

# THE BRIDGE

Missouri S&T  
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Civil, Architectural and Environmental Engineering



Dehghani joins S&T  
as new chancellor  
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Life after death of  
solar panels  
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MISSOURI  
**S&T**  
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# FROM THE CHAIR: Joel G. Burken, Ph.D., P.E., BCEE, F.AEESP

Going into the 2019-20 academic year, we anticipated great things happening in the future, built upon the continuing advancement of the CArEE department and new Missouri S&T-wide bold goals and the vision to advance our campus. Our department progress has been profound and the trajectory strong!

Our breadth of research and education themes is rapidly expanding and recognitions are increasing. The topics in this issue of *The Bridge* look at new programs like Navigating the New Arctic (NNA) as part of the National Science Foundation Ten Big Ideas Program (pg. 18), tackling life cycle assessment of renewable energy integration in our society (pg. 6), and remote sensing of infrastructure health (pg. 9). Increased breadth has also come along with increased productivity. The CArEE team secured \$5.98M in new awards in 2019 and saw a 72% increase in research expenditures over the past two years — the greatest increases on the S&T campus.

The escalation in innovation and productivity is not by accident. As a department, we set a strong **Vision 2020** strategic plan. This plan set out to recruit and retain faculty talent, which is demonstrated by multiple international career recognitions in this issue. We also see our newest team member, **Dr. Yang Wang**, beginning his career by collecting an international award for his research in atmospheric aerosol formation and fate (pg. 17). We also see our faculty leading efforts in educational innovation and professional service (pgs. 16, 17 and 20), with national and international recognition.

Vision 2020 set forth ambitious plans for students to increase experiential and international experiences.

Our students are actively seeking international opportunities (pgs. 12 and 14), are being recognized for excellence (pgs. 3, 6 and 13), and are engaging locally and regionally to understand how their technological knowledge and global-level skills are applied to improving the state of Missouri. As a land grant institution, we are compelled to engage more actively and increase activity.

The building expansion project is well underway with the Advanced Construction and Materials Lab (ACML). The enhanced facilities will position our department as a premier facility in the nation for infrastructure research that will span from research at molecular- and

nanoparticle-scale (pg. 8) to full-scale structural element testing to extending infrastructure lifespan and enhance faculty research already underway (pgs. 8 and 10).

All of these endeavors fit well with the vision of our new campus leadership. **Chancellor Mo Dehghani** hit campus this summer with an invigorating energy and vision, which meshed incredibly well with our department trajectory. He has actively engaged across the board, with our students and has reached out to our faculty to lead the state and international activities that can transform our future in education and research for our society. Dr. Dehghani has also embraced our legacy of excellence through our alumni, (pictured on pg. 4 and above far left with alumnus **Eric Potts**, center, during the Chancellor's Leadership Academy) and we can certainly expect to see the CArEE team of students, staff, faculty and alumni continue to set the pace and blaze the path for a bright future in the civil, architectural and environmental engineering department at S&T and globally to **Change the World!**



Dehghani, Potts and Burken



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## DEPARTMENT ADMINISTRATION

### Department Chair

**Joel Burken**, Ph.D., P.E., BCEE, F.AEESP

### Assistant Chairs

**Civil:** Eric Showalter, Ph.D., P.E.

**Architectural:** Stuart Baur, Ph.D., A.I.A.

**Environmental:** Mark Fitch, Ph.D.

**Graduate Programs:** Cesar Mendoza, Ph.D.



## ASCE Innovation Contest

Ph.D. candidate, **Yasser Darwish** (pictured left), and his advisor, **Dr. Mohamed ElGawady** (center), were invited to ASCE headquarters in Reston, Va., where they shared their innovation — Impact Protection of Bridges Using Meta-Material Revolved Shell Panels — with industry leaders and competed for an Overall Grand Challenge Award and Best Entrepreneur Award.



## CEC Award Winners

The College of Engineering and Computing held a fall meeting with an awards ceremony and reception. Staff member **Darlene Turner** (pictured center), received a Loyalty Award for demonstrating leadership during her years at Missouri S&T and **Dr. Hongyan Ma** (right), was named a Dean's Scholar.



## ACML Construction

The ACML is scheduled to be completed in fall 2020. Follow the construction through weekly time-lapse videos at [rol.la/ACML-live](http://rol.la/ACML-live).

# THE BRIDGE

## In this issue

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**Dr. Mohammad (Mo) Dehghani** joins Missouri S&T as the 22nd leader, bringing a bold new vision and a broad experience from coast to coast.

### 14 CE senior studies abroad in Hong Kong this semester

**Scott Grier**, a senior in civil engineering and engineering management, spends his fall semester in Hong Kong as a recipient of the Benjamin A. Gilman International Scholarship to study abroad.

### 19 Khayat receives lifetime achievement award

**Dr. Kamal Khayat** was recently honored for his lifetime achievements in the field of self-consolidating concrete at the second International RILEM Conference on Rheology and Processing of Construction Materials (RheoCon2) in Dresden, Germany.

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Dr. Mo  
Dehghani



# DEGHANI JOINS S&T AS CHANCELLOR

by Andrew Careaga

New chancellor visits CAReE.

Thursday, Aug. 1, 2019 marked the first day on the job for **Dr. Mohammad (Mo) Dehghani**, the ninth chancellor of Missouri S&T and the 22nd leader in the institution's 149-year history.

Dehghani joins S&T from Stevens Institute of Technology in Hoboken, N.J., where he served as vice provost for research, innovation and entrepreneurship from 2013 until the end of July. Dehghani succeeds **Dr. Christopher G. Maples**, who served as Missouri S&T's interim chancellor from May 2017 through July 31, 2019.

University of Missouri System **President Mun Choi** announced Dehghani's selection as chancellor in May following an extensive national search. In his announcement, Choi called Dehghani "a nationally prominent research and academic leader who has the experience leading complex organizations by leading with vision and building collaborative teams."

"It's clear to me," Choi added, "that he has the skills and expertise to help Missouri S&T reach its ambitious goals to solve some of Missouri's — and the nation's — most complex and urgent problems."

## A RECORD OF LEADERSHIP

Dehghani's selection involved a 23-member search committee co-chaired by **Dr. Francisca Oboh-Ikuenobe**, Missouri S&T professor of geology and geophysics and biological sciences, and **Thomas R. Voss**, EE'69, retired president and chief executive officer of Ameren.

Both cite Dehghani's leadership record as evidence of his ability to lead Missouri S&T.

"Dr. Dehghani is a proven academic leader with an impressive research record," says Oboh-Ikuenobe. "He is known as a collaborative leader who emphasizes the importance of bringing people from diverse groups together for a common purpose."

"I am very impressed with Dr. Dehghani's experience and background," Voss says. "He brings a wealth of research expertise to this position, as well as a strong passion for educational excellence. I believe that under his leadership, Missouri S&T will continue to thrive as one of the nation's leading STEM-focused research universities."

A native of Tehran, Iran, Dehghani came to the United States and attended Louisiana State University, where he earned his bachelor's, master's and Ph.D. degrees in mechanical engineering. At LSU, he was elected to serve as graduate student representative on the College of Engineering's Dean's Faculty and Students Committee. Upon completing his Ph.D., Dehghani went to Massachusetts Institute of Technology on a postdoctoral fellowship from the National Science Foundation.

For the past 22 years, Dehghani has taken on leadership responsibilities at two major research universities and two national laboratories. Prior to joining Stevens, he was associate director for engineering at the Applied Physics Laboratory, a professor of mechanical engineering, and the founding director of the Johns Hopkins University Systems Institute (JHUSI). At JHUSI, he established research and

application programs with federal research agencies including the Department of Defense, the National Institutes of Health, the National Science Foundation, and the Department of Health and Human Services. He helped align those agencies' research efforts with the work occurring at Hopkins through the university's medical, public health and engineering schools as well as its Applied Physics Laboratory.

