aiken says. "Your differences make you unique, so we should always try to learn those first."

Aiken realizes that the world is getting smaller, and wants to do her part to make it a more peaceful and understanding place.

> "I hope that sharing my experience will encourage more students to study abroad."

"We are an increasingly global society," she says. "I hope that sharing my experience will encourage more students to study abroad."

HOMECOMING

MINERFEST 2017

The Miner Alumni Association honored a select group of alumni during Homecoming for their accomplishments and their devotion to the association, the campus and its students.

Awardees were recognized during the Miner Legends Luncheon, and presented with commemorative football jerseys bearing their graduation year. Honorees, pictured above from left to right are:

Max Tohline, Engl'07

Robert "Bob" Pahl, ChE'68, MS ChE'70, PhD ChE'74

Christopher "Chris" Buterbaugh, MetE'07

Robert "Bob" Lankston, AE'85

Fiorella "Fio" Giana, MinE'05

David "Dave" Richardson, CE'71, MS CE'73, PhD CE'84

James "Jim" Bertelsmeyer, ChE'66

John Borthwick, PetE'86

Not pictured: **John Bade**, EMgt'85, MS EMgt'87, PhD EMgt'98

1. Sports-themed decorations adorned the tables during the Legends Luncheon.
2. Hasselmann Alumni House welcomed alumni for Homecoming.
3. Guests dined family-style on kabobs, sandwiches, salad, "tochos," house-made chips and dip, dessert, and concession snacks.
4. **Dottye Wolf** visits with friends during the Legends Lunch.
5. **Helene Hardy Pierce**, EMgt'83 (left), presents a Joe Miner statue to Homecoming awardee **Fio Giana**, MinE'05.
6. During the Legends Luncheon, "sports commentators," student improv group members **Adam Bateman** (left) and **Joseph Styczynski**, introduced the awardees.

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HASSELMANN ALUMNI HOUSE
WELCOME
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MINERS

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MINER ALUMNI
ASSOCIATION
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ALUMNI TAKE LEADERSHIP ROLES IN ASSOCIATION

During its annual Homecoming meeting on Oct. 28, the Miner Alumni Association approved the following new and returning board members:

NEW MEMBERS

John Stutsman, EE'77, Area 5

Kenneth Bandelier, EE'97, Areas 10–18

Jennifer Marshall, ME'96, Area 19

RETURNING MEMBERS

R.J. Agee, EMgt'03, director-at-large

Tessa Baughman, ME'04, MS ME'06, director-at-large

Mike Emanuel, EE'87, director-at-large

Gary Hines, CE'95, Area 6

Rich Berning, CE'69, Area 8

Rachel Jung, MBA'09, Areas 10–18

Bill McAllister, CE'76, MS CE'78, Areas 10–18

DEPARTING MEMBERS

Many thanks to the departing members of the Miner Alumni Association board of directors for their dedication and loyalty to the association and Missouri S&T:

Dan Bailey, GeoE'03, MS EMgt'05, Area 19

Jeremiah King, CE'06, Areas 10–18

1. Alumni mingle in the Bauer Bar during the Silver and Gold Gathering.
2. Guests at the Silver and Gold Gathering at Hasselmann Alumni House.
3. Joe Miner adorned the cookies served during the Legends Luncheon.
4. **Don McGovern**, ME'58, visits with fellow alumni during the Silver and Gold Gathering.
5. International students marched with flags from their home countries during the Homecoming Parade.
6. Interim Chancellor **Chris Maples** and his wife, **Sara Marcus**, ride in a 1911 Rolls Royce Silver Ghost owned and driven by **Bill Kennedy**, in the Homecoming Parade.
7. Before the football game, alumni and friends gathered for lunch at the tailgate party.
8. The Miners beat the Bearcats from Southwest Baptist University 41-38.


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FAREWELL TO JERRY BAYLESS

During Homecoming week, the civil, architectural and environmental engineering department hosted a celebration to honor **Jerry Bayless** for over 50 years of service to his alma mater. Bayless, CE'59, MS CE'62, known to a generation of Miner alumni as Mr. UMR or Mr. S&T, joined the Missouri S&T faculty in 1959 and retired this past February.

ONE STEP AT A TIME

Photo by Yun Seong Song

Yun Seong Song, an assistant professor of mechanical and aerospace engineering at Missouri S&T, wants to make walking up and down stairs easier, so he created a device that recycles the energy we use to climb and descend.

The steps could be useful during post-surgical recovery. They could also help elderly people navigate their homes more safely and avoid falls.

"When walking down, the spring in the stairs acts as a cushion and brake," says Song. "The gentle downward movement alleviates work by the trailing ankle, which is what keeps you balanced and prevents you from falling too fast on normal stairs. When going up, these springs help you by giving back the energy that was stored."

The spring-loaded stairs compress when someone comes down the stairs, saving energy otherwise dissipated through impact and braking forces at the ankle by 26 percent. When going up, the stairs give people a boost by releasing the stored energy, making it 37 percent easier on the knee than using conventional stairs. The low-power device can be placed on existing staircases and doesn't have to be permanently installed.

Each stair is tethered by springs and equipped with pressure sensors. When a person walks downstairs, each step slowly sinks until it locks into place and is level with the next step, storing energy generated by the user. It stays that way until someone walks upstairs. When a person ascending the stairs steps on the sensor on the next tread up, the latch on the lower step releases. The stored energy in the spring is also released, lifting up the back leg.

ALUMNI HONORED AT COMMENCEMENT

Two Miner alumni were honored with the Award of Professional Distinction during May 2017 commencement ceremonies. The awards recognize graduates for professional achievement. Recipients are:

Richard Bausell, ChE'70, of Chesterfield, Mo., retired vice president of URS Corp.'s Pipeline and Power Business Line.

Delores James Hinkle, PetE'75, of Houston, retired director of corporate reserves for Marathon Oil.

S&T COMPLETES SUCCESSFUL FUNDRAISING YEAR

Missouri S&T received $14.7 million in charitable gifts and pledges during the fiscal year that ended June 30.

This total for the 2017 fiscal year is a 37 percent increase over the previous fiscal year and a 45 percent increase over the $10.1 million received in the 2013 fiscal year, which serves as a baseline for the university's strategic goals.

Highlights of the past fiscal year's fundraising efforts include the largest gift ever received for S&T's Engineers Without Borders (EWB) program, a $1 million gift for scholarships, and the addition of four new Rolla Rising Scholarships, a priority funding initiative focused on strengthening S&T's recruiting flexibility.

"These charitable gifts come from donors with an abiding belief in the power of education, a deep commitment to giving back and confidence in the work of Missouri S&T," says Vice Chancellor for University Advancement **Joan Nesbitt**. "This is Miner pride and purpose in action, and we are both inspired by and grateful for their financial investments."

WLEZIEN NAMED CEC DEAN

Richard W. Wlezien, former Vance and Arlene Coffman Endowed Department Chair in Aerospace Engineering at Iowa State University and a former researcher and program director at NASA and the Defense Advanced Research Projects Agency (DARPA), became vice provost and dean of the College of Engineering and Computing on Aug. 1.

He succeeds **Richard Brow**, Curators' Distinguished Professor of materials science and engineering, who had served in an interim role since July 2016.

A RECORD YEAR FOR TECH TRANSFER

Missouri S&T set a new record for the most money generated from patent royalties on commercialized inventions and products during the fiscal year that ended June 30, with $540,396 in royalty income — more than double the amount received in 2013.

Royalties paid to inventors and authors also set a record at $187,998.

During the past year, technology transfer and economic development (TTED) staff received a record 47 invention disclosures, including five software disclosures, which is a new service TTED began providing last year. TTED filed 31 patent or copyright applications and had 14 issued patents and one registered copyright.

"Missouri S&T is ahead of our peers in terms of disclosures per million dollars of research expenditures," says **Keith Strassner**, Chem'79, TTED director. S&T's three-year average is 12.1 invention disclosures per $10 million in research expenditures. In comparison, Massachusetts Institute of Technology reports an average of 9.4 invention disclosures and Georgia Institute of Technology reports 6.2.

MATERIALS WITH MEMORY

You can bend, fold or twist this material, and it will bounce back to its original shape. Polyurethane aerogels developed at Missouri S&T have a rubber-like elasticity that allows them to "remember" their shapes.

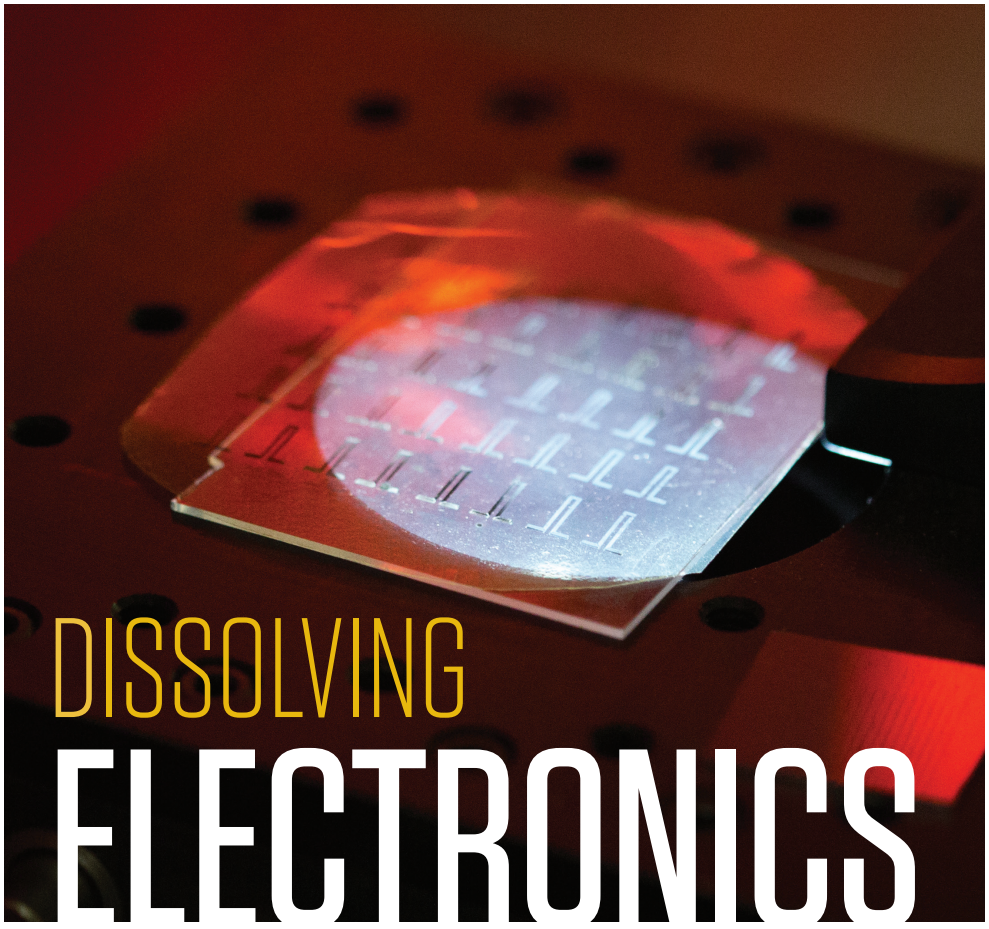
"The specific kind of polyurethane aerogels we have created are superelastic, meaning that they can be bent in any direction or be smashed flat and still return to their original shape," says **Nicholas Leventis**, lead researcher on the project and Curators' Distinguished Professor of chemistry at Missouri S&T. The strong but lightweight materials are different from rubber because they can return to a specific form on command, Leventis says. "They also show a strong shape memory effect, meaning that they can be deformed and cooled and keep the deformed shape forever."

"Their flexibility, combined with elasticity, greatly enhance the range of possible uses."

The shape memory effect is nothing new in materials science, Leventis says. Shape memory alloys and polymers have been around for years. But shape memory aerogels are new and "represent the last frontier in lightweight" materials, he says.

Leventis believes shape memory aerogels hold promise for biomimetic applications, such as prosthetic hands that can grasp and release objects. "Their flexibility, combined with elasticity, greatly enhance the range of possible uses," he says.

The research was published in the May 2 issue of the American Chemical Society journal *Chemistry of Materials.*



DISSOLVING ELECTRONICS

Electronic devices that can not only be implanted in the human body but also completely dissolve on their own — known as "bioresorbable" electronics — are one of medical technology's next frontiers.

In a study published in the journal *Advanced Materials*, S&T researcher **Heng Pan** shows that a laser printing technique using nanoparticles could lead to a more cost-effective approach to building sturdier and safer components.

Pan, an assistant professor of mechanical and aerospace engineering, is working with Xian Huang, a professor of biomedical engineering at Tianjin University in China, to use lasers to process print-ready zinc nanoparticles, then uses them to print tiny electronic components.

Pan says bioresorbable electronics (or transient electronics) that use traditional microchip fabrication methods require expensive optical patterning and vacuum deposition processes. Laser printing is far more cost-effective — but could cause adverse interactions.

The new process sinters zinc nanoparticles together through an evaporation and condensation process that avoids surface oxides. The fabricated, oxide-free zinc conductors showed high electrical conductivity, were more durable and dissolved better in water.

Co-authors with Pan and Huang are Missouri S&T mechanical engineering Ph.D. students **Xiaowei Yu**, **Wan Shou**, **Brandon Ludwig** and **Joshua Staggs**, and **Bikram K. Mahajan**, a master's student in mechanical engineering at S&T.

GOLF RETURNS TO S&T

This past fall marked the first year since 2003 that Missouri S&T fielded a men's golf team, and the first year ever for a women's golf team.

Chad Green leads the men's team. Green previously coached at Central College in Iowa. **Amy West** leads the women's team. She came to S&T from West Virginia Wesleyan College.

Oak Meadow Country Club in Rolla has an agreement with the S&T athletics department to allow the teams to practice and host tournaments at the club. Keep up with the team, and other Miner sports teams, at **minerathletics.com**.

