

# WOMEN WALKING THE ROAD TOGETHER



WESTERN MICHIGAN UNIVERSITY

College of Engineering  
and Applied Sciences



**InSPiRE** 2018

The Magazine College of Engineering and Applied Sciences





Welcome to the inaugural issue of *InSPIRE*, the magazine of Western Michigan University's College of Engineering and Applied Sciences.

**Dear Friends:**

Greetings from the faculty, staff and students of Western Michigan University's College of Engineering and Applied Sciences. I'm pleased and proud to share with you some of the successes of the 2017-2018 academic year and offer a look at what's ahead.

These pages reflect the energy and excitement going on in our college – the genuine commitment of our faculty and staff, the outstanding research efforts across departments, and the accomplishments of our 3,000 students. Our alumni, too, are excelling in their fields and are making a difference in society. We are eager to share with you stories of all these successes.

**Among some of the highlights:**

- After rigorous review and evaluation, all 13 of our undergraduate programs were re-accredited, reflecting the excellent quality of our programs and demonstrating our ability to provide strong learning experiences and an excellent engineering education to our students.
- We're establishing an Industry Outreach Office to help develop relationships for student co-op and intern positions, more industry involvement to engage our students in research opportunities, and enhanced industry interaction with student organizations and senior design projects.
- We recently opened AMP Lab@WMU, a new advanced manufacturing partnership with a state-of-the-art facility in downtown Grand Rapids to help meet the region's need for more engineers and those in the skilled trades.
- Through an innovative partnership, students at Aquinas College in Grand Rapids are able to select engineering as their career goal and earn a bachelor's degree from our college. This partnership allows students to pursue a degree in industrial and entrepreneurial engineering or civil engineering. More engineering programs are expected to be added to this initiative.
- We established a new Ph.D. program in civil engineering.
- Through a joint program with WMU's Haworth College of Business, we now offer a new graduate certificate in information assurance and security.

The future of our college is exceedingly bright. During the 2017-18 academic year, we awarded a record number of bachelor's degrees (377), a record number of doctoral degrees (22), and had the college's highest-ever research expenditures of \$4.7 million. Our world-class faculty continue to conduct exciting, break-through research, leading the way to new avenues for future exploration. Our more than 30 registered student organizations continue to excel and receive awards for their outstanding contribution to their fields and the community.

We are confident our college will continue to grow and that we will graduate students who are independent thinkers and creative problem solvers, and who are ready for the global marketplace.

We are always interested in spreading the word about our college and the success stories of our students, faculty, alumni, and staff. For more information about our college, please visit our website at [www.wmich.edu/engineer](http://www.wmich.edu/engineer). Keep in touch. We would love to hear from you!

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WESTERN MICHIGAN UNIVERSITY

## College of Engineering and Applied Sciences

### Vision

To be the college of choice for tomorrow's engineers through excellence in education, discovery, and service.

### Mission

Our mission is to:

- **Educate:** develop career-ready engineering and applied science graduates for success in the global market;
- **Discover:** advance knowledge and innovation through high-quality research, teaching, and student engagement;
- **Inspire:** prepare our learning community for lifelong excellence, ethical behavior, and professional leadership;
- **Transform:** cultivate an inclusive learning environment, contributing to diversity in the engineering workforce; and
- **Respond:** answer challenges in our local and global communities to improve the well-being of society.

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# InSPIRE

The Magazine College of Engineering and Applied Sciences

## IN THIS ISSUE -



A New Way to Heal a Heart



Engineers Without Borders Changes Lives



Sound Waves: Predicting Tornadoes



Edmund Tsang: Loving to Serve



Women Walking the Road Together

News Around the Spire

1

Center Advances Vehicle Technology and Design

4

Addressing Global Challenges in Construction

13

Building Bridges, Building Boats

15

Agents of Change: University Innovation Fellows

16

Top Scholars

16

Student Success

17

By the Numbers

19

Focus on Faculty

21

Alumni Accolades and Honors

22

Donor Roll

23



## Undergraduate programs receive accreditation



Following rigorous review and evaluation, the 13 undergraduate programs that were evaluated by the ABET accreditation team all received re-accreditation. "This is great news for our college – and for our university," said Dean Houssam Toutanji. "It demonstrates the strengths of our programs and our ability to provide a solid educational foundation for our students and ensure their success in the field of engineering."

ABET is a nonprofit, non-government accrediting agency recognized by the Council for Higher Education Accreditation. The ABET accreditation team made two 3-day visits to the college in September 2017. The Engineering Accreditation Commission evaluated nine engineering programs. A separate Engineering Technology Accreditation Commission visited to evaluate three engineering technology programs, and the Computing Accreditation Commission evaluated the college's computer science program.

"While the ABET accreditation process is lengthy and time consuming, the positive outcome would not have been possible without the hard work by department chairs, faculty and staff," Toutanji said.

The programs that received accreditation include:

- **Aerospace Engineering**
- **Chemical Engineering**
- **Civil Engineering**
- **Computer Engineering**
- **Computer Science**
- **Construction Engineering**
- **Electrical Engineering**
- **Engineering Design Technology**
- **Engineering Management Technology**
- **Industrial and Entrepreneurial Engineering**
- **Manufacturing Engineering Technology**
- **Mechanical Engineering**
- **Paper Engineering**

The only undergraduate program that was not evaluated was Graphic and Printing Science, which is accredited separately by the Accreditation Council for Collegiate Graphic Communications, Inc.

## Cavalli leads undergraduate education



Dr. Matthew Cavalli joined the college in 2018 as the associate dean for undergraduate education. He previously was an associate dean and professor in the Department of Mechanical Engineering at the University of North Dakota. He replaced Dr. Edmund Tsang, who retired.

Cavalli received his bachelor's degree in mechanical engineering from the

University of Wyoming and a master's degree and Ph.D. in mechanical engineering from the University of Michigan. He was on the faculty at the University of North Dakota since 2007, receiving the College of Engineering and Mines Dean's Outstanding Faculty Award in 2017.

His research expertise includes composite materials, corrosion and fatigue, solid mechanics, joining and green materials. He is a member of the American Society of Mechanical Engineers, the American Society for Engineering Education, ASM International, the National Society of Professional Engineers and the Society for Experimental Mechanics.

## Outstanding Standouts

Congratulations to the recipients of our 2017-2018 College of Engineering and Applied Sciences Outstanding Faculty and Staff Awards:



### **Outstanding New Researcher**

**Dr. Jennifer Hudson**

Assistant Professor, Mechanical and Aerospace Engineering



### **Outstanding Senior Researcher**

**Dr. Massood Atashbar**

Professor, Electrical and Computer Engineering



### **Outstanding Senior Teacher**

**Dr. Said AbuBakr**

Professor, Chemical and Paper Engineering



### **Outstanding Staff**

**Anetra Grice**

Director, STEM Talent Expansion Program



### **Outstanding Service**

**Kim Cho**

International Admissions Counselor



## Engineering management globally certified

WMU's master's degree in engineering management is now one of six programs certified globally by the American Society for Engineering Management (ASEM). The certification is designed to recognize master's programs that meet the rigorous standards of the organization.

According to ASEM, "Certification represents outstanding achievement in quality and content by those programs who achieve this distinction, and it places them among the elite in the country in offering their graduate programs."



"We are so pleased to have our program recognized with this prestigious certification," said Dr. Steve Butt, chair of the Department of Industrial and Entrepreneurial Engineering and Engineering Management. "Our faculty is outstanding and have created a solid program that meets the needs of employers, challenges our students and makes them ideal candidates for leadership positions in industry."

Engineering management is a multidisciplinary field that bridges the gap between engineering and business, integrating the management of people, money and projects. This focus appeals to students with engineering and technical backgrounds who seek to advance their technical knowledge while adding management skills. The demand for leadership in modern manufacturing and service-based industries has dramatically increased the need for people with both skill sets.

Dr. David Lyth and Dr. Larry Mallak lead the program. Senior, full-time engineering faculty teach courses in the program, with core courses in engineering management, quality, capital budgeting and project management. Graduates of WMU's program lead engineering efforts in companies such as Google, Apple, General Motors, Stryker, Denso, JR Automation and many others. The 30-credit graduate program is offered in Kalamazoo and Grand Rapids, and will be offered at a regional location in Florida in the future.

For additional information, contact the program advisor, Dr. David Lyth, at david.lyth@wmich.edu or (269)276-3368.

## Keeping things safe and secure



WMU's College of Engineering and Applied Sciences and the Haworth College of Business have collaborated to develop an information security graduate certificate for information technology (IT) professionals which is now available fully online.

The information security field's growth potential has a predicted 35 percent growth rate from 2012 to the 10-year period ending in 2022. As business demands are increasing to train more individuals in the security of information systems, the College of Engineering and Applied Sciences and WMU's Haworth Col-

lege of Business are offering management and engineering graduate certifications for individuals working in the information security fields, which are available for graduate students or industry professionals with a bachelor's degree.