Before joining Hopkins in 2008, Dehghani served as the New Technologies Division leader at Lawrence Livermore National Laboratory (LLNL) in Livermore, California. LLNL is a U.S. Department of Energy multidisciplinary applied science and engineering national security laboratory with programs in advanced defense technologies, energy, environment, biosciences and basic sciences. At Lawrence Livermore, Dehghani helped develop technologies and expand many areas of engineering, including biomedical engineering, nuclear engineering, process systems and the traditional engineering disciplines of mechanical engineering, electronics, fluidics, and multiscale modeling and simulations.

Dehghani also spent a dozen years as a tenured faculty member of the mechanical engineering department at Ohio University in Athens, where he also served as the elected senator representing the College of Engineering in the faculty senate until his departure in 1996 to join LLNL.

*(continued on page 11)*

## In the rankings

### S&T ranked No. 1 among Missouri colleges for alumni salary potential and CArEE programs top ranked in Missouri

Missouri S&T is ranked as the top four-year university in Missouri for salary potential, according to the 2019 PayScale College Salary Report. S&T ranks No. 1 for graduates who earn only bachelor's degrees and among all alumni of Missouri campuses. S&T also is ranked No. 48 nationally for best universities for a bachelor's degree for four-year programs.

The report shows that Missouri S&T graduates can expect median early career pay (zero to five years of experience) of \$67,300 a year and median mid-career pay (10-plus years of experience) of \$122,600. About 80% of S&T's degrees are in science, technology, engineering and math (STEM) fields.

"It is quite common for Missouri S&T grads — a demographic that scores high on the SATs — to earn top-notch salaries in the workforce," the PayScale report notes. "Those with an education from Missouri S&T earn an average of about \$78K."

PayScale bases its rankings on data from millions of people who took its salary survey and reported where they received their bachelor's degree.

Missouri S&T and CArEE programs also fared well in multiple 2019 rankings, nationally and globally. The 2019 Academic Ranking of World Universities (ARWU) placed S&T civil engineering in the top 51-75 programs in the world, along with Penn State University, Texas A&M and Colorado-Boulder. Since 2003, ARWU has been presenting the world's Top 500 universities annually based on transparent methodology and objective third-party data. It has been recognized as the precursor of global university rankings ([shanghairanking.com](http://shanghairanking.com)). The *Wall Street Journal* rankings placed Missouri S&T overall as a top ranked public university and civil engineering program in Missouri.

*U.S. News* also placed CArEE programs atop the state rankings with the civil and environmental programs being top 50 programs within the U.S. at 50 and 48, respectively. Civil engineering was the highest percentile ranking at S&T, being in the top 20th percentile ([www.usnews.com/best-colleges](http://www.usnews.com/best-colleges)). Architectural engineering programs are not currently ranked, as S&T is one of only 22 ABET accredited programs in the U.S. and the only one in Missouri.



Dehghani talks with Ph.D. student, Mohanad Abdulazez.

# PLANNING AHEAD FOR MISSOURI ENERGY DEMANDS

by Peter Ehrhard

By 2050, up to 6 million tons of solar panel waste will need recycling, and the United States is expected to have the second-largest amount of waste after China, according to the International Renewable Energy Agency. But few states have started processes for handling the waste even as they require more energy produced by renewable sources.

Researchers at Missouri S&T hope to help modify state- and local-level recycling efforts by educating current owners about disposal options.

“People don’t realize the sheer number of panels that are installed each year,” says **Thomas Yarbrough**, CE’16, MS CE’18, a civil engineering Ph.D. student at S&T. “In just the past few years, the solar panel industry has averaged half a million panels being installed each day — eventually we will have piles of these things lying around.”

The U.S. currently gets about 2.3% of its electricity from solar energy, and solar energy use is only expected to grow. One challenge that comes along with the increased use of photovoltaic (PV) solar panels is what to do with them once they are no longer usable in 20-30 years’ time. As the demand for such systems grows and current “older” systems fade, governments, businesses and homeowners alike will have to replace them.

By providing a better understanding of current salvaging options, S&T researchers hope to improve recycling efforts and to establish a baseline measure for what solar panels are still usable.

“Both of these challenges require a review of current recycling methods here in the United States,” says **Dr. Stuart Baur**, assistant chair and associate professor of civil, architectural and environmental engineering at Missouri S&T. “The few PV recycling locations in the U.S. reclaim, on average, an estimated 70-75% of all materials. With continued improvements, it is estimated the recycling of these systems could reach in the range of 90-95%.”

2015 Nest Home



Dr. Stuart Baur

Photo taken at the S&T Eco Village and Microgrid test facility, home to Solar Decathlon homes.

Baur leads S&T's research efforts to review repurposing methods used elsewhere in an effort to understand what opportunities are available and cost effective for Missouri and the surrounding region. Aluminum, glass, silica and precious metals can all be recycled from the panels, but Baur says that to get these parts back to their basic elements requires a process that is limited and has a high resource cost.

Besides improving local recycling capabilities, Baur hopes to also create additional public awareness programs focused on reusing and repurposing PV panels for both customers and business suppliers and installers.

"These groups promote the use of active solar technologies but need to also plan for reuse and repurposing of solar panels at the end of their warranty or end of their designated task," says Baur. "Some forms of these panels contain heavy metals or

small amounts of precious materials, resources which could be reintroduced to the manufacturing stream."

Baur wants to start by tackling the main issue he sees with the process, which is that Missouri and its surrounding states do not currently have any panel breakdown or separation processes.

According to Jill Hollowell, Environmental Programs Specialist for the Ozark Rivers Solid Waste Management District (ORSWMD), one solution may be an Extended Producer Responsibility (EPR) program for Missouri. An EPR program could require manufacturers selling solar panels in the state to implement a collection and recycling program at no cost to consumers while also establishing a disposal ban on these products. Hollowell coordinates the ORSWMD grant program that supports Baur's research efforts.

A few states have already implemented EPR programs for PV management," says Hollowell. "Here in Missouri, there is a state-wide initiative gaining momentum for EPR programs addressing the disposal of paint, mattresses and pharmaceuticals."

Baur is working with ORSWMD and other area groups to form potential guidelines and procedures that the industry and state could use to increase reuse.

"With no specific guidelines in Missouri, the creation of state or federal regulations could facilitate greater local recycling rates and help reduce waste," says Baur. "Unchecked, the current direction could lead to a crisis in waste management, where unprepared regions will see large amounts of under-utilized, discarded paneling."

Photo by Tom Wagner/Missouri S&T

## 2013 Chameleon Home



# Missouri S&T wins funding for four new research programs

As part of a multicampus research initiative of the University of Missouri System, Missouri S&T will establish four new research centers and laboratories that build on the university's strengths in materials science and engineering, civil infrastructure, and electrical power systems.

The Missouri S&T projects are among 19 from the UM System's four universities selected to receive funding through the system's strategic investment program for research and creative works. UM System **President Mun Choi**, S&T **Chancellor Mohammad Dehghani** and other university leaders from the campuses in Columbia, Kansas City and St. Louis announced the list of selected programs.

"I'm very proud of the efforts our diverse research teams at Missouri S&T expended to develop creative, collaborative and cross-disciplinary approaches to address some of the great scientific challenges of our state and nation," Dehghani says. "Each of the S&T projects, as well as those of our sister universities, will leverage the talents of researchers and scholars throughout our entire system for the greater good."

Dehghani adds that all four of Missouri S&T's winning projects include researchers from other UM System campuses who will closely collaborate with S&T on the projects.

