FALL/WINTER 2015 VOL. 89 NO. 3

MISSOURI S&T MAGAZINE

MINERS OF INVENTION

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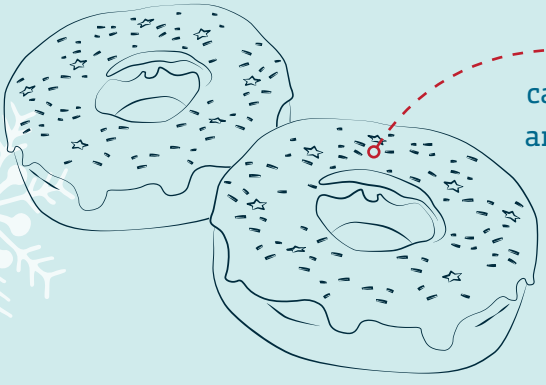
Miners give ...

We give to make the world a better place.

“We have been stuck on I-44 for several hours. These kind Samaritans (college students from Rolla) are passing out hot chocolate along the highway. They made our night!”



Doughnuts bring out the cash and the caring. Student ambassadors sold 330 boxes of the sweets, raising enough money to send a fellow student home to see his family.

We give because it makes us stronger.

We give because we’re grateful.

Your tax-deductible gift will help the Miner Alumni Association continue its legacy of preparing students to meet the challenges of tomorrow.

We give

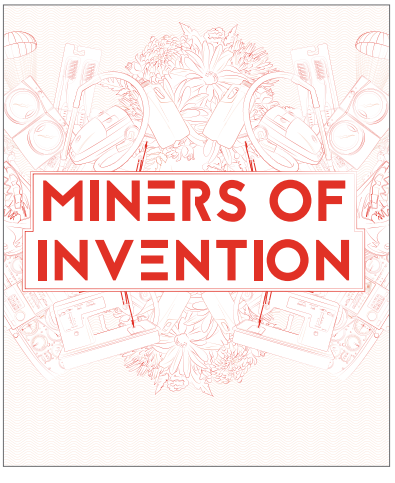
BECAUSE WE’RE MINERS

Make your gift at **mineralumni.com/give**.


16


8


11



ON THE COVER

Look closely at this issue's cover and you'll find vacuum cleaners, washing machines, sewing machines, milk jugs, drill bits, floral arrangements, parachutes, tooth brushes and an airplane cockpit. These images illustrate just a few of the places where Miner alumni inventions can be found.

Rolla's grade on Niche Rankings' June 2015 list of Best College Towns in Missouri. Towns with a high ranking are considered "a great place to live for both students and non-students alike."

3

Missouri S&T's ranking in a *USA Today* and *College Factual* list of the top 10 places to get an engineering degree in the U.S.

15

Career opportunities and employer relations' ranking among best career centers in the 2015 *Princeton Review Best Colleges* guidebook.

49

S&T student-athletes who received academic achievement awards from the Division II Athletic Directors Association for the 2014-15 academic year.

318

Employers who recruited S&T students at the Fall Career Fair in September. Students Today, Alumni Tomorrow and the Miner Alumni Association hosted special events for 96 S&T alumni recruiters.

19

Missouri S&T's rank on **BestColleges.com**'s list of the 50 Best Small Town Colleges of 2015.

74

Missouri S&T's rank among national universities according to *Washington Monthly*. We were listed No. 46 among public national universities.

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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Dear Alumni and Friends,

Miner alumni are an inventive bunch.

From everyday innovations — toothbrushes and vacuum cleaners, driving machines and washing machines — to industrial, medical and digital advances, to the unusual and unheralded, Missouri S&T graduates have put their brains to work to make things better.

Missouri S&T Magazine staff wondered just how many inventions could claim roots in Rolla, so we asked our readers to share their stories. The response was overwhelming.

Over 160 of you wrote in with details about your inventions. Many of you listed patent numbers associated with those inventions. Some of you hold one or two patents, while others have hundreds to their credit.

We asked **Jeff Schramm**, Hist'92, what to make of all this inventiveness. Schramm is an associate professor of history and political science at Missouri S&T. He specializes in the history of technology. Schramm says it boils down to concentration.

"Our students are more focused than many," he says. "This focus often translates into an innovative spirit."

That innovative spirit is the subject of this issue's feature section. Read on to find out what everyday items — and obscure technological gadgets — our Miners have created.

Mary Helen Stoltz
Engl'95
news & features editor

EDITOR'S TOP FIVE PICKS

1} Missouri S&T turns 150 in 2020, and historian **Larry Gragg** is chronicling university history in a keepsake book. Read more on page 19.

2} **Paul Friz**, MS AE'14, channeled a love for outer space into a NASA internship. Now he's pursuing a Ph.D. from Missouri S&T. His story is on page 21.

3} An S&T geological engineer is looking for interstellar water by baking asteroids. Her work could lead to commercial space travel. See more on page 11.

4} Do you know the connection shared by Miner alumni, Chatty Cathy, parachutes and vacuum cleaners? Read the feature section starting on page 24 to find out.

5} Homecoming 2015 was an old-fashioned fall festival on campus. If you didn't make it back, you can check out scenes from the festivities on page 16.

CORRECTION

The obituary for **Won C. Park**, MS GGph'62, which appeared in the Summer 2015 issue, included the wrong photograph. The obituary with the correct photo appears on page 44 of this issue. We regret the error.

Q:

What was your favorite food during college?

Before the days of university food service, many Miner alumni ate their meals at eating clubs. Later, campus cafeterias provided the three squares a Miner needed. For some students, a landlady or fraternity or sorority cook served the meals. Others had a favorite restaurant. We asked about your favorite food during college. Here is what you told us.

A:

"Rayl Cafeteria chili (1980–84). The food service at that time would throw all the leftover legumes they had, including lima beans, into a pot of tomato, grease and microscopic meat. A real gastrointestinal delight!"