AUTOMATED KIOSK SPEEDS TRAVEL SECURITY

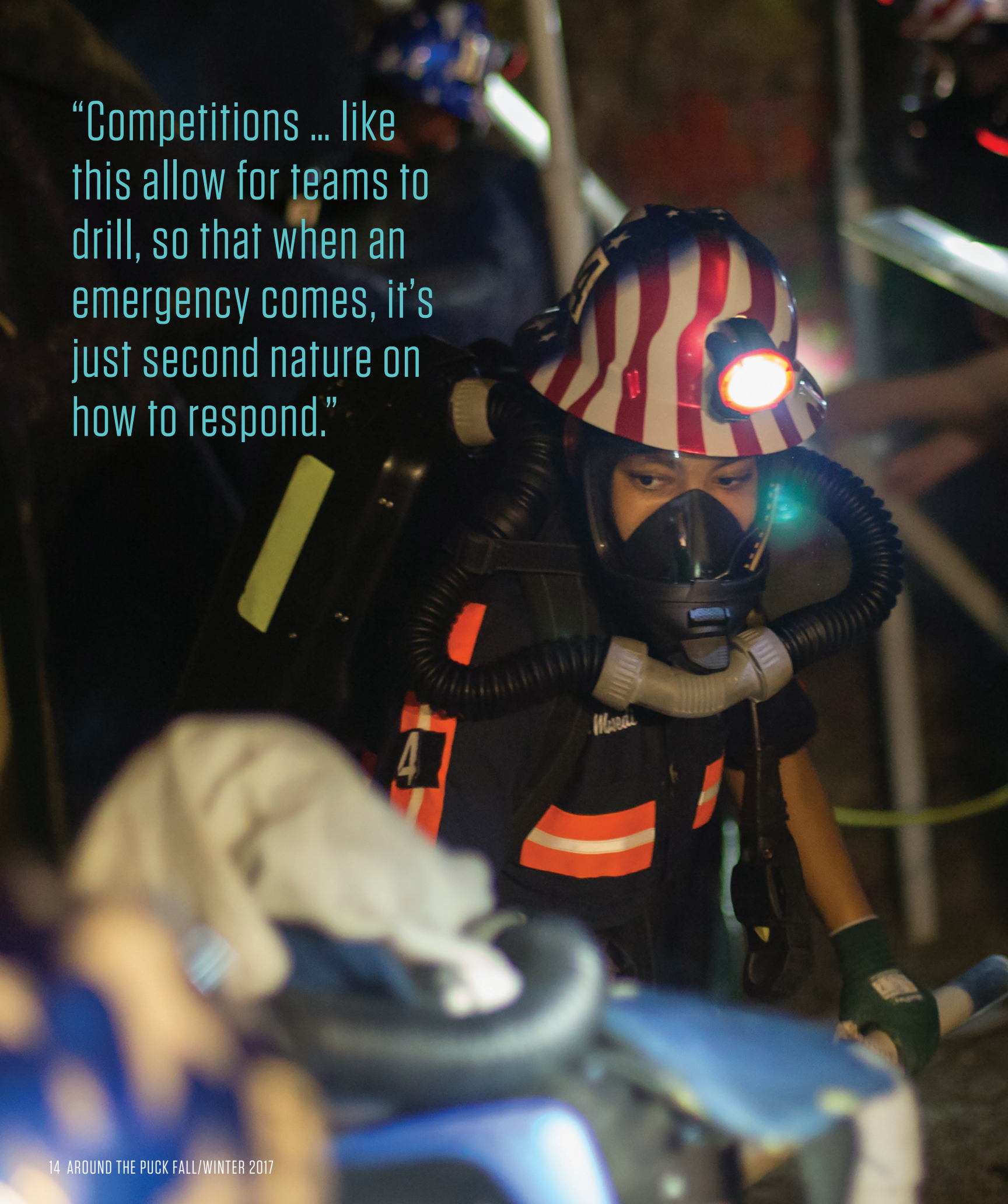
Your wait time at the airport could drop significantly thanks to a new automated security kiosk developed by **Nathan Twyman**, assistant professor of business and information technology.

The kiosk uses an algorithm of "yes" or "no" questions — like "Have you ever been arrested?" or "Have you moved in the last five years?"— delivered by a computer-generated avatar to assess potential threats passengers may pose to others. Twyman says the screening can be completed in under four minutes with a 90 percent success rate.

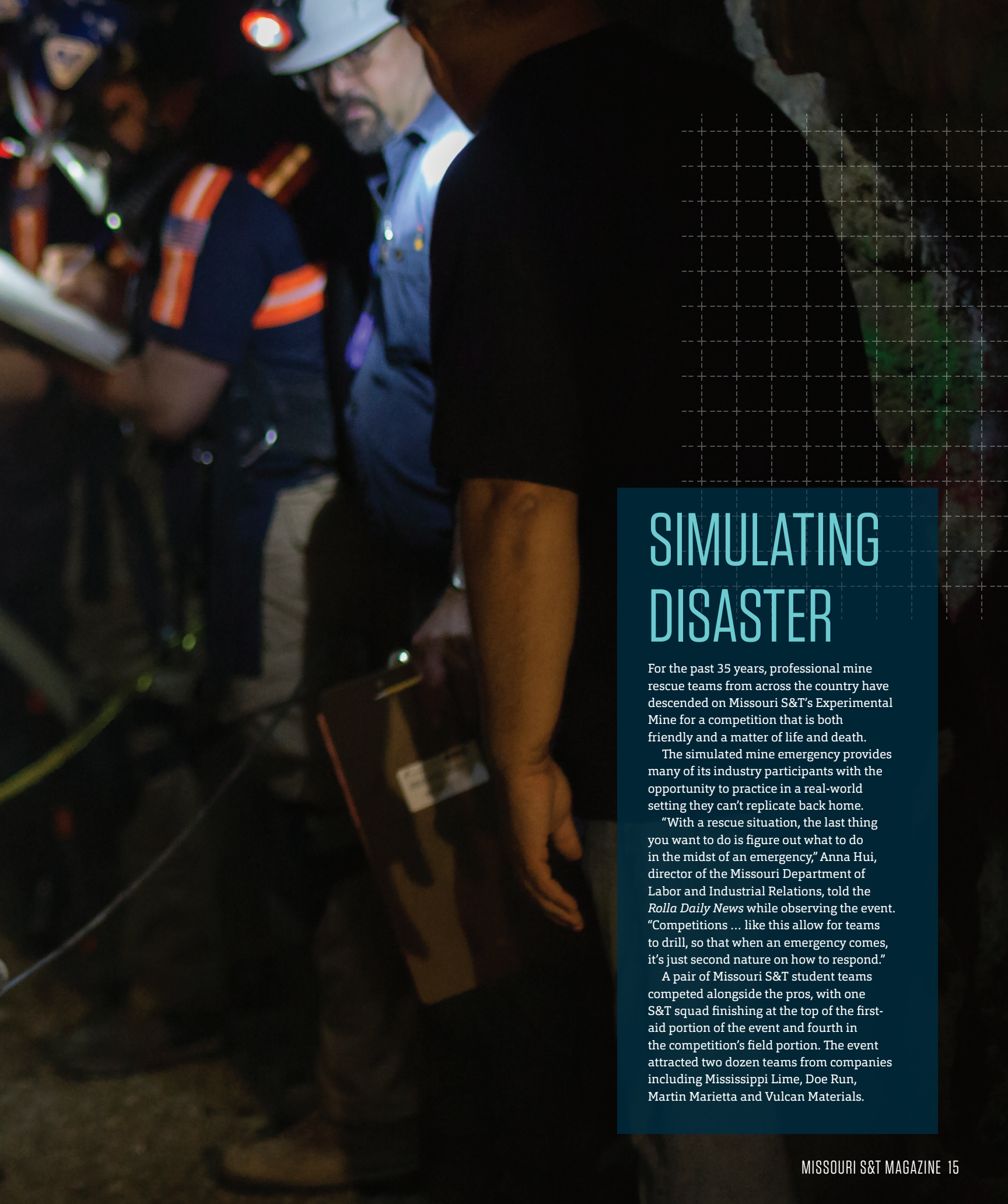
That's compared to a 2015 Transportation Security Administration report that found that TSA agents failed to identify explosives and banned weapons 95 percent of the time.

When travelers enter the U.S. on an international flight, they typically go through a U.S. Customs and Border Patrol area for screening. Depending on their answers, a CBP officer might ask one question or a handful of questions. Twyman says the process can be alarmingly subjective.

His automated screening kiosk eliminates that subjectivity. An infrared camera scans a subject's eye movement and pupil dilation; a video camera captures natural reactions to feeling threatened, such as body and facial rigidity; and a microphone records vocal data, listening for changes in pitch that accompany uncertainty. "This (screening kiosk) measures various psychophysiological responses and tries to make some sort of a risk assessment outcome," says Twyman. "It's an automated risk assessment, instead of a seat-of-your-pants risk assessment. There's a controlled, structured process for it." Twyman has conducted field studies at border crossings and is in talks to implement kiosks at borders in Singapore, where over 250,000 people cross daily for work.



"Competitions ... like this allow for teams to drill, so that when an emergency comes, it's just second nature on how to respond."



SIMULATING DISASTER

For the past 35 years, professional mine rescue teams from across the country have descended on Missouri S&T's Experimental Mine for a competition that is both friendly and a matter of life and death.

The simulated mine emergency provides many of its industry participants with the opportunity to practice in a real-world setting they can't replicate back home.

"With a rescue situation, the last thing you want to do is figure out what to do in the midst of an emergency," Anna Hui, director of the Missouri Department of Labor and Industrial Relations, told the *Rolla Daily News* while observing the event. "Competitions … like this allow for teams to drill, so that when an emergency comes, it's just second nature on how to respond."

A pair of Missouri S&T student teams competed alongside the pros, with one S&T squad finishing at the top of the first-aid portion of the event and fourth in the competition's field portion. The event attracted two dozen teams from companies including Mississippi Lime, Doe Run, Martin Marietta and Vulcan Materials.

THE GAME OF HISTORY

S&T military historian **John C. McManus** says he's noticed that many students who are interested in military history were first exposed to the subject through video games.

So, it may be no surprise that one of McManus' 12 books is the basis for a new video game.

Burden of Command, which will be released in 2018 on the digital video game platform Steam, follows the real-life World War II missions of the U.S. Army's 7th Infantry Regiment, also known as the "Cottonbalers," who have fought in every American war since the War of 1812. Game developers used McManus' book *American Courage, American Carnage* as source material.

As its title suggests, *Burden of Command* asks the player to control a captain in command of a company in the 7th Regiment.

"These are missions that actually happened," McManus says. "It's the exact kind of situations these guys really dealt with starting in November 1942."

Images provided by Burden of Command

STEM-ED REBOOT

This fall, elementary, middle and high school students from around the country learned more about engineering and science fields because their teachers — nearly 600 of them — came to S&T for Project Lead The Way training.

Courses were held throughout the summer to teach K–12 educators how to better teach engineering, computer science and biomedical science to their students.

MAKING 'SMART' DECISIONS

By studying a combination of physical actions, social behavior analysis and data analytics, Missouri S&T researchers hope to better understand how people make decisions when interacting with technology in "smart" environments.

S.N. Balakrishnan, Curators' Distinguished Professor of mechanical and aerospace engineering, and **Devin Burns**, assistant professor of psychological science, say the outcomes of the study could be applied to consumer energy use, purchasing behavior, governmental regulations and even medical diagnoses.

"Studies have shown that when people are presented with two pieces of information, their decisions show differences depending on which piece is presented first," says Burns. "We are hoping to move a step beyond describing these cognitive quirks and will test if simple behavioral interventions can help decision makers avoid being unduly influenced by the chance timing of information."

Using decision-making situations capable of producing results that consider the "smart" environment they are made in, the researchers hope to gather data about how individuals made their choices.

WELCOME BACK, STAT

Students Today, Alumni Tomorrow (STAT) hosted a free barbecue and informational meeting during the first meeting of the fall semester. On Wednesday, Aug. 30, attendees ate chili and grilled hot dogs and learned about the student section of the Miner Alumni Association. All students were entered into a drawing for a PlayStation 4.

MISSOURI S&T PILOTS CONCURRENT ENROLLMENT PROGRAM

Students taking courses for an associate degree at East Central College can now take classes for their bachelor's degree at S&T during the same semester.

The Missouri Department of Higher Education approved the new concurrent enrollment program this past fall through legislation approved in 2016. It is designed to help students earn a degree in less time with fewer expenses.

Two students piloted the program at East Central during the fall semester, and more are expected to enroll in the spring 2018 semester.

S&T and East Central have worked together for more than 40 years through a transfer agreement that allows East Central students to transfer into more than 40 different degree programs. That agreement required students to complete their coursework at East Central before transferring.

IN PRINT

Kathryn Northcut, professor and co-director of Missouri S&T's technical communication programs, co-edited *Scientific Communication: Practices, Theories and Pedagogies*, which will be published by Routledge early in 2018.

EWB COMPLETES GUATEMALA PROJECT

After nearly a decade of work, a small Guatemalan village can now count on clean drinking water thanks to the Missouri S&T student chapter of Engineers Without Borders (EWB).

EWB first traveled to Nahualate, Guatemala, in 2008 as part of a volunteer project to design and build a public water system. This past August, a delegation from EWB's S&T chapter returned to Central America to mark the project's official completion.

The Guatemalan agricultural community's 500 households and 3,000 residents had previously relied on shallow wells for their drinking water.

Students from S&T's EWB chapter visited once or twice a year to work on projects like installing water meters, pressure valves and distribution lines; designing and constructing an elevated storage tank; and helping residents obtain public services by navigating the local bureaucracy. Pictured from left to right: **Chad Barton**, a junior in civil engineering, and **Todd Williams**, CE'95. A fundraising challenge is available to support EWB. Contact **Tory Verkamp** at **verkampv@mst.edu** for more information. Photo by Elysia Sparks

REBUILDING COMMUNITIES

As a single mother paying her way through college, **Stephanie Hall**'s early lessons in hard work weren't confined to Missouri S&T classrooms.

By the time her still-groggy classmates arrived for 8 a.m. classes, Hall had already worked the 5 a.m. shift baking doughnuts at Kroger. After morning classes came lunch-hour waitressing gigs. Nights and weekends meant homework, family time and more work as a waitress and bartender. "One job paid for childcare. One job paid for rent. One job paid for tuition," says Hall, Econ'90, CE'97.

At 28 and a mother of three, she returned to S&T to pursue the engineering career she had envisioned as the young daughter of a Schlumberger oil field worker.

Hall followed her mother's career advice — to zig where others would zag, and to view the absence of female role models in her chosen field as a challenge, not a disadvantage — and embarked on a 23-year career with the U.S. Army Corps of Engineers. Her career has included leadership posts in Afghanistan, Germany and South Korea, as well as overseeing Hurricane Katrina recovery and reconstruction in her New Orleans hometown.

