

MODERN-DAY MARANERS

11 UNDERGROUND UNDERDOGS **14** HOMECOMING 2013 RECAP **29** THE FIRST GENERATION

FALL/WINTER 2013 VOL. 87 NO. 3

While you're out, would you pick up a few things for us? valer quality meter to measure me eneurs or 41,200 environmental contaminants Water quality meter to measure the effects of SHOPPING LIST: viausing 20-men unin press ivi mechanical and aerospace engineering THANK YOU! thank you? The band program always welcome! Clausing 20-inch drill press for mechanical wercury ramp to tuerning specific viological \$160 molecule compounds Mercury lamp to identify specific biological Make a gift that makes a difference.

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• ON THE COVER

A gift from the 1950 class of mining engineering graduates, this bronze sculpture titled *Today's Miner* stands in McNutt Hall as a testament to S&T's rich history in mining. Read more about our Miner miners on page 24.



Students and alumni who attended the Fall Career Fair on Sept. 24.



Companies recruiting S&T students in the past year.



Middle school and high school teachers who came to Missouri S&T last summer to learn how to teach engineering and biomedical science courses as part of Project Lead The Way. See more on page 9.

68,5

Square footage of James E. Bertelsmeyer Hall, Missouri S&T's new chemical and biochemical engineering building. It is scheduled for completion next summer.

Average monthly salary an S&T undergraduate student earns in an internship.

54.179



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

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Dear Fellow Alumni:

This issue of Missouri S&T Magazine is about opportunity and taking a chance. It is about taking what you have and turning it into something greater. In this case, the catalyst is Missouri S&T.

All of the alumni and students featured in this issue took a gamble on Missouri S&T and won.

A Carnation Milk Scholarship recipient came to Rolla from a small Missouri town and ended up on the front row of Mission Control, guiding some of NASA's most famous space flights.

A triathlete, motivated by the pain his ear buds caused when he ran, cashed in his savings to chase down his dream of creating ergonomic earphones for athletes. His product is now sold around the world by companies like Apple, The Sports Authority and Target.

Inspired by three alumni who are pioneers in the mining industry, two miners, a metallurgist and a geologist are using their knowledge and expertise on cutting-edge mining projects from Alaska to Australia.

And Missouri S&T has been capitalizing on some opportunities of its own. Following a year-long process that involved S&T faculty, staff, students, alumni and friends, Missouri S&T has a new strategic plan. Rather than focusing on what's in it for us, this plan ensures that we will provide an exceptional return on investment for all of our customers — students, employers, research partners and donors.

In her most recent State of the University Address, Chancellor **Cheryl B. Schrader** followed through



on the planning process by outlining administrative changes designed to help S&T achieve its strategic goals. Read more about the changes at **rol.la/administrative_changes**.

More information about the strategic plan is available on page 13. But since that story was completed, we learned some exciting news that I'm thrilled to share with you. In mid-September, University of Missouri President **Timothy Wolfe** announced that Missouri S&T will receive \$3.2 million from the UM System to support three of the plan's strategic initiatives — hiring new faculty members, improving learning laboratories on campus and applying technology to enhance learning and productivity.

These stories illustrate what our alumni and donors already know: Missouri S&T has never been a better investment. And through careful stewardship, our stock is only rising.

Mary Helen Stoltz Engl'95

news & features editor

CORRECTIONS

The picture that appeared with the memorial for **Daniel K. Goodman**, EE'65, in the Summer 2013 issue was actually **Jack Goodman**, Phys'65, who lives in Cupertino, Calif. We regret the error. The memorial notice and correct picture of **Daniel K. Goodman** are on page 44 of this issue.

The memorial notice for **C. Parker "Punch" Bennett,** in the Spring of 2013 issue had the wrong graduation year. A revised notice is on page 45 of this issue.



Ahlam Issa spoke no English when she came to the United States from Tanzania at age 10. Read about her journey on page 23.

- Joe Neumann, MetE'07, works four weeks straight at the self-sustained Red Dog Mine in the wilds of Alaska, then takes two-week breaks at his Golden, Colo., home. Read more about S&T's modern-day Miners on page 24.
- Missouri S&T's new strategic plan is focused on providing an excellent return on investment for all of our customers. Read more on page 13.
- Thanks to funding from its namesake, the Burns & McDonnell Student Success Center was dedicated on April 2. The center helps students with everything they need to know about college. Find out what it offers on page 17.
 - Ron Epps, Phys'67, earned NASA's Distinguished Service Medal for outstanding work during his 38-year career with the Johnson Space Center. Read about his involvement with the space shuttle, the Apollo program and more on page 32.



Is S&T haunted?

University campuses and college towns are notorious settings for ghost stories. Is Rolla one of them? Is Missouri S&T haunted? We asked about your spooky Rolla experiences. Here's what you told us. A

Two incidents occurred within a couple weeks of each other at the same house a few blocks from campus in Rolla. First, I usually fell asleep listening to the radio playing softly. One night I was awakened by my radio as it was turning itself up until the volume was blasting. This was an old tube radio with a mechanical volume knob. Second, I was awakened one night by the shower running full blast, not from broken plumbing but from the handle being turned wide open.

Mark Buhr, MetE'89 Washington, Mo.

A few years after graduating from S&T, I brought a group of college students to campus for a conference. While taking the students on a tour of campus, sharing with them what I remembered from my ambassador days, the students asked "Do you have any ghosts?" You see, there is a residence hall on the campus where they go to school that is supposedly haunted. I laughed and explained that when engineers hear weird sounds from the attic, they go upstairs, nail down the floor boards, seal the windows and make sure the mouse traps are set.

Aimee Rea, Psych'06 Maryville, Mo. During my freshman year at S&T, in the fall of 1980, my grandmother asked me to visit the Pi Kappa Alpha house, which had been the home of my great-uncle, Carl Cromer. He had been a member of Pi Kappa Alpha long ago and passed away during his sophomore year after an October 1937 car accident on Highway 63, near the present-day Stonehenge.

I was surprised to find out that Carl was reputed to have haunted the Pike house for years. Many members refused to occupy his room, which had been dedicated in his memory. Many unexplained phenomena had occurred over the years, ranging from the sound of glass crashing, to "ghostly images" and dogs barking and jumping up and down on the tiled crest just inside the front door.

Perhaps the strangest occurrence happened after the fire that destroyed the Pike house in February 1999. My husband, **Chris Ramsay**, MetE'83, MS MetE'85, who is chapter advisor to the fraternity, and several members scoured and searched the rubble of the house looking for the memorial plaque that hung on Carl's door. They searched and searched, but found no plaque. A year later on the first Founder's Day after the fire, my husband returned to his desk in the metallurgy department foundry to find the plaque, a little discolored, bent and scarred by the fire, mysteriously sitting on his desk.

Darlene Ramsay, MetE'84 Rolla, Mo.

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

Submit your answers to alumni@mst.edu, or respond via Facebook or Twitter, by Dec. 9, 2013.

{LETTERS & TWEETS } IN YOUR WORDS

Dear Editor,

I am what you might call one of the ol' timers. I graduated from, as we called it, MSM, way back in 1947. This afternoon, I was sitting in the swing on our front porch in Erwin, Tenn., that is halfway between Flag Pond, Tenn., and Unicoi, Tenn. (now you know where it is!), reading the summer copy of your Missouri S&T Magazine. *I enjoyed it very* much. You all did an outstanding job. I finished reading it and picked up my copy of the July 15, 2013, National Review. On page 27, I saw an article titled "Blowing up Barbie." I didn't think I wanted to read it until I saw "Rolla, Mo.," under the author's name. This piqued my interest and I found the article to be very interesting. I don't know whether or not you have seen it. On the assumption you did not. I have enclosed the article. I found it to be very interesting as it told the story of the Explosives Camp offered at Missouri S&T. Keep up the good work.

Cliff Dameron, MetE'47 Erwin, Tenn.

Editor's Note: Read the *National Review* story about Missouri S&T Explosives Camp online at **rol.la/blowingupbarbie**.



Explosives Camp 2013

I was pleased to see ("On the Right Track," Summer 2013) that you do not share the Wall Street Journal's hatred of railroads (and bicycling and walking for that matter). One of my very few professional regrets is following my father's otherwise excellent advice when I left MSM/UMR/Missouri S&T in 1967. A railroad employee all his working life. he recommended I not consider railroads as a career. For about one decade, the advice looked sound: but as we, and Warren Buffet. know this has changed dramatically. Based on what I saw while riding the "High Line" from Seattle to Minneapolis, It would appear that Travis Duncan, the subject of the article, faces better employment prospects than pipeline engineers.

