



Western Michigan University
ScholarWorks at WMU

College of Engineering and Applied Sciences
News

College of Engineering and Applied Sciences

7-2016

Inspire e-News 06-07 2016

College of Engineering and Applied Sciences

Follow this and additional works at: https://scholarworks.wmich.edu/engineer_news



Part of the Engineering Commons

WMU ScholarWorks Citation

College of Engineering and Applied Sciences, "Inspire e-News 06-07 2016" (2016). *College of Engineering and Applied Sciences News*. 150.

https://scholarworks.wmich.edu/engineer_news/150

This Newsletter is brought to you for free and open access by the College of Engineering and Applied Sciences at ScholarWorks at WMU. It has been accepted for inclusion in College of Engineering and Applied Sciences News by an authorized administrator of ScholarWorks at WMU. For more information, please contact wmu-scholarworks@wmich.edu.



InSPiRE



College of
**Engineering and
Applied Sciences**

WESTERN MICHIGAN UNIVERSITY

June - July 2016



WMU's 3D virtual labs provide hands-on learning around the world

The virtual world is a modern reality. It's the way pilots, doctors and machine operators are being trained today. Why not engineers as well?

[*Read Full Story*](#)



Engineering students develop high-tech motorcycle safety device

Cars today increasingly are equipped with advanced technologies like automatic braking and blind spot detection. Why not develop something that increases the safety for motorcyclists too? That's how two recent engineering graduates came up with Jacket360, a motorcycle safety device that has received wide recognition recently at business pitch competitions.

[*Read Full Story*](#)



Entrepreneurial engineer wins \$10,000 award for software program

WMU mechanical engineering graduate student and student entrepreneur Joshua Teo was fast out of the gate. The Starting Gate, that is. Teo was awarded \$10,000 in the second annual Brian Patrick Thomas Entrepreneurial Spirit Award for his invention of Durabilika, an interactive cloud-based durability analysis software program called FatigueNet. The award is presented annually to a company involved in Starting Gate, WMU's student business accelerator, which provides a fast-track to launching a business.

[*Read Full Story*](#)



WMU's research on safety of older drivers garners national recognition

A recently completed research project on the "Evaluation of Michigan's Engineering Improvements for Older Drivers" has been selected as one of the top 16 transportation research projects in the nation for 2016. The research was funded by the Michigan Department of Transportation and was completed in 2015.

[*Read Full Story*](#)



Tsang's textbook applies
Algebra II to solve
engineering problems



Graduate students
trained on nondestructive
testing of infrastructure

PITCH

THE K.C. O'SHAUGHNESSY BUSINESS PITCH
COMPETITION AND SHOWCASE



Engineering students
earn top spots in
pitch competition



WMU wins bronze in
6th Stryker
Engineering Challenge



Kudos to
graduate grant
recipients



ALUMNI
SPOTLIGHT:
Jerome Beck

Upcoming Events



Send us YOUR news!



Copyright © 2016 Western Michigan University

College of Engineering and Applied Sciences, All rights reserved.

You are receiving this email because you gave your email address to Western Michigan University, our Alumni Association, or the College of Engineering and Applied Sciences and said it was OK for us to contact you. We don't send very much email, but if you'd prefer not to hear from us again, simply unsubscribe and we'll remove you from our lists.

WMU's 3D virtual labs provide hands-on learning around the world



The virtual world is a modern reality. It's the way pilots, doctors and machine operators are being trained today. Why not engineers as well?

WMU's Dr. Pnina Ari-Gur, of WMU'S Mechanical and Aerospace Engineering Department -- along with her research team -- have developed 3D virtual reality interactive lab experiments, which currently are in use at Western Michigan University and distributed to more than 100 institutions around the globe. Virtual laboratories sometimes are the only form of learning when students do not have access to physical experiments, she explained.

Following up with one of the schools using the virtual lab took WMU electrical engineering student Eric Pietrowicz to Brazil this spring during his junior year when he traveled to Instituto Federal de Maranhão

(IFMA) in São Luís. Pietrowicz -- who is from Byron Center, Mich., and is on Ari-Gur's research team -- met with students and professors at the Brazilian university who have been using the WMU 3D virtual laboratory.

"It was satisfying to see students half way across the world using and enjoying the software we developed," Pietrowicz said. "This trip also opened the possibility for collaboration with the university on projects moving forward."

Ari-Gur said the experiments provide students with a virtual hands-on learning experience that they would not otherwise have. "This type of learning especially appeals to the millennial generation who grew up with computer games," she said.