Through the program, Missouri S&T will receive funding for the following projects:

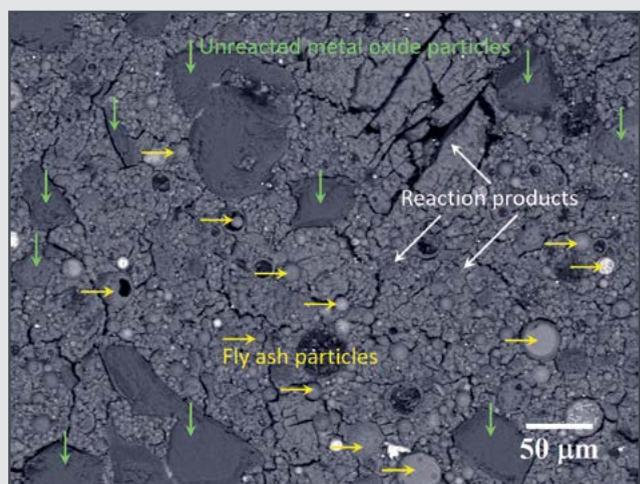
The Center for Glass Science and Technology (CGST), which will provide equipment and lab space to support research across the UM System related to the NextGen Precision Health Initiative and Institute. NextGen is expected to accelerate medical breakthroughs for patients in Missouri and beyond. The CGST builds on Missouri S&T's previous success in glass research, including the development of bioactive glasses to treat cancer and open wounds.

The Center for Novel Carbon-Efficient Binders for Sustainable Infrastructure, where researchers will develop more sustainable and efficient binding agents for concrete. The bonding agents hold promise as being stronger, more durable and longer lasting. **Dr. Kamal Khayat**, the Vernon and Maralee Jones Professor of Civil Engineering at S&T, will lead the center. Other faculty involved are **Dr. Sajal K. Das**, the Daniel St. Clair Chair of Computer Science at S&T; **Dr. Aditya Kumar**, S&T assistant professor of materials science and engineering; **Dr. Hongyan Ma**, S&T assistant professor of civil engineering; and **Dr. George A. Zsidisin**, the John W. Barriger Professor of Supply Chain Management at the University of Missouri-St. Louis.

The Center for Infrastructure Preservation and Resilience, which will bring together experts in data analytics, robotics and artificial intelligence to develop new approaches to the design, inspection and maintenance of infrastructure — from roads, bridges, buildings and tunnels to electrical power grids. The center will be led by **Dr. Genda Chen**, the Robert W. Abnett Distinguished Professor of Civil Engineering at S&T, and will involve **Dr. Jenny Liu**, S&T professor of civil engineering; **Dr. Suzanna Long**, professor and chair of engineering management and systems engineering at S&T; **Dr. Zhaozheng Yin**, associate professor of computer science at S&T; and **Dr. William G. Buttlar**, the Glen Barton Chair of Flexible Pavement Technology at the University of Missouri-Columbia.

A project titled "Energy Reliability and Resilience of Electrified Transportation Infrastructure" and the affiliated Electrified Transportation Distribution System Laboratory. The lab will be used to demonstrate and test new devices and systems for electric transportation, including light rail, electric ships, renewable energy systems and electric vehicle charging stations.

In addition, Missouri S&T faculty are involved in two research efforts led by MU. Khayat is involved in a project to develop future urban infrastructure, and **Dr. Stephen S. Gao**, Curators' Distinguished Teaching Professor of geology and geophysics, is part of a team that will develop capacity for using geospatial-enabled data for a breadth of research across the UM System.



This is a photo of Dr. Hongyan Ma's research on an alternative eco-efficient cement made from abundantly available off-specification fly ash with sphere particles.



Dr. Genda Chen with a data collecting drone

Photo courtesy of Missouri S&T Marketing and Communications

# Chen receives international 2019 Person of the Year award

by Peter Ehrhard

**Dr. Genda Chen**, professor and Robert W. Abnett Distinguished Chair in Civil Engineering at Missouri S&T, recently received one of two 2019 Person of the Year Awards given by the *Structural Health Monitoring (SHM) Journal* at its 12th International Workshop on Structural Health Monitoring.

These awards are given to individuals that work or have worked in government, industry or academic sectors from any region of the world and have made an outstanding contribution to the field of SHM. Awardees were nominated by experts in the SHM field and selected by an awards committee of editors and associate editors of the *SHM journal*.

Chen's nominations included mention of his leading work on lab-on-sensor theory for direct assessment of crack, corrosion and scour susceptibility of structures through innovations in sensor hardware design. Chen improved reliability and relevance of practical applications and eased engineers' acceptance and adoption.

Chen has also led the research community in analytical mode decomposition of vibration signals, together with adaptive wavelet transformation, for enhanced detectability of fatigue vulnerability with adaptive noise filtering capability.

Within the International Society of Structural Health Monitoring of Intelligent Infrastructure (ISHMII), Chen has delivered invited presentations at several society conferences, was elected to be an ISHMII council member in 2013 and an ISHMII Fellow in 2019. He also chaired the ninth International Conference on Structural Health Monitoring of Intelligent Infrastructure in St. Louis.

Since 2016, Chen has directed a nationwide University Transportation Center at Missouri S&T that consists of six research partner universities with over \$7 million in funding in five years. The goal of this center is to transform current inspection processes into a data-driven decision-making

protocol for bridge inspection and maintenance. The data sets collected from sensors and nondestructive devices will be used to develop a risk-based inspection program and optimize and prioritize preservation strategies.

A member of the Missouri S&T faculty since 1996, Chen is also director of the newly established Center for Intelligent Infrastructure at S&T. He earned a Ph.D. in 1992 from the State University of New York at Buffalo and was a postdoctoral trainee at the National Center for Earthquake Engineering Research. He is active in the American Society of Civil Engineers, Earthquake Engineering Research Institute, International Society of Optics and Photonics, International Society for Structural Health Monitoring of Intelligent Infrastructure, Structural Engineering Institute and Transportation Research Board.

# Missouri S&T joins new NUTC

by Peter Ehrhard

Missouri S&T researchers will join a national consortium of universities focused on improving the durability and extending the lifespan of the nation's transportation infrastructure. The U.S. Department of Transportation awarded \$15 million in grants in June to create two new National University Transportation Centers (NUTCs) to advance research and education programs that address transportation challenges facing the nation. Missouri S&T will join the NUTC led by Washington State University – the only center focused on the durability and lifespan of transportation infrastructure.

"Missouri S&T researchers know they can make a difference and help improve the nation's roadways and bridges," says **Dr. Richard Wlezien**, vice provost and dean of the College of Engineering and Computing at S&T. "This is a serious challenge for our country and its growing population, and we are well-positioned to provide a broad range of engineering and science expertise to this effort."

The latest American Society of Civil Engineers Infrastructure Report Card gave America's infrastructure a grade of D+ in 2017. Much of the nation's critical infrastructure was built from the 1950s to the 1970s and is now reaching the end of its durability. More than nine percent of approximately 600,000 bridges in the U.S. are considered structurally deficient, and one out of every five miles of highway pavement is in poor condition. The problem is expanding due to population and traffic growth and an increasing number of disruptive and extreme weather events.



"S&T will contribute to multiple research focuses such as multiscale monitoring, addressing corrosion and aging, addressing natural hazards and extreme events, and management of transportation infrastructure," says **Dr. Jenny Liu**, professor of materials and pavement engineering at S&T and the university's lead faculty at the UTC. "The ultimate goal of the center is to enable a multimodal transportation infrastructure system with enhanced durability, extended service life, and better resilience. The work of this consortium will have a significant impact on the country's infrastructure and the quality of life of its users."

The center will provide support for research, education, workforce development, technology transfer, and industry and public partnerships as a way to accelerate innovations and interactions. Key research areas include new materials, such as ultra-high performance concrete and fiber-reinforced polymeric composites, as well as non-destructive ways of evaluating the condition of infrastructure. Researchers will also study asset and performance management and resilience, so that engineers and managers can make better and more cost-effective decisions around maintenance.

The UTC will be known as the National Center for Transportation Infrastructure Durability and Life-Extension. Missouri S&T will join researchers from Washington State University, Texas A&M University, Case Western Reserve University, the University of Utah, the University of Colorado, South Dakota State University, Florida Atlantic University, the University of Mississippi, Alabama A&M University and Tennessee State University.

## ASPHALT CONFERENCE

The CArE department conducted the 61st Annual Asphalt Conference on Nov. 27-28, 2018. Twenty presentations were made, including those by alumni **Steve Jackson**, CE'07, **Dr. David Richardson**, CE'71, MS CE'73, PhD CE'84, directed the conference. Attendance totaled 268.