Paul Marlin, MS CSci'67 Quincy, Ill.

I have an ash tray that I cast in a foundry class in 1959 that the archives might be interested in. It is a testament to the cultural changes that have occurred during the past half-century. At the time, a large number of students smoked and it was a fairly popular item, but it was a poor design. It was really too shallow to keep ashes from being blown around, and if you set a cigarette in the notch on the side, the length of the cigarette would contact the bottom of the ash tray and extinguish the cigarette. The other interesting feature is the name cast in the top — "Missouri School of Mines and Metallurgy."

Kudos to Missouri S&T Magazine. It is a great publication. It is amazing the number of women that are mentioned. I graduated in January 1963 and I think the number was around 30 then.

Ed Kriege, ME'63 Ocean Pines, Md.



@SaundraMitchell Saundra Mitchell, Indianapolis

Holy cow, I wish I were a teenager again so I could go to Missouri S&T EXPLOSIVES CAMP. #didnotmakethatup

@torilynnmares

Tori Lynn Mares, freshman in civil engineering, Florissant, Mo.

Every time I wear my @MissouriSandT shirt someone stops me and asks me if I go there. Talked to a graduate that retired from Boeing today.

@SparxPhysix Lauryn Bree, Eureka, Mo.

Ladi yn Diee, Luieka, Me

Can't wait to be a part of @MissouriSandT's #minernation next year.

@ddimmett

David Dimmett, Indianapolis

Thanks to #PLTW university partner @MissouriSandT for great service and leadership in #Missouri!

Join your alma mater online at **news.mst.edu/social**.



SETH BURGETT: HIS BUDS ARE FOR YOU

Six-hour workouts can take a toll on the fittest of athletes. But when Seth Burgett, ME'94, was training for a triathlon in 2007, it wasn't his legs or back that caused him the most pain.

"My ears hurt worse than the rest of my body," says Burgett. At fault were his mp3 player's ill-fitting earbuds.

But Burgett hit on a solution to the problem during one of those six-hour cycling and running sessions. The idea also led to a new business designed for athletes like him.

"I can still picture that day in my mind," says Burgett. "I stopped on the trail near the end of a workout after four hours on the bike and two hours on the run. The big idea hit. I knew that we could solve the problem technically."

After selling his wife on the idea, Burgett cashed in savings and investments to launch the company, yurbuds, in April 2008. The St. Louis-based firm makes ergonomically designed earphones for athletes.

"We went from an idea to getting on the shelf at Best Buy in 18 months," Burgett says. yurbuds products are now sold also by Apple, Dick's Sporting Goods, Target,



The Sports Authority and Walmart, and are available in more than 30 countries internationally.

An Illinois native who had his sights set on mechanical engineering since childhood, Burgett was drawn to S&T by what he saw as the university's commitment to helping students find career success. "My No. 1 reason (for coming to Missouri S&T) was the co-op program," Burgett says. He was especially impressed with the interview rooms in the career opportunities and employer relations office in Norwood Hall.

Burgett had no problem landing his first job out of college. He joined McDonnell Douglas in St. Louis as an engineer. But the corporate world didn't suit him. Too much bureaucracy and not enough engineering.

So he took the startup route, first joining a budding St. Louis robotics firm, Automation Technology, which was founded by **Daniel C. Stanglein**, EE'72, and the late Robert Alexander. Burgett then joined Stereotaxis, a St. Louis firm that develops medical devices to treat heart arrhythmia. Those startup experiences gave him the confidence to strike out on his own with yurbuds, he says.

He also benefited from the advice an S&T professor once gave him. "He said, 'If you can't communicate your ideas to others, they won't go anywhere.' ... That advice has helped in raising more than \$10 million in capital for this business."

Burgett is still a triathlete. "I try to do one Ironman every other year," he says. While he's "über-competitive" in business, he doesn't worry about finishing first in triathlons.

"My goal is to get across the line before midnight and enjoy every minute of it," he says. "I want to finish strong and finish with a smile." ■



NEW STEEL RESEARCH CENTER HONORS FIRST IVERSON CHAIR

A new center for steel manufacturing research has been renamed to honor the legacy of the late **Kent D. Peaslee**, a metallurgical engineering professor who helped establish the center. The University of Missouri System Board of Curators approved the naming of the Kent D. Peaslee Steel Manufacturing Research Center at Missouri S&T during a board meeting last June.

Peaslee was S&T's first F. Kenneth Iverson Chair of Steelmaking Technology and Curators' Teaching Professor of metallurgical engineering. He died on May 17, 2013, at age 56.

"Kent was one of the nation's leading authorities in steelmaking research, and he had the vision to establish this steel manufacturing center on our campus," says **Wayne Huebner**, CerE'82, PhD CerE'87, chair of materials science and engineering at Missouri S&T. "He also worked diligently to obtain industry support for the center.

"After Kent's sudden passing, the first order of business at the initial meeting of the center's advisory board was a unanimous vote to honor his legacy by renaming the center in his honor," Huebner says.

Peaslee helped raise more than \$550,000 for the center from 12 companies, Huebner says. The center will bring those companies together with university researchers to address steel casting and manufacturing issues.

EXPERIMENTAL MINE: STILL AN **'AWESOME' LAB**

For the fourth year in a row, S&T's Experimental Mine topped the list of "Awesome College Labs" published by *Popular Science* in the magazine's September issue.

Located on Bridge School Road in Rolla, the mine hosts the popular summer Explosives Camp for high school juniors and seniors and gives Missouri S&T students a place to get practical experience in surveying methods and practice, mine ventilation, rock mechanics measurements, geological mapping, mine equipment power systems, groundwater testing, drilling and blasting practice, and mine safety and health. Read more about S&T's Mine Rescue Team on page 11.

NEW VC FOR FINANCE AND ADMINISTRATION



Walter J. Branson joined S&T as vice chancellor for finance and administration in August. He formerly served as vice chancellor for financial affairs at Indiana University-Purdue University Fort Wayne.

In the only laboratory of its kind in the nation, Muthanna Al-Dahhan (left) is developing methods to measure and track how materials move in a pebble-bed small modular reactor. He's also looking at how the pebbles — simulated by large marbles — would transfer heat and disperse gas in such a reactor.

S&T TO LEAD SMALL MODULAR REACTOR CONSORTIUM

Ameren and Westinghouse Electric Co. are tapping into Missouri S&T's nuclear engineering expertise to lead a new research effort for the nuclear energy industry.

In July, those companies joined S&T, the University of Missouri System, the University of Missouri-Columbia and Missouri Technology Corp. to announce the multi-university Small Modular Reactor Research and Education Consortium. S&T, home to the state's first nuclear reactor, will lead the consortium. A satellite center will be established on the Columbia campus.

The consortium will identify and develop technology that supports small modular



nuclear reactors and improves the security of the energy they produce. Smaller than traditional nuclear power plants, SMRs provide more flexibility for generating electricity. Many are designed to use fuel more efficiently, thereby reducing waste.

"The consortium will support memberdriven research," says **Joseph Smith**, the **Wayne** (CE'67) and **Gayle Laufer** Chair of Energy at Missouri S&T and executive director of the SMR Research and Education Consortium. "An industrial advisory board representing each consortium member will determine the research projects and direction. We will be working on projects that are of interest to our members, and everyone will benefit from the research and education that result. The work of this consortium will have a significant impact on energy and energy security, and will help the U.S. maintain its leadership role in science and technology."

NEW NAME, BROADER EMPHASIS FOR BIOMEDICAL CENTER

The five-year-old Center for Bone and Tissue Repair and Regeneration now has a new name: the Center for Biomedical Science and Engineering. The change took effect July 1. "We believe this new name is appropriate, as we are broadening the scope of the center," says center director **Len Rahaman**, professor of materials science and engineering.

Founded in 2008, the center's initial mission was to research and develop advanced biomaterials and biosensors to help heal traumatized bones and tissues. Early projects included the development of bioactive glass scaffolds to treat bone injuries and hydroxyapatite implants to help broken bones mend themselves. But "bone is just one tissue," Rahaman says, and recent research supported by the center encompassed a broader array of biomedical approaches. They include a urinalysis screening method to diagnose breast cancer and studies on the antibacterial properties of artificial bone implants to prevent infections.

More information about the center is available online at **cbse.mst.edu**.

MARS ROVER TEAM HONORS ALUMNUS-ASTRONAUT TOM AKERS

Missouri S&T's Mars Rover Design Team paid homage to Missouri S&T's first astronaut, Col. **Tom Akers**, Math'73, MS Math'75, by naming its rover Akers. The team took part in the Mars Society's University Rover Challenge, held May 29–June 1 in the desert outside Hanksville, Utah. Although Akers struggled over the terrain, team member **Ian Lee**, a junior in engineering management, says the group learned a lot from the experience and from other teams.