Hall's only daughter, **Antoinette Hay**, CE'13, followed her mom into the Army Corps of Engineers after graduation.

"She never gave up," says Hay. "She stayed the course and plowed through all the walls instead of going around. She's more brute force than finesse. You'll pay attention to her because she's too good at what she does to ignore, she's always been that way."

Two years ago, eager for both a new professional challenge and the desire to live closer to her grandchildren, Hall joined the Corps' Kansas City district office to oversee USACE Mega-project N2W, the $1 billion-plus design and construction of a western regional headquarters of the super-secretive National Geospatial-Intelligence Agency (NGA). St. Louis community leaders hope the new spy complex, which is slated to open in 2022, will anchor a rebirth in an impoverished urban corner.

Those outsized expectations don't deter Hall, who now finds herself in what is likely the most highly visible public role of her career.

As a senior government engineer, her experience includes building temporary "cities" for military operations ("everything from sewage treatment and water and electrical distribution to all the buildings") to supervising over $5 billion in planning, design and construction in Afghanistan war zones.

"I like the challenge," she says of her penchant for complex projects. "I like the dynamics, the multiple partners, the multiple stakeholders and the moving parts. I like the push and pull to start and finish."

Hall is also mindful of her status as the type of role model whom she saw very little of earlier in her career, including at the university. In her case, that means promoting both the humanitarian and the public service aspects of her profession.

"In civil engineering, at the end of the day, through one way or the other, you've improved somebody's life — their standard of living, their quality of life, their quality of work. Even if it's just the roads they're driving on. At the end of the day, it's public service. You've contributed to the public well-being."

PUSHING THE BOUNDARIES OF SPACE EXPLORATION

Photo courtesy of Stratolaunch Systems Corp.

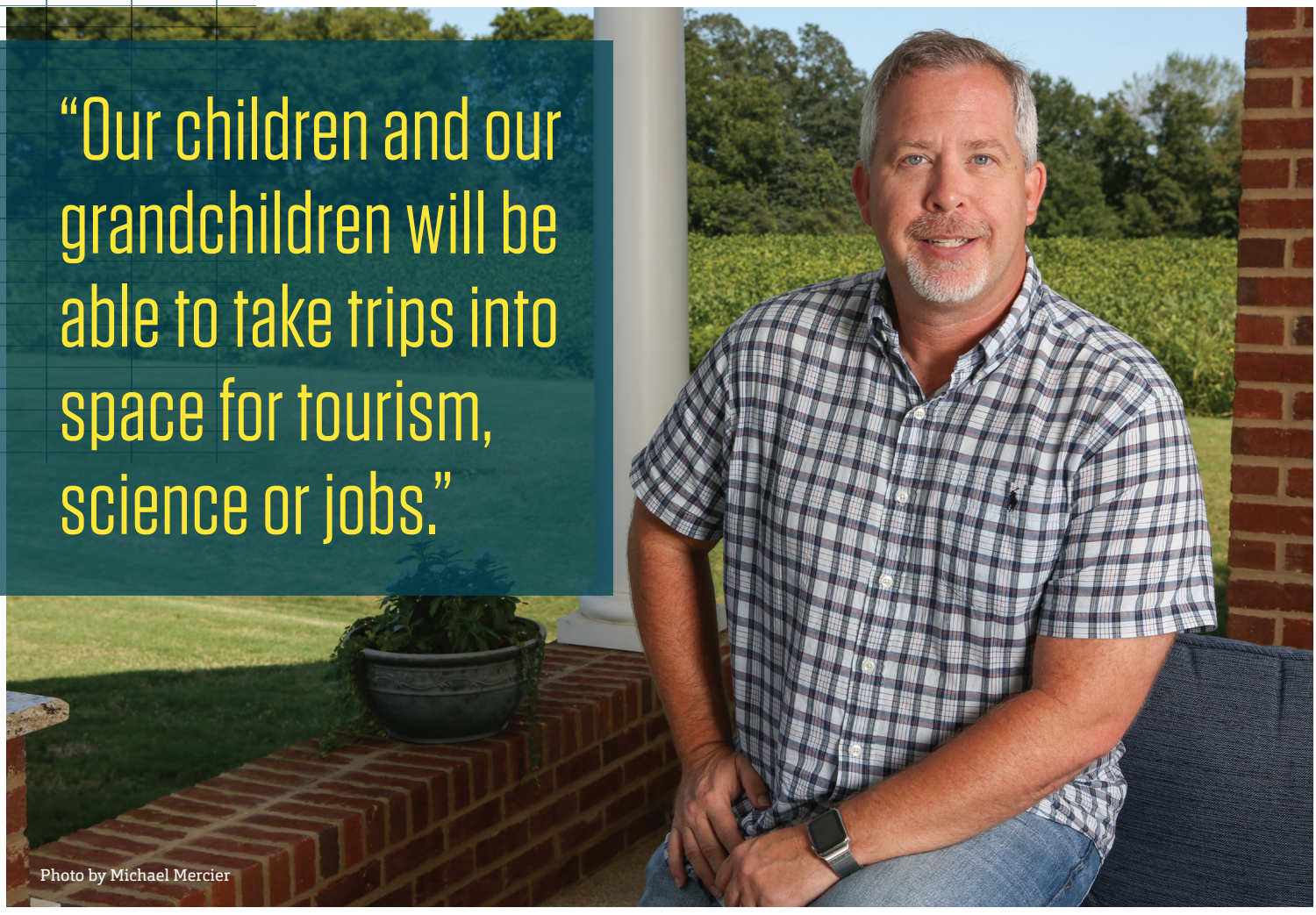


Photo by Michael Mercier

Space tourism could start in the next two years, says **Jeff Thornburg**, AE'96, but it's going to be expensive.

"Five minutes of weightlessness is pretty cool to a tourist, and it definitely gives you the astronaut experience," Thornburg says. "But at around $200,000 a ride, not everyone is going to be able to do it. But not everyone could ride on the first airplanes for the same reason."

As the vice president for propulsion engineering at Stratolaunch and the founder of Interstellar Technologies LLC, Thornburg hopes to change that. He wants to expand access to near-Earth orbit, the moon and the solar system — and then take people along for the ride.

Stratolaunch is building the outer-space version of an aircraft carrier, or in other words, a flying launch site for new spacecraft. Expected to debut before the end of the decade, the aircraft is a reusable air-launch vehicle powered by six Boeing 747 engines that can carry payloads of up to 500,000 lbs. At 385 feet, its wingspan is the world's largest. In comparison, a National Football League field spans 360 feet. The aircraft is being designed to air-launch rockets into orbit.

"At one time, it was a big deal to cross the ocean in a wooden vessel," Thornburg says. "Once it became routine and people weren't risking their lives significantly to cross the ocean, we were able to make incredible discoveries."

Thornburg always had a strong interest in technology, and like a lot of other kids, he dreamed of a job at NASA.

"When I was a kid, my mom bought a set of encyclopedias with an annual science yearbook subscription," Thornburg says. "As geeky as it sounds, every year this book would arrive and I would just drive through that thing."

Thornburg learned about the build-up to the first space shuttle launch as well as the history of the space program and the first *Mercury*, *Gemini* and *Apollo* launches.

"It really had a strong impact on my career interest in space exploration," he says.

Thornburg spent the first 20 years of his career in rocket engine development and learning how to operate launch vehicles with the Air Force, NASA and SpaceX. "Those were incredible learning experiences for me," he says.

He plans to spend the next 20 years pushing the boundaries of space exploration, both at Stratolaunch and with Interstellar Technologies, an R&D company he founded to develop new launch vehicles and rocket propulsion technologies.

"With current technology, it takes four to six days to get to the moon, and it's a nine-month trip to Mars," he says. "What do you do with someone who is just sitting in a chair in a very small can on a six-day ride to the moon? Then talk about a nine-month trip to Mars. We really have to cut that time down and then focus on exploration. I want to see explorers reach further into the solar system within my lifetime."

Typical of the *Star Trek* and *Star Wars* culture he grew up in during the 1980s and early '90s, Thornburg jokes that everyone who is a propulsion engineer wants to be Scotty from *Star Trek*. "I was never any different," he says.

"We're right on the edge of something really powerful here with the ability to provide a business model that shows commercial space access companies can be successful," Thornburg says. "Our children and our grandchildren will be able to take trips into space for tourism, science or jobs. It really makes for a very exciting future." ◻

OUT OF THIS WORLD

By Peter Ehrhard, ehrhardp@mst.edu | Photos courtesy of Téa Thomas, Missouri S&T Mars Rover Design Team

After days of competition in a barren desert, 36 teams of finalists, more than 500 students from seven countries, slowly made their way to the "Hab," a deep space habitat at the Mars Desert Research Station, to find out who had won the University Rover Challenge.

Winners were announced in ascending order, and once the third-place and second-place teams were named, members of Missouri S&T's Mars Rover Design Team broke into wild celebrations.

They already knew the score.

"We knew that we scored 52 on equipment servicing and 100 on autonomy and extreme retrieval, so when they announced the score for third and second place, you could see everyone's faces light up as they did the math and realized that we scored more than second place, even without the final science scores," says the team's chief financial officer **Téa Thomas**. "As soon as they said our names, we screamed and cheered and a few of us even cried. We were standing next to some of the teams we had become friends with, and I think some of them were just as excited as we were. We're the only American team to win in the last seven years, so all the other American teams were cheering for us."

"AS SOON AS THEY SAID OUR NAMES, WE SCREAMED AND CHEERED AND A FEW OF US EVEN CRIED."

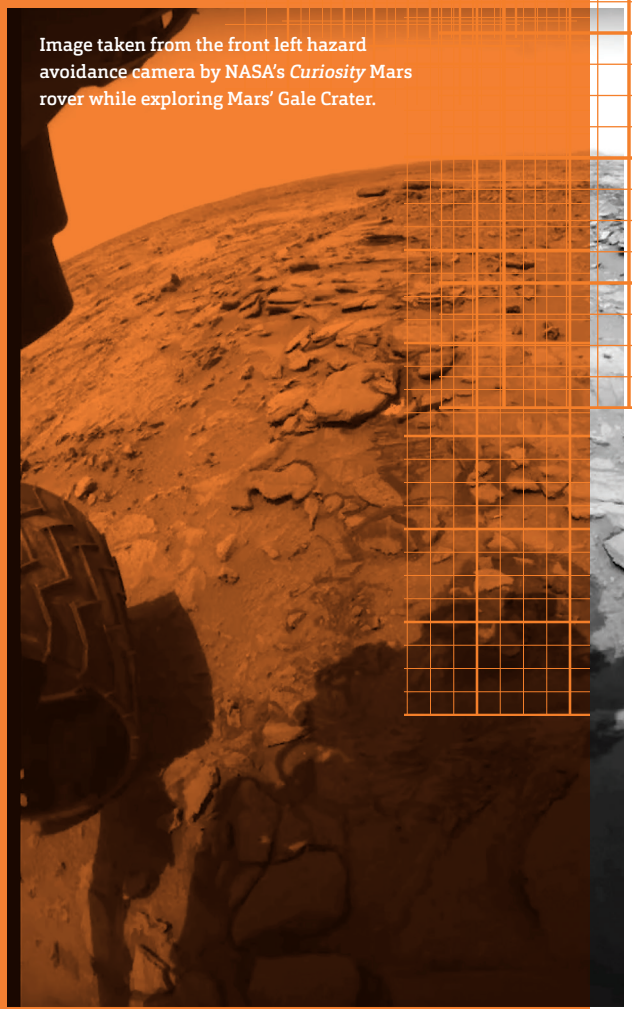


Image taken from the front left hazard avoidance camera by NASA's *Curiosity* Mars rover while exploring Mars' Gale Crater.

CONQUERING THE GOD OF WAR

The Mars Society sees the red planet as one of the next great frontiers in space exploration. It hosts the University Rover Challenge each year, inviting collegiate teams from around the world to showcase the potential next generation of planet surveyors and explorers.

The terrain of Mars is a never-ending series of craters. Its surface includes the largest volcano known in the universe, as well as the second-highest mountain and one of the largest craters in the solar system. It is impossible to mimic the

terrain here on Earth, but the competition copies the look of Mars by hosting the event at the Mars Desert Research Station near Hanksville, Utah — a town with a total population of 200. The station itself is off the beaten path, located in an isolated desert surrounded by red rocks and clay.

IT IS IMPOSSIBLE TO MIMIC THE TERRAIN HERE ON EARTH, BUT THE COMPETITION COPIES THE LOOK OF MARS BY HOSTING THE EVENT AT THE MARS DESERT RESEARCH STATION NEAR HANKSVILLE, UTAH.

"Hanksville is unlike anywhere else. There are a few small patches of grass, but for the most part, it's all just red dust and sand," says Thomas, a sophomore in business and management systems from Lee's Summit, Mo. "The competition site is miles from any actual road and it just keeps going. There's nothing but orange rocks for as far as you can see."

Left: Missouri S&T's rover, *Gryphon*, pictured here during competition at the University Rover Challenge, was designed and built by S&T students in the Kummer Student Design Center. The Mars Rover Design Team is one of 19 teams that make up the Student Design and Experiential Learning Center.

NEVER ENOUGH

You would think being crowned world champions would satisfy even the most competitive people, but not the Mars Rover Design Team members. The team was initially invited to the Canadian International Rover Challenge, held in July in Drumheller, Alberta, to help judge the inaugural competition, but decided to enter the competition as well.

Logistics prevented the team from bringing world-champion *Gryphon* to the competition, so they challenged themselves to build a new rover in 14 hours. That is design, find parts and build a functional rover in the same amount of time that it took the team to travel to the Canadian event.

After two trips to a big box store and three to a local tire store, the team entered *Ned* into the competition. *Ned* was built out of four hockey sticks, four dismantled cordless drills, a wooden milk crate, an angle iron, two plastic knives and some 16-gauge wire.

The team members finished third out of three, but had a lot of fun guiding the other teams and pushing themselves to the edge of creativity.

THIS YEAR'S COMPETITION INTRODUCED TWO NEW TASKS: RETRIEVAL AND DELIVERY. THE CHANGE DIDN'T FAZE THE S&T TEAM.

TO-DO LIST

The University Rover Challenge is designed to demonstrate the fundamentals of remote robotic travel and task completion.