The 3D virtual lab project was funded through a grant from the National Science Foundation and two awards from Hewlett-Packard.

Working closely with professors at the university in Brazil, Pietrowicz demonstrated the virtual experiments and learned how the experiments will be used by their engineering students. He also visited the various departments who benefit from the virtual laboratory to gather feedback and talk about the development of the project. This insight will be used to make improvements to the virtual experiments.

During his free time, Pietrowicz traveled around the historic city of São Luís, learning about its rich culture. A city of about 1 million, São Luís is the capital of the state of Maranhão and is on the UNESCO World Heritage List.

Ari-Gur said she and her team look forward to further collaboration with Instituto Federal de Maranhão and continuous improvement of the virtual laboratory. Pietrowicz was invited back to Brazil and also will be presenting at a conference in Croatia in July.

Engineering students develop high-tech motorcycle safety device

Cars today increasingly are equipped with advanced technologies like automatic braking and blind spot detection. Why not develop something that increases the safety for motorcyclists too?

That's how two recent engineering graduates came up with Jacket360, a motorcycle safety device that has received wide recognition recently at business pitch competitions.

During their senior year, Electrical engineering graduate Cody Middleton and mechanical graduate Nicolas Theoret, conceived, designed, and pitched their product. The team won more than \$4,700 in two different competitions, including clinching the top spot at WMU's fourth annual K.C. O'Shaughnessy Business Pitch Competition and Showcase this spring.

The team received a \$1,700 award in the WMU competition, which will go toward building a prototype of Jacket360. They are refining their first prototype, which they expect to be complete this fall.

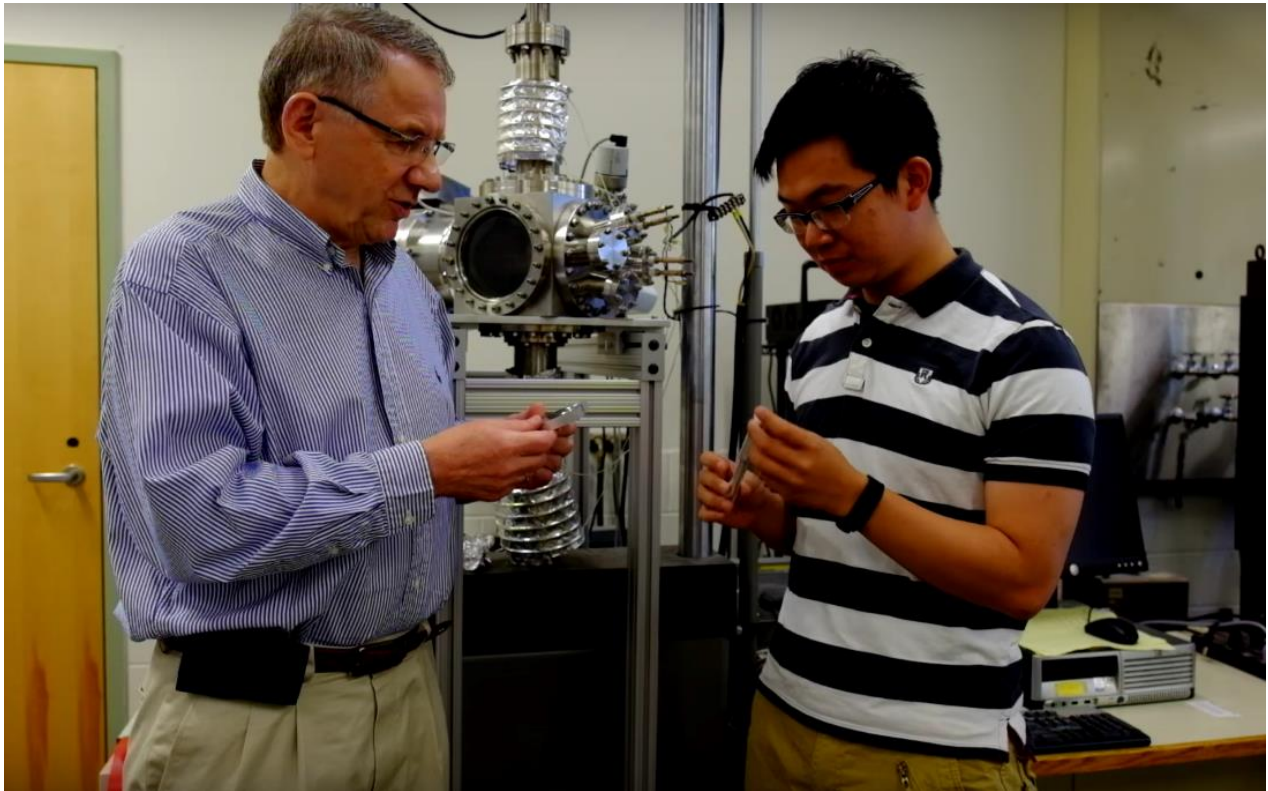
Advanced drivers assistance systems are increasingly commonplace today in the automobile industry. Middleton said he saw a need for similar systems in the motorcycle industry.