John LaBerg, CE'84
Schaumburg, Ill.

"Back in the late '50s, my wife worked at dear old Rolla Drug. I spent many evenings in the back booth. As a scientist, I had to experiment with all of the ice creams and flavorings to concoct the ideal milkshake. The hands-down winner was a pineapple shake made with black walnut ice cream. I paid a big price in poundage gained, but science was served."

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

"I never liked liver and onions as a kid. But Lambda Chi Alpha's long-time cook Myrtle Mae Marlow made liver and onions. Since I was away from home, I had to try to eat whatever was served. Much to my surprise I loved Mrs. Marlow's liver and onions. I have been eating liver and onions ever since."

Pete Legsdin, Econ'70
Springfield, Mo.

"One of my favorite food experiences was being a part of the 'meal plan' at a small Asian restaurant called East Meets West. The woman who ran the place went out of her way to 'educate' me on the new types of food I was eating. The meal plan consisted of 20 meals for $40, and that was certainly within my budget. Four or five years after I graduated, I was back in Rolla recruiting for my company. I stopped in to eat one afternoon, and not only did she remember me, she pulled out my five-year-old meal card that still had a couple meals remaining. She insisted that I not pay for my meal since I had already paid for the plan. Wow. Would you ever find a place or service like that today? Very fond memories for me."

John LeaRussa, ME'88
Houston, Texas

Editor's note: The owner of East Meets West was the late Meiko Tyler, the wife of ***John Tyler****, research engineer in Missouri S&T's Rock Mechanics and Explosives Research Center and longtime Solar Car Team advisor.* *See page 46 for Ms. Tyler's obituary.*

"I was at Rolla when Alex's Pizza opened, and it still is one of the best pizzas I have ever had. It tasted best after a long and difficult EE exam. I was a member of Shamrock Club, board bill was $1 a day. We got steak once in a while, which was great. We ate on picnic tables across from the theater on Pine. I remember eating breakfast and reading the *St. Louis Globe-Democrat*. I also liked the A&W Root Beer stand; they had a great chili dog. Life was a lot simpler back then."

Robert Heider, EE'66
St. Louis

Watch for the next question in your Miner Alumni Association eNewsletter.

Email your answers to alumni@mst.edu or respond via Facebook or Twitter.

@kwlynn

Kent Lynn, CE'85, Washington, D.C.

@MissouriSandT cited on the front page of today's @washingtonpost for requiring freshman to live on campus. Good!

@marawilliamskc

Mara Rose Williams, *Kansas City Star*

Longtime collaboration between @MissouriSandT and @HoneywellNow is a go.

@geniuskmo

Keith Mosby, CSci'03, St. Louis

I remember making an alarm clock for my Computer Engineering lab at @MissouriSandT. #IStandWithAhmed

@fredstone

Fred Stone, MetE'07
Engineer II, Missouri S&T facilities operations

So proud of @MissouriSandT's solar house design team! What incredible effort and creativity to get to this point.

schneiderelectric

Schneider Electric

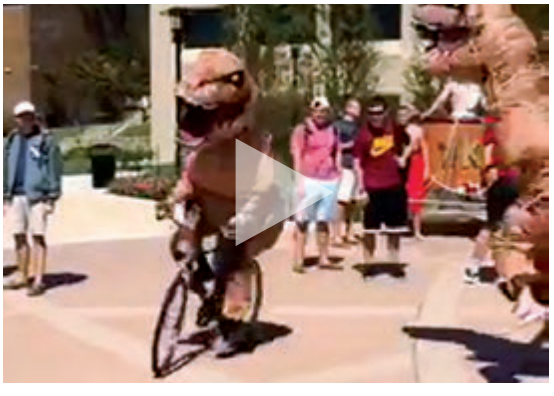
Your Nest Home is very interesting and homey. Great design Missouri University of Science & Technology #nesthome #RiseWithUs #missouriuniversity #missourisolarhouse #science #technology #SchneiderElectric #sd2015 #SolarHouse #SolarDecathlon

MissouriSandT

Zorb Soccer at The Puck all afternoon! #zorb #soccer #rolla #missourisandt

MissouriSandT

Students speak with employers at the Career Fair today in the Multi-Purpose Building. #missourisandt #careerfair



MissouriSandT

Ever seen a dinosaur ride a bike? Well now you have, thanks to our #SigEp chapter.

sandtminervb

Missouri S&T Miner Volleyball

THANK YOU so much to all the OUTSTANDING fans who came out last night in their pink (shirts & body paint) to support #MinerVB to victory over a great Truman team and the fight against breast cancer! The energy in the gym was AMAZING!! THANK YOU! #PinkOutNight #FightBreastCancer #GoMiners #MinerPride #GLVCvb

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DAVE BAYLESS: THE POWER OF LEADERSHIP

Dave Bayless of Ohio University is the son of **Jerry Bayless**, CE'59, MS CE'62, an associate professor of civil, architectural and environmental engineering, who has been a member of the Missouri S&T faculty since 1959. Photo by Ben Siegel/Ohio University.

The oil crisis of the 1970s ignited Dave Bayless's passion for energy. A few years at the Naval Power School in the late 1980s opened up an interest in teaching. And multiple entrepreneurial experiences fueled a new cause — integrating leadership education into engineering education.

A fellow of the National Academy of Inventors, Bayless, ME'87, credits **Virgil Flanigan**, ME'60, MS ME'62, PhD ME'68, professor emeritus of mechanical and aerospace engineering at Missouri S&T, and his advisors at the University of Illinois, the late Jim Peters and Richard Buckius, with sparking his interest in research.

"I realized you can teach and do really cool things, and it reinforced that I wanted to be a professor," he says. "It's not for everybody, but I just have a blast. Where else can you basically do what you want to do all the time and be around young people who are eager to learn and want to solve problems?"