WMU's information security graduate certificate is offered as an online-only, accelerated, 15-credit program and includes two 10-month track options. Individuals have the opportunity to specialize in either information security management, or secure software and engineering. Following completion of the graduate certificate, students will be exposed to various opportunities to gain the necessary knowledge to prepare for industry standards testing such as SANS GIAC, CISSP, CISA, and ITIL, which are recommended when pursuing expanded IT career opportunities.

Courses are taught by WMU faculty from the College of Engineering and Applied Sciences and the Haworth College of Business. More information regarding the information security graduate certificate is available at [wmich.edu/infosecurity](http://wmich.edu/infosecurity).

## A space to bring ideas to life

Western Michigan University's Grand Rapids regional location for a state-of-the-art manufacturing laboratory opened in September. AMP Lab @WMU, an Advanced Manufacturing Partnership Laboratory, was built in collaboration with West Michigan manufacturers and Grand Rapids Community College to address the shortage of skilled trades and engineering employees in the region. The lab occupies the first two floors of WMU's downtown Grand Rapids location, which is located on Cherry and Ionia in the city's Arena District.



"AMP Lab is a place for collaboration and learning in an advanced manufacturing and design environment," said Dr. Steve Butt, professor and chair of WMU's Engineering Design, Manufacturing and Management Systems department. "Entrepreneurs will have opportunities to prototype their ideas. For some it may be a place to start and for others it will be a place to hone a new product, process, or skill. We are pleased to offer this state-of-the-art laboratory for innovation, instruction, training and research."

The facility will serve as a program to cultivate the next generation of engineers, designers and other skilled individuals to serve the manufacturing industry. The AMP Lab will combine prototyping, training and small-scale manufacturing with the opportunity for individuals to earn a degree.

According to a recent employer assessment by Talent 2025, an organization consisting of 100 CEOs from West Michigan who are working to ensure an ongoing supply of talent for the region, the demand for engineers and designers within manufacturing outstrips the supply of qualified individuals by at least a factor of two. The assessment also states the supply for managers and supervisors within the manufacturing industry in the region is about 90 percent of the demand. The lab is divided into hands-on instructional learning and research areas, with plans to also support college lab sessions, professional workshops, training sessions, K-12 outreach and workforce development activities.

The program will connect students with opportunities in manufacturing and engineering education options. Along with WMU, Grand Rapids Community College will have access to offer various manufacturing and engineering courses inside the Lab.

## Weishaars establish endowed scholarship fund



The College of Engineering and Applied Sciences received a \$100,000 endowment for undergraduate scholarships from Mark and Karen Weishaar.

"We greatly appreciate the support and generosity of Mark and Karen Weishaar," said Dean Houssam Toutanji. "This endowment will help our students realize their dreams and educational goals."

Sturgis Molded Products (SMP) Mark D. and Karen M. Weishaar Endowed Engineering Scholarship will be used to provide scholarships for undergraduates who demonstrate academic promise and financial need.

Mark Weishaar has served as a member of the WMU Foundation's board of directors since 2013, and was elected president in 2016. Since 1997, Mark Weishaar has served as chief executive officer and president of Sturgis Molded Products (SMP), a custom injection molding company headquartered in Sturgis, Michigan. While a student at WMU, he lettered in basketball from 1977-1980. In addition to a business degree from Western, he received an MBA from Northwestern University's Kellogg School of Management.

# A NEW WAY TO HEAL A HEART

Thanks to innovative work by one of WMU's mechanical engineering professors, surgery to repair a hole in the heart using 3D printing is being used successfully here in Kalamazoo. In an unusual collaboration, Dr. William Liou, professor in the Department of Mechanical and Aerospace Engineering, is working with Dr. Vishal Gupta, a Kalamazoo-area interventional cardiologist, to transfer images of a patient's heart to a 3D printed model. Gupta then uses the 3D printed model to plan the repair of the hole so that the procedure best fits the patient's anatomy.

The process is being used for surgery to correct atrial septal defect, a congenital defect of the heart in which there is a hole in the dividing wall between the two upper chambers of the heart, or atria. The hole allows freshly oxygenated blood that returns to the heart from the lungs to mix with deoxygenated blood that is returning to the heart after circulating throughout the body. The condition can damage the heart and lungs because of the excessive amount of blood circulating through the two organs, and can cause significant cardiovascular and pulmonary issues.

One surgical option is through cardiac catheterization, in which a small tube with a plug is inserted into the patient's blood vessel and delivered to the heart to close the hole. Cardiologists guide the delivery of the plug device using medical imaging. However, this can be quite challenging as the hole can be of different shapes and sizes, and it is difficult to visualize other areas the plug might compromise because of the proximity to the hole.

"This is groundbreaking and quite revolutionary," Gupta said. "Using a 3D model helps not only pre-plan the procedure but even practice an operation before it is done. It gives me great confidence that the device is going to be placed accurately for the best outcome for the patient."


Liou noted that using 3D technology in medicine has tremendous potential. "The use of 3D printing technologies in engineering fields has advanced from simple prototyping to making functional parts for airplane engines and spacecraft. We are only beginning to unlock its potential in applications like medicine."

Liou heads WMU's Computational Engineering Physics Lab and is involved in numerous research projects to help gain a better understanding of the hemodynamics and biomechanics of the human heart and brain.



**Dr. William Liou (right) and Dr. Vishal Gupta (left) with a 3D model of a heart.**





# CENTER ADVANCES VEHICLE TECHNOLOGY AND DESIGN

In a state where the automotive industry is still king, a research program at WMU's College of Engineering and Applied Sciences is helping to shape new advances in vehicle technology and design.

The Center for Advanced Vehicle Design Simulation (CAViDS), was founded in 2007 with a mission to bring together members of academia, industry, national research labs and other stakeholders in a collaborative approach to address technical challenges in the automotive industry.

Companies provide funding for research they are interested in, with the Center leveraging additional funding through federal agencies. Several companies have partnered with the Center over the years, including consortium members Eaton Corp., Dana Inc. and Lubrizol Chemical Co.

"We find individual ways to solve problems," says Dr. Claudia Fajardo-Hansford, a mechanical engineering faculty member who directs the consortium. "CAViDS combines the unique expertise of academics in tandem with the experience of engineers working in the industry."

For instance, when a company comes to CAViDS looking to collaborate on specific research topics, the Center seeks the academic lab or specific professor university-wide who best fits the needs of the company, then connects the two. From aerodynamics to drivetrain efficiency to fluid dynamics, CAViDS provides a platform for fostering and sustaining multi-disciplinary research and collaboration to tackle practical challenges.

The consortium also serves as a kind of real-world classroom for the undergraduate and graduate students who participate in research projects, not just putting their science-based knowledge to work, but gaining what Fajardo-Hansford calls "soft skills."

"Developing interpersonal skills is so important," she says. "You can do lots of research, but you have to be able to present it in a compelling way. Students who participate in CAViDS don't just become better researchers, but better communicators as well."

Eaton Corporation joined CAViDS in 2007 as a charter member of the consortium, intent on developing a relationship with WMU to not only utilize some of the university's lab and technical facilities and academic expertise, but also to attract potential employees, says Carlos Wink, a principal

engineer with the company who oversees Eaton's participation in CAViDS. Being in the consortium also frees up engineers at the company to work on other projects, he says.

"We like to develop connections with local universities," he says. "Using local resources and facilities helps our own research while allowing us to help shape the engineers of the future."

Eaton partnered with CAViDS in 2011 on a research project to determine the temperature increases over time inside truck transmissions, utilizing WMU labs and academic personnel to create models before physical testing was performed at a facility in California.

The results were impressive, Wink says.

"We wanted to see if the results in the field could be predicted before the actual testing," he says. "The results turned out to be very correlated. They gave us a good idea of what was going to happen so we could make changes going forward."

Beyond the more science-based research experience students in the Center receive, Wink echoes Fajardo's points about the softer skills learned by presenting research findings and developing effective interpersonal communications skills with industry professionals.

"What is really valuable is when students present to people from industry," he says. "I think it helps them become more confident in their communication skills while they also receive effective feedback from professionals in the field."

Megan Arduin thinks so, too.

Entering her second year as a graduate student in mechanical engineering, Arduin is involved in research with CAViDS compiling a summary review of academic literature related to improving efficiency in gearboxes.

She has presented her findings and progress at several of the monthly meetings, and says she feels industry representatives show an authentic interest in what she has to say.

"I am developing relationships with companies," she says. "I feel they take me seriously and are interested in what I'm saying. They ask questions and give me ideas on ways to expand my research. Being able to interact with experienced engineers has really grown my confidence."