## MISSOURI CONCRETE CONFERENCE

The annual Missouri Concrete Conference, directed by CArE faculty member **Dr. David Richardson**, CE'71, MS CE'73, PhD CE'84, was held on the Missouri S&T campus May 6-7, 2019. Nineteen presentations were given, including ones by departmental alumni **Patrick Martens**, CE'83, **Randy Hitt**, CE'97, **Jim Eckrich**, CE'96, **Jesse Jonas**, CE'01, and **Joe Clendenen**, CE'06. There were 143 attendees.

## SUPERPAVE SHORT COURSES

During the 2018-19 season, five different types of certification courses were held at Missouri S&T: two Superpave QC/QA full certification short courses (5-day), three Superpave QC/QA re-certification short courses (2-day), one Binder Test course (1-day), two Aggregate Consensus Tests courses (1-day), and two TSR courses (1-day), for a total of 10 courses. More than 140 engineers, inspectors, and contractors were certified. The courses were directed and taught by faculty member **Dr. David Richardson**, CE'71, MS CE'73, PhD CE'84. Other instructors included, **Steve Jackson**, CE'07, **Mike Meyerhoff**, CE'02, and **Mike Lusher**, CE'96, MS CE'04, PhD CE'18. Over 3,400 individuals have gone through the training and certification at S&T since 1998.

# DEGHANI JOINS S&T AS CHANCELLOR

(CONTINUED FROM PAGE 5)

## THE NEW “3 R’S”

Dehghani’s immediate focus at S&T will be to learn as much as he can about the campus and the UM System. In an email he sent to students, faculty and staff, Dehghani wrote: “Embarking on this new chapter in our nearly 150-year history, I admit that I have a lot to learn — and I am confident that I will learn much from you. Indeed, we must work together to achieve greater excellence and make the 2019-20 school year the best ever.”

In addition, he plans to home in on what he calls his “3 R’s” of recruitment, retention and research.

“It’s important that we grow in all three areas,” Dehghani says. “If we only recruit students but don’t retain them, then we do a disservice to those students and to society. If we strengthen our research efforts, we will be able to recruit more graduate students as well as raise our profile nationally and internationally.”

He’s quick to add a fourth R to his list: reputation.

“With the right recruitment, retention and research strategies in place, we will be well-positioned to take S&T to a higher level of national recognition and relevance,” Dehghani says. “To do that, we must also create new, modern programs in many areas to make S&T the destination of choice for a new generation of students who are interested in being a part of the solution to grand global challenges.” He adds, “I consider the opportunity of serving Missouri S&T as its chancellor a personal and professional honor as I recognize the recent and historic achievements of this great institution. Missouri S&T is at an exciting point in its evolution to enhance its national standing and achieve further prominence among top public, land-grant research universities.”

Dehghani is married to Dr. Mina (Saffari) Dehghani. They have one son, Devon, as well as a Brittany spaniel named Ginger and two cats, Masghati and Asal.

Join us on our new LinkedIn page!



[linkedin.com/school/missouri-s-t-civil-architectural-and-environmental-engineering](https://www.linkedin.com/school/missouri-s-t-civil-architectural-and-environmental-engineering)



CAREE students, alumni and employers visiting in Butler-Carlton Hall atrium.

# Fall Networking and Social Event



Thank you to the alumni and companies that participated in this year’s Networking and Social Event before the Career Fair. It was a perfect “first evening” of fall, and we are grateful that our students had the opportunity to connect with you on a personal level and discuss their career goals, aspirations and the future job market in civil, architectural and environmental engineering.

The 2019 Fall Career Fair had 331 registered employers and was at capacity. The spring networking event is planned for **Monday, Feb. 17, 2020**. If you are interested in joining us, please contact **Jody Seely** by email at [seelyj@mst.edu](mailto:seelyj@mst.edu).



Steel Bridge Team with alumni recruiters.

# EWB brings clean water to people in South America over the summer

Throughout the summer, two teams of Missouri S&T students traveled to three locations in South America to help source clean water and construct well systems in several remote and impoverished communities.



The students are involved with S&T's Engineers Without Borders (EWB) student design team, which partners with developing communities to improve quality of life through the implementation of environmentally and economically sustainable engineering projects while developing internationally responsible students. This summer, the teams traveled to

Puerto Pando, Bolivia; Atahuallani, Bolivia; and Agua Fria, Ecuador, to help provide clean water and sanitation to the areas.

The Puerto Pando, Bolivia, group assessed a water system that it implemented on a previous trip and fixed parts of the system that were in disrepair. The team also conducted community leader interviews and water tests to evaluate the system's effectiveness and use.

"The community took a storage tank design that we had built on a previous trip and copied it to build their own tank, which they use for water storage," says Cade Long, one of the team leaders and a senior in engineering management. "This was amazing to see, as we didn't provide any guidance in this process, yet they learned from us by watching and studying our design. This felt like a 'proud teaching moment,' as seeing their success with no help from us was awe-inspiring and reassured

us that our system would be left in good hands."

The same team then traveled to Atahuallani, Bolivia, a mountaintop community at over 12,000 feet in elevation. There, the EWB team surveyed various locations in topography and collected water samples from local sources. This was one of the first trips to this location for the team and was focused on information collection and working with the local community to build a relationship.

The Agua Fria, Ecuador, trip involved team members working for six days side-by-side with community members to build a rainwater catchment system and basic filtration system at a local school. The catchment system will have a 7,500 liter capacity and will provide year-long access to potable water for the school children. The team also worked to teach community members how to implement a similar system on individual homes.

## S&T-Missouri State Miners on tour in Springfield



Visiting Prestressed Casting where they produce structural components for arenas, hotels, parking garages and schools.



Springfield Underground – Subsurface building space

Students participating in the Cooperative Engineering Program through Missouri S&T and Missouri State University usually tour five or more local businesses or construction sites as a way to enhance what they are learning in the Construction Materials, Concrete Design and Steel Design courses. **Dr. Jeffery Thomas**, associate teaching professor, feels that students learn concepts better and remember them longer when they get out of the classroom and from behind a textbook. Businesses in the Springfield area have been very generous with their time and knowledge, especially when they employ S&T graduates.

# Ph.D. student awarded GSI fellowship for use of wicking geotextile to mitigate frost action in cold regions

**Javad (Jay) Galinmoghadam**, a Ph.D. student in geotechnical engineering, was recently awarded a \$5,000 Geosynthetics Institute Fellowship grant for the year 2019-20 for his research proposal “Use of Wicking Geotextile to Mitigate Frost Action in Cold Regions: a Numerical Study.” The Geosynthetic Institute Fellowship Program recognizes and supports outstanding students from around the world whose research focuses on innovative geosynthetics and development projects. The objectives of Jay’s research is to develop and implement a model to predict frost action and mitigate it by using wicking geotextile.

Jay has been working as a research teaching assistant under the guidance of **Dr. Xiong Zhang**, associate professor of geotechnical engineering since 2018. He believes that there

*(continued on page 15)*



Ph.D. student Jay Galinmoghadam

## STUECK LECTURER DR. PAUL BOULOS FUNDS DIGITAL WATER WORKS FELLOWSHIP

During the Missouri S&T 2019 Stueck Lecture, **Dr. Paul F. Boulos**, a global water resources and wastewater industry expert, shared his successful leadership lessons with our students, faculty and members of the S&T Academy of Civil Engineers. After spending a few days getting familiar with our department, Boulos helped facilitate a fellowship offered by Digital Water Works, an engineering services provider where he serves as CEO.

This fellowship “Digital Water Works Excellence in Water” was offered to support an outstanding graduate-level student pursuing a degree in water resources engineering that has a passion for promoting the advancement and well-being of all people by building, operating and sustaining safe, reliable water and wastewater infrastructures.

“Through the tremendous efforts and passionate commitment of S&T faculty and its distinguished Academy of Civil Engineers members, the university is quickly earning a stellar reputation in the field of civil, architectural and environmental engineering education.



**Dr. Robert Holmes, Academy of Civil Engineers President and adjunct professor of water resources with Wesam Ali.**

We want to do what we can to help support their water resources program and its students. We believe this is the most effective way to promote the well-being of people everywhere. We see it as an excellent investment not only in students at S&T, but in the future of our nation and the world,” said Boulos.