"We took the opportunity of the lulls in the competition to talk with other teams, see how they made their robots, and to identify many of the gaps in our knowledge so that we will be better prepared for next year's competition," Lee says. "The team is enthusiastically preparing to take next year's rover competition by storm."



Members of the 2013 Mars Rover Design Team who were selected to travel to Utah for the competition are, from left: Jonathan Bopp, Joshua Jetter, Ian Lee, Catherine (Catie) Josten, Jacob Armenta, Hailey Tipton, Kumar Singampalle, Charles Gardner, Michael Bouchard and Frank Marshall. (Photo submitted)

LEADING THE WAY IN TEACHER EDUCATION

More than 200 middle school and high school teachers from across the United States spent part of their summer at Missouri S&T learning how to teach engineering and biomedical science to their students this fall. The teachers are involved in Project Lead The Way (PLTW), a national effort to get more youth interested in studying engineering and science in college. Missouri S&T is the state affiliate for PLTW.

"The teachers go through a very intensive two-week training program," says **Benny Yates**, program director for Missouri S&T's PLTW effort. "It's like having a full semester of professional development in only two weeks."

Missouri S&T is one of 44 colleges and universities in the U.S. that offer PLTW training for teachers, and one of only nine that provide PLTW training in biological science.

IN PRINT

Elizabeth Cudney, associate professor of engineering management and systems engineering, co-authored a book titled *Lean Systems: Applications and Case Studies in Manufacturing, Service, and Healthcare.* The book is designed to help organizations get rid of waste or anything that doesn't add value to a product or service.

FALL 2013 CAREER FAIR

Career opportunities and employer relations hosted the Fall Career Fair on Sept. 24. More than 260 employers were on campus with nearly 200 alumni returning to recruit graduates of their alma mater. Prior to the career fair, the Miner Alumni Association, along with Students Today, Alumni Tomorrow (STAT) and Engineers Without Borders, hosted a continental breakfast to thank the recruiters for their support of S&T.

S&T BREAKS RECORD

While enrollment declined this fall at several universities in the state, demand for a Missouri S&T education remains high. S&T has a record number of students enrolled this fall.

At the official fourth-week count, 8,130 students were enrolled — the most in Missouri S&T's history. The previous record of 7,795 was set in fall 1982.

There are 1,263 first-time freshmen, which is the fourth-largest class in school history and they are some of the brightest. These students are among the upper 10 percent in the nation with an average ACT score of 27.9.







The only sound in the darkened mine tunnel is water dripping off limestone walls. A lone injured miner lies motionless on the gravel floor. Five lights pierce the darkness as muffled voices announce the arrival of the rescue team.

"Hold on, Buddy. We are going to get you out of here," says team captain **Casey Slaughter**, MinE'09, his voice distorted through his rebreather mask.

The mining engineering graduate student from Webb City, Mo., barks out commands to the team as the five stabilize the mine's roof and remove the injured miner on a wheeled stretcher. Back on the surface, they remove the Velcro straps securing him to the stretcher. Released from those bonds, he rises and smiles.

This has all been a training exercise at Missouri S&T's Experimental Mine, a research and training site drilled out between the railroad tracks and a quarry on the southwest side of Rolla.

Two Missouri S&T Mine Rescue Teams practice for various national and regional contests. Every fall, one of those events is held at the Experimental Mine. Judges from the federal Mine Safety and Health Administration evaluate the S&T teams, along with rescue groups from mining companies, on how they handle a simulated underground disaster situation. Slaughter spent last summer in Australia at Melbourne's Monash University, which is starting its own mining engineering program. "Mine rescue is a real big brotherhood,"

IT'S KIND OF LIKE A SEMI-PRO FOOTBALL TEAM GOING UP AGAINST A PROFESSIONAL FOOTBALL TEAM IN THE NFL. - Casey Slaughter, MinE'09

While the S&T teams have a homecourt advantage at the Experimental Mine, they're competing against industry professionals who work together daily. "It's kind of like a semi-pro football team going up against a professional football team in the NFL," Slaughter says. says Slaughter, who plans to graduate with his Ph.D. in 2014.

"We all have friends out in industry who take care of us and we take care of them." Want more? Check out the video at

rol.la/SandTminerescue.



Members of the 2013 V4DiR Team are, from left: Nathan Jarus, David Zemon, Nick Eggleston, Robert Higgins, Mark Bookout and Travis Bueter.

aking sense of everincreasing mounds of data is a huge challenge facing researchers today. But staff and students in Missouri S&T's information technology department have come up with a way to help researchers make sense of all that information by turning it into 3-D visualizations.

Make that 4-D visualizations, because the tool created by IT's research support services team at S&T shows 3-D imagery over time.

The tool is called Visualizing Four Dimensions in Rolla, or V4DiR for short. The IT folks call it "Vader," as in Darth. But unlike Luke Skywalker's *Star Wars* nemesis, V4DiR sheds light, not darkness, by letting researchers see their data in 3-D over various time spans.

On campus, RSS director **Mark Bookout** and his team have been demonstrating V4DiR's power by showing researchers maps-in-motion of natural disasters: all of the world's earthquake occurrences from 1920 through 2012 as well as tornado activity in the U.S. since 1950. The earthquake data is also being used by **Stephen Gao**, a professor of geology and geophysics who is studying seismic activity in the Horn of Africa region.

That on-screen loop of information can be manipulated to help researchers home in on specific data points. For instance, the visualization can be tilted on an axis to provide greater levels of depth or various angles. Or it can be stopped if researchers want to examine data from a particular time frame.

"We can pinpoint exactly where on the earth, as well as how deep within the earth, an earthquake has happened," says **Nick Eggleston**, a junior computer science major who leads the project.

"V4DiR has the potential to enhance any sort of research," Bookout says. "It allows us to use our natural pattern-recognition capabilities to isolate interesting groupings of information. And our association with vendors ensures that we have enough computing horsepower to build and display very large data sets in quick order."

RISING to the CHALLENGE

Missouri S&T's new strategic plan provides a blueprint to ensure that every undergraduate student gets involved in "experiential learning," along with upgrades in teaching and research facilities, and identifying four best-in-class areas and hiring additional faculty positions. These and other goals will help ensure that S&T offers the best possible return on investment for students, research partners and others, Chancellor

Cheryl B. Schrader says.

The plan — titled "Rising to the Challenge:

Missouri S&T's Strategy for Success" — is the result of a year-long process involving thousands of faculty, staff, students, alumni and friends. Schrader discussed the plan during her State of the University Address in September.

"Missouri S&T is well-known for providing a high return on investment for our undergraduate students in terms of starting salaries and career success," Schrader says. "We want to make sure that all of our customers receive that same sort of high ROI. This plan is our blueprint for providing an exceptional ROI for all undergraduate or graduate students who earn their S&T degrees on campus or online — or a combination of the two — as well as the employers who hire our students, the companies and agencies who partner with us in research, and the donors who invest in Missouri S&T and help us realize our promising future."

Details of the plan are available online at **strategicplan.mst.edu**.

THE PLAN IS BUILT ON FOUR THEMES:



HOMECOMING HONORING SUPER MINERS

During Homecoming, the Miner Alumni Association honored a select group of "super heroes" for their accomplishments and devotion to the association and the university. Selected from an impressive list of nominees, the "League of Super Miners" was revealed during the Miner Legends Luncheon on Oct. 18. Eight awardees were honored for their Super Miner achievements, volunteer work, dedicated service and outstanding teaching. Awardees were recognized at events throughout the weekend, including the Silver and Gold Gathering and the football game. Congratulations to the following award recipients:

- **Daniel P. Ellis**, CE'99, vice president, Crafton Tull and Associates, who received the Distinguished Young Alumni Award
- **Bradley H. Hornburg**, CE'69, CEO Landmark Contract Management Inc., who received the Robert V. Wolf Alumni Service Award
- **Jerry D. Parsons**, CE'70, retired materials engineer, Illinois Department of Transportation, who received the Frank H. Mackaman Alumni Volunteer Service Award
- **Jennifer Pattershall**, assistant professor of psychological science, who received the Class of 1942 Excellence in Teaching Award
- Col. **John Pierre Powell**, AE'87, president, PAMCO Investments Corp., who received the Alumni Achievement Award
- **Karlynn Sievers**, Engl'96, LSci'96, physician and clinical assistant professor, University of Wyoming, who received the Distinguished Young Alumni Award
- **LeRoy E. Thompson**, CE'56, MS CE'65, retired principal and vice president, C3TS, and emeritus professor, Florida International University, who received the Alumni Achievement Award
- **Kathryn A. Walker**, MS EMgt'82, managing director, OPENAIR Ventures, who received the Alumni Merit Award.