To qualify for the event, teams created a video presentation that explained the design and cost of their rover. Teams also had to submit a detailed final expense report. At the final event in Utah, all 36 qualifying teams attempted to complete four challenges:

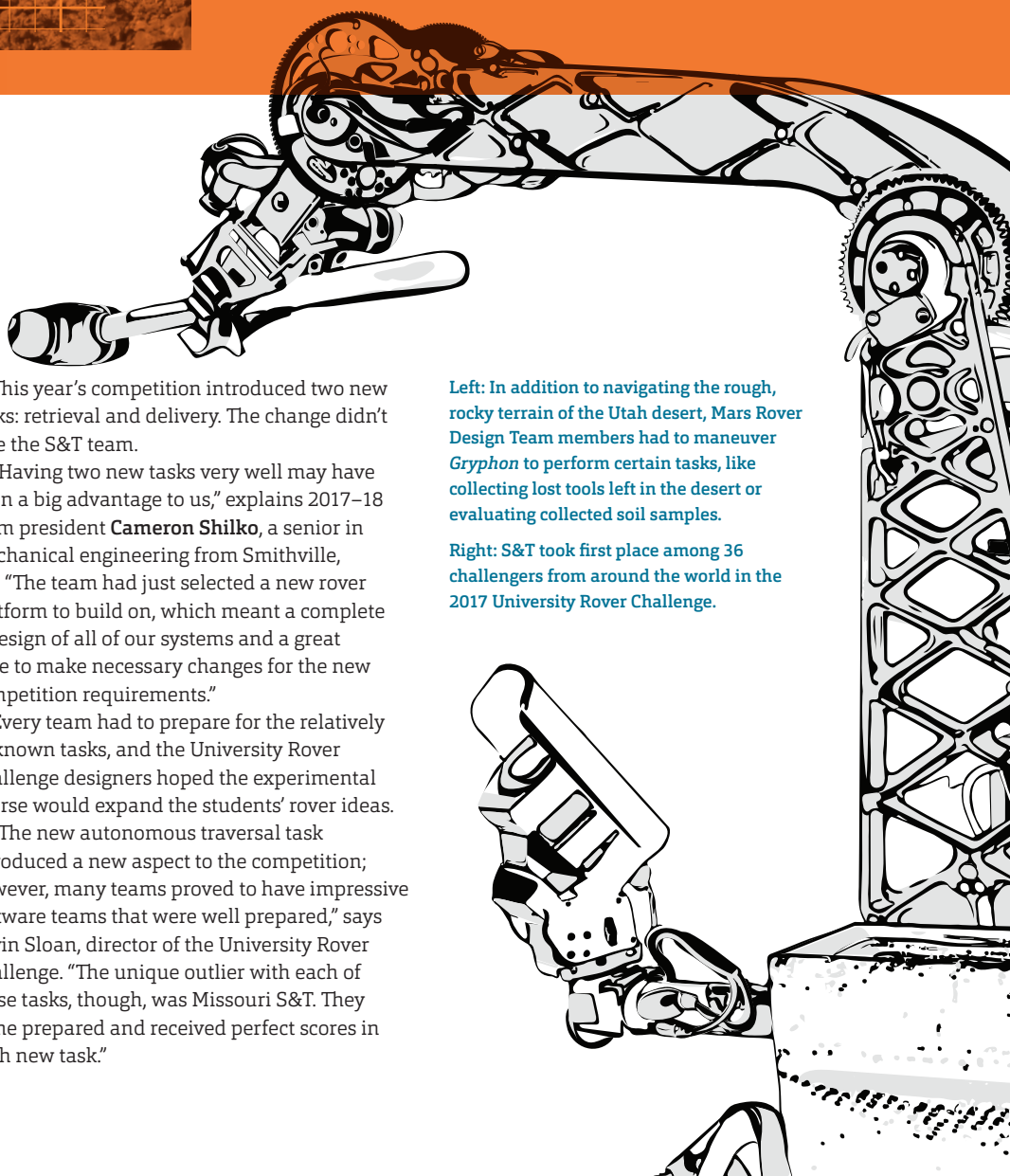
- **An astronaut assistance task**, which required teams to use the rover to collect lost tools left in the field and deliver them to multiple locations.
- **The equipment servicing challenge**, which required rovers to repair a mock equipment system. Tasks included turning valves, pushing buttons and reading pressure gauges.
- **The sample return**, which required the rover to collect soil samples at selected sites in the field and use onboard instrumentation to perform a basic scientific evaluation to determine geological significance or determine the likelihood of biological life.
- **The autonomous travel challenge**, which required rovers to maneuver themselves through a variety of difficult terrains based on a given set of GPS coordinates. Obstacles included soft sand, rough stones, rock and boulder fields, vertical drops, and steep slopes.

This year's competition introduced two new tasks: retrieval and delivery. The change didn't faze the S&T team.

"Having two new tasks very well may have been a big advantage to us," explains 2017–18 team president **Cameron Shilko**, a senior in mechanical engineering from Smithville, Mo. "The team had just selected a new rover platform to build on, which meant a complete redesign of all of our systems and a great time to make necessary changes for the new competition requirements."

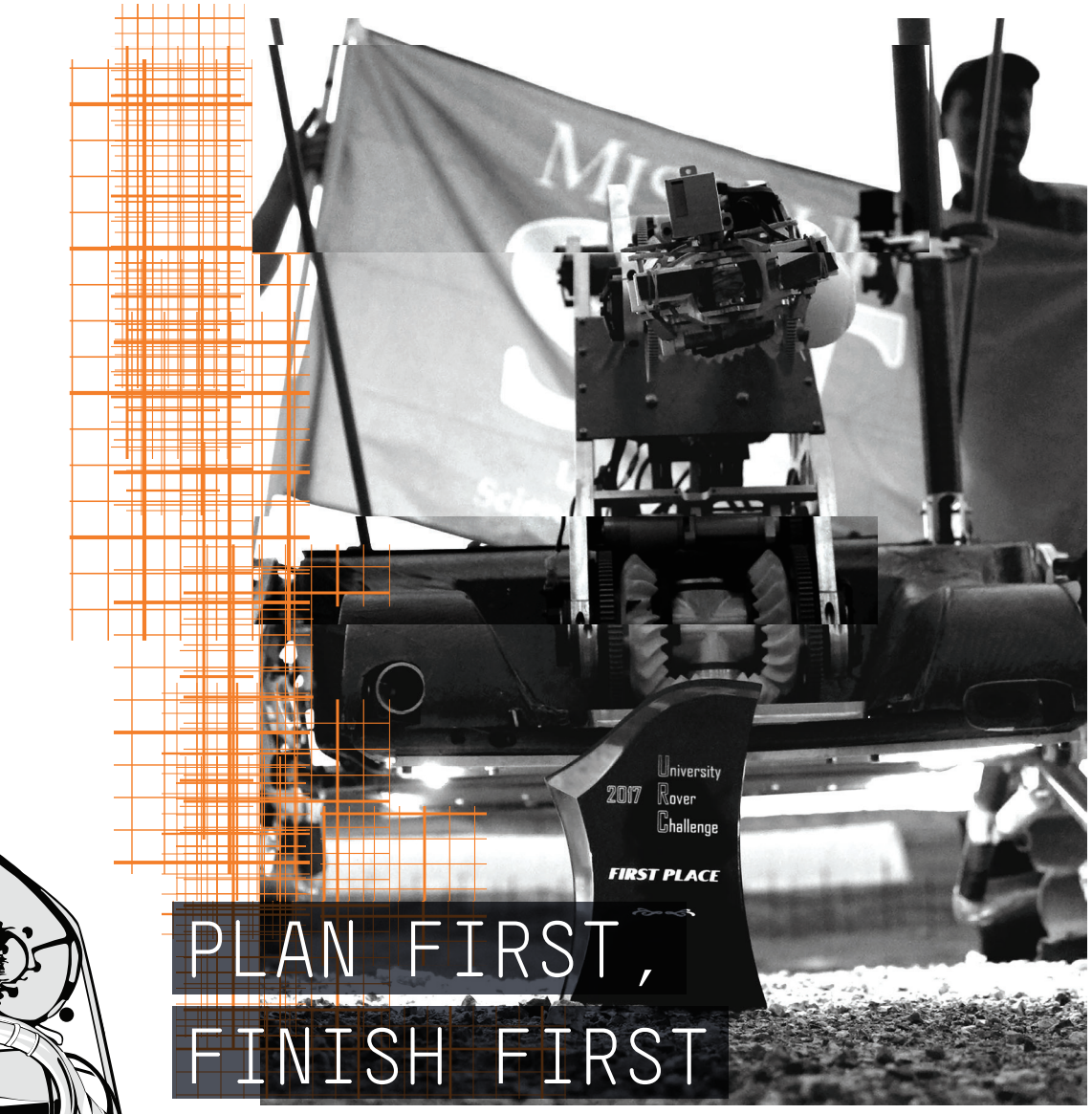
Every team had to prepare for the relatively unknown tasks, and the University Rover Challenge designers hoped the experimental course would expand the students' rover ideas.

"The new autonomous traversal task introduced a new aspect to the competition; however, many teams proved to have impressive software teams that were well prepared," says Kevin Sloan, director of the University Rover Challenge. "The unique outlier with each of these tasks, though, was Missouri S&T. They came prepared and received perfect scores in each new task."



Left: In addition to navigating the rough, rocky terrain of the Utah desert, Mars Rover Design Team members had to maneuver *Gryphon* to perform certain tasks, like collecting lost tools left in the desert or evaluating collected soil samples.

Right: S&T took first place among 36 challengers from around the world in the 2017 University Rover Challenge.



PLAN FIRST, FINISH FIRST

The Mars Rover Design Team designed *Gryphon* for this year's competition. The student-designed and -built rover was a meticulously planned vehicle. The team developed custom circuitry for the rover, machined the aluminum and carbon-fiber support structure, developed durable wheels for terrain mobility, and 3-D printed gears for its robotic arm.

"This year the team aimed to have, and had, an operating rover earlier in the design process than ever before," says Shilko. "We created a detailed rover test plan including system verification, acceptance testing and task simulations in the months leading up to competition. All of this led to a very refined machine and an experienced crew to send to the University Rover Challenge."

The Mars Rover Design Team had tasted victory after only five years of competitions. This year, the team earned a total score of 403.4 — nearly 70 points more than the second-place team.

"The team was confident, but not cocky going into the event," says team advisor **Melanie Mormile**, associate provost for faculty affairs and a professor of biological sciences and geological sciences and engineering. "They knew they had a robust rover but also understood that the people in charge of the competition set out to truly challenge the teams. The team had great spirit and mood while competing. When issues or conflicts arose, they focused on problem-solving by taking everyone's input and then sifted through the input to the most likely solution."

So how did the team celebrate the world championship? By arriving back to Missouri S&T in the middle of the night, unloading the truck at the Kummer Student Design Center, eating some cake to revel in the victory, and starting to plan for next year. ■

PROUD ADVISORS

The faculty advisors for the Mars Rover Design Team (MRDT) have seen the team grow from a small but enthusiastic group of students to world champions.

Melanie Mormile, associate provost for faculty affairs and a professor of biological sciences and geological sciences and engineering, has been the team's advisor since it was founded in 2012. She has traveled with the team to Hanksville, Utah, for the University Rover Challenge the last four years.

She says she and **Garry "Smitty" Grubbs II**, associate advisor of the team, have seen the MRDT improve every year, culminating in this year's challenge victory.

"We are truly fortunate to work with such amazing students," Mormile says.

"They look to Dr. Mormile and me for guidance, but are extremely autonomous," Grubbs says. "They have a plan, business model and deadlines, and they execute each one almost flawlessly. This year, in particular, they had an incredibly ambitious schedule and kept it, which was amazing."

Grubbs, an assistant professor of chemistry, joined the team as associate advisor in 2013. He traveled with the MRDT to Poland in September 2015 for the European Rover Challenge.

"They are thoughtful, kind and ambitious students," Grubbs says. "There is nothing more exciting as an educator than getting to work with students like that."

S&T IN SPACE

By Alan Scher Zagier, zagiera@mst.edu and Mary Helen Stoltz, mhstoltz@mst.edu | Photos by Sam O'Keefe

All across campus, Missouri S&T professors — and their students — are conducting research that could have implications for future space travel.

SPACE MICROWAVE

Researchers in Missouri S&T's Applied Microwave Nondestructive Testing Laboratory (amntl) have developed a handheld microwave camera that noninvasively captures high-resolution 3-D images of the interior of structures in real time, like a video camera.

The device was developed by **Reza Zoughi**, the Schlumberger Distinguished Professor of Electrical and Computer Engineering and amntl director, and **Mohammad Tayeb Ghasr**, MS EE'04, PhD EE'09, associate research professor in electrical and computer engineering.

The camera can be used to inspect composite structures and thermal insulating materials used in aerospace and space vehicles, or in space habitats. It also has more down-to-earth potential applications, such as detecting and monitoring a variety of skin conditions and screening in airports and sports venues.

INTO ORBIT

Launching soon from a NASA space station near you: an experimental satellite designed and built by Missouri S&T students.

Research teams supervised by **Hank Pernicka**, professor of mechanical and aerospace engineering, are working on three spacecraft projects with both the federal space agency and the U.S. Air Force.

The most promising effort consists of two microsatellites and is expected to launch from the International Space Station as soon as late 2018 after winning a 2015 Air Force competition.

FASTER THAN SOUND

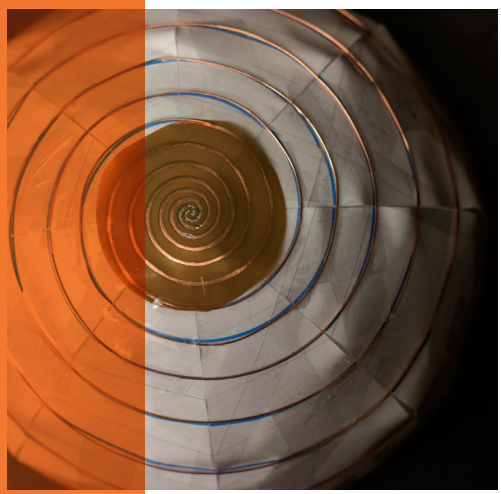
Hypersonic vehicles like the *U.S. Falcon*, which is capable of flying 13,000 mph through the upper levels of the atmosphere, must be able to withstand ultra-high temperatures over longer periods of time than retired space shuttles or *Apollo*-style capsules.