Bayless currently directs the Robe Leadership Institute at Ohio University, where he also serves as the Loehr Professor of Mechanical Engineering and director of the Ohio Coal Research Center.

"The institute helps engineers develop their leadership skills," he says. "No matter how brilliant an idea is, it takes a champion to fight the fight. Most engineers coming out of school don't have that."

Nearly four years ago, Bayless and another member of the American Society for Engineering Education (ASEE) started a new leadership division within the organization. Today, the group has more than 700 members.

"It's really developed a life of its own," he says. "It's not a fad. It's something that engineers need to learn. In 20 years, it will be like calculus. At least that's my vision."

Bayless says his career success reflects an ability to both solve technical problems and convince others to implement his solutions.

"It's really strange from my perspective because I'm not a creative person," he says. "I don't have great musical ability or grand visions. However, I can apply basic engineering skills and problem-solving to things that have a commercial value — there's never a lack of problems in the energy field."

Responsible for more than $18 million in externally funded research, Bayless holds five U.S. and 25 international patents, with 13 applications pending, and has authored more than 60 peer-reviewed publications. He is co-founder and president of ECO2Capture Inc., an Athens, Ohio, start-up company that patented technology to capture carbon dioxide for use in algae commercialization. ■

MEM'S THE WORD

Missouri S&T is the only university in America to offer mechanical earth modeling (MEM) as part of the undergraduate petroleum engineering curriculum. Now with a $225,000 gift from Chevron through its University Partnership Program, S&T is one step closer to establishing a MEM Center of Excellence to build the program.

"One of the strengths of our program is to include mechanical earth modeling into the undergraduate environment," says **Andreas Eckert** (above), an assistant professor of geosciences and geological and petroleum engineering at Missouri S&T. Eckert teaches undergraduate courses in Finite Element Analysis and MEM.

The petroleum industry has extensively used mechanical earth modeling in the last 15 years, but there's a gap between the industry and academia, Eckert says.

Eckert also teaches the graduate course Advanced Mechanical Earth Modeling 1, in which students compile and analyze numerical MEM data, using a variety of approaches to reach the same goal. They use seismic (fault) analysis; geological maps; well logging; and lab rock mechanics to test rock strength.

When all the data is gathered, they analyze it and produce 3-D earth models and numerical models that quantify subsurface stress environments of geologic structures. This knowledge can help predict where a well can be drilled safely or to assess risk of fracturing reactivation — that is, inducing an earthquake on a fault by changing the subsurface pore pressure — when fluids are injected or withdrawn.

"As a result, our students are well prepared for tasks such as hydrologic fracturing," Eckert says.

SCHRENK HALL **FACELIFT**

Schrenk Hall's 83,000-square-foot west wing will get a much-needed facelift next fall thanks to $12 million in state capital improvement funding. Missouri Gov. Jay Nixon signed the bill in June.

The University of Missouri System and Missouri S&T will contribute approximately $6 million toward the project. Final renovation plans were approved by the UM System Board of Curators in October. Construction is expected to begin in September 2016 and be completed by December 2017.

BERTELSMEYER HALL EARNS **LEED SILVER CERTIFICATION**

James E. Bertelsmeyer Hall, S&T's chemical and biochemical engineering building, was recently awarded LEED Silver certification from the U.S. Green Building Council.

The LEED rating system is the foremost certification program for buildings, homes and communities that are designed, constructed, maintained and operated for improved environmental and human health performance.

Bertelsmeyer Hall received 56 points and achieved LEED Silver certification for water savings, energy efficiency, indoor environmental quality, site selection, and development density and community connectivity. The scorecard is available online at **rol.la/BertLEED**.

CRUISING THE SURFACE OF MARS

You may one day have the chance to cruise the surface of Mars in a rover designed by an S&T student. The Missouri S&T Mars Rover Design Team took 10th place this fall in an international competition in Poland with their rover *Horizon*. The students competed against 40 teams from around the world in a contest to design and build the next generation of Mars rovers.

S&T TAKES 5TH IN SOLAR DECATHLON

S&T's Solar House Design Team placed fifth in the 2015 U.S. Department of Energy Solar Decathlon, held Oct. 8-18 in Irvine, Calif. This was the team's sixth competition and its highest score yet. S&T's entry, called the Nest Home, was built from three repurposed shipping containers covered with siding made from pallet lumber. It gets its name from the practice of birds that build nests using natural materials. The house was judged in 10 categories, including marketability and architecture. Photo by Thomas Kelsey/U.S. Department of Energy Solar Decathlon.

HIGH-STRENGTH STEEL = FUEL-EFFICIENT CARS

Dan Field, MetE'13, a graduate student in metallurgical engineering (pictured here using the scanning electron microscope in McNutt Hall), works with Ronald J. O'Malley and David C. Van Aken in the Kent D. Peaslee Steel Manufacturing Research Center.

By the year 2025, cars and light trucks will average 54.5 miles per gallon — at least that's the goal set by the U.S. Department of Transportation in its corporate Average Fuel Economy (CAFE) regulations.

To get there, auto manufacturers are looking at ways to improve exhaust treatment systems, transmission efficiency and aerodynamics. But reducing vehicle weight is also important in achieving the CAFE goals, says **Ronald J. O'Malley**, the F. Kenneth Iverson Endowed Chair of Steelmaking Technologies at Missouri S&T.

Using a process known as TRIP — or transformation-induced plasticity — O'Malley is developing a third-generation advanced high-strength steel in S&T's Kent D. Peaslee Steel Manufacturing Research Center. It is stronger and more lightweight than the first-generation steel used in today's cars and trucks, and it's easier and cheaper to make than the second-generation material currently being developed.

The process involves the transformation of an unstable crystal structure known as austenite, which normally exists at high temperatures, into martensite, a harder substance that develops as the steel deforms. Under the direction of **David C. Van Aken**, Curators' Teaching Professor of metallurgical engineering, the Missouri S&T team has used an atomic modeling method known as density functional theory to identify alloying elements to create the dual TRIP character of these new steels.