# ENGINEERS WITHOUT BORDERS CHANGES LIVES

(Zac Miller)



Our mentor discussing the community's water system with a local resident



Stephen Siitari after we surveyed a family about their water needs

Four engineering students traveled from Western Michigan University to San Antonio de Upa, Nicaragua over their winter break in 2017, hoping to change the world—one small village at a time. The students were warmly welcomed by the farmer who owned the local coffee farm, the main employer in the village, opening the doors of his home to them.

"It was a fantastic trip," says Turner Slaughter, president of Engineers Without Borders (EWB), the WMU chapter. "For some of us, it was our first time traveling out of the country. We met with the coffee farmer and members of the community to hear more about what they needed and how we could help, following up on many conversations over the previous year in preparation for our trip."

The community needed water that is clean and easily accessible. The students surveyed the village of about 40 homes, measured water usage, and tested the water from the one tap that brought water to the entire village. Along with Slaughter, the student team included Jessica Graves, international project lead at that time; Dylan Davis, previous president; Stephen Siitari, current international project lead; and Zac Miller, professional mentor. The team returned to WMU to work on a solution with the hope of returning to Nicaragua within the coming year to implement the project.

Engineers Without Borders is based on the well-known "Doctors Without Borders" model, with experts in the field volunteering to help those in need across the globe. Slaughter, alongside chemical engineering graduate Matt Van Ness, founded the WMU chapter in 2016. The chapter is one of the newest in Michigan, one of about 300 chapters across the country. Some chapters consist of students, others of professionals. Each chapter chooses a local and a global project, and must be willing to take on a 5-year commitment to complete those international projects.

Members are provided the opportunity to attend business meetings, fundraisers, and team-building activities along with working on the projects, sometimes also attending regional and national conferences of Engineers Without Borders-USA. A local project, recently completed, was to design a solar food dehydrator system for produce grown in the Gibbs House on the WMU campus. The dehydrator will promote long-term food storage.





Road to the coffee farm we toured



Dylan Davis & Jess Graves testing for bacteria contaminants in water samples

The global project in Nicaragua represents a significant commitment. “At the end of our trip, we signed a community agreement in accordance with the Engineers Without Borders-USA’s policies,” Slaughter says. “The agreement stated that we believe that the need is present, a system is feasible, any future system will be well taken care of by the community, and that our chapter is willing to take on the project. It also serves as a statement of camaraderie and understanding between Engineers Without Borders-WMU and the community.”

“Being a part of this chapter not only is a perfect opportunity to give back, but also an opportunity to learn and grow in ways I never imagined,” Jessica Graves says. Graves graduated in spring 2018 with a degree in chemical engineering. “Being full-time students, it can be challenging to find free time to commit to this chapter. But the commitment we made to the community of San Antonio de Upa is strong. I was so impressed by the efforts my fellow students made to prioritize their schedules to make a difference in someone else’s life.”

Another member of the team is Zac Miller, a 2014 WMU graduate with a degree in civil engineering, now working as a pavement design engineer. “Through Engineers Without Borders, I can offer my skills as an engineer to help build projects that bring sanitation and clean drinking water to communities in need. It’s a great service opportunity that I wish more engineers knew about,” Miller says. “I am basically a sounding board for the students throughout the whole project process, and I provide technical guidance as well as support for fundraising and chapter events. The students do all the work.”

The chapter still needs to raise approximately \$15,000 to complete the water system project in Nicaragua. A greater problem, Slaughter says, is the current political unrest in the area that has stalled their return for implementation. Chapter members work with the WMU study abroad office to ensure they travel safely.

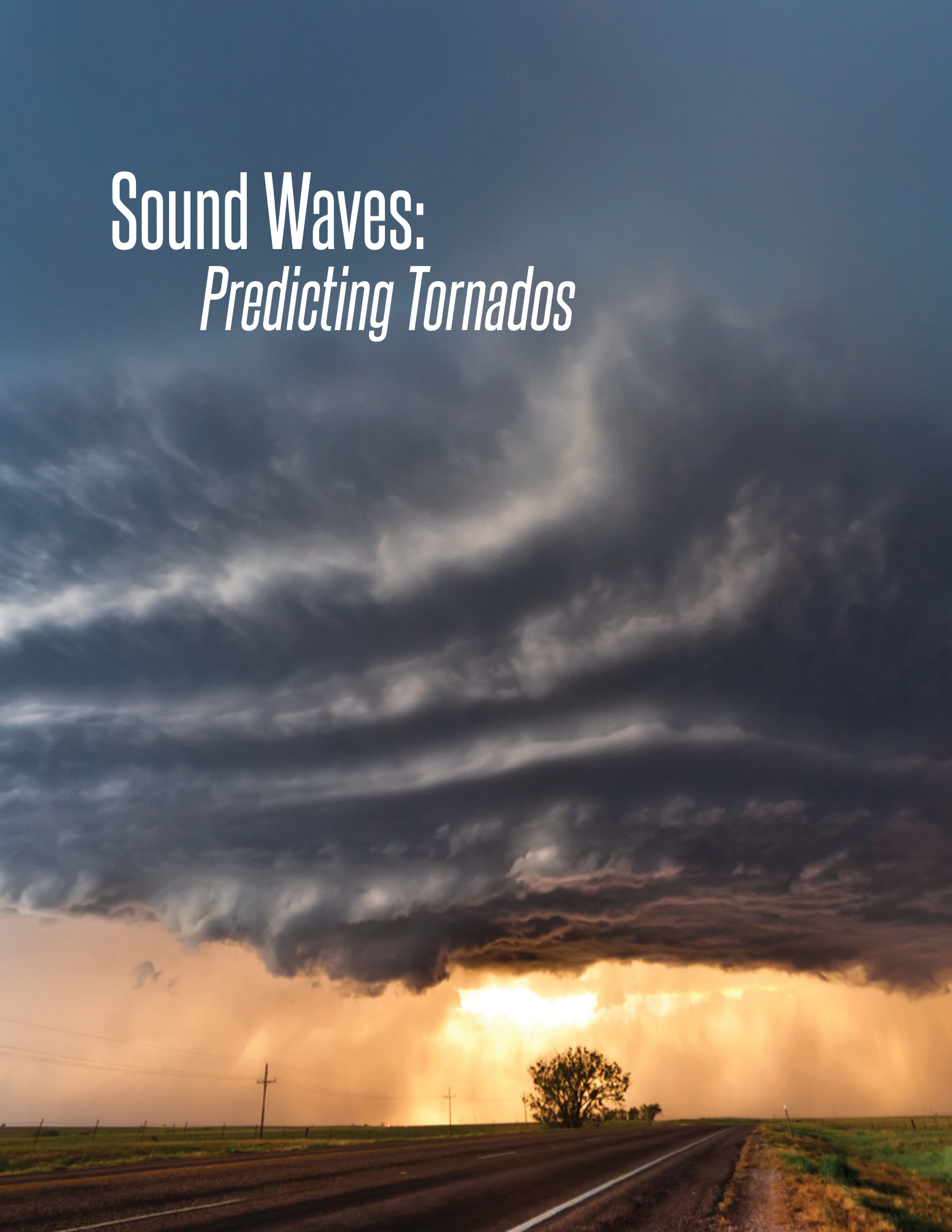
“We remain in close contact with the coffee farmer and others in the community,” Slaughter says. “Our plan is to bring a tap of clean water into each home in the village. It’s about doing good in the world.”

To learn more about Engineers Without Borders-WMU, email [ewb.wmich@gmail.com](mailto:ewb.wmich@gmail.com).

Tax-deductible donations may be made at [www.ewbwmu.wordpress.com](http://www.ewbwmu.wordpress.com).



# Sound Waves: *Predicting Tornadoes*







To most human ears, it's the sound of silence. To the ear of a meteorologist, it's music. To the ear of Brian Elbing, an assistant professor of mechanical and aerospace engineering at Oklahoma State University and a 2003 graduate of Western Michigan University in mechanical engineering, it's the sound of science. Elbing has found a way to predict tornadoes by the sound emitted prior to the formation of a funnel.

"We think of tornadoes as being loud, but they also emit infrasound—sound that the human ear cannot hear—up to two hours before the tornado forms," Elbing says. "If we can detect that sound, we could predict tornadoes much earlier and with much improved accuracy."

Currently, Elbing says, 75 percent of tornado warnings amount to nothing. It's a little like crying wolf. When a real tornado looms, people realize it often too late—literally minutes—before great damage is done. Researchers have discovered, however, that tornadoes produce infrasound in the 0.5 to 10 Hz range when they mean business. That sound can predict the size, the wind speed, the core pressure, and the direction of the tornado as it forms.