The recipient of the Digital Water Works Excellence in Water Fellowship was **Wesam Mohammed Ali**, a Ph.D. candidate in civil engineering. Wesam was recently recognized with one of

the S&T College of Engineering and Computing Dean’s Educator Awards for his excellence as a graduate instructor in teaching water resources. Wesam also received the 2019 James and Sharon Weinel Fellowship, the top graduate fellowship from Chi Epsilon, the national Civil Engineering Honors Society.

For his Ph.D. dissertation, Wesam uses a computational model to optimize water releases from hydroelectric power plants for the minimization of the streambank instability down the river. The proposed method uses the reach of the Osage River downstream of Bagnell Dam as a test case.

**Dr. Joel Burken**, Curators’ Distinguished Professor and chair, says, “Wesam is a very deserving recipient. He is an outstanding instructor and gives much of his time to his profession. He hosts student groups in the hydraulics and hydrology lab — ranging from grade school students to prospective student groups, to distinguished alumni. He engages them all with his passion for engineering and water. Wesam will be a fantastic professor after graduation.”



# Civil engineering senior studies abroad in Hong Kong

by Velvet Hasner

**Scott Grier**, a senior in civil engineering and engineering management, spent his Fall 2019 semester in Hong Kong as a recipient of the Benjamin A. Gilman International Scholarship to study abroad. The scholarship allowed Grier to participate in academic and cultural experiences while studying structural engineering at Hong Kong University of Science and Technology.

“The idea of spending a semester in another country and an environment so different from what I am used to seems like the ultimate adventure,” Grier says. “I am excited to experience the culture and learn more about how people interact in Hong Kong, and how that differs from what I am used to being from the Midwest in the United States. This scholarship will help as I am studying abroad to allow me to experience things more fully and worry less about the costs.”

The Gilman Scholarship Program supports students who have been historically underrepresented in education abroad, including those students in science, technology, engineering and mathematics (STEM) fields. More than 1,300 U.S. institutions have sent more than 28,000 Gilman scholars to nearly 150 countries around the globe.

If you'd like to read about Scott's adventures, you can visit his blog at [scottgrier.com/study-abroad](http://scottgrier.com/study-abroad).





AEI and ArchE Design students with Jeanne Sinquefield at her home near Folk, Mo.



Jeanne Sinquefield showing students her design inspiration.

## Inspiring Missouri house tour

Missouri S&T's Architectural Design Class, along with members of the Architectural Engineering Institute (AEI), were invited to tour Rex and Jeanne Sinquefield's lake house near Folk, Mo., on Tuesday, Oct. 1.

Jeanne guided the tour and talked about the inspiration for the design. "The design is based on the "dog trot" style popular before air conditioning was invented. Essentially this is two rooms that are separated by 15 feet with a large overhanging roof," she said. "The dogs and people in hot weather would hang out in the covered area between the two rooms where the breeze came through. Our version has sliding glass doors for a middle room to let the breeze in. In the cooler or very hot times we close the doors."

Completed in 2006, the home serves not only as a private residence but a beautiful demonstration of environmentally conscious design that takes full advantage of locally provided resources. Jeanne shared with us that the home's designs incorporate passive solar techniques that promote natural heating and cooling by integrating lower/upper operable windows in conjunction with large roof overhangs.

The adjacent lake serves as a geothermal mass reducing swings in temperature thereby providing input for the heating and air conditioning system. The use of glass throughout the home allows for breath taking views. Most importantly our visit to the Sinquefields and the tour given by Jeanne, inspired students of a new engineering generation to value passive solar design and recognize the importance that architectural engineers contribute in this area.

## GSI fellowship story continued...

(from page 13)

is a huge gap between understanding the frost action in cold regions compared to what actually happens. If the coupled thermo-hydro-mechanical behavior of soil is fully understood, then, more efficient measures can be taken towards mitigating frost action. This could be very beneficial for pavements in cold regions. It is estimated that damages caused by frost action account for approximately half of all pavements' maintenance expenditures in cold regions.

Using a wicking geotextile can be a potential method in mitigating frost action by draining soil better. Compared to conventional drainage systems, wicking geotextile can drain both capillary water in addition to gravity (free) water from the pavement system. This will help the pavement remain drier thus mitigating both frost heave and thaw weakening. This concept has been proven through laboratory tests and successfully validated by several field applications. For example, in a rehabilitation project at the Dalton Highway MP 197-209 in Alaska, the use of wicking geotextile to replace "Wrapped Shot Rock" Treatment has led to \$2.5 million in the initial construction cost and another \$3.5 million in maintenance costs in the following 5 years.

At present, there is still no design method to take full advantage of the benefits of wicking fabric and all designs are purely based upon the engineer's judgment. Jay is now working on implementing the coupled thermos-hydro-mechanical model via numerical simulations. The next step is incorporating the wicking geotextile in the numerical model to quantify its effects in mitigating frost action in different scenarios. Ultimately, he hopes to provide guidelines on the application of the wicking geotextile to mitigate frost action in pavements in cold regions.



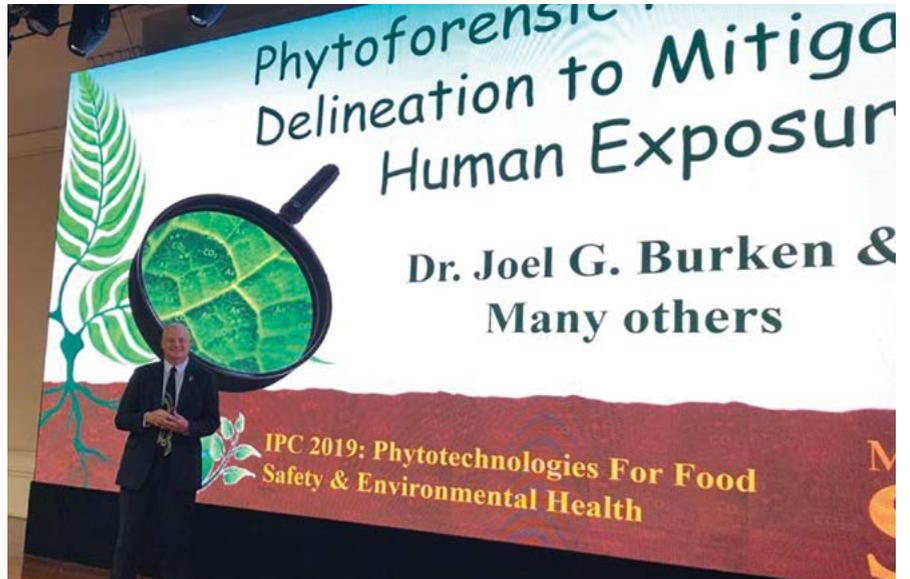
## ASCE Award

**Dr. Eric Showalter**, assistant chair of civil engineering and teaching professor, received a Professional Recognition Award from the St. Louis Section of the American Society of Civil Engineers. This award recognizes the importance of professional attainment in the advancement of the science and profession of engineering and is presented annually to a member of the St. Louis Section.



## Ahead of the game

Graduate student, **Ali Al-Khafaji**, passed the PE exam ahead of schedule while still working toward his Ph.D. in civil engineering. His hard work and dedication will certainly pay off.



Dr. Joel Burken preparing to give his presentation.

# Burken receives international research achievement award

by Sarah Potter

The International Phytotechnology Society (IPS) awarded **Dr. Joel Burken** the Milton P. Gordon Award for Excellence in Phytoremediation during the society's annual conference in Changsha, Hunan Province, China. IPS recognizes one leader every year in the field of phytoremediation — a process that uses various types of plants to remove, stabilize or destroy contaminants in soil and groundwater.

"I'm incredibly honored to receive the Milt Gordon Award," says Burken, Curators' Distinguished Professor and chair of civil, architectural and environmental engineering at Missouri S&T. "I met Milt, who was a true founder of the field, when I was a Ph.D. student, along with many of the recipients. I've always looked up to them all, and gained greatly from them as mentors and colleagues. To be a recipient with this incredible group of talent is truly an amazing honor, and very humbling."