One benefit of conducting the research at Missouri S&T is the ability to create and test small batches of steel. S&T's labs can create 200 pounds of steel at a time, whereas big steel manufacturers like Nucor, where O'Malley was chief metallurgist before joining S&T, would have to make 170 tons of steel for testing, O'Malley says.

CHANGES IN UM SYSTEM **LEADERSHIP**

Amid criticism over his handling of racial issues, University of Missouri System President **Tim Wolfe** announced his resignation on Nov. 9, 2015. On Nov. 12, the UM System Board of Curators appointed former University of Missouri-Columbia Deputy Chancellor **Mike Middleton** to serve as interim president during a search for a new president.

Middleton joined the MU faculty as a law professor in 1985. He retired as deputy MU chancellor on Aug. 31, 2015, after 17 years in the position.

HONORING DONORS AND VOLUNTEERS

Missouri S&T's Honor Roll of Donors and Volunteers for fiscal year 2015 is now available online at **honorroll.mst.edu**. The listing recognizes contributions and service from July 1, 2014, to June 30, 2015.

Through the Honor Roll, Missouri S&T acknowledges the philanthropic and volunteer support that continues to move our university forward. Thank you to the alumni, friends, corporate and foundation partners, faculty, staff, students, parents and others who fill our registry with Miner Pride.

CELEBRATION OF NATIONS

This past fall, Rolla residents joined the Missouri S&T community for a celebration of the cultural diversity that makes the town unique. The sixth annual Celebration of Nations, held in downtown Rolla on Sept. 26, began with a Parade of Nations featuring flags from approximately 80 countries — all of which are represented in the S&T student body — as well as themed floats, marching bands and community entries. After the parade, visitors sampled international cuisine, created multicultural arts and crafts, and enjoyed cultural exhibits and performances.

EASY-BAKE ASTEROIDS

***Leslie Gertsch** is baking asteroids in search of an interstellar water source that could one day lead to industrialized space travel.*

Using a vacuum chamber that simulates the conditions of space, Gertsch, an associate professor of geological engineering at Missouri S&T, heats near-Earth objects (NEOs) like asteroids and comets, and then measures and analyzes the gases they release.

"Some NEOs contain up to 22 percent water locked within minerals," she says. "Our job is to predict how much water we can actually get out of them in space."

One of the processes, called in-situ resource utilization, involves collecting resources from NEOs, the moon or Mars, and converting them into useful things like spacecraft fuels and propellants, Gertsch says.

The ability to use resources found in outer space could reduce payload needs and boost planetary exploration, Gertsch says. "This work could change the way we view space travel."

Her work is funded through a $500,000 NASA Early Stage Innovation Research Grant, which supports new technology that addresses high-priority needs for the U.S. space program. Gertsch works on the project with NASA Kennedy Space Center, NASA Glenn Research Center, Colorado School of Mines, the University of Hawaii and Integrated Concurrent Systems Associates Inc.

"This is an interdisciplinary project," she says. "Our researchers have backgrounds in planetary geology, meteoritics, mineral processing, chemical engineering, mechanical engineering, mining engineering and astrophysics, among others." ■

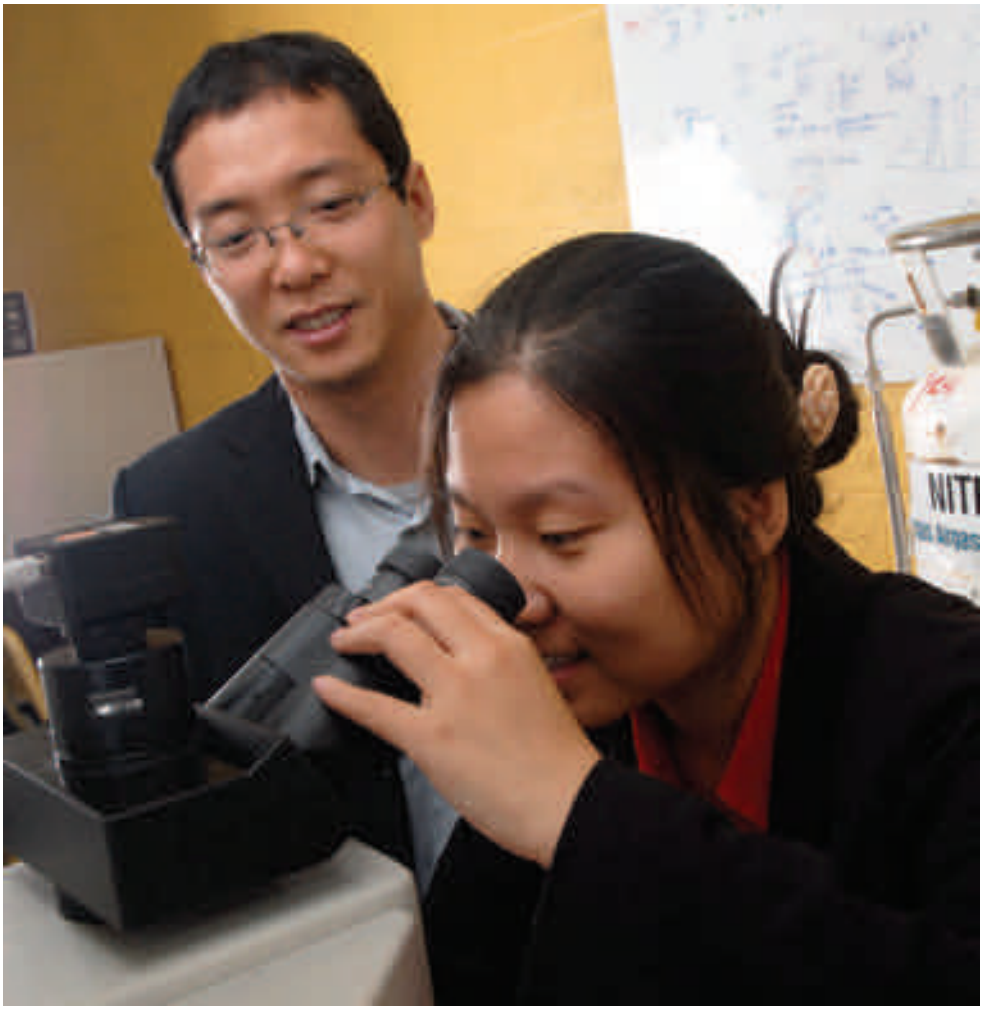
STUDYING THE **BUILDING BLOCKS OF LIFE**