- Missouri S&T's Super Miners were immortalized in a comic book, presented to guests at the Miner Legends Luncheon on Oct. 18.
- 2. Before the football game, nearly 300 Miner alumni and friends showed their superhero spirit at the tailgate party. Many sported green superhero capes.
- 3. More than 30 runners and walkers traversed the S&T campus on a chilly Homecoming morning as part of the first Super Miner 5K, held on Oct. 19.
- 4. Despite trailing much of the game, the Miners rallied in the second half to beat St. Joseph's College at the university's annual Homecoming football game.
 Mireille Paquette*, a senior in engineering management from Chesterfield, Mo., was named S&T's 2013 Homecoming Queen. She was nominated by Pi Kappa Alpha.
 Brian Van Booven*, a senior in mechanical engineering from Lake Saint Louis, Mo., was named Homecoming King. He was nominated by Pi Kappa Alpha.

*(not pictured)





PERFECTING CPR IN ZERO-G

Peter Carnesciali (left), a junior in computer engineering from Ballwin, Mo., says floating in microgravity is something "you can't imagine until you feel it. It's mind-blowing."

Carnesciali and **Kevin King**, a senior in aerospace engineering from Houston, Mo., spent a week in Houston, Texas, with fellow members of the Miners in Space Team as part of NASA's Reduced Gravity Education Flight Program. The students flew aboard NASA's Weightless Wonder aircraft to test how CPR could be improved in a microgravity environment.

NEW CAT ON CAMPUS

Fabick CAT of Fenton, Mo., and Caterpillar Global Mining presented a new Cat 316E hydraulic excavator valued at \$250,000 to S&T's Experimental Mine on Sept. 26.

The machine will be used to excavate materials, dig trenches for drainage control and lay pipelines.

"The hydraulic hammer attachment allows the machine to be used for breaking boulders and concrete structures," says **Samuel Frimpong**, the Robert H. Quenon Chair of Mining Engineering at S&T. "The machine's use becomes more critical in areas where explosives cannot be used due to safety or environmental concerns."





V

NATIONAL AWARD FOR SUSTAINABILITY

S&T's Solar Village and geothermal energy project combined to help the campus earn a 2013 Climate Leadership Award last spring. The award is from Second Nature, a non-profit organization that promotes sustainability in higher education.

"We are honored to receive this national recognition for what we believe are very pragmatic yet bold approaches to sustainability," says Missouri S&T Chancellor **Cheryl B. Schrader**. "Our Solar Village is the only neighborhood of its kind on any university campus, and it demonstrates the feasibility of green, low-impact living while highlighting the creativity of the students who designed and built those homes. Our geothermal energy system is one of the most comprehensive to be undertaken on a university campus. I believe it too will become a model for other institutions to emulate."

The Climate Leadership Awards are presented annually to colleges and universities whose leaders have signed the American College & University Presidents' Climate Commitment. A video produced by S&T also earned a first-place honor in a voting competition. To view the video, go to **rol.la/climatevideo13**.



STUDENT SUCCESS CENTER UP AND RUNNING

Chancellor **Cheryl B. Schrader** and **Breck Washam**, ME'90, vice president of Burns & McDonnell and an outgoing member of the Miner Alumni Association board of directors, were on hand April 2 to formally dedicate the Burns & McDonnell Student Success Center, a new outreach to S&T students. Located in Room 198 Toomey Hall at the center of campus, the new center serves as a clearinghouse of information and services for Missouri S&T students.

Funded through support from Burns & McDonnell and the university, the center also provides workshops and sessions on financial aid, study skills, advising and overall success. Student "success coaches" are also on hand to assist. **Tara (Dudney) Stone**, TComm'09, MS TComm'12, is the office's primary advisor. More information about the center is online at **studentsuccess.mst.edu**.

HOW IS S&T GOING GREEN?

An unconventional approach to sustainability, Missouri S&T's Geothermal Energy Project is expected to save more than \$1 million in energy and operational costs every year. That savings is expected to grow to \$2.8 million annually in the future. The project is scheduled for completion in 2014.



Energy use will be cut by 50%



16 buildings

will be heated and cooled by the geothermal system



Water usage will be cut by

8 million

IN PRINT

The Life of Margaret Alice Murray: A Woman's Work in Archaeology by **Kathleen Sheppard**, assistant professor of history and political science, was published in August by Lexington Books. Murray was one of the first female archaeologists and was the first woman to publicly unwrap a mummy.

OVERVIEW: INDUCTIONS AND COMMENCEMENT

ACADEMY INDUCTIONS

During the 2012–13 academic year, 53 alumni and friends were inducted into Missouri S&T academies. Academy membership recognizes a career of distinction and invites members to share their wisdom, influence and resources with faculty and students.

ACADEMY OF CHEMICAL ENGINEERS

RICHARD N. ALTICE, ChE'86, of Wildwood, Mo., president and general manager of technical specialties with Solutia Inc.

SARA R. BOCK, ChE'87, of St. Louis, project manager of research and development for Covidien/Mallinckrodt

NEIL BOOK, ChE'72, of Rolla, associate professor emeritus of chemical engineering at Missouri S&T

JOHN MAX BRAWLEY, ChE'56, of Ellington, Mo., director of CC Energy

JACK CHOSNEK, PhD ChE'75, of Houston, founder of KnowledgeOne

DANNIE CLARIDA, ChE'65, MS ChE'66, of Ponca City, Okla., owner of CorrMat International

JEFFREY L. COSTELLIA, ChE'87, of Herndon, Va., partner and deputy chair of Nixon Peabody

CLYDE LORRAIN COWAN JR., ChE'40, former professor at the Catholic University of America, inducted posthumously

CHARLES W. LYON, ChE'84, MS EMgt'91, of Atlanta, business director of Americas and Asia for INEOS Capital Ltd.

JOHN "JACK" E. MAURER, ChE'51, of Chesterfield, Mo., retired general patent counsel for Monsanto Co.

JOSEPH E. SCHROEDER, ChE'77, MS ChE'81, of Union, Mo., senior vice president of engineering for Nooter Eriksen

ACADEMY OF CIVIL ENGINEERS

DAVID AHLVERS, CE'84, EMgt'84, of Jefferson City, Mo., state construction and materials engineer with the Missouri Department of Transportation GARY AMSINGER, CE'80, of Defiance, Mo., corporate vice president of safety for McCarthy Building Companies Inc.

DAN BOOHER, CE'80, MS CE'81, of Springfield, Mo., retired senior vice president of design and construction for Kohl's Department Stores

JOHN BRANHAM, CE'70, of Stella, Mo., president of Branco Enterprises Inc.

MICHAEL L. DAVIS, CE'75, of Lebanon, Mo., president and CEO of Barton Engineering Co. Inc.

RICHARD HENRY, CE'83, of Lafayette, Calif., president of the Northern Pacific Division of McCarthy Building Companies Inc.

ROBERT "BOB" HOLMES JR., CE'87, MS CE'89, of Rolla, Mo., national flood hazard coordinator for the U.S. Geological Survey

TERRY LEEDS, CE'84, of Kansas City, Mo., director of the water services department for the city of Kansas City, Mo.

FRED PALMERTON, of Springfield, Mo., vice president of Palmerton and Parrish Inc.

TOM SIECKHAUS, CE'88, of Fenton, Mo., senior vice president and partner of Clayco Construction Corp.

CURTIS SKOUBY, CE'85, of St. Louis, director of public utilities for the city of St. Louis

ACADEMY OF COMPUTER SCIENCE

KENT LYNN, CE'85, of Charlottesville, Va., client executive for IBM Corp. in Washington, D.C.

CHARLES L. MARSH, CSci'76, of Chapin, S.C., senior vice president and chief operating officer of ESCADA of the Americas in New York

ACADEMY OF ELECTRICAL AND COMPUTER ENGINEERING

MICHAEL J. BASLER, EE'79, MS EE'89, of Highland, Ill., electrical engineering manager for Basler Electric Co.

MARK C. BIRK, EE'86, MS EE'91, of St. Louis, senior vice president of Ameren Corporate Planning

ROBERT D. ENGELKEN, MS EE'80, PhD EE'83, of Jonesboro, Ark., professor of electrical engineering at Arkansas State University

JEFFREY VERNON HACKMAN, EE'80, of Wentzville, Mo., director of transmission operations for Ameren

JAMES L. PAUNICKA, MS EE'88, PhD EE'92, of St. Louis, technical fellow and senior researcher in Boeing Research and Technology

STEVE E. WATKINS, EE'83, MS EE'85, of Salem, Mo., professor of electrical and computer engineering and associate chair of electrical engineering undergraduate studies at Missouri S&T

ACADEMY OF MECHANICAL AND AEROSPACE ENGINEERS

MATTHEW G. BAEBLER, ME'79, MS EMgt'80, of San Antonio, Texas, director of energy and greenhouse gas for Tesoro Refining and Marketing Co.