"The basic idea of Jacket360 is that it notifies motorcycle riders of their surroundings by monitoring blind spots," he said. And while the original design is oriented toward motorcycle riders, he and Theoret see the potential for wider applications of their product. "There are opportunities for our technology to save the lives of runners, snowboarders, longboarders, jet ski riders, and other recreational enthusiasts," Middleton said.

Jacket360 now is an LLC in the state of Michigan, owned by Middleton, from Grand Blanc, Mich., and Theoret, from Montreal, Canada. The two have been busy the last six months winning competitions and attending start-up events coast to coast – from Brooklyn, NY, to Las Vegas, Nev. Theoret will be representing Jacket360 at the San Francisco Lean Start Up Convention this fall.



Entrepreneurial engineer wins \$10,000 award



WMU mechanical engineering graduate student and student entrepreneur Joshua Teo was fast out of the gate. The Starting Gate, that is. Teo was awarded \$10,000 in the second annual Brian Patrick Thomas Entrepreneurial Spirit Award for his invention of Durabilika, an interactive cloud-based durability analysis software program called FatigueNet. The award is presented annually to a company involved in Starting Gate, WMU's student business accelerator, which provides a fast-track to launching a business.

Durabilika helps design engineers at manufacturing companies predict the service life of their products through cloud-based software. Teo created the software while he was an undergraduate and realized most products available were either extremely expensive, difficult to learn to use, or both. "I knew there had to be a better way to run a simple fatigue analysis," he said. Durabilika simplifies this type of software, helping users save time and money with low-risk payment plan options and making the product self-explanatory and easy-to-use. Durabilika was co-founded by Dr. Daniel Kujawski, professor of mechanical and aerospace engineering at WMU.

"We are honored to receive this award," Teo said. "It will enable us to continue to broaden our research on the product, making it even easier to access and use." The company plans to use the award to conduct research and keep improving the software.

Teo said in the next five years, he hopes Durabilika will be well-known as a simple cloud fatigue software for small and medium companies. By 2021, the company hopes to see sales revenue of \$5 million. “Our passion to assist manufacturers is what keeps us excited every day on this journey,” he said.

Brian Patrick Thomas, an alumnus of WMU who earned his degree in industrial marketing in 1996, is the former CEO Of OtterBox. His passion for entrepreneurial thinking and social entrepreneurship sparked his desire to establish the award to support student entrepreneurs. Thomas currently is co-owner and CEO of Jemez Technology, a software company focused on real-time perimeter detection and security for the country's critical infrastructure, monuments and national security assets.

WMU's research on safety of older drivers garners national recognition

A recently completed research project on the “Evaluation of Michigan’s Engineering Improvements for Older Drivers” has been selected as one of the top 16 transportation research projects in the nation for 2016. The research was funded by the Michigan Department of Transportation and was completed in 2015. The two-year research project, led by Dr. Valerian Kwigizile, WMU assistant professor of civil and construction engineering, evaluated the safety benefits of five engineering countermeasures implemented in Michigan since 2004. The five countermeasures – primarily for increasing the safety of older adults (age 65 and above) included: the use of Clearview fonts on guide signs (freeway and non-freeway), installation of box span traffic signals, installation of pedestrian countdown signals, use of fluorescent yellow sheeting on warning signs, and use of arrow-per-lane on guide signs. The research team also included Dr. Jun-Seok Oh, professor of civil and construction engineering, and Dr. Ron Van Houten, professor of psychology.



Field surveys of Michigan road users were coupled with extensive crash data analysis for the periods before and after the installation of countermeasures, to quantify safety benefits. A benefit-cost analysis was performed for each countermeasure. It was determined that each of the countermeasures improves safety for not only older adults, but road users of all ages.