Yinfa Ma, Curators' Teaching Professor of chemistry, and **Honglan Shi**, an associate research professor of chemistry, are working with colleagues at Clemson University to develop a microscopic fiber optic probe that can detect changes in a single cell. The work is funded through a $567,311 grant from the National Institute of General Medical Sciences of the National Institutes of Health.

Imagine a doctor's needle that is only 2 to 5 microns in size. When inserted into a cell, the probe's fluorescent nanomaterial-doped tip is used to detect either the cell's pH change or corresponding temperature change.

When hit with a laser source attached to the probe, the six strands surrounding the central fiber detect changes in the cell's reflected fluorescent signal. Researchers then calculate the ratio in two ways: one looks at the peak fluorescent intensity and the reference intensity; the other measures the decay time of the phosphorescence, which is then calculated and correlated with the pH or temperature values.

"Comprehensive understanding of a single cell in response to its biological environment and stimuli is becoming the foundation of many biomedical research fields, including drug development, nanotoxicity study, biomarker discovery, cancer diagnosis and treatment, and many other areas," Ma says.



Xiandong Yang (left) and Jie Gao, assistant professors of mechanical and aerospace engineering. Photo by B.A. Rupert.

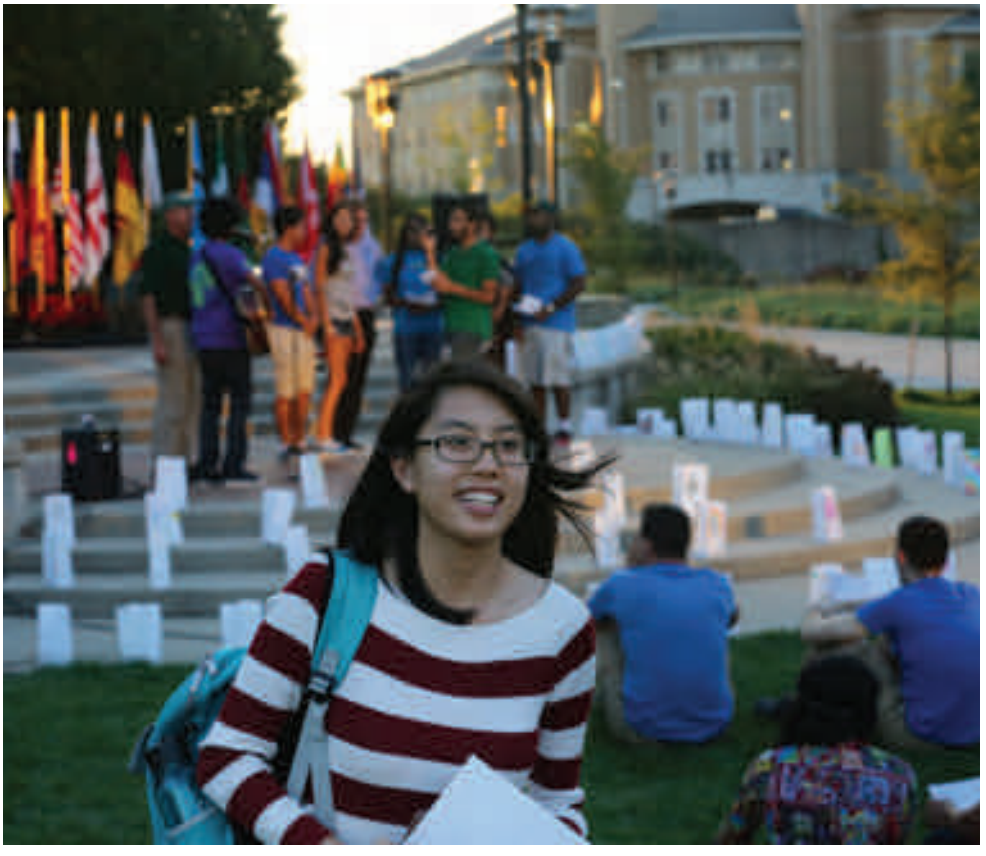
COLOR PRINTING WITH NO INK

Unlike inkjet or laser printers, which use mixtures of various pigments to reproduce color on a printed page, a new process developed by a pair of S&T mechanical engineers uses nanomaterials for color printing with no ink. The finished product is visible only with the aid of a high-powered electron microscope.

Xiaodong Yang and **Jie Gao**, both assistant professors of mechanical and aerospace engineering, say the process could be used for high-tech security markings that are invisible to the naked eye, or for a light-based method of information storage that could replace magnetic hard drives. Their work was published in the Nature Publishing Group journal *Scientific Reports*.

Their printing surface consists of a film of silica sandwiched between two thin films of silver. The top layer of silver film is punctured with tiny holes created by a microfabrication process known as focused ion beam milling. The researchers then beamed light through the holes to create an image using no ink — only the interaction of the materials and light.

By varying the size of the holes, the researchers could create different colors. So far they have produced gold, green, orange, magenta, cyan and navy blue.