STEVEN M. BASS, AE'87, of St. Louis, director of advanced global strike in phantom works for Boeing Defense, Space and Security

BRYAN H. CUPPLES, AE'86, of Euless, Texas, director of advanced quality systems in Fort Worth for Bell Helicopter, a Textron Inc. company RANDY FRANK, ME'91, of Dearborn, Mich., global front end and underbody/computer-aided engineering manager for product development in body exteriors and stamping engineering for Ford Motor Co.

CHRISTOPHER W. KEENE, ME'88, of Sugar Land, Texas, president and CEO of Rangeland Energy LLC.

ACADEMY OF MINER ATHLETICS

WENDELL "BUDDY" BARNES, EMgt'73, golf team, of Houston, who works in private practice with NWH Americas

DR. KIM COLTER, ChE'73, football team, of Washington, Mo., a physician

LAFAYETTE GATEWOOD, Psych'88, football team, of University City, Mo., teacher and football coach at University City High School

GREG HAUG, CE'76, football team, of Jefferson City, Mo., owner of Resource Enterprises

DIANA NEWMAN, EMgt'84, basketball and softball teams, of Kansas City, Mo., vice president of business processes for Perfect Output

CHRIS NISBET, EMgt'84, football and baseball teams, of St. Louis, project director for educational and commercial projects for McCarthy Building Co.

MIKE NOBLE, Phys'91, football and track and field teams, of Carson, Calif., plant manager for General Mills Inc.'s yogurt factory

LARRY OLIVER, CE'70, MS CE'76, football team, of Tucson, a member of the project management team involved in the expansion and upgrade of the Ina Road Wastewater Reclamation Facility in Tucson RODDY ROGERS, CE'81, MS CE'83, football and track and field teams, of Springfield, Mo., manager of water treatment and supply for the City Utilities in Springfield

TIM SWINFARD, Psych'90, cross country and track and field teams, of Jefferson City, Mo., CEO of the Missouri Coalition of Community Mental Health Centers

DARRIN TALLEY, ME'88, football team, of Vienna, Va., vice president for marketing and technology for ExxonMobil Corp.'s fuels, lubes and specialties company

ACADEMY OF MINES AND METALLURGY

R. TIM BRADLEY, PetE'77, of Houston, president of carbon dioxide for Kinder Morgan

LARRY BRITT, GeoE'79, of Grove, Okla., consulting engineer with NSI Fracturing

ERIK ERBE, CerE'87, MS CerE'88, PhD CerE'91, of San Diego, vice president of research and development in the Biologics group at Nuvasive Inc.

KENNETH GIELOW, MetE'70, MS MetE'71, of Festus, Mo., president of Imrie-Gielow Inc.

HARVEY GOODMAN, GeoE'77, MS GeoE'87, of Houston, research consultant with Chevron Energy Technology Co.'s Rock Mechanics Analysis Team and adjunct professor at Missouri S&T

DAN SCOTT, MetE'70, of Montgomery, Texas, senior technical advisor with Baker Hughes Inc.

TOM WETTEROTH, CerE'79, MS CerE'82, of Chandler, Ariz., vice president of operations for Applied Microarrays Inc.



HAVENER RECEIVES HONORARY DOCTORATE

More than 1,000 students graduated from Missouri S&T in May, and two longtime supporters received special honors during commencement ceremonies May 17 and 18.

Entrepreneur **Gary Havener**, Math'62, received a doctor of engineering from S&T. The Fort Worth, Texas, business leader is also a member of the S&T Board of Trustees. Havener has a long record of service and giving to the university, but he is best known for his contribution to establish the Havener Center on campus.

Missouri State Sen. **Dan W. Brown** of Rolla spoke at the Saturday, May 18, commencement ceremony. Brown has practiced veterinary medicine for more than 30 years and has served on the Missouri Veterinary Licensing Board.



KRAWITZ RECEIVES CHANCELLOR MEDAL

Natalie M. "Nikki" Krawitz, former vice president for finance and administration for the University of Missouri System, received the Chancellor Medal for her contributions to the university. Krawitz served as vice president from 2002 until her retirement in June. Krawitz spoke during commencement Friday, May 17.

S&T AWARDS PROFESSIONAL DEGREES

Five Missouri S&T alumni and friends received honorary professional degrees during Spring Commencement. The degrees recognize these graduates for professional achievement:

- William E. Acree Jr., Chem'75, MS Chem'77, PhD Chem'81, of Argyle, Texas, chair and professor of chemistry at the University of North Texas.
- Christopher C. Curfman of Peoria, Ill., president of sales and support for Caterpillar Global Mining in Oak Creek, Wis.
- John F. Eash, AE'79, MS EMgt'90, of Weldon Spring, Mo., director of F/A-18 production operations for the Boeing Co. and president of the Miner Alumni Association.
- Brady F. Hays, CE'98, of Overland Park, Kan., director of projects and associate vice president of Black & Veatch's water business focused on mining and oil and gas clients.
- Robert L. Phillips Jr., LSci'90, of Fairfax, Va., vice president for research and policy with the American Board of Family Medicine.

IN PRINT

Patrick J. Huber, professor of history and political science, published a book titled *He's Dead*, *All Right*, about Father Oscar L. Huber, the Catholic priest who performed last rites on President John F. Kennedy and a cousin of the author. The book was published to commemorate the 50th anniversary of the Kennedy assassination.

MINER GIFTS: BIG IMPACT

Graduates and friends from across the nation raised \$10.1 million during the past fiscal year. These generous benefactors regularly contribute to their university in support of our mission to prepare today's students for tomorrow's challenges. Here's a look at how Miner Nation gave from July 1, 2012, through June 30, 2013.











GOLDEN MINERS REUNITE

- 1. The Miner Alumni Association hosted 48 members of the Class of 1963 and their guests at the 2013 Golden Alumni Reunion May 20–21. In addition to getting reacquainted with each other, alumni and guests toured campus and the Kummer Student Design Center, visited their departments and learned about life on campus today through a presentation by Chancellor Cheryl B. Schrader. In a grand recognition ceremony on the final day of the reunion, Schrader and Miner Alumni Association executive director and past president Darlene Ramsay, MetE'84, presented class members with their 50-year pins and certificates.
- 2. During Monday night's banquet, an Elvis Presley tribute artist entertained class members. Pictured during the dinner are **Michael S. Goodman**, ME'63, and his wife, **Sharon**.
- 3. John T. Sedovic, CE'63, and his wife, Eliana, enjoy Monday night's banquet.
- 4. Student design team members displayed their projects for members of the Class of 1963. Here class members (left to right) James R. Knox, Chem'63, John J. Zenor, AMth'63, Zenas C. Blevins, CE'63, David L. Schwaller, ME'63, Kraig G. Kreikemeier, ME'63, and Elizabeth, guest of David W. Spencer, CE'63 (not pictured), visit the Kummer Student Design Center as Joshua Jetter, a junior in computer science and computer engineering, shows off his work with the Mars Rover Design Team.

STAT HOSTS OPENING WEEK BARBECUE

Students Today, Alumni Tomorrow (STAT) hosted a free barbecue during the group's first meeting of the year on Aug. 28. Students enjoyed food hot off the grill and learned about STAT, the alumni student organization.

JOIN US FOR THE 106TH BEST EVER

On Saturday, March 15, alumni and friends are invited to attend the St. Pat's pre-parade party from 9 to 11 a.m. on the Alumni Patio outside Castleman Hall, 10th and Main streets in Rolla. Complimentary coffee, juice and assorted pastries will be served. Beer, Bloody Marys and Mimosas will be available at a cash bar.

Immediately following the St. Pat's parade, all alumni, their families and guests are invited back to Castleman Hall for grilled hot dogs and \$1 beer until 2 p.m. Make plans to travel to Rolla for St. Pat's or look on **mineralumni.com** for a section event in your area. Help make the 106th celebration the Best Ever!

MORTON ELECTED TO ASEE POST

Lea-Ann Morton, assistant vice chancellor for university advancement, has been elected to a three-year term as chair of the American Society for Engineering Education's Professional Interest Council V. She began her term with ASEE on July 1, 2013.