The award was established in 2007, two years after Gordon's death, to honor his excellence in research, promotion of technology, and teaching and mentoring undergraduate and graduate students. Burken is only the fourth American recipient of the award.

Burken "is, as judged by the selection committee, an outstanding example of what the award stands for – a commitment to teaching the next generation of scientists, doing exemplary research in the area of phytoremediation and always being ready to reach out and help others," says Dr. Lee Newman, founding IPS president. "No one deserves this award more than Joel."

Burken was also invited to give a plenary speech during the conference, which was held Sept. 23-27. His talk was titled "Phytoforensic Pollutant Delineation Methods to Mitigate Human Exposures."



New assistant professor Yang Wang receives award in Sweden.

## Wang earns award for aerosol research

by Peter Ehrhard

**Dr. Yang Wang**, pictured above center, recently earned a Ph.D. Award from the Gesellschaft für Aerosolforschung (GAeF), or Association for Aerosol Research, based in Germany. Wang, an assistant professor of civil, architectural and environmental engineering at Missouri S&T, received the award at the association's General Assembly in Sweden this August.

The GAeF Ph.D. Award is given “to recognize internationally successful young scientists whose ideas have provided decisive stimulus in their area of aerosol research and who are recognized as outstanding among their peers in their field,” according to the association. The award is given to a maximum of two early career scientists each year.



Understanding aerosol formation can improve air quality and human health.

Wang earned a Ph.D. in energy, environmental and chemical engineering from Washington University in St. Louis in 2017. He earned a bachelor of science degree in thermal engineering from Tsinghua University in Beijing, China, in 2012. Prior to joining Missouri S&T, he served as a postdoctoral research associate at Brookhaven National Laboratory and Washington University.

GAeF works to promote all areas of aerosol research, provide information amongst members and the public, and to provide an international forum for collaboration and teaching at all levels. Learn more by visiting [info.gaef.de](http://info.gaef.de).

Wang's doctoral research was titled “Sub 2 nm particle characterization in systems with aerosol formation.” His research interests include the study of aerosol-cloud interaction and influence on global climate, and the development of a fast-integrated mobility spectrometer for atmospheric particle measurement.

## Oerther receives Ratchford Award

University of Missouri System **President Mun Choi** awarded **Dr. Daniel B. Oerther**, professor of environmental health engineering at Missouri S&T, the C. Brice Ratchford Memorial Fellowship Award on June 20 during the Board of Curators meeting at the University of Missouri-Columbia.

The C. Brice Ratchford Memorial Fellowship Award recognizes a University of Missouri faculty member who demonstrates commitment, dedication and effectiveness in advancing the land-grant mission through extension, international education and agricultural economics programs. The fellowship is presented to a faculty member who personifies the creativity, vision and leadership exhibited by the late Dr. C. Brice Ratchford, president emeritus of the University of Missouri and dean of cooperative extension.

## Oerther elected to lead AAEEES

**Dr. Daniel B. Oerther** has been elected incoming president of the American Academy of Environmental Engineers and Scientists (AAEES). He will serve as vice president in 2020, president-elect in 2021, president in 2022, and past-president in 2023.

Oerther served as the treasurer of the academy for six years. His awards from AAEEES include the 2009 Honor Award for University Research, the 2014 Excellence in Environmental Engineering Education Award, the 2016 Superior Achievement Award and the 2018 Stanely E. Kappe Award. In 2019, Oerther became the first individual to be board certified as both an environmental engineer and as an environmental scientist.

## Two faculty members receive promotions

Congratulations to two of our faculty members who received promotions this fall.

### Dr. Islam El-adaway



#### Dr. Islam El-adaway

was promoted to professor. He is the Hurst/McCarthy Professor of Construction

Engineering and Management. He joined Missouri S&T in 2018 after two prior appointments with the University of Tennessee – Knoxville and Mississippi State University. He earned his Ph.D. from Iowa State University in 2008. His research studies how to mitigate the management challenges associated with the construction industry in particular and civil infrastructure systems in general. He was selected a 2019 ENR Top Young Professional and his work with his graduate students was selected for two ASCE Editor Choice journal papers in 2018, as well as an ASCE Best Journal Paper Award in 2017.

### Dr. Dimitri Feys



**Dr. Dimitri Feys**, was promoted to associate professor with tenure. He joined S&T in 2013 and received his Ph.D from Ghent

University, Belgium in 2009. He works on rheology of cement-based materials, design and placement of high-performance concrete. Feys was also recognized in 2018 with the ACI Young Member Award for Professional Achievement.

# Planning for future climate changes in the Arctic

by Nancy Bowles

As global temperatures warm, communities in the Arctic regions of Alaska face long-term changes to their way of life. Missouri S&T researchers are working as part of a five-year, \$3 million National Science Foundation (NSF) project to help those communities plan for the future.

**Dr. Xiong Zhang**, associate professor of geotechnical engineering at Missouri S&T, will work with Dr. Ming Xiao, associate professor of civil engineering at Penn State University, to develop a geotechnical hazard map to predict the effects of warming and thawing of permafrost. When frozen, permafrost provides a solid foundation for roads, airports, oil pipelines and railroads. But as the soil warms and softens, infrastructure can be damaged and possibly destroyed. Along Alaska's coastline, thawing permafrost can cause a loss of land mass, which in turn could force entire communities to relocate. Zhang's research will help determine where and how much damage could occur.

"The Arctic is very sensitive to climate change," Zhang says. "It's estimated that by 2050, 30% of permafrost could be affected."

Permafrost regions cover nearly 9 million square miles, or about 24% of the Northern Hemisphere.

To investigate the effects of permafrost degradation, researchers will use special equipment to mimic the behavior of permafrost soils at different temperatures, ice contents and water contents. They will then measure the volume of change in each soil specimen using a mapping tool Zhang developed, known as ultra-high-resolution photogrammetry. The test results will be used to develop a permafrost model, which will be validated against results obtained from previous lab and field tests.

**Navigating the New Arctic is one of NSF's 10 Big Ideas.** The NSF project is intended to document and understand rapid changes in the Arctic, gauge possible effects on U.S. national security and economic development, and enable sustainable Arctic communities. The project is led by Penn State in conjunction with Missouri S&T, the University of Alaska Fairbanks and the University of Idaho. Researchers will work to not only understand how permafrost changes as it warms and how infrastructure would be affected, but also how changes may affect the social networks of communities in the region.

"The NSF Big Ideas were created to identify emerging STEM challenges of global societal importance," says **Dr. Angela Lueking**, associate dean of Missouri S&T's College of Engineering and Computing. "The research conducted as part of this project can help preserve people's way of life, the land and critical infrastructure in permafrost regions."



Dr. Xiong Zhang and his team



Dr. Kamal Khayat

## Khayat receives lifetime achievement award

**Dr. Kamal H. Khayat**, Vernon and Maralee Jones Professor of Civil Engineering at Missouri S&T, was recently honored for his lifetime achievements in the field of self-consolidating concrete. The second International RILEM Conference on Rheology and Processing of Construction Materials (RheoCon2) was held in conjunction with the 9th International RILEM Symposium on Self-Compacting Concrete (SCC9) in Dresden, Germany, Sept. 8-11. RILEM is the International Union of Laboratories and Experts in Construction Materials, Systems and Structures, and Khayat is one of only 64 named Fellows in the RILEM organization.

“The symposium on Self-Compacting Concrete is organized in honor of Prof. Kamal H. Khayat and his impressive scientific research achievements and exceptional engagement in the field,” says Viktor Mechtcherine, conference chair of RheoCon2 and SCC9.

Khayat presented the opening keynote lecture titled “Fiber-reinforced SCC – Recent Advances and Perspectives.” Khayat specializes in the development of high-performance cement-based materials for structural applications and

rehabilitation, particularly focusing on SCC and high-performance concrete behavior. His work in the area of SCC, starting in 1991, has contributed to its acceptance worldwide.