PROMOTING PEACE

In observance of International Day of Peace, Missouri S&T students held a candlelight vigil outside the Havener Center on Sept. 21. The event was designed to promote peace and the absence of war and violence. Information on how to respond to domestic violence and resources for victims of violence also were available.

A MINER VICTORY

Miner football fans were treated to the best offensive night in nearly two years of play on Sept. 26, when the Miners beat the Pumas from Saint Joseph's College 39-27. The Miners entered the game averaging 317 yards of total offense per game, but ended this match with 569 as they ran 98 plays from scrimmage. The Miners ended the season with a 5-5 record.

MAKING RESEARCH MORE ACCESSIBLE

Military historian **John C. McManus** is conducting research for a new two-volume history of the U.S. Army in the Pacific and Asian theater during World War II through a grant from the National Endowment for the Humanities (NEH), which wants to make scholarly research more accessible to the public.

McManus, Curators' Professor of history and political science, anticipates that the two volumes will be published in 2018 and 2020. They will be published by New American Library, a division of Penguin Books. These will be the first of McManus' 12 books to focus entirely on the Pacific theater of World War II. He has written extensively on the American experience in the European theater during the war.

"The goal of this new series is to shed new light on the Pacific and Asian war and its long-term significance, not just for the Army, but for the United States as a whole," McManus says.

SAVE THE DATE: BEST EVER 108

Make plans now to travel to Rolla for the 108th St. Pat's pre-parade party at 11 a.m. Saturday, March 19, at Hasselmann Alumni House, located at 1100 N. Pine St. Complimentary breakfast and a cash bar will be available before the parade.

If you can't make it to Rolla, attend one of the St. Pat's section events in your area. Help make the 108th celebration the Best Ever!

LIFE IS A HIGHWAY (SIMULATION)

Using the cab of a white Ford Ranger XLT with split bucket seats as a driving simulator, a team of Missouri S&T researchers is evaluating road sign configurations to see if alternatives could make drivers — and workers — safer in work zones on Missouri roadways.

Three projectors mounted on the truck's roof project a simulated straight stretch of Interstate 70 on a concave screen. Drivers control the steering wheel, accelerator and brake pedal to go through four merge configurations, two each for left and right.

One researcher records drivers' simulation performance, measuring speed, steering and braking. Another researcher records a driver's body language, facial expressions and anything said. Participants are then asked to take a survey to assess their attitudes about the work zones.

Suzanna Long, Hist'84, Phys'84, MS EMgt'04, PhD EMgt'07, interim chair and associate professor of engineering management and systems engineering, is the principal investigator. Co-primary investigators include **Ming Leu**, the Missouri Distinguished Professor of Integrated Product Manufacturing; **Dincer Konur**, an assistant professor of engineering management and systems engineering, and **Ruwen Qin**, an associate professor of engineering management and systems engineering.

GERALD COHEN: WORD WHIZ

Gerald Cohen, a professor of foreign languages, is a word sleuth who has dug up the origins of terms like *jazz*, *shyster* and the *Big Apple*, a nickname applied to New York City. He's also famous for discovering the origins of *hot dog*.

"The term was based on the popular 19th-century belief that dog meat could turn up in sausages," he says, "and this belief had a basis in fact. … Some butchers even hired dog killers — young toughs armed with a club who would bash any poor dog they came across and then sell the carcass to the butcher."

Last June, Cohen received a lifetime achievement award from the Dictionary Society of North America. It's an honor he's certain to relish.

HONORING MINER LEGENDS

During Homecoming, the Miner Alumni Association honored seven Miners for their accomplishments and their devotion to the association, the campus and its students.

Selected from an impressive list of nominees, the awardees received special recognition during the Miner Legends luncheon for their achievements, volunteer work, dedicated service and outstanding teaching. Pictured above (from left) are:

Laura Agee, CerE'02, principal engineer, systems and integration engineering, Honeywell Federal Manufacturing & Technologies, Distinguished Young Alumni Award

Carl Schmitz, IST'10, IT project manager, The Boeing Co., Robert V. Wolf Alumni Service Award

Ronald Epps, Phys'67, retired chief of NASA's Flight Design and Dynamics Division, Alumni Achievement Award

Richard Szevery, MetE'02, manager, QA Primary, ArcelorMittal, Distinguished Young Alumni Award

Piloo "Phil" Ilavia, MS PetE'70, consulting engineer, Chevron, Frank H. Mackaman Volunteer Service Award

Egemen K. Çetinkaya, MS EE'01, an assistant professor of electrical and computer engineering, Class of '42 Distinguished Teaching Award

LaWanda Jones, CE'91, senior project engineer, ABNA, Alumni Merit Award.

ALUMNI TAKE **LEADERSHIP ROLES IN ASSOCIATION**

During its annual Homecoming meeting on Oct. 24, the Miner Alumni Association approved the following new and returning board members. We welcome them and thank the departing members for their dedication and loyalty to Missouri S&T and the Miner Alumni Association.

Executive board

Preston Carney, CE'02 MS CE'03, director-at-large (second term)

Darrin Talley, ME'88, director-at-large (second term)

Kurt Haslag, CE'07, director-at-large (second term)

Steven Frye, MS Phys'06, Area 4 director

Bernard Held, CE'75, Area 7 director (second term)

Alan Erickson, EE'75, Area 10-18 director (second term)

Stephen Squibb, ME'98, Area 10-18 director (second term)

Hugh Cole, EMgt'72, Area 21 director

Departing members

John Keating, MetE'73, Area 4 director

Dan Jackson, ChE'90, Area 21 director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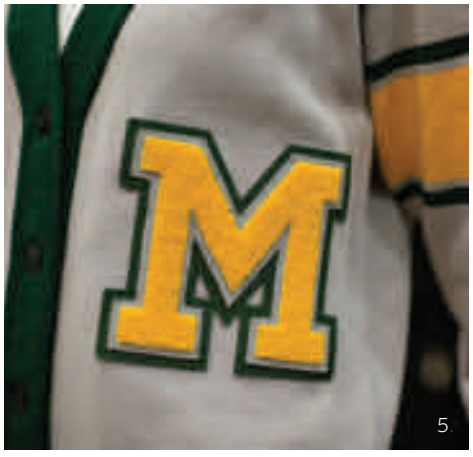