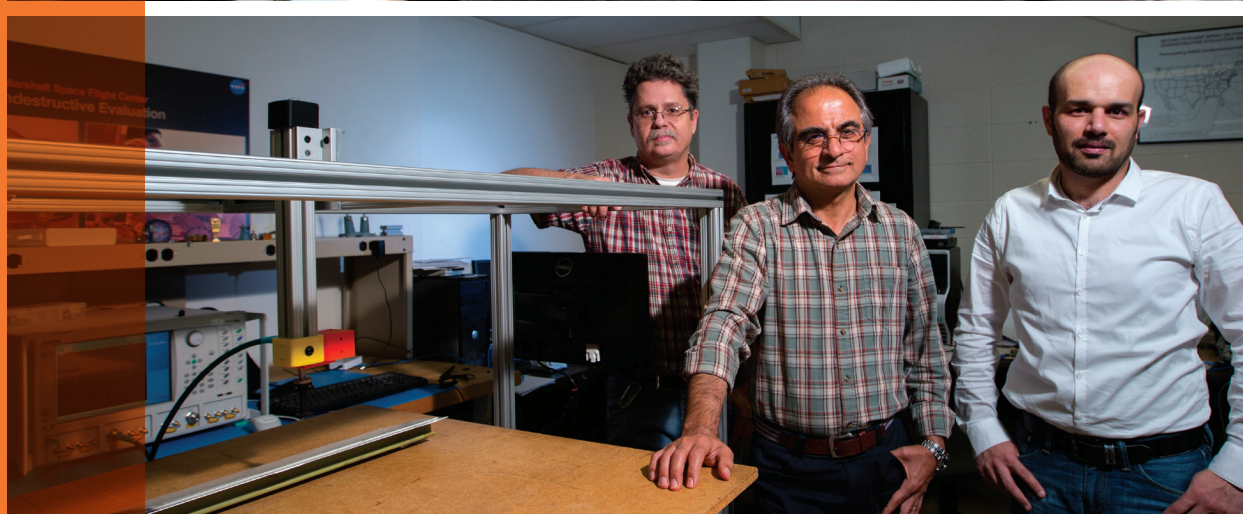
Developing materials to withstand those kinds of temperature extremes is one project in the Enabling Materials for Extreme Environments signature area, led by **Greg Hilmas**, interim chair of materials science and engineering, and **Bill Fahrenholtz**, director of the Materials Research Center. The two Curators' Distinguished Professors of ceramic engineering are testing the thermal and mechanical properties of ceramics while developing methods to improve their performance.

RABBIT EARS REINVENTED

Building more reliable antennas linking small satellites to ground stations is the aim of **Ali Foudazi** and **Atieh Talebzadeh**, husband-and-wife Ph.D. students in electrical and computer engineering.

The couple, joined by **Matthew Dvorsky**, EE'17, of Peoria, Ill., were finalists in a student design contest sponsored by IEEE. They developed a spiral antenna with a broad frequency range and the widest possible bandwidth that can be folded into a balloon attached to the satellite. Once in space, the hemispherical antenna unfolds to its full size upon release.





Top left: S&T researchers believe this spiral antenna will be a more reliable link between small satellites and ground stations.

Top right: **Bill Fahrenholtz**, left, and **Greg Hilmas** examine a sample of ceramic material capable of withstanding extreme temperatures.

Center: **Hank Pernicka**, right, and his research team is working with the U.S. Air Force to launch two student-designed microsatellites into orbit.

Bottom: **Reza Zoughi**, center, and **Tayeb Ghasr**, right, pictured here with **Jeffrey Birt**, technical assistant in electrical and computer engineering, have developed a microwave camera you can hold in your hand and use to noninvasively capture 3-D images of the interior of structures.

KATELYN BRINKER ADVANCES THE FUTURE OF SPACE EXPLORATION

By Andrew Careaga, acareaga@mst.edu | Photo by Sam O'Keefe

When the European Space Agency (ESA) launches its mission to explore Jupiter's moons in 2022, the ambitious effort will stay connected to Earth thanks in part to the work of Mars Rover Design Team member **Katelyn Brinker.**

A member of the team's science group during the 2017 University Rover Challenge (URC), Brinker, CpE'17, EE'17, spent her previous summer interning at Southwest Research Institute in San Antonio, where she helped write the software for an ultraviolet spectrograph that will be aboard ESA's Jupiter Icy Moons Explorer (JUICE) spacecraft. The instrumentation will capture close-up views of Jupiter's three largest moons as part of the expedition and, thanks to Brinker's work, transmit that information back to Earth.

It likely won't be the last time her work will provide us with a deeper look at space. Brinker's sights are set on a career focused on creating spectrometers, cameras and other instruments to advance future extraterrestrial exploration. She also wants to develop nondestructive testing techniques to make space exploration safer. Brinker learned many of these techniques as an undergraduate research assistant in Missouri S&T's Applied Microwave Nondestructive Testing Laboratory, and now she's fine-tuning her expertise as a graduate student working with lab director **Reza Zoughi**, the Schlumberger Distinguished Professor of Electrical and Computer Engineering.

"I wasn't a total space nerd until I joined Mars Rover my first week of college," says Brinker, a native of Highland, Ill. "Once I got involved with Mars Rover, I found there were a bunch of people interested in space technology, and team members were going to work for SpaceX or intern at NASA, and I thought that was pretty cool."

During the University Rover Challenge, she helped with experiments at the team's base station during the competition and built a mechanism to collect samples from the Utah terrain. "I think the most exciting part (of the URC) was getting to meet all the new teams from all over the world," she says. "We all have different ideas of what a rover should be and we all approached the competition in different ways, but we're all super passionate about this project, advancing space technology and the journey to Mars."

FOLLOWING OPPORTUNITY

WHEREVER IT MAY ROVE

By Andrew Careaga, acareaga@mst.edu | Photo by Rob Greer Photography

Michael Bouchard's interest in Mars — and Mars rovers — didn't end when he left Rolla.

The Mars Rover Design Team founder, now a Ph.D. student at Washington University in St. Louis, recently wrapped up his second summer interning at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, Calif. JPL is where NASA builds, operates and monitors its rovers. "It is *the* place for Mars exploration," says Bouchard, GGph'14, "and we are in the golden age of robotic exploration of Mars. It's pretty incredible."

As a systems engineer, Bouchard worked on subsystems for the next generation of rovers, which NASA plans to send to Mars in the next decade. But every Monday, Wednesday and Friday, he also works with rover *Opportunity's* science and operations teams to analyze the latest data from Mars and to help plan the rover's next tasks.

Now back in St. Louis, Bouchard continues to join the thrice-weekly meetings via Skype or WebEx. The sessions benefit Bouchard as much as they do NASA, as the data he analyzes are relevant to his specialty: the lithology, or physical and chemical properties, of volcanic Martian rocks from the region *Opportunity* covers.

It's quite a leap from the basement of S&T's former Rayl Cafeteria, where Bouchard and some fellow students first met in January 2012 to hatch the idea of creating a new design team. They spent that semester working on the paperwork — the bylaws, constitution and organizational structure — and, because "some of our engineers were getting restless with meetings and writing a constitution," building a small remote-controlled machine as a prototype.

By the time 2013 rolled around, the team was official and ready to rove in its first University Rover Challenge. The team finished dead last.

But not every rookie season is sensational. The students learned from past mistakes and improved year by year. Today's championship team is grateful for pioneer predecessors like Bouchard, whom they invited back to campus last spring to speak during the group's annual banquet. Who knows? Maybe Bouchard's pep talk will inspire other S&T students to set their sights even higher.

"WE ARE IN THE GOLDEN AGE OF ROBOTIC EXPLORATION OF MARS. IT'S PRETTY INCREDIBLE."

EXPANDING POSSIBILITIES

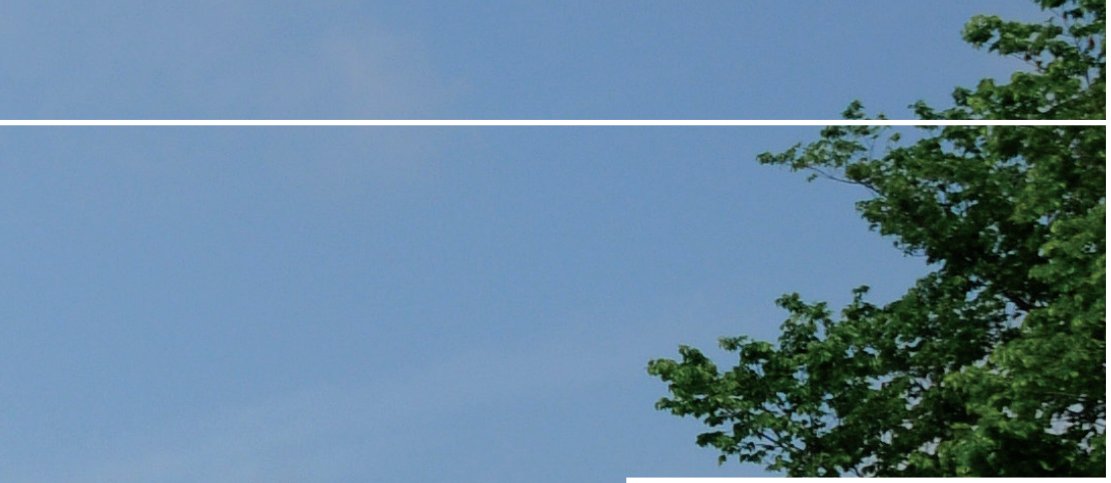
By Maridel Allinder, allinderm@mst.edu
Photos by Sam O'Keefe and Jesse Cureton

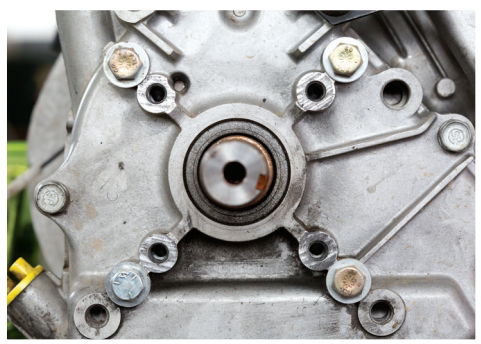
From the desert landscape of Mars to rural villages in Central America, Missouri S&T students are turning possibilities into powerful outcomes. It's a learning process that unfolds every day at the Student Design and Experiential Learning Center, home of S&T's 19 student design teams.

Over the past six years, design team participation has grown from 400 students to more than 1,200 — and the number continues to climb: more students, more teams, more learning. This growth has created an urgent need for more space, and fundraising is underway for an 8,000-square-foot addition that will expand the design center's fabrication bays, machine shop, innovation suite and much more.

"Our design teams are attracting a growing number of students from every major," says center director **Chris Ramsay**, MetE'83, MS MetE'85. "Miner design teams are not only attracting more students to S&T; they are also grabbing the attention of our industrial partners, who are aggressively competing for these highly skilled design team alumni."

The first major gift in support of the design center expansion — a $500,000 pledge from an anonymous donor — has launched the fundraising campaign. For more information on the project and naming opportunities, contact **John Held** at **heldjohn@mst.edu** or 573-341-6533.



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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.**

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

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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:
Summer issue — March 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.

1949

Walter Knecht, ChE: "My wife, Shirley, passed away in June 2016 and I have been going through old papers, including an old file labeled 'MSM/UMR' and a note from the alumni association. Looking through the file gave me a chance to recall some of my Rolla days. Over the years, Shirley and I attended a few Homecomings, but because of the distance and health issues we have not returned in many years. Thanks for providing me the opportunity to reminisce."

Charles K. Wissel, ME, has been married for over 70 years. He and his wife, Elizabeth, have four sons, eight grandchildren and 10 great-grandchildren.

1957

Donn G. Ziebell, MetE: "My third book, *Gorky, Russia; First man in*, was listed on Amazon in March."

1961

William F. Jud, GGph, was featured in a Fredericktown, Mo., *Democrat News* article about his work as manager of Legend Minerals, a start-up mining company with a field office in Fredericktown. Jud believes there could be a large ore body in Madison County and the surrounding area.

1962

Dinesh Shah, ChE, and his wife, Sumitra, celebrated their 50th wedding anniversary on May 11, 2017.

1964

Alan A. Kamp, CE, MS CE'66: "I retired as vice president and senior project manager for Black & Veatch in oil and gas. I continue to own and operate Branson Scenic Railway with my wife, Illa."

1967

Dale Brown, MetE, was featured in a Farmington (Mo.) *Daily Journal News* article on the 105th anniversary of the sinking of the *Titanic*. In the article, Brown discussed his work with the late Dr. H.P. "Phil" Leighly, professor emeritus of metallurgical engineering, in testing steel samples from the *Titanic*.

1968

Michael C. Korb, MinE, received the Distinguished Member Award from the Society for Mining, Metallurgy and Exploration.

David Rosenbaum, CE, retired in June as vice president of facilities management at Methodist Le Bonheur Healthcare in Memphis, where he worked for 23 years.

1969

Charles "Chuck" Foster, CE, MS CE'70: "I retired from federal service after 20 years in the U.S. Army and 26 years as a federal civilian working in Washington, D.C., and northern Virginia. Worked as an instructor in the civil engineering department for a year before beginning my military career after ROTC commissioning. Great career for my nation and good opportunities for my family. Spent 10 years in Germany and a year in Korea. Training was beneficial to my assignments and tasks. Study hard and learn the material; don't just get a good grade and move on. You'll appreciate it as you progress in your jobs."

1971

Richard Ash Jr., MinE, retired longtime director of the St. Charles, Mo., parks and recreation department, was awarded the 2016 Honorable Cornelius Amory Pugsley Medal for his promotion and development of parks and conservation.

Dennis Ditch, EMgt: "My wife, Kathryn Garth, passed away in March 2017. She attended Missouri S&T from 1970 to 1971. We have four sons and four grandchildren. Please check my class

ALUMNA SELECTED TO LEAD ENGINEERING MANAGEMENT, SYSTEMS ENGINEERING

Suzanna Long, Hist'84, Phys'84, MS EMgt'04, PhD EMgt'07, was named chair of engineering management and systems engineering at Missouri S&T. Long, a professor in the department, had served as interim chair since July 2015. She has been a member of the S&T faculty since 2008.

"I am honored to serve this outstanding group of faculty, staff, students and alumni, and look forward to working to build on our department's tremendous heritage here at S&T," she says.

BORROK CHOSEN TO CHAIR S&T DEPARTMENT

David Borrok, GGph'95, began work as chair of geosciences and geological and petroleum engineering at Missouri S&T on Aug. 1. Before returning to his alma mater, Borrok served as a professor of geosciences and director of the School of Geosciences at the University of Louisiana at Lafayette.