At the conference banquet held in his honor, Khayat received a certificate “in recognition of his impressive scientific research achievements, exceptional engagement and contribution to concrete rheology, in general, and self-compacting concrete, in particular, as well as a sustained leadership in technical societies and technology transfer.” The certificate was signed by the five-honoree chairs of the conference, all leaders in the field of concrete science and technology.

“Being honored for my life’s work by such a talented group of the top researchers in my field has been an amazing and incredibly humbling experience,” says Khayat.

For more information about the conference, visit their website at [rheocon2019.org](http://rheocon2019.org).

## KHAYAT DELIVERS TWO KEYNOTES ON ULTRA-HIGH PERFORMANCE CONCRETE

**Dr. Kamal H. Khayat** was the keynote speaker at the International Conference on Innovative Materials for Sustainable Civil Engineering. The conference was held in Nanjing, China, in August. Approximately 375 people attended the event from 22 countries. Khayat spoke about ultra-high-performance concrete (UHPC). His talk was titled “Development and Performance of Cost-Effective UHPC for Sustainable Concrete Infrastructure Applications.” It featured the work of three recent Ph.D. students funded through the

RE-CAST University Transportation Center in conjunction with the Missouri Department of Transportation as well as RE-CAST consortium members.

Khayat was also invited to give a Keynote Presentation at the 15th International Congress on the Chemistry of Cement, held in September at Prague, the Czech Republic. Khayat’s presentation was titled “Rheological Properties of Ultra-High-Performance Concrete – An Overview” and was published in

a special issue of the *Cement and Concrete Research Journal*, which is the leading journal in this field. The congress is held every four years and is considered as the “Olympics” in the field of cement and concrete science.

“The International Congress on the Chemistry of Cement (ICCC) is the renowned global platform which summarizes the state of art of cement chemistry as well as major trends in cement application,” says Khayat.

## Oerther celebrated by educators with three awards



**Dr. Daniel B. Oerther**, professor of environmental health engineering, was celebrated by educators during three ceremonies this past year. In June, Oerther received the Robert G. Quinn award from the American Society for Engineering Education for, “outstanding contributions in providing and promoting excellence in experimentation and laboratory instruction.”

In July, Oerther received the Education Excellence award from the National Society of Professional Engineers for, “linking engineering education with the promotion of professional practice.”

In September, Oerther received the Lillian Wald Humanitarian award from the National League for Nursing. Founded in 1893 and boasting more than 40,000 members, the NLN is the premiere national nursing organization for faculty nurses and leaders in nursing education.

Oerther was recognized, in part, for his collaborative development of GRoWES — Global Research in WaSH (water, sanitation and hygiene) to Eliminate childhood Stunting. As a professor of engineering, and in collaboration with nurses, Oerther developed GRoWES to improve healthcare quality, reduce costs and enhance consumer satisfaction among mothers and their children during the first 1,000 days of life and up to age 5 years old in developing communities.



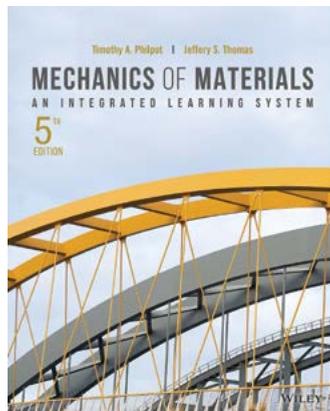
## Alumnus gives special talk

A special guest was in the house for Senior Seminar this semester. **Eric Potts**, CE'73, account director for Freese and Nichols, spent time talking with our students about his mentors — Professor **Jerry Bayless** and Coach **Charlie Finley** — who impacted his life in many ways.

Potts discussed his various career opportunities, challenges and moves from his time with the Army and U.S. Army Corps, where he oversaw a \$5 billion budget. He stressed the value of giving back, including his work with the Houston Rodeo that has generated over \$400 million for scholarships, noted in the *Missouri S&T Magazine* in 2016. ([magazine.mst.edu/2016/03/eric-potts-urban-cowboy/](http://magazine.mst.edu/2016/03/eric-potts-urban-cowboy/))

It is always an awesome opportunity for our students to get the chance to hear from engineers in the field and to learn from their experiences. He also spoke to the Chancellor's Leadership Academy.

Potts is a member of the Missouri S&T Academy of Miner Athletics and the Academy of Civil Engineers.



5th Edition Cover

### THOMAS PUBLISHES NEW EDITION

The fifth edition of *Mechanics of Materials, an Integrated Learning System* was released by **Dr. Jeffery Thomas**, associate teaching professor. This is an update that started with deceased professor, **Dr. Timothy Philpot**.

- 10,000 students per year from hundreds of colleges and universities benefit from this book
- **NEW CONTENT:** 800 algorithmic problems which provide each student with unique numbers, 560 problem-solving videos
- **EXISTING CONTENT:** 2,000 concepts and reading questions, 1,700 algorithmic problems and hundreds of videos, animations and tutorials
- John Wiley and Sons, [www.wiley.com](http://www.wiley.com)

# MEMORIALIZING 'MR. MINER'

## Jerry Bayless — teacher, mentor and friend

**Jerry Bayless**, retired associate professor of civil engineering passed away Tuesday, July 2, at age 81. He taught thousands of students in a career that spanned seven decades and three different names for the same university. Known by students and alumni as “Mr. MSM,” “Mr. UMR” or “Mr. S&T,” depending on the era, or simply as “Mr. Miner” to many, he will also be remembered as a dedicated professor who was the “heart and soul” of Missouri S&T.

Bayless came to Rolla in 1955 to study engineering at what was then known as the Missouri School of Mines and Metallurgy. After earning his bachelor’s degree in civil engineering in 1959, he joined the civil engineering faculty while pursuing a master’s degree in that discipline. He remained on the faculty and held various administrative positions until his retirement 58 years later in February 2017.

Along the way, he touched the lives of thousands of students.

“There’s nobody who has made such an impact on our students in our almost 150 years of civil engineering education in Rolla,” says **Dr. Joel Burken**, Curators’ Distinguished Professor and chair of civil, architectural and environmental engineering.



“Jerry Bayless represented the heart and soul of Missouri S&T,” adds **Dr. Richard W. Wleziem**, vice provost and dean of the College of Engineering and Computing (CEC). “His values and his actions were the essence of what make us a great technological university. He will be missed by all of us in the college, but his memory and his values will persist.”

“Jerry touched so many lives far beyond the university,” says **Dr. John Myers**, professor of civil engineering and associate dean of CEC. “His is a life that must be celebrated and always remembered. He was an individual always of high integrity and character, one who looked to solve problems, whether they be on campus or within our community. Jerry truly lived by the motto ‘service before self,’ and always put others before himself. We have lost what I would consider part of the fabric of Missouri S&T-UMR-MSM.”

When Bayless announced his retirement plans, Burken noted his impact on countless students through the years. “He has influenced many, many students, helping those who are struggling to stay in school and see it through,” Burken said. “That’s day to day, not just a special occasion. That’s who he is.”

One of those former students is **Lister B. Florence**, CE’95 of Rolla, a member of the Missouri S&T Board of Trustees.

“Dean Jerry Bayless was a mentor to me in life and now beyond,” Florence says. “May he continue his good work in heaven.”

Bayless served as an assistant chair of engineering and assistant dean of engineering. In 1990, he became associate dean, and in 2004, the university presented him with the Chancellor Medal in recognition of his service. Bayless was named an Honorary Knight of St. Patrick in 1999, and in 2004 he was named Honorary St. Pat and parade marshal for the annual event. A member of the Academy of Civil Engineers and former treasurer of the Miner Alumni Association, he also received the Alumni Merit Award. He also was a member of Lambda Chi Alpha fraternity and served as its academic advisor for many years.

An avid sports fan, Bayless could often be found cheering the Missouri S&T Miners at various events. He was also a loyal fan of the St. Louis Cardinals.

Bayless was named to the inaugural class of Missouri S&T Alumni of Influence in 2011. Asked in an interview prior to that event how many students he’d taught in his career, he replied: “Holy smoke! A wild guess: 10,000.”