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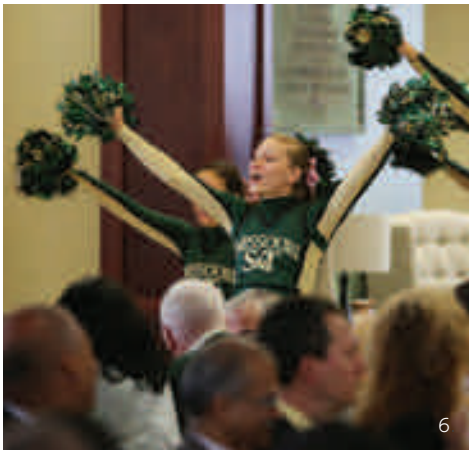
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HOMECOMING 2015: MINERFEST IN REVIEW

1. The Miners came from behind in the second half of the Homecoming football game to beat McKendree University 34-27.
2. The Chancellor's Advisory Committee on African-American Recruitment and Retention celebrated its 30th anniversary during Homecoming. **Gregory Skannal**, GeoE'85, and **Joan Montague**, CSci'95, reminisce at the CACAARR Tailgate.
3. Spectators lined the Rolla streets to watch the first-ever MinerFest Homecoming Parade, sponsored by the Student Union Board.
4. Students made s'mores and watched a movie at a SUB-sponsored bonfire outside Toomey Hall.
5. During the Legends Luncheon, the Miner Alumni Association presented vintage-inspired letter sweaters to award recipients.
6. The Miner Cheerleaders shared a bit of school spirit with alumni and guests during the Legends Luncheon.
7. S&T student design teams showed off their work to alumni during the Silver and Gold Gathering at Hasselmann Alumni House.
8. Alumni visited with current students and old friends during the Silver and Gold Gathering.


8

HELP US REMEMBER:

150 YEARS OF MINER LEGACY

The year 2020 will mark Missouri S&T's sesquicentennial celebration. A special commemorative book is being planned for the occasion, and we need your help. Please share remembrances of your alma mater and you may see your story in the book. All stories will be shared with the University Archives. Email your stories to **150@mst.edu** or visit **magazine.mst.edu/150memories**. We look forward to hearing from you!

HISTORY IN THE MAKING:

LARRY GRAGG ON CHRONICLING THE S&T STORY

*In 2020, Missouri S&T will celebrate the 150th anniversary of its founding as the Missouri School of Mines and Metallurgy. Among the many activities and projects planned to commemorate the sesquicentennial is a new history book of the university. **Larry Gragg**, Curators' Teaching Professor of history, is writing the book and is seeking submissions from alumni about their experiences on campus through the years. We asked him about the project.*

Attempting to capture the 150-year history of this university in a single, coffee table-style volume is an ambitious project. Why did you decide to take it on?

First, I have lived much of it! This is my 39th year at S&T. Also, I served four years as the campus archivist and became fascinated with the rich source material available for a history of the campus. Moreover, the development of MSM/UMR/S&T mirrors so much of what was happening in America generally. This is an opportunity to look at modern American history from a local perspective.

What excites you most about writing this book?

We have had three histories of the campus, and they all are helpful in understanding the institution's development. The last, written by Lawrence Christensen and Jack Ridley, is by far the best, but they published their book in 1983 and much has happened in the intervening three decades. I have an opportunity to build upon these books and, in particular, discuss the evolution of UMR into S&T and what that has meant for the visibility of the campus.

You've mentioned that you want to incorporate stories or recollections from alumni in this book. What types of stories are you looking for, and how do you plan to use them?

The best histories combine archival material along with oral histories. The latter provide the rich detail that enlivens an account of an institution. I am hopeful that alumni will send recollections

of their best of times as well as their challenges, their recollections from the classroom and labs, the friendships they developed, their extracurricular activities and the impact that their time on campus had on their careers. I especially hope that they will send their recollections of a faculty member or someone on the staff who had a great impact on their success.

From your perspective as a historian, what are the most significant periods of this university over its nearly 150-year history?

The most significant periods were the ones where the university overcame significant challenges. Simply maintaining the institution in the late 19th century; the impact of World War I, the Great Depression and World War II on enrollment; the shift to a research institution in the latter half of the 20th century; and the efforts to become a more comprehensive and diverse institution in the 21st century will be the most important challenges that I will address.

What do you hope alumni and other readers will get out of reading this book?

I hope that they will have a better appreciation for the extraordinary quality of the institution. It truly has become one of the premier universities in the nation.

We know that historians are used to looking back, but we want you to look forward, so fast-forward to 2170 — the 300th anniversary of Missouri S&T. What will our university be like then?

Predicting the future is always a fool's errand, but I often have been labeled a fool so let me suggest that the university in 2170 will be one that will embrace new extraordinary technologies. However, if its leadership is wise it will still understand that the most important thing that its faculty can do is to have a strong personal connection with its students. In higher education we have learned through many studies that, regardless of the pedagogy employed, the most important element in a student's success is to have a significant connection with one or more faculty members.

RECORD: BROKEN

In August, nearly 8,900 students started classes at Missouri S&T and broke the previous enrollment record, set in 2014. That total included 1,491 first-year and transfer students, which also shattered the previous record. That one had held since 1981.

WALKING THE MALL

For the first time in several years, the main campus mall was free of construction when classes started in August. Throughout the installation of equipment for the geothermal energy project, which included digging 789 wells on campus, construction was a constant. At the end of the first year of operation, the geothermal energy system exceeded its goals. The university saw a 57 percent reduction in energy use, a reduction of 25,013 tons of carbon dioxide emissions and a reduction in the use of water of over 18.7 million gallons.