Every January, the American Association of State Highway and Transportation Officials solicits states for recently completed research projects for submission as examples of “Transportation Excellence Through Research.” Each of the organization’s four regions then selects its top four research projects to form the “Sweet Sixteen” awards. Kwigizile’s research project will be showcased this summer at the organization’s summer meeting in July in Providence, Rhode Island, and at a poster session at the next Transportation Research Board annual meeting in Washington, D.C., in January 2017.

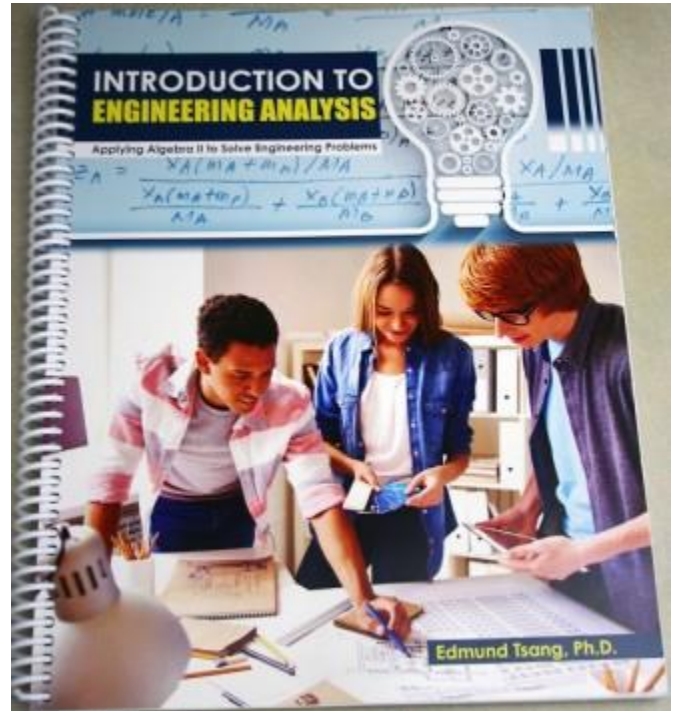
The Mid America Region 3 in which Kwigizile competed includes 10 states: Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Ohio and Wisconsin.



Tsang's textbook applies Algebra II to solve engineering problems

If you know Dr. Edmund Tsang, you know he has a grueling schedule and doesn't usually have spare time. But when Tsang, Associate Dean for Undergraduate Programs and Assessment, found himself in chemotherapy this past year with time to fill during his twice-weekly sessions, he wrote a textbook.

Introduction to Engineering Analysis: Applying Algebra II to Solve Engineering Problems was launched June 27 at the American Society for Engineering Education's annual conference in New Orleans. The textbook will be used this fall for freshman taking Introduction to Engineering Analysis and Algebra II concurrently.



In an effort to keep costs low for students, Tsang had not used a textbook in previous years. “I wanted materials for my classes to be free for students so I put everything online—course notes, video lectures, the assignments, and solutions,” Tsang said. “But there was student interest in having a textbook, too, and I thought, ‘why not?’” So he converted the online materials and video to print, to give students an option.

Tsang worked with publisher Kendall Hunt to ensure the cost of the textbook remained as low as possible. And he said if there is a demand, he may write a follow up textbook focused on applying pre-calculus to solve engineering problems.

Tsang has returned to work and is in remission. He'll be back teaching in the fall.

Graduate students trained on nondestructive testing of infrastructure

Of the 600,000 bridges in the United States, more than 25 percent of them are classified as functionally obsolete or structurally deficient. In addition, there are many tunnels, culverts, water and sewer pipes, transmission lines and power plants that are sub-standard.

Effectively managing a large network of infrastructure is a challenge to many state and local agencies, transit authorities and utility companies. Identifying the need for infrastructure assessment – and understanding current and future demands for those trained to assess the condition -- led Dr. Upul Attanayake, associate professor of civil and construction engineering, to develop a graduate course on Structural Systems and Assessment (CCE 6510).

Condition assessment plays a vital role in infrastructure management. Using state-of-the-art technology for condition assessment is essential to making cost-effective repair, rehabilitation or replacement decisions. However because of a lack of expertise available, there is limited use of nondestructive and durability testing in infrastructure management. This has created an unparalleled demand for civil engineers with knowledge of nondestructive and durability testing.

Attanayake's course, which covers these topics, also provides students with hands-on training in the laboratory. "Students make several visits to laboratories operated by consultants and equipment manufacturers," Attanayake said. "These visits allow students to relate what they learn in the classroom to real practice, providing practical training and networking opportunities, too."