"My team of students and I have been developing a way to measure these sounds from hundreds of miles away with infrasound microphones, covered in domes to seal out wind noise and placed in a triangle, spaced about 200 feet apart, for a true bearing," Elbing says. "Then we send out drones to collect data—temperature, wind velocity, humidity."

Weather forecasters now use a combination of factors when predicting tornadoes—atmospheric conditions, Doppler radar, and human observation, often by "storm chasers." Elbing believes that the data he collects, including the infrasound, would not only predict tornado formation with much greater accuracy, but also predict how strong the tornado will be. As Elbing's research evolves, it could even lead to something akin to smoke detectors placed in homes that could warn of an approaching tornado.

Elbing's research is already garnering great interest. The National Weather Service and AccuWeather have expressed interest in using Elbing's research to improve their weather forecasts. The National Aeronautics and Space Administration (NASA) is working with Elbing to improve the measurement and detection of tornadoes. And some of Elbing's research will be featured in a documentary on the National Geographic channel.

Elbing presented his findings earlier this year at the 175th meeting of the Acoustical Society of America in Minneapolis, Minnesota. His research has been supported as part of a National Science Foundation multi-university collaboration led by Oklahoma State University. Elbing's research has received media coverage in WIRED magazine, USA Today, NPR, National Geographic, Newsweek, Science Daily, and many others.

As Elbing's work gathers momentum, he's grateful for his roots. The boy who grew up on a small farm in Pigeon, Michigan, is living the life he wanted.

"I've always liked math and science," he says. "When it was time to pick a college, Western Michigan University was the only university to which I applied—WMU has a strong engineering program."

Inspired by research he was doing in Professor Ho Sung Lee's lab, Elbing went on to earn a master's and Ph.D. in mechanical engineering at the University of Michigan. He also completed an internship as a research assistant at the NASA Langley Research Center.

"So far, we've been able to monitor only one tornado, in May 2017," Elbing says. "Living in Oklahoma, the heart of the tornado alley, you can imagine how much my friends enjoy giving me a hard time about that. But you can't simulate a tornado in a lab. We are developing a hypothesis now about the source of the infrasound before a tornado forms. We need to identify that mechanism. That's the next big question."

A photograph of Edmund Tsang, an older man with glasses, wearing a dark suit and tie. He is standing in front of a glass wall. On the wall, the text "Edmund Tsang:" is written in large black letters, and "LOVING TO SERVE" is written in large red letters. Below this, the text "College of Eng & Applied Sc" is visible in green and gold letters.

# Edmund Tsang:

## LOVING TO SERVE

College of Eng  
& Applied Sc

Some who ascend to lofty professional positions gaze out onto their institutions from ivory towers. Edmund Tsang preferred a more grounded approach.

It wasn't uncommon to find him sharing a brown bag lunch with colleagues and students, or chatting up undergraduates, taking a keen interest in their academic and personal lives. There is a warmth about him, those who know him say, an authentic curiosity in the lives of students and sincere interest in their success.

Tsang, 70, who retired at the end of 2017 after a long career in the college, is many things to many people: A relentless champion of students. A survivor. A devoted single father. A humble man.

"I have done a lot of things," he says. "But nothing has been more satisfying to me than being a father."

Tsang came to Kalamazoo in 2001 from the University of South Alabama, where he had been an associate professor of mechanical engineering since 1984. At WMU, he became associate dean for undergraduate programs and assessment and associate professor of mechanical engineering. He served as interim dean for the college as well.

Born in Macau and raised in Hong Kong, Tsang was the first in his family to go to college, earning a bachelor's degree in mechanical engineering from the University of Nebraska-Lincoln in 1973 and later a Ph.D. in metallurgy from Iowa State University in 1977.

"Education provides a person with financial mobility and broadens opportunities," he says. "My family wanted that for me, and I want that for others, too. I strongly believe that every student we admit we have a responsibility to help them succeed."

Tsang was instrumental in bringing in several grants totaling more than \$6 million to create the STEM Talent Expansion Program (STEP) and seminars to enhance student learning and success, and improve retention and graduation rates among engineering students. He also helped run the Lewis Stokes Alliance for Minority Participation, a statewide effort designed to increase graduation rates among minorities in STEM fields.

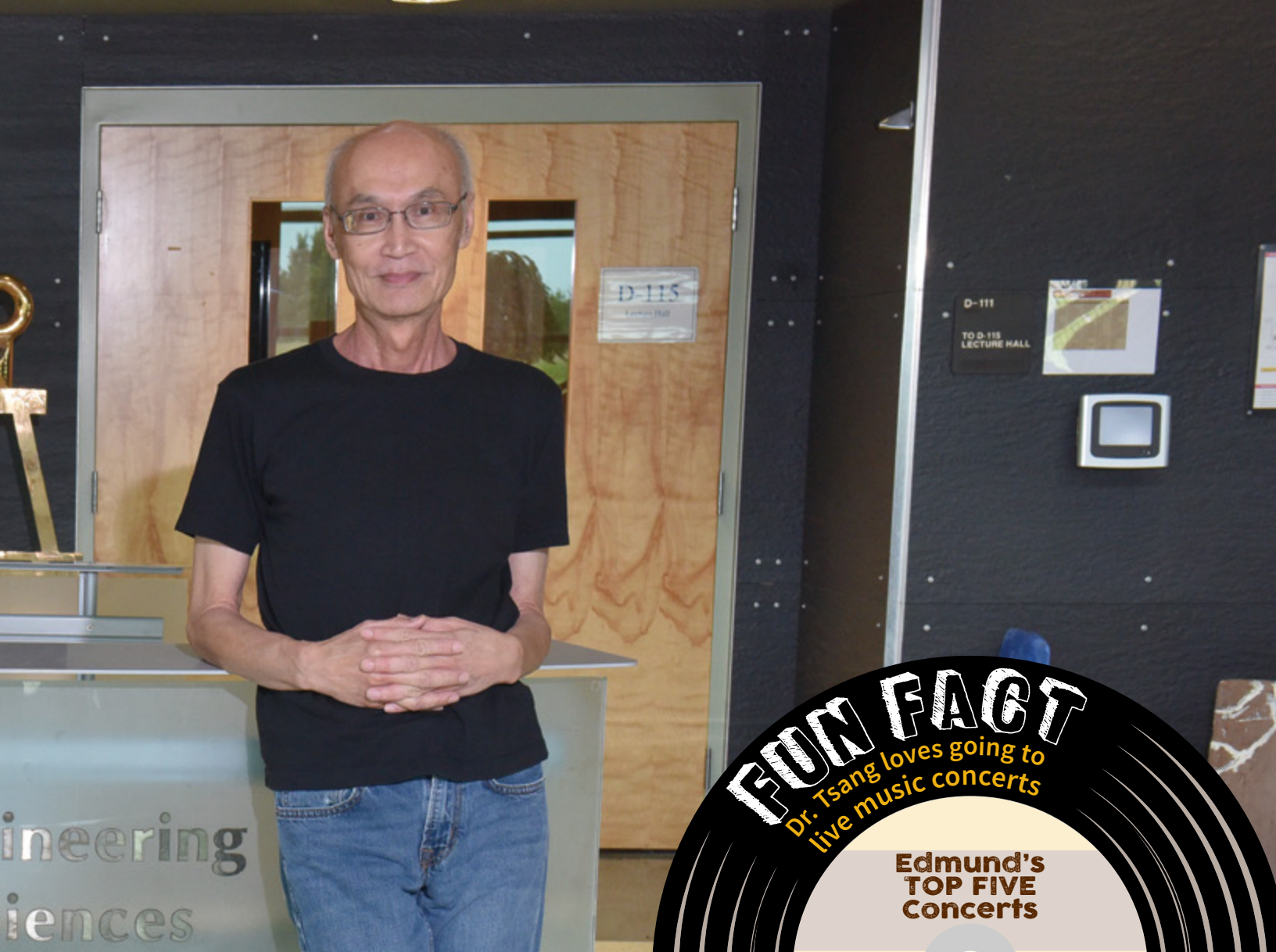
"You'll never meet someone more focused on student success than Edmund," says Anetra Grice, manager of the STEM Talent Expansion Program. "The students always come first. He has a can-do attitude. If someone says it can't be done, he just finds another way. He has always said, 'Learn how to love to serve.'"

His list of awards is long and distinguished: an Excellence in Service-Learning Faculty Award in 2012; Faculty Fellow of Lee Honors College in 2010; Phi Kappa Phi-WMU in 2005; and the Platinum Award by the WMU Division of Multicultural Affairs in 2002.

He served as an interim dean of the College of Engineering and Applied Sciences from 2013-2015.

Sometime in 2015, Tsang says he felt a pressure in his stomach area. It





went away, then came back a week later. Doctors ordered tests to be done. The results were a “shock,” he says. It was pancreatic cancer.