FORE!

Twenty-six alumni members of Tau Kappa Epsilon fraternity met at the Lake of the Ozarks in May 2017 for their annual golf outing in the Ozarks. This is the 18th year for the annual golf outing.

Robert Brandt, EE'76: "I've enjoyed driving my new Harley Davidson 2017 Sportster 1200C around Dallas and the countryside. Hello to all my friends!"

notes on the alumni website. I can be reached at dennis.ditch@gmail.com."

1972

Jerry R. Jackson, EE, retired from Blessing Health System as vice president of engineering, facilities and property management after 32 years of service.

1975

Kevin Skibiski, CE, MS CE'76: "After 40 years, I retired from full-time consulting on Jan. 15, 2017. I teach a course in engineering statistics at Missouri State University in the cooperative engineering program with S&T and do some selective part-time consulting."

1977

Don Bingaman, AE, MS AE'86, retired from Boeing as director and chief engineer of air systems, Phantom Works in December 2016 after 39 years of service. He started with McDonnell Douglas immediately after graduation. In January 2017, he started a new company in St. Louis, VPE Aerospace Consulting LLC.

1978

Michael McFarland, GGph, self-published a book titled *Beyond the Darkness*, a fictional story of mysterious and suspenseful tales relating to a Missouri cave. The book is available by emailing haxanist@aol.com.

Doug Melton, MS GGph, was appointed by Arkansas Gov. Asa Hutchinson to the Arkansas Pollution Control and Ecology Commission. Melton is an oil-and-gas industry consultant.

David Winter, CE, president and CEO of Seattle-based Hart Crowser, was named Engineer of the Year by the American Council of Engineering Companies of Washington.

1979

Richard A. Jones, CE, MS EMgt'93, retired from the U.S. Army Corps of Engineers as the Vicksburg District area engineer in the Vidalia (La.) area office.

1983

Tony Flaim, PhD Chem, chief technical officer at Brewer Science in Rolla, was the keynote speaker at the Advanced Packaging and System Integration Technology Symposium, held in April in Wuxi, China.

1984

Donald Reago Jr., Phys, PhD Phys'86, was selected to serve as acting director of the U.S. Army Communications-Electronics Research, Development and Engineering Center.

Continued on page 39

WHAT THE HEX?

William Heimsoth, ME'11, and **Aaron Attebery**, ME'10, MS ME'12, designed a hexagonal beer pong cup they call the Hexcup. The cup's honeycomb-inspired design allows for tighter "racks," which means less space between cups. Hexcups are also top-rack dishwasher safe and have a creased coaster design that breaks the surface tension of the cup to prevent the cups from "ghosting," or floating on slick, beer-soaked tables.

Beer pong is typically played with 16-ounce plastic cups with circular rims. Teams of two set up six or 10 cups in a "rack," much like a rack of bowling pins, and try to land ping pong balls in the opposing team's cups from across a table. The cups are lined as closely together as possible, but there is inherently space between circular cups.

Heimsoth and Attebery played enough beer pong as Beta Sigma Psi fraternity brothers, and had enough trouble with racking cups, that they wondered if there was a better way. They came up with the idea for the Hexcup — coincidentally — over beers at their favorite bar one night.

"One of us said, 'Why aren't these things hexagons?'" says Attebery, now an engineer with Black & Veatch in Overland Park, Kan. "The hexagon is the strongest shape with the least amount of material."

Heimsoth and Attebery sat on their idea for five years as college, careers and life got in the way. Then, at a bachelor party in September 2014, they were challenged by one of their fraternity brothers to follow through on their idea.

So they did.

In 2015, they created a limited liability company (LLC) with the help of Heimsoth's wife, a certified public accountant, and launched a 60-day Kickstarter campaign. Their fundraising goal was $50,000, but after 30 days, they had only raised $4,000.

Then, in a stroke of luck, their Hexcup campaign was shared on a Facebook page called "Yup That Exists." The post got over 10 million views, and the donations started pouring in. When all was said and done, the Kickstarter campaign had raised $108,000. The Hexcup was featured on Reddit, Buzzfeed, the CHIVE and Yahoo!

With such overwhelming exposure, Attebery and Heimsoth soon had a distribution deal with Spencer's, a mall gift store with over 650 locations in the U.S. and Canada. For more information, visit **hexcup.com**.

WATER, WATER EVERYWHERE AND HERE'S A DROP TO DRINK

Andrea DuMont wants to set free the engineer inside.

"My mission is to encourage and empower young women and girls who might be interested in the field of engineering and help to foster social enthusiasm for the lifestyle," says DuMont, GeoE'11.

A self-described water engineer by day and independent blogger by lunch break, DuMont has a website called **thewatermarkblog.com** and an Instagram account **@dumontandi**. On them, an aspiring engineer can find stories about computational fluid dynamics, spicy sweet potato chipotle chili — and "drinking recycled poopwater."

That last topic rates high on the ick meter, but "if it's good enough for astronauts, it's good enough for me," DuMont says. In easy-to-understand language, complete with graphics, she explains how wastewater can be turned into potable water that comes out of your tap. With natural aquifers being depleted around the globe, DuMont predicts that treating wastewater will become more ordinary — and more necessary.

Demystifying engineering and showing how it benefits the world is all part of DuMont's mission.

"I've been working lately to get the message out that, 'Hey this is what female engineers do,'" she says. "It's not just math in cubicles all day long."

SPENCE ELECTED NATIONAL KD PRESIDENT

Patricia (Ruma) Spence, EMgt'94, MS IST'05, vice president of enterprise planning and PMO at Prudential, was elected national president of Kappa Delta Sorority. She also serves as a director on the Kappa Delta Foundation board. She has served Kappa Delta both regionally and nationally in collegiate and alumnae sectors, previously serving as national vice president-alumnae. She is a member of the Order of the Golden Shillelagh and a former member of the Missouri S&T Board of Trustees.

JOHNSON RETURNS TO ALMA MATER

Rebecca Johnson, CerE'83, MS EMgt'92, PhD EMgt'99, retired deputy to the commanding general and retired senior executive of Fort Leonard Wood, Mo., began a new assignment as executive director of development for the College of Engineering and Computing (CEC) at Missouri S&T on Sept. 11.

Johnson coordinates philanthropic strategy for the CEC, working closely with vice provost and dean **Richard Wlezien** to engage alumni and friends in the college's strategic vision.

FUTURE MINERS

Steve Puzach, CE'09: "Michelle and I got together with my fraternity brothers and their wives and daughters for a weekend in Houston in January and got a picture of our three daughters. On the left is Dia Bansal (daughter of Divya and **Aditya Bansal**, IST'08), the center is Valerie Puzach (daughter of **Michelle**, ArchE'10, and I), and on the right is Olivia Miller (daughter of Melissa and **Ryan Miller**, CSci'09)."

SPACE CASE

Otto Schnarr, CSci'09 , Math'10 (right), is a principal investigator for NASA's Advanced Data Acquisition and Telemetry System in the Armstrong Flight Research Center at Edwards Air Force Base in California. His work was recently highlighted in a feature story by NASA (see **rol.la/2vFKjWg**.) Schnarr is helping develop a communication system that could be used to assist aircraft with super-fast data transmission while using half the bandwidth of traditional methods. The new system can move 40 megabits per second, which is the equivalent of streaming eight high-definition movies from an online service each second, says Schnarr.

Photo courtesy of NASA Photo / Ken Ulbrich

Stephanie O'Sullivan, CE'82, former principal deputy director of National Intelligence at the Office of the Director of National Intelligence, was Missouri S&T's May 2017 commencement speaker. In her talk, she encouraged S&T graduates to be willing to tackle big challenges and then do the hard work to back it up.

1985

Stephen Knobbe, CE, was named North Texas office leader for HNTB Corp. He oversees 100 infrastructure professionals and handles operations in the firm's offices in Dallas and Plano, Texas.

1986

Teik C. Lim, MS ME, was named provost and vice president for academic affairs at the University of Texas at Arlington.

1993

Karun Sreerama, PhD CE, was appointed director of the city of Houston's public works and engineering department.

1996

Jeff Thornburg, AE, was named vice president of propulsion at Stratolaunch. Thornburg is also founder and president of Interstellar Technologies LLC.

1997

Gül Kremer, PhD EMgt, was named the C.G. "Turk" and Joyce A. Therkildsen Department Chair in Industrial and Manufacturing Systems Engineering at Iowa State University.

1999

Danielle Kleinhans, MS CE, PhD CE'02, was named vice president of bridges for the American Institute of Steel Construction.

Margaret L. McGunegle, GeoE, MS GeoE'04, was promoted to lieutenant colonel in the U.S. Army.

2000

Jonathan Erdman, Psyc, a former Episcopal priest, was ordained June 29 as a priest of the Personal Ordinariate of the Chair of St. Peter, a special diocese-like entity created in 2012 by the Vatican for former Anglican individuals, communities and clergy joining the Roman Catholic church.

2002

Ellie (Eckhoff) Dudley, EE: "The third generation of my family attended Aerospace Camp in July — my daughter Leah. Her dad is **Joe Dudley**, EMgt'02, and her grandfather is **Jim Dudley**, EMgt'76. My nieces Katie and Anna Jenks attended, too. Their parents are **Chrissie (Eckhoff) Jenks**, ChE'99, and **Steve Jenks**, ChE'99. They all have a great uncle, **Jerry Eckhoff**, CE'64."

Jayne Huseman, CE, administrative director of facilities, engineering

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A DAY IN THE LIFE OF A WOMAN IN STEM

Photo Courtesy of Tiffany Rebecca Photography

Lisa Stine, CE'10, a transmission engineer with Mesa Associates in Denver, was featured in a June 15 interview at Career Contessa, a career website for women. The question-and-answer-style interview focused on Stine's ability to forge successful relationships with clients in engineering despite the challenges associated with being a woman in STEM.

The article covers her time at Missouri S&T, her first job as a field engineer for the Arkansas Department of Transportation and how skills she learned in the workplace are as important as the ones she learned in school.

Stine's advice for women interested in engineering is to not get discouraged and to ignore perceived stereotypes.

"I think one of the biggest misconceptions — and something that unfortunately draws a lot of people away from the industry — is that everyone is super weird and introverted or that you're entering the land of pocket protectors," Stine said in the interview. "These stereotypes couldn't be further from the truth. We're normal, fun people! Maybe we get really excited about everything math and science — but hey, the world is a fascinating place!"

> "Maybe we get really excited about everything math and science — **but hey, the world is a fascinating place!"**

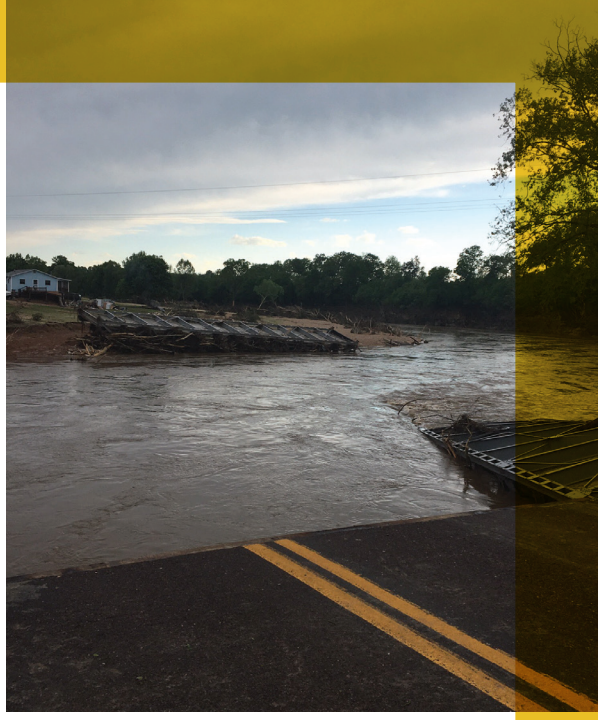
In her current position, Stine works on the design and structural analysis of high-voltage power line structures.

Initially, Stine thought getting respect from seasoned coworkers as a young female engineer would be difficult, but instead she sees advantages.

"For me, it's been an incredible experience," Stine said. "Walking into a meeting with men who have been in the industry for years, owning the floor, and holding your own is so amazingly empowering. … As women, though, we tend to be more empathetic. We form relationships, and we have sincere interests in others and their lives. This is so advantageous in working with clients — they start to look forward to seeing us, share milestones their kids have had, talk about their weekends. When projects have mishaps or schedules get behind (which will always happen), these genuine bonds can be a saving grace. You are much more likely to get some compassion and that additional change order from those whom you share connections with."

LIFESAVING FLOOD RELIEF

At one point during the heavy rain that fell across southern Missouri this past April, the only thing volunteer first responder **Dan Israel**, CE'83, could see from his back porch was the swollen North Fork River — a river that usually flows 100 yards from his house.



Photos courtesy of *Ozark County Times*

Floodwaters reached unprecedented heights the weekend of April 29, 2017, in Ozark County, where Israel lives with his wife, **Caroline**, CE'83. At its peak flow — 41.8 feet on the local gauge — the river consumed the homes of many of his neighbors and either flooded or destroyed bridges throughout the county, including several near their rural Tecumseh, Mo., home. Israel and his neighbors had no way out.

Israel works part time for the Ozark County Sheriff's office and is a first responder and firefighter with the Tecumseh Volunteer Fire Department.

"I entered law enforcement right after high school," says Israel, a past president of the Academy of Civil Engineers who retired as a geotechnical engineer and part owner from Terracon after 31 years in industry. "I kept a hand in law enforcement and have worked part time more than 26 years."

As the river rose out of its banks that April weekend, Israel evacuated his neighbors — eight people, including four children. In all he helped save 17 lives during the flood. Three he plucked from a rooftop. Six others he pulled from the water.

Israel didn't just save these people. He and his wife took them into their home. They fed them, gave them clothes and shoes, and provided other necessities, like toothbrushes. When they ran low, they called on the Ozark County Sheriff and the Missouri State Highway Patrol, and these agencies brought additional supplies by boat.

"These people were cold and wet," Israel said. "All they had was what they were wearing; many of them had no shoes."

Once floodwaters began to recede and the evacuees secured alternate living arrangements, Israel ferried them out. They were welcome to stay as long as they needed to, though. Five weeks after the flood, the last evacuee left the Israel residence.

"We had to get a little creative," Israel says. "I'm just glad we were there and able to help."