SPORTS BY THE NUMBERS



Career home run total for S&T softball catcher **Kaylea Smith**, a senior in civil and architectural engineering. Smith, who earned all-conference and all-Midwest region and All-Academic honors after the 2013 season, is a student assistant for the team.

Fielding percentage for Missouri S&T's baseball team during the 2013 season, the best in school history and second-best in NCAA Division II.

.975

16 Act

Academic All-America selections from S&T since 2000, the fifth-most of any institution in NCAA Division II.



Capital One Academic All-America selections from Missouri S&T during the 2012–13 season, tying the school record for the most in one academic year. Missouri S&T also had six in the 2003-04 season.



Missouri S&T student-athletes who were Great Lakes Valley Conference's Council of Presidents Academic Excellence Award winners for 2012–13, the second-most by any school in the GLVC. To earn the award, student-athletes must have been at an institution for two academic years, completed their athletic eligibility and maintained a GPA of 3.5 or better.



hlam Issa isn't the kind of person who lets opportunities slip by. Born in Tanzania, Issa left the country at age 10 to live in St. Louis. She didn't speak any English when she arrived, but overcame that and other obstacles to graduate as valedictorian from Hazelwood East High School.

"I'm fluent in both English and Swahili, and I'm on my way to learning a third language, Spanish," she says. "Though my parents were not educated, my father did all that he could to make sure all of his children went to college and made something of themselves."

Now a junior in chemical engineering at Missouri S&T, Issa enjoys staying involved on campus. She's a member of Miner Mentors, a student organization focused on promoting acceptance and understanding, and the National Society of Black Engineers. She's also the student life editor for the *Rollamo*, the university's yearbook.

"Besides learning new things in the classroom, the most exciting part about college life is being involved," she says. Issa says the campus atmosphere was a huge factor in her decision to attend S&T.

"I wanted to go to a place where my professors not only knew me by name, but were there to help me when I needed it," she says. "I also wanted to be at a place that was going to challenge me to be better than what I am now."

After she graduates, Issa says she hopes to live in Texas and work for an oil company such as ExxonMobil or Chevron. ■



by Linda Fulps | fulpsl@mst.edu

Yes, we're the Miners. For nearly 150 years, S&T alumni have been developing new ways to get to the metals, fossil fuels and other mineral resources society wants and needs.







From left to right: Jackling, McNutt and Hasselmann. Below: A statue honoring S&T's history in mining resides in McNutt Hall.

Early on, **Daniel C. Jackling**, MetE 1892, came up with the idea of using open-pit mining, steam shovels and railroad cars to access and remove low-grade copper from Utah's Bingham Canyon. Although many thought it was a waste of time, Jackling's low-cost solution revolutionized the industry.

Several years later, **Vachel McNutt**, MinE 1910, stumbled upon a massive deposit of potash near Carlsbad, N.M. It was the first time the agricultural fertilizer had been found in the Western Hemisphere, and it allowed U.S. farmers to use a local, rather than foreign, source.

And after discovering oil pools off the Texas coast, **Karl Hasselmann**, MinE'25, used innovative tools and techniques to create offshore drilling rigs to extract oil from the Gulf of Mexico.

These pioneers laid the groundwork for today's highly sought-after miners.

According to a January 2012 report by the Society of Mining, Metallurgy and Exploration (SME), the mining industry will need 78,000 new U.S. workers to replace retirees and to meet increasing demand for materials. But fewer universities are producing mining engineers.

"The number of universities in the U.S. with mining engineering programs has declined from 22 in the 1980s to just 14 today," says **Samuel Frimpong**, the Robert H. Quenon Chair of Mining Engineering at Missouri S&T. "That decrease puts a lot of pressure on schools — even small programs still have to teach the entire curriculum, but with fewer faculty."

Frimpong says that although many other schools have shown declining enrollment, the number of mining engineering students at Missouri S&T has gone up. "We used to be second or third in the country, but beginning in 2007, Missouri S&T became the largest school in the U.S. to produce mining engineers. And we still have room to grow," he says.

Missouri S&T's reputation for top-notch graduates led 13 companies to recruit mining and metallurgical engineering majors at this fall's Career Fair in September. And our graduates get the good jobs. In 2012-13, the average starting salary for S&T's mining engineering graduates was \$66,348. For metallurgical engineering graduates, it was \$63,306.

In addition to robust starting salaries, new mining technologies may also draw more students to the field. "Automation, collision avoidance, process control and tracking systems, and data warehousing and information technology applications are some of the advanced technologies now being used in the industry," says Frimpong.



Machines equipped with multiple sensors and cameras allow operators to monitor everything that goes on around them, reducing accidents and improving worker safety. Systems also monitor equipment performance, saving money by reducing downtime.

"A 400-ton truck costs between \$4.5 million and \$5 million. You need those trucks to be available," says **Dianna Tickner**, MinE'79, vice president of health, safety and the environment and project governance for Peabody Energy Corp., the world's largest private-sector coal company. "It's vital to spot problems early on, before there is catastrophic damage."

Jason Buenemann, MinE'02, agrees. A project coordinator with Kiewit who moved his family to Australia last year, Buenemann says his group uses Caterpillar's trademarked Cat MineStar System. "It gives us real-time feedback on equipment usage," he says. "If an

"IT REALLY MADE ME THINK ABOUT WAYS MINING CAN HELP THE ENVIRONMENT."

operator abuses equipment, we can review the actual road conditions and monitor operator behavior. We can also replay the exact situation in a 3-D simulator, creating a retraining opportunity. It helps maintain the equipment, increase productivity and lower costs."

Students get this same kind of training at S&T's own Virtual Surface Mining Facility, where heavy mining machinery, surface-

mining methods and materials-handling systems are simulated. The lab was made possible through donations from Caterpillar Global Mining, Luminant Energy, Immersive Technologies and P&H Mining.

Many students considering mining careers want to know about the environmental aspects of mining. Today's mining companies work to minimize the impact their operations have on the environment and rehabilitate the area when mining operations are complete.

Frimpong says this is a priority for the companies. "Before an operation begins, mining companies go through an extensive process to understand community needs," he says. "To get permits, companies must demonstrate an understanding of the implications of mining and show how they will restore the land and systems back to the original conditions or better when they are done. It's a meticulous process all mining companies follow, particularly in the U.S."

Joe Neumann, MetE'07, says Teck Alaska Inc.'s commitment to environmental stewardship and sustainability was a big reason he was interested in working for the company. "**Tom Krolak** (GGph'85), a senior geologist with Teck, talked to my class about the company's Red Dog Operations in a remote part of Alaska. He showed us what the environment in the area was like before mining and after. It really made me think about ways mining can help the environment."

A model for environmental responsibility, Teck Alaska maintains an operating agreement with the Northwest Alaska Native Association (NANA) as it develops Red Dog Mine. Located in an isolated area in Alaska's Northwest Arctic Borough, it's the largest zinc mine in the U.S.

As part of this agreement, an independent committee of local native hunters and elders gives the mine direction on environmental matters. Red Dog's environmental technicians regularly test the region's air, water, soil and wildlife and give local villages monthly environmental reports. *(continued on page 28)*

— JOE NEUMANN, METE'07









Above left: Kiewit dozer operators gathered to mark the first day of work on the company's project at Fortescue Metals Group's Cloudbreak Mine in remote Western Australia. Jason Buenemann is on the far right.

Above right: Buenemann (left) with Bill Pruitt, who interviewed him for a position a Kiewit while Buenemann was a student in Rolla in 1999. The photo was taken at the Cloudbreak Mine's site airport. To reach the mine, employees have a two-hour flight from Perth, Australia.

At left: Kiewit uses stripping dozers like these CAT D11T models to expose iron ore for mining.

Photos submitted by Jason Buenemann.





Joe Neumann enjoys skiing after work near Alaska's Red Dog Mine. Photo submitted by Joe Nuemann.

When he discovered the company was seeking an entry-level engineer, Neumann jumped at the opportunity to join Teck after graduation. "I knew it would be a challenge unlike any other offered," he says. Now an operation supervisor for the mill, Neumann spends four weeks

"AMERICANS ARE CONSUMERS OF HUGE AMOUNTS OF MINING PRODUCTS."

--- SAMUEL FRIMPONG, ROBERT H. QUENON CHAIR OF MINING ENGINEERING AT MISSOURI S&T working at Red Dog, then two weeks off at his home in Golden, Colo.

The seasons rule in a place accessible only by plane, where trucking operations may be suspended during caribou migration. "We can only ship from July through October and only operate construction from May through November. Some departments are only there in the summer," says Neumann.

Red Dog Mine is just one example of the many unique job prospects available to S&T graduates. And the need for mining professionals isn't going away any time soon.