Still, Tsang – true to form – says he was “too busy to really take in the seriousness of it.” He had surgery and began treatment, even finding time to write an Algebra II textbook “to take my mind off what was going on” while undergoing chemotherapy. He has now been cancer-free for two years, he says.

“The university community really supported me and my kids,” he says. “They were like family.”

Ken Domingue, an aerospace engineer, showed promise as an undergraduate, and was assigned a teaching assistant position for a pilot position that involved leading a classroom of first-year engineering students.

“Dr. Tsang trusted me to get in front of 30 or so freshmen at a time, and I was only a sophomore, which later translated into another course with even more students,” says Domingue, who works for the San Antonio-based Southwest Research Institute. “But that’s who he was. If he saw potential, he was going to help you take it as far as you could. In many ways, he became my mentor.

“Sometimes you can run into a professor who believes you either sink or swim. Dr. Tsang wanted everyone to swim. The funny thing was many students didn’t even know he was the associate dean. He was just so humble.”

As for retired life? Well, it’s probably not a surprise that Tsang isn’t plan-

## FUN FACT

Dr. Tsang loves going to live music concerts

### Edmund's TOP FIVE Concerts

1. Bruce Springsteen - 1977
2. Jethro Tull - 1978
3. David Byrne - 2018
4. David Bowie - 1982
5. Flaming Lips - 2018

ning on resting on the laurels of a life full of accomplishments. He loves to cook and “experiment” in the kitchen, he says. Having more free time means he can spend more of it with his son Manny, 18, and daughter Clarice, 12. He also loves going to live music concerts, recently seeing David Byrne of the Talking Heads in Grand Rapids.

And this fall he was back on campus, teaching a few courses, including Introduction to Engineering Analysis.

“I really like being around the students,” Tsang says. “I still have a lot of energy and feel like I need to be there to help.”



# WOMEN WALKING THE ROAD TOGETHER

Tessa Williams has been interested in engineering since her senior year in high school, and she has found her career path taking shape over the past few years. A senior majoring in industrial and entrepreneurial engineering, Williams is the president of the Society of Women Engineers – known as SWE -- at Western Michigan University. SWE provides the opportunity for women engineers to network, build resumes, and polish their skill sets together.

“We are lucky to be where we are today. We can thank the women who came before us,” Williams says. “Some of us are here precisely because we were told engineering was not for women. It’s a lively career, not just sitting at a desk, and we are very passionate about it.”

SWE is just one of the many resources Western Michigan University provides to women interested in pursuing engineering as a career.

“Almost 16 percent of our engineering students now are women, compared to about 13 percent for Midwestern public universities,” says Anetra Grice, program manager for STEP, the STEM Talent Expansion Program. “That’s up from about 8 percent a few years ago -- but we would love to see 50 percent or more. The needle is moving.” A mentor once told her class about her experience as a student, when the class in which she was the only female was divided into groups. The professor joked to her group that they already had a secretary built in.

It wasn’t long ago that almost every woman engineer had a story to tell about the discrimination she has faced in her career. As time goes on, however, the stories are fewer—and Western Michigan University’s College of Engineering and Applied Sciences is doing everything possible to maintain that trend.

One of the ways that Grice and STEP are changing gender bias is by offering a course to first-year women engineering students, called Women and Leadership in Engineering and Applied Sciences.

“We started the course in 2014,” Grice says. “Students are assigned a mentor matched to their major and their interests, a female professional who has earned her engineering degree at WMU. Usually we have about





25 students per class, and each class listens to a mentor presentation about her career and school experience. It's an empowering class."

Students communicate with their mentors using email, building a rapport and completing writing and reading assignments. The students live and study in "cohorts," or learning communities, so that they see familiar faces as they transition into college life. Older, successful students tutor younger students, and if someone falls off in attendance, Grice makes a friendly intervention, offering encouragement.

Simone Abrams, who has a degree in manufacturing engineering from Western and is a project engineer at FedEx, has been volunteering as a mentor to students for three years.

"I mentor because some of the experiences I encountered in college, as well as experiences I've had as a woman engineer, had me thinking many times that maybe I'm not cut out for this—It's tough! If sharing my experiences helps one person stay true to her desire to become an engineer, then that is why I continue to mentor."

Her mentoring efforts have not gone unnoticed. Sara Rodriguez, a 2018 graduate now working as an engineer in Battle Creek, still has emails she exchanged with Abrams, carefully printed off and preserved.

"Oh, I had my doubts about my career choice," Rodriguez says. "But I printed those emails and highlighted the parts that reminded me of my own story. I read those emails again and again, whenever I needed encouragement."

In her college days, Rodriguez served as president of the Society of Women Engineers.

"As members of the organization, it was so reassuring to talk to each other," Rodriguez says. "We built connections and found out what jobs were available for women engineers."

Rodriguez turned her college part-time job into a full-time profession after graduation. One of 10 women engineers in her workplace of about 150, Rodriguez no longer gives in to self-doubt. She has circled back to become a mentor to others.

"There are so many great resources at WMU for women to become successful engineers," she says. "So I do for others what was done for me."

Sara Repen, a Western graduate in mechanical engineering, has returned as a mentor through STEP. She now works as an engineer at Fiat-Chrysler.

"Unfortunately, it has become acceptable and somewhat popular in our society to claim to be bad at math and science," Repen says. "Claims

become self-perceptions and self-perceptions become reality. When a young woman overcomes all of those challenges to embrace her talents and passion for math and engineering, I think that it's crucial that she knows that she is not walking that road alone. I try to share what I have learned that has made the journey easier and more enjoyable, or that I simply wish I had known when I had finally embraced becoming an engineer. It's one of the best choices I have ever made in my life."

Molly McKenzie completed the Women and Leadership course and recommends it highly. Now in the mechanical engineering program, McKenzie had no exposure to the world of engineering prior to coming to WMU.

"From the first time I toured the campus, I was very impressed with the engineering program at Western," McKenzie says. "Every engineering course that I took this past year expanded my knowledge and brought me a step further in my program. The faculty here wants to see you succeed, and as long as you are focused and know when to ask for help, you will make it through."





# ADDRESSING GLOBAL CHALLENGES IN CONSTRUCTION

An interdisciplinary group of researchers from the College of Engineering and Applied Sciences is busily studying new and creative ways to build better in an age of climate change and other global challenges facing the construction industry.

Their activities are being funded by grants from WMU's Georgeau Construction Research Center, which was established in 2016 through a \$5 million gift from Phil Georgeau of Kalamazoo and his late wife, Betty.

The couple funded the center to not only advance the construction industry through innovative research, but also to create better, stronger, safer, sustainable and more resilient construction systems and materials. Housed in Floyd Hall and administered by the College of Engineering and Applied Sciences, the center already has awarded \$350,000 in grants to seven projects being conducted by faculty members at the University.

In addition, construction has begun on a \$1 million lab in the College of Engineering and Applied Sciences annex near the Kalamazoo/Battle Creek International Airport. The state-of-the-art laboratory facility will allow researchers to evaluate roofing system designs under extreme wind loads as well as study the properties of large-scale structural elements and samples under different loading conditions, including seismic loads.

## NEED FOR CHANGE

According to government figures, the construction industry contributed more than \$1 trillion to America's gross domestic product and employed some 7 million people in 2017.

Dr. Osama Abudayyeh, chair of the Department of Civil and Construction Engineering and founding director of the Georgeau Center, notes that it's important for this industry to remain competitive, given its huge impact on the U.S. economy.

"We're facing a host of challenges, from evolving regulatory requirements, population increases and energy shortages to air quality issues, a rising ambient temperature and more violent weather," Abudayyeh explains. "Engineers and architects have been forced to rethink traditional building codes and construction practices.

It's not only sensible to change how we do things, it's become mandatory."

With that reality in mind, the Georgeau Center aims to:

- Advance the construction body of knowledge through innovative research.
- Distill research results into best practices that can be implemented by industry.
- Educate the next generation of construction researchers by engaging undergraduate and graduate students alike in the center's research.
- Transfer technology to industry through product development as well as publications, workshops and other knowledge dissemination.

"We need to adapt our materials and construction practices to new realities and we need to provide higher levels of training for construction professionals," Abudayyeh says. "The cutting-edge, forward-thinking research and training we're doing at the Georgeau Center will accomplish both."

## PHIL AND BETTY GEORGEAU

Phil Georgeau earned a bachelor's degree in chemistry from WMU. He went on to found Chem Link, a company based in Schoolcraft, Michigan that manufactures adhesive, sealant and coating products for the construction industry that employed 104 people at the time Phil and Betty sold it in 2016.

The couple also gifted \$250,000 in 2016 to the WMU Office for Sustainability to boost its studies in environmental and renewable building materials issues that impact the Earth's survivability.