The recovery effort kept Israel busy. He developed house plans and consulted on other rebuilding projects.

The flood swept away Israel's barn, all of his tools and his blacksmith shop. He began rebuilding the barn in mid-June.

"We are nearly back to normal," Israel says. "Our barn has been rebuilt and the property cleaned up from the flood damage. We still have many of our neighbors' personal property in our buildings as they continue to rebuild. As you can imagine, it's been a real challenge, but progress is being made day by day."

A COLLECTION OF GREEN

What began as **Michael Greenway**'s dream to own a St. Pat's sweatshirt from every year they were produced ended this past summer when his father-in-law, **Larry Stratman**, Econ'78, found a 1964 sweatshirt — the only one missing from the collection — for sale in Sun City, Ariz. Greenway, NDD, had hoped to complete the collection by the 100th Best Ever, but some of the shirts were a challenge to locate.

"There were only a total of 50–60 made from the first three years because they weren't sold to the public," Stratman says. "They were only made for members of the St. Pat's Board."

The complete collection, including the only known sweatshirt from 1963, the first year they were made, is on display at University Book and Supply in downtown Rolla.

HERNANDEZ INSPIRES FUTURE ENGINEERS

Emily Hernandez, EE'16, a Ph.D. student in electrical and electronics engineering at Stanford University, discussed her efforts to encourage young people to pursue an education in a field related to science, technology, engineering and math (STEM) in the July 17 issue of *The Institute*, an online publication of IEEE.

Hernandez mentors pre-university students in California who are interested in a STEM field. She has worked in youth outreach since she was a high school student, when she first mentored young girls at a camp for engineering. That initial spark encouraged her to be creative and unafraid of failure — lessons she tries to instill in all her students.

SIZEMORE TO LEAD ST. LOUIS DISTRICT CORPS OF ENGINEERS

Col. **Bryan Sizemore**, MS EMgt'00, assumed command of the U.S. Army Corps of Engineers St. Louis District. Sizemore is the 52nd commander of the district, having previously served as a senior officer at the Maneuver Support Center of Excellence at Fort Leonard Wood, Mo. The St. Louis district manages the 300-mile Mississippi River watershed above the Ohio River by applying engineering and scientific resources to preserve, restore and enhance the environment.

MINER UNIONS

1. **Benjamin T. Brannon**, EE'11, and **Anna Osborne**, ArchE'11, CE'11, were married Sept. 5, 2015, in St. James, Mo. The couple has lived in San Francisco for the last four years, but is moving to Australia for a two-year work assignment. The photo was taken in front of *Expanding Horizons*, Missouri S&T's 2009 solar house, which the Brannons worked on together while members of the Solar House Design Team.
2. **Alyssa Russell**, BSci'15, married **Ryan Baysinger**, EE'16, on July 31, 2017. The couple resides in Kansas City, Mo.

and development at Blessing Hospital in Quincy, Ill., earned certified healthcare constructor status from the American Society for Healthcare Engineering of the American Hospital Association.

2004

Samantha (Whitwell) Kaysinger, Hist, was named Rolla High School Teacher of the Year for 2016–17.

Honggang Wang, MS MfgE, is an assistant professor of industrial and systems engineering at Rutgers University.

2005

Michael Lampe, NucE, MS NucE'08, was ordained a Catholic priest at the Cathedral Basilica of St. Louis in May following years of study at Kenrick-Glennon Seminary.

Stephanie Maiden, BSci, Chem, teaches cell biology and genetics as an assistant professor of biology at Truman State University.

2007

Emel Meteoglu, MS SysE, was awarded her first patent for "Access network type identification in mobile internet protocol (MIP) registration (RRQ)."

2008

Andrew "Drew" Johannes, MS EMgt, received the Federal Engineer of the Year Award, which honors top engineers employed by federal agencies across the country. Johannes is the battalion executive officer of the 84th Engineer Battalion, 130th Engineer Brigade at Schofield Barracks, Hawaii.

2011

Matt Limmer, EnvE, PhD CE'14, a postdoctoral researcher in the plant and soil sciences department at the University of Delaware, was awarded a two-year fellowship from the U.S. Department of Agriculture to study uptake of organic forms of arsenic in rice.

2012

Joshua Silverstein, GGph, a graduate student at Miami University of Ohio, was appointed president of the Microscopy Society of America's newly formed Student Council. The council was formed to improve the level and sustainability of student input in MSA decision-making.

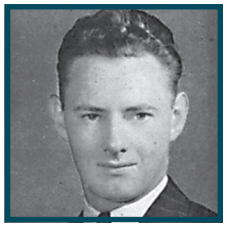
2016

Erin Clawson, Psyc: "My fiance, **Jacob Zorn**, CerE'17, and I were both accepted into graduate programs at Penn State University this coming fall, with full tuition scholarships and stipends. Jake also received a fellowship sponsored by 3M. I will be pursuing my law degree and Jake will be pursing his Ph.D. in materials science and engineering. I was born in Sydney, Australia, but raised in Naples, Fla. (where I graduated high school). Jake was born and raised outside of Troy, Mo. S&T was an amazing experience for both of us and our education here propelled us into being able to achieve our goals of getting into top graduate programs."

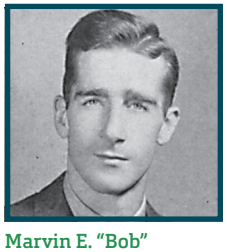
MINERS REMEMBERED

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.

1941



John B. McKee, EE, was a member of the Army ROTC and the Radio Club. After graduation, he served in the U.S. Army in Oregon following the Invasion of Pearl Harbor, then went to Alaska with the U.S. Army Corps of Engineers to help build the Alaska Highway. He earned a Bronze Star and retired in 1964 as a lieutenant colonel in the Army Reserves. He worked for Wagner and Howard Industries for many years. (March 31, 2017)



Marvin E. "Bob" Nevins, MetE, was a member of the *Rollamo* staff and the Miner football and golf teams. He co-founded Wisconsin Centrifugal Inc., which is now known as Metaltek Inc. He was a member of the Missouri S&T Academy of Mines and Metallurgy and was active in the Miner Alumni Association. (June 4, 2017)

1942

Carl T. Johnk, EE (May 24, 2015)

1944

Ralph J. Feldhaus, EE, was a member of Theta Tau, Blue Key and the *Rollamo* staff and was president of the Shamrock Club. He served in the Naval Air Corps and flew Corsair aircraft. Later, he worked for Bergstrom-Verbag Co. and then founded Dolan-Feldhaus Co. (April 1, 2017)

1945

Satoshi R. Kuwamoto, GGph (May 30, 2017)

Elmer A. Milz, PetE, was a member of Sigma Nu, Blue Key and Tau Beta Pi. He worked for Shell Oil Corp. for 42 years. (Jan. 22, 2017)

1946

Burnette Henry, MinE (May 17, 2017)

Walter H. Kiburz, CerE, was a member of Sigma Nu. He worked for A.P. Green for 43 years, retiring in 1989. Mr. Kiburz was a 50-year member of the First Presbyterian Church in Mexico, Mo., and served on a district board for the Great Rivers Council of the Boy Scouts. (April 18, 2017)

1948

John E. Corbett, EE, was a member of Tau Beta Pi. He served in the U.S. Navy during World War II and the U.S. Army during the Korean conflict and then worked for General Electric for over 40 years. (Feb. 24, 2017)

Ronald E. Emo, EE, was a member of Triangle, Blue Key and Tau Beta Pi. (Feb. 21, 2016)

Herbert B. Sachs, ChE, MS ChE'55, was a member of Alpha Chi Sigma and was a retired U.S. Navy commander. (May 4, 2017)

1949

William F. Bennett, EE, joined the U.S. Navy weeks after Pearl Harbor and was a sonar tech on the *U.S.S. Healy* then spent his career in the aerospace industry. (April 25, 2017)

Walter J. Janczewski, EE (April 12, 2016)

Vaughn E. Tippit, CE (Dec. 5, 2015)

1950

Laurence W. Cantwell, CE (May 4, 2017)

Paul F. Carroll, GGph (June 18, 2017)

Enrique S. Heller, CerE, MS MetE'59 (Feb. 13, 2017)

George W. Jamieson, ChE, was a member of Lambda Chi Alpha, Alpha Chi Sigma and Tau Beta Pi. He served in the U.S. Army during World War II in the European theater. He began his career with Carter Oil and retired from Exxon Production Research Co. (Feb. 14, 2017)

John J. Sydnor, EE (March 15, 2017)

William Weinstein, CE (May 30, 2017)

1951

Donald W. Canady, MetE (May 27, 2017)

Robert D. Martin, GGph (Jan. 31, 2017)

Joe R. Powell, EE (Feb. 27, 2017)

1952

Rolla S. Lush, CE, MS CE'57, served in the U.S. Army, retiring in 1972. (May 13, 2017)

Charles T. Mahoney, PetE, was a member of Lambda Chi Alpha and the Miner swim team. He came to Rolla after serving in the U.S. Navy for three years

during World War II. He worked at Texaco until his retirement, and then served the company as a consultant in its Latin America West Africa division. (Oct. 3, 2016)

Robert W. McLeane, CE, MS CE'57 (April 9, 2017)

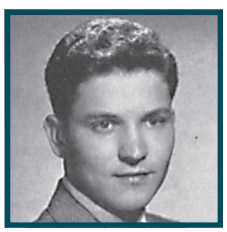
1953

Robert C. Wigger, NDD (March 29, 2015)

1954

Joseph B. Cole, ME, was a member of Sigma Nu, served in the U.S. Marine Corps until 1948 and then held positions in the oil and gas industry at Foxboro, Cabot and Wilbros Engineering. (May 26, 2017)

Robert E. Schwartz, NDD (May 28, 2016)



Milton J. Smid, ME, was a member of Pi Kappa Alpha, Blue Key, Army ROTC and the *Rollamo* staff. He was a first lieutenant in the U.S. Army and worked for Monsanto for 35 years. (March 5, 2017)

1955

P. Russell Dessieux, GGph (May 2, 2016)

1956

Henry R. Atkinson, CE (June 20, 2017)

James E. Fick, NDD (July 10, 2015)

William A. Gartland, ME, was a member of Kappa Sigma, the Newman Center, Army ROTC and the *Rollamo* staff and played baseball for the St. Louis Cardinals' farm team. (April 29, 2017)

Edward L. Mills, EE, was a member of the Independents. He worked for Gardner Denver Cooper Industries for over 33 years, retiring in 1989 as the electrical group manager. (April 17, 2017)

1957

Richard H. Aberle, MetE (Jan. 31, 2017)

William Charles Bohling, CerE (June 15, 2017)

Francis H. Henninger, ME, was a member of Pi Kappa Alpha, Blue Key and Pi Tau Sigma. He was a deep-sea diver in the U.S. Navy during the Korean conflict and worked for Allied Signal for 33 years, retiring in 1992. (March 2, 2017)

Harry M. Meyer, CE (June 23, 2017)

Harold A. Steinbruegge, EE, MS EE'65, was a member of Pi Kappa Alpha, Blue Key, Tau Beta Pi, Army ROTC and the *Rollamo* staff. A member of the Academy of Electrical and Computer Engineering, he retired as an electrical engineer for Bechtel Bettis-West Mifflin. (April 6, 2017)

James W. Trautwein, EE, co-founded Opteck Technology Inc. and retired in 2001. (Oct. 19, 2016)

1958

Harvey C. Guinn, Phys (June 19, 2017)

Orville L. Schaefer, EE, was a member of Blue Key and Tau Beta Pi and served in the U.S. Army during the Korean conflict. He

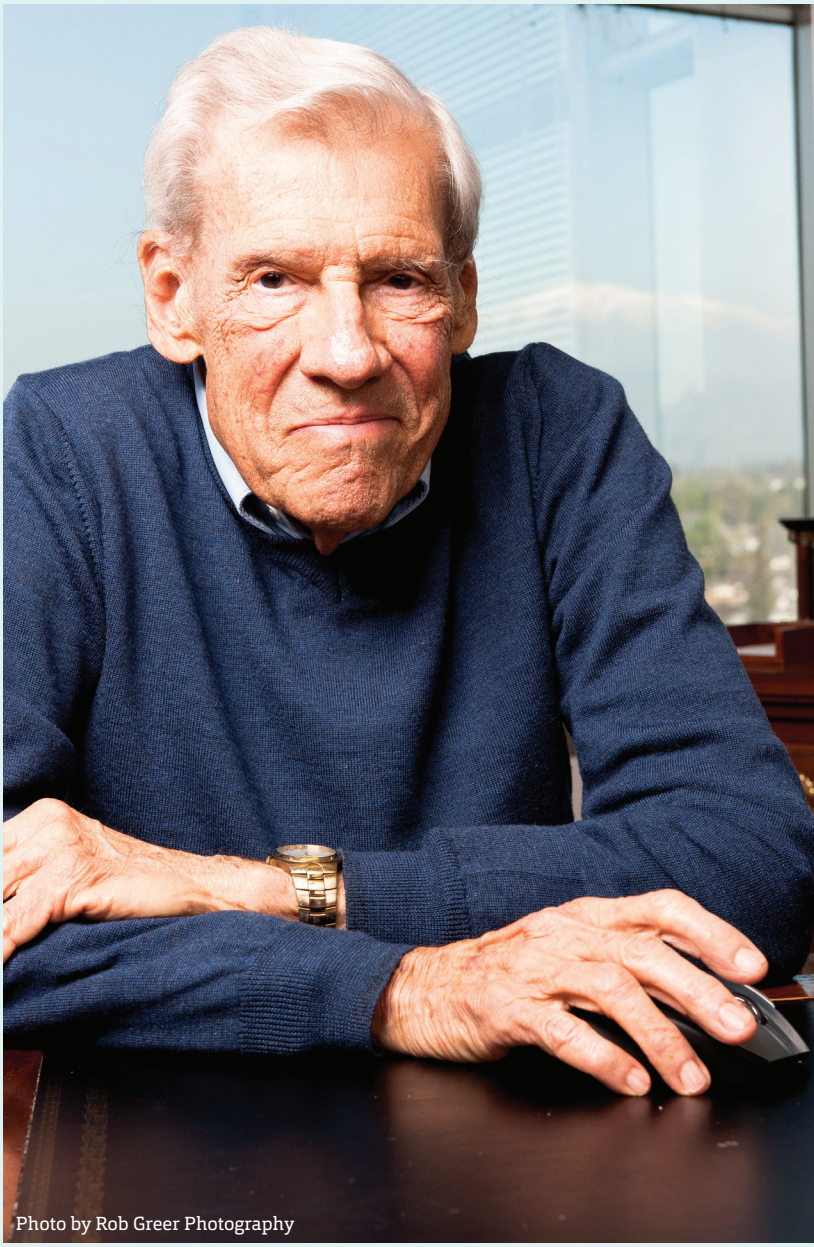


Photo by Rob Greer Photography

IN MEMORIAM: EDWARD TUCK

Edward Tuck, EE'53, founder of Magellan Systems Corp. and principal of the private investment fund Falcon Fund, died June 26, 2017. He was 85. Mr. Tuck was a leading pioneer in the handheld and embedded GPS navigation industry.