PAUL FRIZ:
A FUTURE IN OUTER SPACE

Photo by David C. Bowman, NASA

When he was a teenager, Missouri S&T doctoral student and former NASA employee Paul Friz looked up into the night sky and found the twinkling points of light, a thousand beacons in the darkness, irresistible. He was hooked.

So when he was 14, Friz, MS AE'14, saved up his lawn-mowing money and bought his first telescope — an 8-inch Dobsonian Reflector — to bring the sky's lights closer. He looked at the gas giant Saturn; it's the solar system's sixth planet from the sun and looks like a star to the naked eye, but its rings and moons came to life in his telescope's lens. Then he went out of Earth's solar system to view the M44 Beehive Cluster located in the constellation Cancer.

"I believe I chose those objects because they were easy to find in the sky, and I didn't really know what I was doing at that point," Friz says.

Looking through that first telescope in a cemetery behind his Creve Coeur, Mo., home was the first step in a journey that has led Friz, 25, to pursue a Ph.D. in aerospace engineering at Missouri S&T.

Before that, Friz was a NASA Pathways intern in Langley, Va., and was at NASA's Jet Propulsion Laboratory in Pasadena, Calif., as an assistant to the project manager on the Rosetta mission that put an orbiter around comet 67P/Churyumov-Gerasimenko.

He was there when the orbiter launched the Philae lander that synced up with and landed on the comet. When it finally touched down and started sending data, the relief in the room was palpable.

Now the stars of his youth are the stars of his future.

"Going to space has always been a dream of mine," he says. "If I ever have the opportunity to be an astronaut I will take it, but there are thousands of other people who are more qualified for that job than I am. So right now I'm not betting on it, but I am aligning my career and lifestyle so that I can take the opportunity if it comes up." ■

A GOLDEN YEAR FOR COMP SCI

This past fall, S&T's computer science department kicked off a year-long celebration honoring the 50th anniversary of the computer science degree program, the first of its kind in the state. Check out more photos from the program's history at **cs.mst.edu/50years/timeline**.

IN **PRINT**

Elizabeth Cudney, PhD EMgt'06, an associate professor of engineering management and systems engineering, co-wrote *Total Productive Maintenance: Strategies and Implementation Guide*, which was published in July by CRC Press.

Kellie Grasman, a lecturer in engineering management and systems engineering, co-wrote a textbook titled *Fundamentals of Engineering Economic Analysis*. The text won the Book of the Year Award at the 2015 Industrial and Systems Engineering Research Conference.

SPORTS
BY THE NUMBERS

1.14

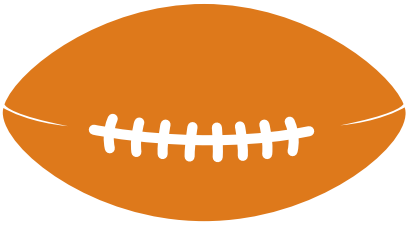
Career goals against average for junior goalkeeper **James Holloway** entering the 2015 season. Holloway had a 1.05 mark with seven shutouts last fall.

1,269

Kills racked up by Missouri S&T senior volleyball player **Krista Haslag** during her career at S&T — a new school record. The previous record of 1,243 kills was held by **Erin Bekebrede**, Psyc'12.

38

Points scored last season by returning players to Missouri S&T's women's soccer team — more than half of the 72 recorded last year.



885

Yards recorded by senior **Spencer Elrod** during the 2014 season, the most of any Miner player who returned for the 2015 campaign.

173

All-academic awards earned by Missouri S&T student-athletes from the Great Lakes Valley Conference during the 2014–15 academic year.

THE THRILL *OF THE KILL*

Krista Haslag, a senior from Linn, Mo., celebrates with her teammates after the S&T volleyball team defeated the University of Missouri-St. Louis on Oct. 3.

Krista Haslag, a senior on the Missouri S&T volleyball team, knows a thing or two about competing. The 6-foot-1 senior from Linn, Mo., racked up 18 kills one mid-November weekend to become the university's all-time leader in career kills. Haslag finished the season with 1,269 kills. (**Erin Bekebrede**, Psyc'12, who played for the Miners from 2008–11, held the previous record of 1,243 kills).

"I remember looking at my statistics last year and thinking that I am going to have to have a big season to reach that goal," she says. "I just go out and play the best that I can every game so I can help my team win."

Coach **Jason Holt** credits Haslag, **Gracey Moon** and **Jackie Pyles**, the team's three co-captains, with providing the leadership and determination to help the team go undefeated at home — the first time a team has done so in the program's history. The feat helped earn the team a postseason spot for the fifth season in a row.

"Krista is one of our top players on the roster — not only this season, but in the history of our program," says Holt, who started the volleyball program from scratch nine seasons ago. "She is one of the leading and most-feared hitters and blockers in the Great Lakes Valley Conference."

Growing up, Haslag's number one sport was basketball. In fact, it wasn't until high school that she started playing volleyball competitively for the Central Missouri Volleyball Club.

"There's no better feeling than getting a stuff block," Haslag says. "A stuff block at a crucial time in a game is a huge momentum changer, and the excitement after a game-changing block is very unreal."

The student-athlete, like her teammates, takes her coursework just as seriously. For the past six years, the volleyball team has earned Academic Team Honors from the American Volleyball Coaches Association for keeping a team GPA of 3.3 or higher. Recently, Haslag became the fourth player to earn College Sports Information Directors of America (CoSIDA) Academic All-District honors. It was the third time she has received the recognition.

"Academics has always been a huge part of my life and I wanted to go to a college that I knew would prepare me for the real world and leave me with a bright future," says Haslag, a double major in civil and architectural engineering. "I have always been a very hands-on kind of person, which led me to the engineering field." ■