In addition, the Georgeau family established a \$500,000 endowed scholarship in Betty's name to support graduate students pursuing engineering degrees in programs offered through the College of Engineering and Applied Sciences at WMU. Betty was a registered nurse who worked locally at Bronson Methodist Hospital for many years as well as spent 14 years with the American Red Cross.

"This is the first endowed scholarship for graduate students in our college. We are grateful for the generosity of the Georgeau family," said Dean Houssam Toutanji.

## CURRENT CENTER RESEARCH

This spring, the Georgeau Center awarded

continuation grants to principal investigators at WMU that build on eclectic work that the center first funded in 2017.

• Dr. Upul Attanayake, associate professor of civil and construction engineering, and Dr. William Liou, professor of mechanical and aerospace engineering, received funding to further Attanayake's recent evaluation of roof systems and materials for improving structural resilience in damaging winds such as tornados and hurricanes. That research has identified the need to develop numerical simulation expertise to assess the performance of roofing and structural systems. The continuation project includes designing a mobile outdoor experiment facility to evaluate sensors and validate numerical simulation models. It also will be used for STEM—science, technology, engineering and math—education and other outreach activities.

• Dr. William Liou has built a predictive tool to simulate incidents of fire and smoke events and predict the location and likely growth of fire and smoke in smart buildings. The second phase of his research involves developing two datasets for predicting fire spread in smart buildings and then using those datasets to design an artificial intelligence-based algorithm for big data analytics for fire safety in these buildings. The nearly half million structure fires in the U.S. each year cause 17,000 injuries and deaths, and \$10 billion in property losses.

• Dr. Xiaoyun Shao, associate professor of civil and construction engineering, has been studying an innovative application of construction adhesives to enhance the resilience of wood-frame buildings. With her latest grant, Shao will investigate additional novel approaches to dramatically enhance the resilience of wood-frame buildings using construction adhesives to improve strength and stiffness. Damage to those structures from earthquakes, hurricanes and other natural hazards lead to tremendous economic loss and emotional distress in North America, where wood-frame construction is predominantly used.

Learn more about the Georgeau Construction Research Center at [ceas.wmich.edu/georgeau](http://ceas.wmich.edu/georgeau).





1. Promotion  
2. Research  
3. Business  
4. Development  
5. Engineering  
6. Manufacturing  
7. Planning



# Building Bridges, Building Boats



Western Michigan University's College of Engineering and Applied Sciences hosted a regional steel bridge and concrete canoe competition in 2018, when 10 universities competed in a variety of categories with hopes of advancing to the national finals. WMU engineering students participate each year in the American Society of Civil Engineers (ASCE) North Central Regional Competition and have the opportunity to host the event every 10 years.

Universities from Michigan and Ohio attended the conference, with nine concrete canoe teams and nine steel bridge teams. The teams were judged by industry professionals.

"The concrete canoe and steel bridge competitions have a long tradition of fostering teamwork and camaraderie," said Dr. Osama Abudayyeh, professor and chair of the college's Department of Civil and Construction Engineering. "The event provides students with a chance to gain hands-on, practical experience and leadership skills while dealing with real-world engineering issues."

## STEEL BRIDGE TEAM

The steel bridge team designs, fabricates and constructs a scale-model bridge based on criteria established by the American Society of Civil Engineers and the American Institute of Steel Construction. The competition involves building a 1:10 scale bridge that is evaluated on lightness, stiffness, construction speed, construction economy, structural efficiency and overall performance. An award is also given for display. For the 2018 competition, bridges were required to be 17 feet with a clearance of 7.5 inches and able to hold 2,500 pounds.

## CONCRETE CANOE TEAM

WMU's entry in this year's concrete canoe competition was named "Golden Opportunity," and for the second year, was produced using a "female" mold rather than the typical "male" mold. The concrete was trowelled inside the Styrofoam mold, rather than the outside. Canoes are judged in categories such as hull design and aesthetics as well as performance in a number of different races. Races in the 2018 competition were canceled due to weather.

The 2019 ASCE North Central Regional Competition will be hosted by the University of Michigan in Ann Arbor.



# Agents of Change: University Innovation Fellows



Two students from the College of Engineering and Applied Sciences were among the 258 students from 64 higher education institutions in nine countries who were named University Innovation Fellows. Daniel Mozel, a student in engineering design technology, and Saleh Mohamed, a student in mechanical engineering, were part of the incoming group of the University Innovation Fellows program, which empowers students to become agents of change at their schools. Two other Western students were also named Fellows for 2017-2018: Megan Miller, a marketing major, and Andy Hobelsberger, a physics major.

The program is run by Stanford University's Hasso Plattner Institute of Design. With the addition of this year's new Fellows, the program has trained more than 1,500 students since its creation. Fellows work to ensure that their peers gain the knowledge, skills and attitudes required to compete in the economy of the future and make a positive impact on the world. To accomplish this, these students advocate for lasting institutional change and create opportunities for other students to engage with innovation, entrepreneurship, design thinking and creativity at their schools. They design innovation spaces, start entrepreneurship organizations, host experiential learning events, and work with faculty to develop new courses.

"WMU and our college have had a number of students admitted into the University Innovation Fellows program in recent years," said Dr. Steve Butt, professor and department chair of Industrial and Entrepreneurial Engineering and Engineering Management and also department chair for Engineering Design, Manufacturing and Management Systems. Fellows, who are selected through an application process each year, go through six weeks of online training and travel to the University Innovation Fellows Silicon Valley Meetup. Throughout the year, Fellows take part in events and conferences and have opportunities to learn from one another, Stanford mentors, and leaders in academia and industry.

Butt noted that through the efforts of previous Fellows, an Innovation Club was started on campus and a student-run makerspace was created, providing a place for students to design, build and be creative. "Our participants in the University Innovation Fellows program really build resources that will last beyond their time at Western," he said. "They truly are agents of change."

## TOP SCHOLARS

Among the 50 students recognized as Western Michigan University's top seniors for 2017-18 were seven students from the College of Engineering and Applied Sciences.

Each year, faculty members from across the University select the most outstanding senior in their various academic schools, departments and programs to represent their units as a WMU Presidential Scholar. For 2017-18, 50 scholars were chosen from a senior class of 5,437 students.

The Presidential Scholar designation is the highest academic honor that WMU can bestow on its undergraduates. Selection is based on the students' general academic excellence, academic and artistic excellence relative to their majors, and intellectual and artistic promise.

### 2018 Presidential Scholars

#### College of Engineering and Applied Sciences

##### Chemical and Paper Engineering

**Andrew D. Kathan**  
of Carmel, Indiana

##### Civil and Construction Engineering

**Anthony G. Conigliaro**  
of Sterling Heights, Michigan

##### Computer Science

**James J. Ward**  
of Buchanan, Michigan

##### Electrical and Computer Engineering

**Joshua J. White**  
of Paw Paw, Michigan  
(double scholar, also in World Languages and Literature)

##### Engineering Design, Manufacturing and Management Systems

**Cameron S. Tschupp**  
of Galien, Michigan

##### Industrial and Entrepreneurial Engineering and Engineering Management

**Lukas P. Swoboda**  
of Kalamazoo, Michigan

##### Mechanical and Aerospace Engineering

**Conner P. Knepley**  
of Stockbridge, Michigan



# STUDENT SUCCESS



## ***Students take top awards for best paper***

Congratulations to two civil engineering students for taking the 1st and 2nd place awards for Best Student Paper at the Michigan chapter of the Institute of Transportation Engineers meeting.

The \$500 1st place award went to Odai Alhouz, a master's student in civil engineering for his paper titled, "Effectiveness of Bicycle Signal and Bike Box for Improving Safety and Multimodal Mobility at Urban Intersections." The \$300 2nd place award went to Fadi Alhomaidat, a Ph.D. student in civil engineering for his paper titled, "Cycling Risk Perception and Skill Level of Different Age Groups."

Alhouz and Alhomaidat are working on a number of transportation research projects with Dr. Jun-Seok Oh in WMU's Transportation Research Center for Livable Communities.

## ***State Department awards scholarship for study in Japan***

Joshua White, a graduate student in electrical engineering, received a full scholarship from the U.S. Department of State's Critical Language Scholarship program to participate in an eight-week summer course at the University of Shiga Prefecture in Hikone, Japan.

The scholarship program is part of a federal effort to expand the number of Americans studying and mastering critical foreign languages. White is one of about 550 competitively selected American students at U.S. colleges and universities who received a Critical Language Scholarship award in 2018.

A student in the accelerated master's degree program in computer engineering, White graduated from the university in April 2018 with a Bachelor of Arts in Japanese, Bachelor of Science in applied mathematics and Bachelor of Science in Engineering in computer engineering. He expects to graduate with a Master of Science in Engineering in electrical engineering and a Master of Science in applied and computational mathematics in April 2020.