"Americans are consumers of huge amounts

of mining products," says Frimpong. "Imagine the rest of the world in developing economies with increasing populations requiring the same amount. Demand will remain high."

THE FIRST GENERATION by Mindy Limbackm@mst.edu

First-generation college students make up 25 percent of the 2013 freshmen class. We talked to five first-generation students — four current students and one recent graduate. Find out what they think about the challenges they faced, how it felt to leave home and what campus resources helped them.

ayla Billadeau, ME'13, had a "can-do" personality even before she became salutatorian of her high school's graduating class. The daughter of a retired St. Louis police officer and an administrative assistant, Billadeau kept it up throughout her time at Missouri S&T, completing five internships at companies like ConocoPhillips and The Walt Disney Co. Like many other firstgeneration students, she was relentless in her drive to succeed and pushed herself to work harder. She credits her family's support and the financial aid she received for allowing her to "get a world-class and affordable education."

"I had the opportunity to just be myself and get involved with many organizations," says Billadeau, who joined ConocoPhillips's selective training program for project engineers and project managers after graduating in May. "S&T has a prestigious reputation with companies across the nation, which opened many doors for me."

Billadeau's story is a common one at S&T. First-generation college students like her make up 25 percent of the 2013 freshmen class. We sat down with four current first-generation students to hear their experiences. Meet **Ashley Koesterer**, a senior in economics and business and management systems from St. Louis; **John Gettemeyer**, a senior in mechanical engineering from St. Peters, Mo.; **Austin Anderson**, a freshman in electrical engineering from St. Charles, Mo.; and **Diamond Williams**, a senior in engineering management from Black Jack, Mo. Here are their stories.



First-generation college students, like all college students, have the opportunity to enrich their experience through internships. Kayla Billadeau had five during her time at S&T. Here is a glimpse of how she took full advantage of her opportunities.













Ashley Koesterer

What did it feel like to leave home for college?

Koesterer: When I first got to college, I was homesick and I only wanted to be around a friend I knew who attended the school. It took me a few weeks to get used to everything and realize what a great opportunity I had.

Williams: It was scary. I left this big city to come to a small town that only had a Walmart. However, Rolla has matured me and exposed me to another style of living that I wouldn't have been able to get back in St. Louis.

Anderson: I'll have to admit it was pretty weird to leave the people you've lived with for your whole life up until now. I was lucky enough though to room with a friend I've had since middle school.

What are some challenges facing firstgeneration college students?

Gettemeyer: One of the biggest challenges that I faced was all of the new information coming at us. With neither of my parents having sent a child off to college, and never going themselves, we were all learning about the Free Application for Federal Student Aid (FAFSA), living on campus, and even the Family Educational Rights and Privacy Act (FERPA).

Williams: You have to hold yourself accountable. In high school, teachers would remind you of homework and projects, but that never happens in college. You have to keep yourself on task and focused.



Austin Anderson

John Gettemeyer

Diamond Williams

What campus resources might first-generation students find particularly helpful?

Gettemeyer: Learning Enhancement Across Disciplines (LEAD) sessions are crucial to your success on this campus. I'm not saying that they are required for you to do well, but they provide that study group if you can't find one. It also provides a day and time each week where you have to sit down and do your homework.

What tips can you give to other first-generation students?

Koesterer: Have fun and get involved as much as you can. This has helped me learn more about myself along with other personalities. I am a woman and I am the student body president of a school with a student body that is more than 70 percent men. You can do it too!

What can parents of first-generation students do to support their college kids?

Koesterer: The small efforts really make a huge difference. I do not have a car in Rolla, so whenever I want to come home, they always offer to come and pick me up.

Gettemeyer: Let your student know that they can open up to you about anything. They are experiencing a lot of firsts. Be open to whatever questions they may have.

If you hadn't attended S&T, what do you think you would be doing now?

Williams: I honestly have no idea. Missouri S&T has changed my life for the better and has given me and my family endless hope. Since attending Missouri S&T, my cousins and friends have been inspired to ignite their passions and go back to school.

What might surprise first-generation students about the college experience?

Koesterer: You have to reach out to people and network. You cannot expect everything and everyone to come to you. You will miss out on so many opportunities if you do not put yourself out there.

What survival skills do first-generation students need to be successful at S&T?

Koesterer: Go to the Career Fair your freshman year. This is a great opportunity to network and practice talking with employers.

Gettemeyer: Don't be afraid to ask questions and use your resources. That simple sentence will get you far. Keep some food and drinks around your room — especially stuff that reminds you of home. For example, I always have hot cocoa around that I can enjoy on those winter evenings before bed.

Anderson: Be prepared for a lot of homework and take advantage of professors' office hours to ask any questions that you might have. Study and do homework in groups. It makes it a lot more bearable.

A front-row seat to the history of **SPACE EXPLORATION**

10.7

by Mary Helen Stoltz | mhstoltz@mst.edu

n 1963, **Ron Epps**, Phys'67, rode his 1951 Harley Davidson Panhead from Mount Vernon, Mo., to Rolla to attend the Missouri School of Mines on a Carnation Milk scholarship. When he crossed the stage as a first-generation graduate, NASA was preparing to send a man to the moon.

Epps had 17 job offers at graduation, but NASA's offer caught his attention.



Ron Epps, in the center of the back row, pictured in 1981 with the STS-1 Flight Control Team in Johnson Space Center's Mission Control. STS-1 was the first orbital flight of NASA's Space Shuttle Program. Photo submitted by Ron Epps, Phys'67.

"NASA recruited me heavily," Epps says. "I actually got a Western Union telegram that said, 'We think you could help this country land a man on the moon and we'd like you to come to work for us.'"

Epps reported to the Manned Spacecraft Center (later named the Johnson Space Center) in Houston on June 5, 1967 — a week after graduation. He served his entire career there, taking part in some of the space program's most significant events.

"I have been extremely fortunate to be one of those who participated in the development of the U.S. space exploration program," Epps says. His 38-year career spanned the Apollo, *Skylab*, Apollo-Soyuz, space shuttle and International Space Station programs. "It has been a great ride, and it all started with a degree in physics from Rolla."

Epps started work as an aerospace technologist with the Landing and Recovery Division, serving as a technical advisor to the U.S. Navy. Assigned to recovery ships for *Apollo 8*, *9* and *14*, he was deployed all over the world to recover spacecraft returning from the moon and to cover deep space aborts — unplanned landings following system failures. on forever, but budget cuts brought an end to the Apollo program."

After *Apollo 14*, Epps spent the next 12 years as a flight dynamics officer in

"It has been a great ride, and it all started with a degree in physics from Rolla."

- Ron Epps, Phys'67

"I was making friends with flight controllers in Mission Control, learning lunar trajectories and orbital mechanics it fit my degree quite well.

"The Apollo program was truly a technical marvel," Epps says. "I don't think any group of talented individuals has ever done so much for the country outside of wartime. At the time, I thought space flights to the moon and beyond would go Mission Control, responsible for all aspects of trajectory operations.

"After liftoff, you monitor the vehicle's performance and flight path and call abort modes if required. Your main job is to watch the vehicle's flight path uphill and determine how much energy it's got and how much it needs to get to orbit."

(continued on next page)

"I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the Earth. No single space project in this period will be more impressive to mankind or more important in the long-range exploration of space; and none will be so difficult or expensive to accomplish."

 President John F. Kennedy in a May 1961 special address to a joint session of Congress

Epps manned a console on the front row of the Mission Control Center, an area known as "the Trench," during the two final Apollo flights, the launch of *Skylab*, the docking of the Apollo spacecraft with the



capsule, and the first nine space shuttle flights. The Apollo-Soyuz program ended in 1975 and Epps turned 30 at the console. From there, he began

Russian Soyuz

Epps

prepping for the shuttle era.

He started by writing the requirements to get the Apollo software to work on the space shuttle missions. Some of the basic orbit and rendezvous software could be easily transitioned, he says, but the real problem was developing code to get the shuttle off the ground and into orbit and determining abort modes.

"It was a totally different beast," Epps says of the space shuttle. "Apollo was a ballistic vehicle. The shuttle, though, was designed to be a partially reusable winged vehicle with solid rockets and an external tank."

After weeks of deliberation and discussion, the solution came to Epps at 4:30 a.m. He woke his wife shouting "I figured it out!" as he ran down the hall.

Epps' solution, the Abort Region Determinator (ARD), was used to monitor the shuttle's ascent trajectory and to determine abort modes for the entire shuttle program. Epps tested the system for two years in 1,080 integrated ascent simulations with the STS-1 crew. "Utilizing the ARD as a member of the hand-picked STS-1 flight control team was a magnificent achievement," he says.