After founding Magellan, he led efforts to use low-Earth orbital (LEO) satellites to provide low-cost, high-bandwidth data and telephony to any location on the planet. He created Teledesic, a telecommunications company, that helped pioneer ideas for new satellite systems that are currently used around the world.

A supporter of private space flight, Mr. Tuck provided seed funding for the X Prize, which challenged teams from around the world to build a reliable, reusable, manned spaceship capable of carrying three people to 100 kilometers above the Earth's surface twice within two weeks.

Mr. Tuck, who was honored as one of Missouri S&T's 2011 Alumni of Influence, was a member of the Order of the Golden Shillelagh and the Academy of Electrical and Computer Engineering and was an emeritus member of the Missouri S&T Board of Trustees.

owned Schaefer Water Centers. (May 9, 2017)

Melvin D. Sherwood, CerE (March 27, 2017)

Henry L. Strieder, MetE, was a member of Sigma Phi Epsilon and Army ROTC. He retired from Deere and Co. in 1994. (March 23, 2017)

Charles E. Ward, ME (May 27, 2017)

1959

Richard L. LeGrand, ME (April 30, 2017)

Edward Landon Niedringhaus, CE, MS CE'70, was a member of Chi Epsilon, Army ROTC and Phi Kappa Phi. He served in the U.S. Army and worked as an environmental engineer for the Illinois Environmental Protection Agency. (May 6, 2017)

1960

Richard A. Bee, ME, MS EMgt'69 (Feb. 25, 2017)

Delano A. Doss, EE (March 11, 2016)

Terry W. Forinash, ME (Feb. 17, 2017)

Andrew Lapinski Jr., Phys, was a member of Theta Xi, the Newman Center, Pershing Rifles and the St. Pat's Board. (Sept. 5, 2015)

Robert C. Marshall, CE, served in the U.S. Army during the Korean conflict and was a member of the Korean War Veterans organization in Rolla. He retired in 2001 from Archer Engineering in Rolla. (Aug. 23, 2017)

William P. Renner, PetE (April 21, 2017)

Richard G. Schneider, EE, was a member of Pi Kappa Alpha, the Honors Association, American Foundry Society and the *Rollamo* staff. He worked at Westinghouse Electric for 34 years. (April 23, 2017)

1961

Richard C. Barnes, ChE, was a member of the American Institute of Chemical Engineers, the Baptist Student Union, Independents and the Honors Association. He worked in the paint manufacturing industry. (May 5, 2017)

Dale W. Leidy, ME, was a member of Pi Tau Sigma, American Society of Mechanical Engineers, Mathematical Association of America and the Honors Association. He retired in 1996 as corporate vice president for Owens-Brockway Glass and technical director for the company. He received Missouri S&T's Award of Professional Distinction and was a member of the Academy of Mechanical and Aerospace Engineers. (May 2, 2017)

Wayne L. Sievers, Phys (June 20, 2017)

Roy B. Smith, CE, was a member of Independents, M-Club, the American Society of Civil Engineers, Honors Association and the Miner swim team. After graduation he worked for Boeing and then took a job with the federal government specializing in the construction and maintenance of dams and bridges. (April 8, 2017)

James W. Stone, EE (July 23, 2015)

1964

William E. Dey, EE (April 17, 2017)

Reynolds Chrysostom Hayden Jr., EE, MS CSci'88, MS EE'91, was a member of Sigma Phi Epsilon and Army ROTC. He retired from McDonnell Douglas in 2006. (March 10, 2017)

Fred A. Hornbeak Jr., EE (June 10, 2017)

John P. Ruppert, MetE, MS EMgt'67, was a member of Sigma Nu, Army ROTC, American Foundry Society and American Society of Metals. He worked for Southwestern Bell, AT&T and Lucent. (Feb. 25, 2017)

Clarence P. Wagner, ME, was a member of Phi Kappa Theta, Army ROTC, Newman Center, Society of American Military Engineers, Alpha Phi Omega and the *Rollamo* staff. (Feb. 15, 2017)

1965

Larry Cooper, ME, MS ME'71 (June 1, 2017)

Kenneth P. Ferguson, MetE, MS MetE'70, was a member of Sigma Nu, Interfraternity Council, American Society of Metals, American Foundry Society, and Alpha Phi Omega. (April 16, 2017)

1966

John W. Crow, ME (April 15, 2017)

E. David Hayes, EE (Jan. 5, 2015)

1967

Raymond E. Boothe, CE (March 28, 2017)

Chester A. Henson Jr., CE, was a member of Acacia, the St. Pat's Board, Army ROTC, the American Society of Civil Engineers and the Society of American Military Engineers and was a student knight of St. Patrick. (March 26, 2017)

1968

Ronnie E. Brooks, CE (April 11, 2017)

Harry A. Burns, Chem (April 3, 2017)

Joe G. Goedde, CE (May 28, 2017)

Richard Trapp, NDD (Jan. 14, 2016)

1970

Stephen E. Wright, PetE (April 17, 2017)

1971

Franklin D. Roberts, MS EMgt (Sept. 23, 2016)

1973

Barbara Andrews, Psyc (April 2, 2015)

Terry W. Caldwell, CE (June 3, 2017)

Brian G. Marstellar, ME (May 10, 2017)

Ron L. Thompson, MS Phys, a retired Boeing executive, was a guest lecturer at Washington University in St. Louis and the University of Missouri-St. Louis. A passion for Disney led Mr. Thompson to a second career as a writer and podcaster for Walt Disney World Fan Zone. (April 12, 2017)

1974

Michael D. Moellering, MetE (Jan. 16, 2015)

1975

Gregory N. Brockman, ME (April 18, 2017)

Barbara J. Clayton, Engl, was a reporter, feature writer and managing editor for the *Raytown News*. She served as an adjunct lecturer in English and continuing education coordinator for Missouri S&T at Fort Leonard Wood, Mo., where she taught English as a second language to military spouses. (March 3, 2017)

Michael A. Stevens, MinE (Dec. 24, 2016)

1976

William J. Fleis, CE (April 10, 2017)

Cecil O. Locklear, AE (June 17, 2015)

1977

Thomas R. Androlewicz, MS CSci (Feb. 22, 2017)

Roy J. Mattes Jr., ChE (Sept. 10, 2016)

Michael G. Quagliata, CE (June 6, 2017)

1980

Merle D. Dillow, Econ, EMgt'86, was a member of Delta Tau Delta and Theta Tau and was a Student Council officer. He played on the Miner football and basketball teams. (March 28, 2017)

1981

Donald O. Darrough, EMgt, was a member of Tau Kappa Epsilon, Beta Chi Sigma and the American Society of Engineering Management and played on the Miner football team. (April 6, 2017)

Roy O. Wingfield, GeoE (Sept. 7, 2016)

1982

Paul J. Entwistle, PetE, was a member of the Society of Petroleum Engineers and the Water Polo Club and was on the Miner swim team. (June 2, 2017)

Carla C. Leitner, EMgt (Sept. 25, 2016)

1983

Robert Joseph Krull, EE (April 7, 2017)

1984

Joan Wolfe, Hist (March 26, 2017)

1985

Keith Allen Knudsen, ME (March 27, 2017)

1991

Thomas M. McMahon, CSci (May 10, 2017)

1993

Mickey Dean Lawrence, MetE, MS MetE'95 (June 1, 2016)

1996

David Lee Wells, EMgt (May 10, 2017)

2009

Jonathan Lance Ellis, MS EMgt (Sept. 19, 2016)

2015

Michael Rene Tarasiewicz, Cert EMgt (Oct. 12, 2016)

FRIENDS

Marjorie Abernathy, wife of Thomas S. Abernathy, CE'52 (March 7, 2017)

Dillon Barton, former Missouri S&T student (April 27, 2017)

Drew Bischoff, a senior in computer engineering and a member of the Missouri S&T Mars Rover Design Team (June 13, 2017)

Mark Boyle (June 3, 2016)

Lloyd H. Brown (Aug. 21, 2015)

Ethyl Burton, wife of Sam Burton, former Missouri S&T employee (May 29, 2017)

Keith Dake (May 2, 2017)

Donna Dawes, wife of Ronald F. Dawes, EE'74 (Oct. 21, 2015)

Virginia L. Doss, wife of the late Delano A. Doss, EE'60 (March 2, 2015)

Laura Dressel, wife of Waldemar M. Dressel, GGph'43 (April 16, 2017)

La Homa Dreste, wife of the late Jerome Dreste, CE'41 (Sept. 17, 2015)

Wayne Duley (March 16, 2016)

Dickie Dunn, wife of the late Ervin E. Dunn, ME'51 (Jan. 15, 2017)

Peggy Epps, wife of Ronald C. Epps, Phys'67 (Feb. 21, 2017)

Dolores J. Friede (June 20, 2017)

Jerry Gardner (May 8, 2017)

Norma L. Garver, wife of August Garver, professor emeritus of mathematics and statistics (Dec. 25, 2015)

Adam Hagenson (May 15, 2017)

Aurora Hart, wife of Gerard J. Hart, EMgt'71 (Sept. 16, 2015)

Stacia Kasten, wife of the late Vernon Kasten, CerE'45, MS CerE'45 (Feb. 25, 2017)

Carl M. Kidwell (April 27, 2017)

Robert J. Kitchen (May 20, 2017)

Julian M. Kite (Feb. 28, 2017)

Jerry Lamar (March 6, 2017)

Marjorie Ledbetter, wife of the late George R. Ledbetter, CerE'57 (May 16, 2017)

Dorothy Marshall, wife of the late Robert C. Marshall, CE'60 (June 3, 2017)

Doris I. Meyer (May 5, 2017)

Margaret Ann "Molly" Mills, former executive assistant in University Advancement (May 26, 2017)

Weldon W. Moore (March 19, 2017)

Hanna Nevins, wife of the late Marvin E. "Bob" Nevins, MetE'41 (April 17, 2017)

A.C. O'Neal (May 29, 2017)

Betty Owens (June 3, 2017)

Don E. Peaslee (May 7, 2017)

Hila Pepmiller, wife of the late Paul E. Pepmiller, EE'59 (May 17, 2016)

Peggy S. Powell (May 5, 2017)

Peggy Salarano, wife of the late Stephen Salarano, MetE'47 (April 3, 2017)

Elizabeth Schneider, wife of the late Richard G. Schneider, EE'60 (Jan. 31, 2015)

Bettye Sheffield (June 2, 2017)

Ann R. Siehr, wife of the late Dr. Donald Siehr, professor emeritus of chemistry (March 29, 2017)

Glynnes Smith (Nov. 4, 2015)

Lawanda Smoot (March 24, 2017)

Harriet Spanel, wife of the late Dr. Leslie Spanel, Phys'59 (Feb. 2, 2016)

Jerry Vineyard, former assistant state geologist with the Missouri Department of Natural Resources and author of several books on Missouri's natural wonders, including *Geologic Wonders and Curiosities of Missouri*. (March 31, 2017)

Richard L. Wirz (March 10, 2017) □

Photo by George Bridges

LEAVING A LEGACY
IN METALLURGICAL ENGINEERING

The steel industry career **Lindell R. "Bob" Hurst** expected when he majored in metallurgical engineering never materialized.

But things have a way of working out, and that's the wisdom Hurst offers to students today.

"You may think you're preparing for a certain profession, but opportunities change that," he says. "You need to be ready to adapt."

Hurst, MetE'74, MS MetE'77, MS EMgt'84, MS EMch'87, grew up in the St. Louis area and applied to two universities: Missouri S&T and Purdue. He says deciding which to attend was easy: "Rolla was just a much better value." In choosing a major, Hurst went with a smaller program.

"I was a good chemistry student in high school but I didn't want to major in chemical engineering because it was one of the larger departments," he says. "I liked being part of a smaller department because of how well I got to know my classmates."

A summa cum laude graduate, Hurst attributes his GPA to a disciplined disposition. "I studied from 6 to 10 p.m. every night with only an occasional trip to the vending machine." He finished his bachelor's degree and earned the first of three master's degrees before joining Monsanto, where he spent 17 years in corrosion and materials engineering, working as a troubleshooter in chemical plants.

"It was my job to help keep the plants running," he says. "If we had an equipment problem, I worked with the other staff to get it fixed as quickly as possible and in a way that ensured the problem didn't reoccur." During this time, Hurst earned two additional S&T master's degrees.

When Monsanto spun off its chemical division as an independent company, Hurst went to work for the spinoff, Solutia. He joined Shell Oil Co. in 2006. "The work at Shell challenged me to get outside my comfort zone," says Hurst. "A big project for Solutia was $100 million, while a big project at Shell was in the billions."

Hurst retired from Shell in 2016 as senior corrosion and materials engineer. He and his wife, Kathleen, a University of Missouri journalism graduate, live in the Houston area. Longtime supporters of the Miner Alumni Association and the metallurgical engineering department, they recently established the Lindell and Kathleen Hurst Endowment, a planned gift that will support a faculty chair and lab fund in metallurgical engineering.

"I was well-prepared for industry because of my excellent engineering education," says Hurst. "We want our gift to give others that advantage."

FOURTH-PLACE FINISH IN MILE-HIGH CITY

The Missouri S&T Solar House Design Team finished in fourth place in the U.S. Department of Energy's 2017 Solar Decathlon, held Oct. 5–15 in Denver.

The team's house, called SILO, was one of 11 entries in the design competition. Entries in the Solar Decathlon were judged by a panel of experts in 10 categories, ranging from appliances and architecture to energy use and market potential.

During the competition, members of the Order of the Golden Shillelagh, the university's major donor society, toured the house as part of a weekend celebrating the organization's 40th anniversary.

MISSOURI S&T

Miner Alumni Association
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Rolla, MO 65409-0650

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