White plans to continue on and obtain a doctoral degree in electrical and computer engineering, focusing on research in electro-neurophysiological interfacing. Eventually, he wants to move to Japan and work on developing advanced prosthetics that interface directly into the human nervous system to help improve the quality of life for amputees.

During his undergraduate career, White was named WMU's 2018 Presidential Scholar in Electrical and Computer Engineering as well as its 2018 Presidential Scholar in World Languages and Literature. Being named a Presidential Scholar is the highest honor a senior can receive from the University.

## ***First Betty J. Georgeau Scholarship awarded***

Jenny Komorowski, a senior in industrial and entrepreneurial engineering and in the accelerated master's program in industrial engineering, was the first recipient of the Betty J. Georgeau scholarship, awarded during the 2017-18 academic year. The scholarship provides \$20,000 a year for two years.

Dr. Steve Butt, professor and chair of the Department of Industrial and Entrepreneurial Engineering and Engineering Management, nominated Komorowski for the scholarship.

"Jenny is one of our top students," he said. "She truly possesses the qualities and abilities necessary to become a consummate engineering professional and a leader in her field. She is a perfect pick for this scholarship and will be a fantastic ambassador for WMU now and in the future."

The Betty J. Georgeau Scholarship was established through a \$500,000 endowment by Phil and Betty Georgeau. Phil Georgeau is a graduate of WMU and founder of Chem Link, a company based in Schoolcraft, Michigan, that manufactures products for the construction industry. Betty Georgeau, a passionate and ardent supporter of WMU, passed away in November 2016.

The Georgeaus also provided a \$5 million gift for the creation of the college's Georgeau Construction Research Institute, allowing researchers to pursue innovative construction research that addresses the numerous challenges facing the construction industry.

## ***Ph.D. student earns honor from foundry society***

Congratulations to industrial engineering Ph.D. student Prayag Patel for receiving the Foundry Education Foundation Scholarship from the American Foundry Society, Northeastern Wisconsin chapter. He also received a Certificate for Excellent Academic Achievement for the research work he is doing on "qualification of chemically bonded sand systems" for his dissertation.

Patel has developed a quality control framework to qualify chemically bonded sand systems. He also has developed process monitoring techniques to administer chemically bonded sand systems in foundries.





### **Entrepreneur places in prestigious pitch competition**

Congratulations to Chris Messecar, a mechanical engineering student, who was 3rd runner-up and received a \$2,000 check in the Accelerate Michigan competition, one of the biggest business competitions in North America.

Nearly 30 student competitors pitched their 4-minute business ideas in several rounds. Messecar and his teammate Jonathon Penrod were participants in WMU's Starting Gate business accelerator and pitched their idea for an "Interlocking Electrical Box."

"We developed an interlocking electrical box using a two-piece design that results in more efficient drywall installation," Messecar explained. "The base mounts flush with the stud, and once the drywall is completely installed, the base is used as a stencil to cut out a hole for the insert. The insert slides into place and snaps securely to the base, bringing the mounting points flush with the drywall."

The two worked with WMU's Innovation Club to print a couple of prototypes using a 3D printer.

Awarding up to \$1 million in cash and in-kind prizes, the Accelerate Michigan competition each year attracts student competitors and more than 200 company applicants, from which 36 are selected for semifinal pitches and vie for a \$500,000 grand prize.

### **Ph.D. student recognized for best research paper**

Bilge Altay, a graduate student working on a Ph.D. in paper and printing science, received the 2018 Dusty Rhodes Graduate Student Paper Award through the Technical Association of the Graphic Arts. The award was established in 1995 to recognize the quality of research papers authored by graduate students.

Altay's graduate program advisor, Dr. Paul Fleming, professor of chemical and paper engineering, said she is an "outstanding student who has already made significant accomplishments in research." Altay's work involves the study of nickel, an abundant metal with high electrical conductivity. "Less expensive than silver and gold, its magnetic properties open up a new class of printed electronic devices, including wireless power, electromagnetic sensors, proximity sensors and micro magnetic field sources," Fleming said. Her work will contribute to the quickly growing technology of printed electronics.

Altay is the author or co-author of 18 peer-reviewed articles and has presented her work at both national and international conferences.

### **Students receive awards at engineering education conference**

The College of Engineering and Applied Sciences was well represented at the 2018 conference of the American Society of Engineering Education (ASEE), North Central section. Hosted by University of Akron, the sectional conference drew faculty and students from Michigan, Ohio, Pennsylvania and West Virginia. All WMU students who attended participated in either student paper or student poster competitions.

Three students from chemical engineering – Alexander Maldonado, Naomi Van Dien and Sarah Koehler – presented an individual paper and two posters, respectively. Sarah Koehler won 1st place for the best student poster with her research poster titled "Reaction kinetics and speciation dynamics during extraction of runoff particulate-bound phosphorus using citric acid."

An interdisciplinary senior design project team from the Department of Engineering Design, Manufacturing, and Management Systems – Geoff Burns, Brian Fulkerson, Andre Ly, Jack Ruggless and Ozella Wooley – presented a poster on their senior project, "Architectural-specific design and build of Little Free Libraries," and took 2nd place.

### **Civil and construction students earn 2nd place award**

Congratulations to the team of students working on the project titled "Enhancing Non-motorized Mobility within Construction Zones," for their award-winning work. The team took the 2nd place award as part of the Environmental Science & Policy Program Research Symposium at Michigan State University. Abul Fazal Mazumder and Wjdan Dhaif Sahi Sahi, Ph.D. students in the Department of Civil and Construction Engineering, presented their poster on "Decision-support Framework for Managing Non-motorized Mobility within Work Zones."

Other members of the team were Dustin Black and Matthew Mueller, both recipients of Undergraduate Research Excellence awards. The research project received funding from the Transportation Research Center for Livable Communities at Western Michigan University.