## Academy elects Strauss secretary and Richardson treasurer

The S&T Academy of Civil Engineers elected **Amy Strauss**, CE'90, MS CE'91, retired manager of power generation engineering for the John Twitty Energy Center, to serve as secretary; and **Dr. David Richardson**, CE'71, MS CE'73, PhD CE'84, civil, architectural and environmental engineering faculty member, to serve as treasurer at the 2019 spring academy annual meeting.

## Spraggs inducted into Hall of Fame

Missouri S&T inducted yet another distinguished class to the Miner Athletics Hall of Fame in September. One of the inductees was a 2008 civil engineer and phenomenal softball player from our department.

### Kandi (Wieberg) Spraggs



Spraggs left her name prominently in the S&T record book during a four-year career in the softball program, finishing as the all-time

leader in home runs with 34, runs scored with 169 and walks with 98 as she earned All-America honors following her junior and senior years. The 2007 GLVC Player of the Year, Spraggs also ranked second on the S&T career list with 223 hits, 49 doubles – including a school record 21 in that 2007 campaign – and third on the list with 105 runs batted in and 73 stolen bases. A two-time, first-team All-GLVC selection, she was also the only player in program history with two five-hit games and finished her career with a .347 batting average. Her advisor was **Dr. Lesley Sneed**, associate professor.

# Remembering Marsha Grayer

There are two things we know about **Marsha Grayer**. She was a woman of strong faith and she deeply and unendingly loved her family. Husband **Ernest Grayer Jr.**, PetE'83, CSci'00, three children Celeste, Tiffany and Ernest the third – they were her pride and joy – along with her extended family from Tennessee. Marsha's eyes would sparkle and she would smile



while sharing stories about family get togethers, sporting events, graduations, or trips to Columbia, Kansas City, St. Louis or Tennessee. Marsha passed away unexpectedly Saturday, June 15, 2019, at the age of 62 doing what she loved most – spending quality time with her beloved family.

Marsha was dependable, steady, truthful and a master at planning and preparing social events, (i.e. senior luncheons, department celebrations, retirements, Academy of Civil Engineers ceremonies, etc.) She was professional and always ready to help when help was needed, no matter the task. Marsha received the Academy of Civil Engineers Outstanding Support Staff Award four times over her 35-plus years at Missouri S&T. She served as senior secretary, or "right-hand assistant" to five chairs in the department.

When **Dr. William Schonberg**, her fourth chair, first came to S&T, she greeted him with her typical friendly, humorous style. "Hmmm, looks like I have to train another one," she said. Behind these great men and leaders, there was Marsha keeping things on track for faculty, students and alumni.

**Gary Abbott**, friend and coworker, shared many humorous "Marsha stories/pranks" during her memorial service. Boarding over **Dr. Rick Stephenson's** window during construction of the new building, sprinkling confetti for **Darlene Turner's** birthday and teasing interim chair **Dr. Paul Munger** about having a bad phone connection. But Gary Abbott said it best in his closing, "It is comforting to know that Marsha was a believer and my reception with her will be when we walk the golden streets of heaven together."

# Schonberg named Presidential Engagement Fellow

**Dr. William Schonberg** was one of three faculty members from the Missouri S&T campus selected to serve as a University of Missouri System Presidential Engagement Fellow during the 2019-20 academic year. As a fellow, he serves as an ambassador in the region and speaks to local organizations and communities about his area of research and expertise. Schonberg is a professor of civil engineering at S&T and an expert on "space junk" – the extraterrestrial debris now circling the world that could one day fall to Earth. He's served as a consultant to NASA's Jet Propulsion Laboratory and Engineering Safety Center as well as to the United States Air Force.

He is available to discuss space debris, the 50th anniversary of the Apollo moon landing or other topics related to space. To request Schonberg as a speaker, visit [umsystem.edu/forms/pef-speaking-request-form](https://umsystem.edu/forms/pef-speaking-request-form).

# CIVIL ENGINEERING LEADER

## Leonard C. Kirberg (1943-2019)

**Leonard C. Kirberg**, CE'66, civil engineer, innovative industry leader, and past Chairman, CEO and President of Horner & Shifrin, Inc. from 1988 to 2004, passed away on Wednesday June 19, 2019, at the age of 76. Leading the fourth generation of company management, he was known for extensive revitalization and growth of the established firm, founded in 1933. After employment in 1967-68 with McDonnell Douglas Corp., he served 38-years of his professional career at the firm.

Mr. Kirberg was born in St. Louis on March 18, 1943 to Karl and Lorraine Kirberg. He earned the rank of Eagle Scout and attended Lindbergh High School. Missouri S&T honored him with a professional development degree in engineering management in 1978 and an Award of Professional Distinction in 1986. He was a licensed professional engineer in Missouri and Illinois.

He is remembered by his loving family, his clients, staff and professional colleagues alike as a steady hand at the helm, a resourceful team builder and an approachable, sympathetic leader. He made friends easily and tempered his relationships and decisions with calm analysis, practicality and a warm sense of humor. He counseled his staff and employees that the key to marketing professional services was to build relationships with them as fellow human beings, and the work assignments would follow. He was a good listener, unassuming in manner and trusting of his colleagues and staff. Many credited a large measure of his success to his encouragement and help for his people to reach their full potential. From an early age he loved to build things with his father. By the peak of his career, he had expanded his creative achievements from model trains to Metrolink.

"In the 30-plus years Len and I worked together, he placed his colleagues' successes, both financial and professional, as a primary goal. He always thought of fellow Rolla graduates as special because they were 'one of us.' Len supported Missouri S&T — UMR as we referred to it — by setting up scholarships, leading the alumni at his fraternity (Lambda Chi Alpha) and being a valuable member of the Academy of Civil Engineers. Len will be missed, but his impact will live on in those he impacted so positively," said **William P. "Bill" Clarke**, CE'74, MS CE'79.

Surviving Mr. Kirberg are his wife of 52 years, Mary C. Kirberg (nee Stolsek), his siblings, Kent (Pat), Mary Ellen (Scott), Gary (Shari), Sue (Steve) and brothers-in-law Fred (Bev) and Frank. And many nieces and nephews.

Despite his wide-ranging responsibilities, Mr. Kirberg found time to take an active role in a number of technical, business and professional development organizations.

He was president of the Engineers' Club of St. Louis (1991-92) and served on the board of directors and as chairman of several committees. He was past president (1984-85) of the St. Louis Section of the American Society of Civil Engineers, an organization that recognized him with its Professional Recognition Award in 1988. He was past president (1981-82) of the St. Louis Chapter of the Missouri Society of Professional Engineers, an organization that named him Young Engineer of the Year in 1976 and Engineer of the Year in 1992. He also was past president (1994-95) of the Consulting Engineers Council of Missouri, an organization that named him New Principal of the Year in 1987. He also contributed his talents to the American Public Works Association, the Water Environment Federation, the Society of American Military Engineers, and the

Illinois Society of Professional Engineers. For the 1996-97 term, he was elected president of the Missouri S&T Academy of Civil Engineers. In addition, he participated in many civic organizations, including St. Louis Ambassadors, St. Louis Counts and the Boy Scouts of America – St. Louis, Circle Club, and the Downtown Rotary Club, serving also as president of Rotary's Skyway Farm. A proud member of Lambda Chi Alpha fraternity, he was involved in numerous charitable expansion and fundraising projects. He was particularly proud of a committee he chaired, which succeeded in raising over two million dollars for renovation of Rolla's chapter's fraternity house and his selection as the fraternity's "Man of the Year" in 1965.

In honor of Mr. Kirberg's outstanding leadership and professional contributions, family and friends are establishing a fellowship in his name for students in civil and environmental engineering at Missouri S&T looking to follow a similar career path. If you are interested in contributing to his memorial fellowship, please email **Bill Clarke** at [wpcmail@yahoo.com](mailto:wpcmail@yahoo.com) or **Dr. Joel Burken** at [burken.mst.edu](mailto:burken.mst.edu).



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