After the first nine shuttle missions, Epps spent 36 months training astronauts for shuttle ascent and entry. In 1986, he became chief project engineer for all projects supporting Mission Control operations and shuttle space flight simulators. After the *Challenger* accident, Epps was awarded the NASA Exceptional Service Medal for technical management in preparation of those facilities for the shuttle's return to spaceflight. Epps retired in January 2005 after his wife, Peggy, was diagnosed with Parkinson's Disease. He had just completed a nine-year run as chief of the flight design and dynamics division responsible for all aspects of trajectory analysis, design and flight control operations supporting the U.S. space shuttle and space station programs. He oversaw 35 space shuttle flights, including 16 shuttle missions to the International Space Station, six shuttle-*Mir* missions, three Hubble Space Telescope servicing missions, 10 ISS expeditions and 25 visiting-vehicle missions to ISS.

At the close of his retirement celebration, NASA awarded Epps the agency's highest award, the Distinguished Service Medal, for his outstanding technical contributions and exceptional leadership to the nation's space program.

"I can't imagine another job where the highs were so high and the lows were so low," Epps says. "It was a great ride for a boy from Mount Vernon."



Presented to RONALD C. EPPS

This flag was flown aboard Space Shuttle "Columbia" (STS-1) April 12 - 14, 1981. It is presented to you in recognition of the significant contribution you made to the success of the mission.

















Clockwise from top left: One of many awards of recognition Epps received during his 38-year career with NASA. Epps, back row, right, and his fellow crew members prepare for a Flight Dynamics Officer shift change in the Mission Control Center for Skylab. Epps was part of the ground crew working behind the scenes on STS-41, one of the missions former astronaut Col. **Tom Akers**, Math'73, MS Math'75, flew that successfully deployed the Ulysses satellite to study the solar poles of the sun. He also worked at NASA during the flights of S&T astronauts **Sandra H. Magnus**, Phys'86, MS EE'90, and **Janet L. Kavandi**, MS Chem'82. Epps was the lead ascent flight dynamics officer in Houston's Mission Control Center in 1982. He was responsible for the uphill journey of the space shuttle's third launch. Photos submitted by Ron Epps.

MISSION, GOALS AND BENEFITS

MISSION

The association proactively strives to create an environment – embodying communication with and participation by Miner alumni and friends – to foster strong loyalty to the university and growth of the association. The association increases its financial strength and provides aid and support to deserving students, faculty and alumni.

GOALS

- \bullet Increase alumni pride in their association with Missouri S&T and the Miner Alumni Association
- Increase alumni involvement, especially that of young alumni
 Increase alumni contributions, both in the number of alumni making a financial commitment and in the dollars raised to
- benefit Missouri S&T and the Miner Alumni Association • Strengthen relationships with faculty, staff and students on behalf of the alumni association.

The officers and other members of the association's board of directors provide leadership and personal participation to achieve these goals and fulfill this mission. For their efforts to be a success, they need YOUR active participation as well, in whatever alumni activities you choose.

BENEFITS

CAREER ASSISTANCE Missouri S&T's career opportu

Missouri S&T's career opportunities and employer relations will help you in your job search. For information, call 573-341-4343.

SERVICES

Online Community including searchable directory at mineralumni.com

Access to alumni office via email (alumni@mst.edu)

Address update service so you don't miss your Missouri S&T mail Insurance discounts

MINER MERCHANDISE

License plates (for Missouri residents) and the official Missouri S&T ring

GET MORE

Want to know who else is planning to attend a section event in your area? Need more details about an upcoming event? Register online at **mineralumni.com**, click on the events tab, select the events you want to attend then click registration.



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Representing more than 56,000 alumni wordwide

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ALUMNI TAKE LEADERSHIP ROLES IN ASSOCIATION

During its annual Homecoming meeting on Oct. 19, the Miner Alumni Association approved the following new and returning board members:

Douglas Marquart, MetE'82, Area 1 (second term) Stephen Schrock, ArchE'11, Area 2 Daniel Ryan, ME'12, Area 3 Michael Gross, MetE'88, MS MetE'94, Area 9 John Renz, EMgt'81, Area 10–18 Elizabeth Baumbach, CerE'90, Area 10–18 Michael Busby, CE'78, Area 10–18 (second term) John Campbell, ChE'74, Area 20 Kimberly Morrison, GeoE'96, Area 22 Dennis Leitterman, EE'76, MS EE'77, Area 23 (second term) David Heineck, ChE'79, Area 24 Bill Brune, CSci'73, director-at-large (second term)

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

Dave Bufalo, CE'66, Area 22 Rhonda Galaske, MetE'79, Area 10–18 Christopher Mayberry, CSci'98, Area 2 Nathan Rues, ME'02, Area 9 Gregory Skannal, GeoE'85, Area 20 Brian Tenholder, MetE'97, Area 3 Breck Washam, ME'90, Area 10–18 M. Theresa Williams, ChE'98, MS EMgt'02, Area 24

WITHOUT SET, IT'S JUST PAT'S.

But just because you can't make it back to Rolla for the revelry doesn't mean you can't celebrate like a proud member of Miner Nation.

Join your fellow Miners at St. Pat's celebrations in dozens of cities across the nation. Come relax, meet your fellow Miners and celebrate Rolla style. To locate the nearest St. Pat's party, please visit mineralumni.com, click the events tab to select the party you plan to attend and click registration.

YOUNG ALUMNI GATHER IN ST. LOUIS



On July 24, 28 young alumni met at Blueberry Hill in the Delmar Loop, a vibrant entertainment district in St. Louis. Miners who graduated over the last 10 years gathered to enjoy appetizers over a few games of darts.

The Miner Alumni Association provides networking opportunities for Miners who are just beginning their journeys and those who are facing the challenges of transitioning from student to young professional. Check out a section or young alumni event designed to strengthen bonds of the Miner family. We're 56,000 strong (and growing)! Visit **mineralumni.com** and click on the events tab for a complete list of upcoming events.

MIKE MCEVILLY: A NATURAL LEADER

Whether he's working on a deep-water offshore development in the Gulf of Mexico or helping Missouri S&T produce top-notch engineers, Mike McEvilly, CE'80, MS EMgt'81, is a natural leader. McEvilly, project director of Hess Corp.'s Tubular Bells Development, supports Missouri S&T as a dedicated member of the Academy of Engineering Management, Academy of Civil Engineers and the Miner Alumni Association board of directors.



Leading by example: McEvilly chairs the Academy of Civil Engineers' Vision 2020, a strategy to help the civil, architectural and environmental engineering programs at S&T produce "street-ready" and "career-ready" engineers by enhancing the department's programs, recruiting top students, promoting interdisciplinary teaching and research, and nurturing knowledge creation and technology transfer.

"There is a basic desire to set the stage to attract upper-tier potential students, and allow them to enjoy their time at S&T as well," explains McEvilly. "We want to prepare students, not just for their first day in industry, but for the first five or 10 years of work."

Team spirit: Leadership has been a recurring theme throughout McEvilly's university involvement. "If you are going to be a member of an organization, you might as well give it your all," says McEvilly. As a student, he was president of three different organizations: Chi Epsilon, Intercollegiate Knights and Blue Key Honor Society. Today, he chairs the Strengthening Campus Relations Committee of the alumni association board of directors.

Off the clock: McEvilly, a member of Tau Kappa Epsilon, met his wife, **Mary Ellen (Hilton)**, EMgt'81, at a fraternity function. The couple enjoys living only five minutes away from their first grandson, Timothy, in Spring, Texas, where McEvilly is an active member of his church. He enjoys hunting, fishing and shooting sporting clays.

Giving back: McEvilly, a member of the Order of the Golden Shillelagh donor recognition society, recently made a naming donation to the Hasselmann Alumni House. "This is a great opportunity to assist in moving the project forward," says McEvilly. "Donating one's time and resources is rewarding and hopefully sends a message to other alumni, showing commitment for the future."

MOLTEN METAL

Founded 143 years ago as the Missouri School of Mines and Metallurgy, Missouri S&T still graduates metallurgical engineers with hands-on experience working in the Robert V. Wolf Foundry, a part of the Kent D. Peaslee Steel Manufacturing Research Center. Here, molten steel cools in clay molds in the foundry.



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106th Annual

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Graduation doesn't mean goodbye. We want to know what's going on in your life. Have you moved? Have you had a career or family change? Would you like to network with

Take a moment to update your contact information and you will automatically be entered into the **Stay-Connected Sweepstakes**. Submit your information before the end of November, and you'll be eligible to win great S&T prizes, including **2014 St. Pat's sweatshirts**.

HURRY, GONTEST GLOSES NOV. 30, 2013.



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