# BY THE NUMBERS

**Students**

**3019**

**Undergraduates**

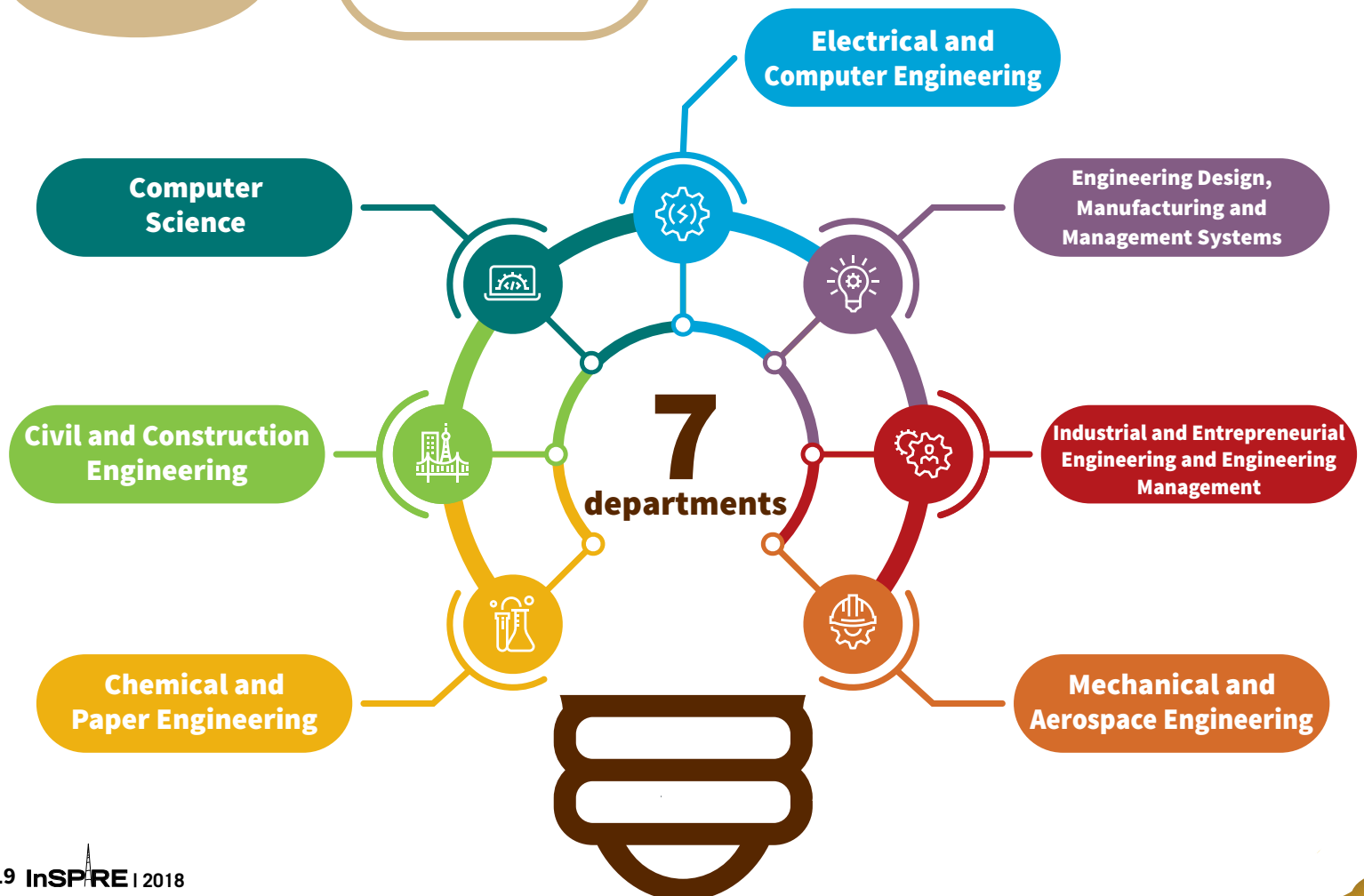
**2416**

**Master's Degree  
Students**

**450**

**Ph.D.  
Students**

**153**





**14** Undergraduate Programs

**11** Master's Programs

**7** Doctoral Programs

**\$4.7 Million**  
in  
Research  
Expenditures

**9**  
Accelerated  
degree  
programs

with  
**1**  
Additional year  
to earn both bachelor's  
and  
master's degrees

**Registered Student  
Organizations**

**32**



**91**

of those who earn an  
undergraduate degree are  
employed or in graduate school

**\$1 million**  
in scholarships  
and assistantships  
awarded annually



**Save the Date!**  
**CEAS Annual Giving Day**  
**Thursday, March 14, 2019**





## **NSF grant focuses on neurological research**



Dr. William Liou has received a \$204,000 grant from the National Science Foundation (NSF) for research designed to help improve the medical diagnosis and treatment of patients with neurological diseases related to cerebrospinal fluid flow in the brain. Using

a multidisciplinary approach, Liou, professor in WMU's Department of Mechanical and Aerospace Engineering, is collaborating with Dr. Shinya Yamada, chief of neurosurgery and chief of the Hydrocephalus and Cerebrospinal Fluid Research Center at the Toshiba Rinkan Hospital in Japan.

The research, "Turbulent Cerebrospinal Fluid Flow Dynamics in Physiological and Pathological Conditions," is looking at abnormalities in cerebrospinal fluid – which surrounds the brain and spinal cord – and how they affect health.

"Cerebrospinal fluid is believed to circulate in the central nervous system, protecting the brain from trauma by providing buoyancy and transporting nutrients," Liou said. "Abnormalities in the fluid, its containment space, and its circulation have been related to several diseases, such as hydrocephalus, Alzheimer's disease, schizophrenia and multiple sclerosis."

The project is using state-of-the-art brain imaging and computational science equipment to study how the cerebrospinal fluid flow impacts the brain. "This research is unique because we are looking at the dynamics of the cerebrospinal fluid and the blood flow systems in the brain and using computer modeling to get an advanced understanding of its impact on health," Liou said.

## **Bringing STEM education to migrant students**



Western Michigan University has been awarded more than \$2 million over the next five years to support first-year, first-generation undergraduate students who are migrant or seasonal farmworkers, or the children of such workers.

The U.S. Department of Education and its Office of Migrant Education awarded the grant to fund the long-standing College Assistance Migrant Program (CAMP). The University is one of only 10 institutions in the country and the only one in Michigan to receive grant money for CAMP's new funding cycle.

WMU's CAMP project, which is housed in the Division of Multicultural Affairs, received \$416,293 for the 2017-18 academic year and \$2,107,988 overall. The College of Engineering and Applied Sciences will help give new WMU-CAMP participants increased access to STEM -- science, technology, engineering and mathematics -- coursework and activities. The WMU-CAMP program is designed to address a federally identified priority that calls for increasing the number of students who are

prepared to enter STEM fields. The program will enroll an average of 40 eligible students during each year of the 2017 through 2022 grant period. Nationwide, CAMP helps out about 2,000 students each year.

"Teaming up creates another good opportunity for WMU to emphasize STEM education," said Dr. Jorge Rodriguez, WMU-CAMP's co-principal investigator and an associate professor of engineering design, manufacturing and management systems. "STEM education is a priority in the global environment we live in, and it's something that will have a significant positive impact in our region."

## **Predicting the fatigue properties of materials**



Dr. Daniel Kujawski, professor of mechanical and aerospace engineering, is one of five people from five universities who have been selected to receive a 2018 award from the ADVANCE Grant Proof of Concept Fund. The awards incentivize faculty members at

Michigan public universities to engage with their technology transfer office to move their early-stage technologies toward commercialization. They are administered by Michigan State University and the Michigan Strategic Fund, through the Michigan Economic Development Corporation and range from \$15,000 to \$80,000.

Kujawski, who directs WMU's Fatigue and Fracture Laboratory, received \$49,892 for a project that improves prediction of the fatigue properties of materials. His methodology will lower the expense of providing designers with material properties over the lifecycle of manufactured parts. The technique promises higher reliability from nondestructive testing and analysis.

## **Butt named Fellow of IISE**



Dr. Steve Butt was named a Fellow of the Institute of Industrial and Systems Engineers (IISE), the highest classification of membership in the organization.

The accolade recognizes outstanding industrial and systems engineering

leaders who have made significant, nationally recognized contributions to the profession. WMU now has four fellows, which as a percentage of industrial IISE engineering faculty, is one of the highest percentages of fellows at any institution.

Butt serves as professor and chair of both the Department of Industrial and Entrepreneurial Engineering and Engineering Management and the Department of Engineering Design, Manufacturing and Management Systems. Butt joins three other faculty members who have been named IISE Fellows: Drs. Tycho K. Fredericks, 2015; Timothy J. Greene, 1999; and Kailash M. Bafna, 1996. All three are professors of industrial and entrepreneurial engineering and engineering management. Bafna also is a professor of engineering design, manufacturing and management systems.

IISE is an international nonprofit association that provides leadership for the application, education, training, research and development of industrial and systems engineering. Since 1950, only about 500 members of the organization have been named a fellow.

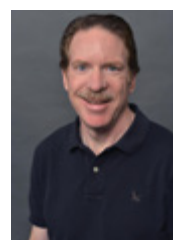
## **Foundry society honors expert in metal-casting**



Congratulations to Dr. Sam Ramrattan, professor in the Department of Engineering Design, Manufacturing and Management Systems, who received the prestigious British Foundry Medal at a ceremony in London earlier in the year. He is a world leader in metal

casting research and runs the college's student-centered metal casting lab.

## **Mallak named Fellow of ASEM**



Dr. Larry Mallak, professor of engineering design, manufacturing and management systems, received the 2018 American Society for Engineering Management (ASEM) Fellow Award. This award represents the highest level of membership in ASEM and is presented

annually to selected candidates who have eight years of continuous membership in the organization with significant service, demonstrated engineering management accomplishments, and continuing distinguished service and contributions to the society. Mallak received the award during the society's Honors and Awards Banquet in October during the American Society for Engineering Management's International Annual Conference in Coeur d'Alene, Idaho.

## **Professor to lead engineering association**



Dr. Jun-Seok Oh, professor in the Department of Civil and Construction Engineering, recently was elected president-elect of the Korean-American Scientists and Engineers Association (KSEA). Representing all Korean-American scientists and engineers, KSEA is

a non-profit professional organization with more than 6,000 registered members in 70 local chapters and branches and 13 technical groups across the U.S.

Oh also is director of the Transportation Center for Livable Communities, a Western Michigan University-led consortium of five universities established in fall 2013 through a \$4.3 million grant from the U.S. Department of Transportation. The center aims to address the nation's critical transportation challenges through the prism of livable communities.



# Alumni Accolades and Honors

We celebrate the success of eight of our alumni who were inducted into this year's Alumni Excellence Academy. Our honorees include three alumni receiving our Outstanding Alumni Achievement Award and five additional alumni receiving our Alumni Excellence Award. We congratulate you all!

## Outstanding Alumni Achievement Award



**Dr. Farshad Fotouhi**  
B.S. Computer Science '81  
Dean, College of Engineering  
Wayne State University



**Tim Hagenbuch**  
B.S. Paper Engineering '94  
General Manager  
West Rock Eaton Mill



**Tonya Noble**  
B.S. Electrical Engineering '96  
Director, International  
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B.S. Civil Engineering '06,  
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B.S. Chemical Engineering '09  
Senior Marketing Specialist,  
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B.S. Aircraft Engineering '89  
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Wish you were here!



Our team in Nicaragua  
Jess, Dylan, Zac, Stephen and me



Jess testing collected water  
samples for contaminants



Trekking down the mountain after  
a day testing water samples

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