Attanayake's most recent class visited Tourney Consulting Group in Kalamazoo, Mich. The company's work involves quantifying concrete durability and developing cost-effective, service-life solutions for concrete structures. Students also visited Germann Instruments in Chicago, Ill. Germann Instruments is a manufacturer of advanced state-of-the-art nondestructive testing equipment for evaluating concrete structures.



Engineering students earn top spots in pitch competition

Engineering students placed well in the WMU's K.C. O'Shaughnessy Business Pitch Competition and Showcase this spring, taking both first and third place with their products. Jacket360, pitched by Cody Middleton an electrical engineering graduate from Grand Blanc, Mich., and Nicolas Theoret, a mechanical engineering graduate from Montreal, Canada, took first place with their motorcycle safety device (see related story in this issue) and received a \$1,700 award. Trash Can Suction Solutions came in third place, pitched by Lukas Swoboda, an industrial and entrepreneurial engineering major from Kalamazoo. The team took third place and received an \$800 award. Partners on the team -- all industrial and entrepreneurial engineering majors -- included Amber Johnson from Sturgis, David Haruza from Kalamazoo and Nick Roe of Jackson. Their product is a one-way valve used to reduce the suction that is created in the bottom of trash bins. When a trash bag gets too full, it presses up against the sides, blocking airflow and creating a vacuum.



WMU wins bronze in 6th Stryker Engineering Challenge

A team of WMU engineering students finished third out of seven teams in the most recent Stryker Engineering Challenge held in April. WMU competed against teams from Notre Dame, the University of Michigan, Purdue and a team with members from several Michigan colleges. Notre Dame and the University of Michigan each fielded two teams.

The competition this year built on previous challenges and required students to construct remotely controlled vehicles to rescue 'victims' from a room-sized mockup of downtown Kalamazoo during a 'gas leak' disaster. Vehicles had to navigate various obstacles on their way to pick up and transport patients to a treatment area. Rescue vehicles could take advantage of magnetic safety vests worn by the victims. The teams built their designs in a marathon 12-hour session. The two teams from Notre Dame finished first and second in the competition. Winning team members earned a cash prize and a guaranteed interview with Stryker.

WMU team members were Jacob Ganzak, Nicholas Neppach, Zachary Reinke and Caleb Slater. Dr. Damon Miller coordinated their participation in this event.



Kudos to graduate grant recipients

Congratulations to our graduate engineering students who were awarded research and travel grants recently:

RESEARCH GRANT RECIPIENTS

- Mohammad Ali Abu Shattal, electrical and computer engineering

TRAVEL GRANT RECIPIENTS

- Ahmed J. Al Bayati, civil and construction engineering
- Bilge Nazli Altay, chemical and paper engineering
- Tyler W. Bayne, electrical and computer engineering
- Michael J. Joyce, chemical and paper engineering

Alumni Spotlight: Jerome Beck

Six months ago, Jerome Beck, his wife and three children moved to Brazil, where Beck is General Motors' director of powertrain manufacturing for South America. Beck received his bachelor's degree in mechanical engineering from WMU in 2000, and a master of science in engineering degree from Purdue in 2006. Read on about his career path, cultural adjustments and fond remembrances of WMU. He can be reached at jerome.beck@gm.com.

What has your career path been like since graduating from WMU's College of Engineering and Applied Sciences? Have there been any surprises along the way?

I would say that my career path has not been like most. I've been fortunate enough to work for the same company for all of the 16 years since I graduated from WMU. I started out as a manufacturing engineer in a General Motors Powertrain metal castings plant here in Michigan. During my career with GM, I've held numerous positions in manufacturing, maintenance and engineering that have given me experience in multiple facilities within Michigan and Ohio. Within the past year, I accepted an executive position leading Powertrain Manufacturing for South America, in Brazil. My family and I will be here for the next two to three years.



The advantage of working for a single, global company is that I've been able to forge a career path that follows my areas of interest, while also developing leadership skills and numerous professional relationships. Those relationships are with colleagues who have a wide variety of professional expertise and have directly impacted my professional growth.

Tell us a little about life in Brazil and whether there have been any big adjustments.

We are currently completing our first six months of living abroad. Personally, this has been a life-changing experience for my wife, our three children and me. We are extremely thankful for the opportunity to fully experience day-to-day life in such a beautiful country, with a culture that is so different from our own. There are challenges to settling into a new country and learning a new language, but we have also met and formed friendships with so many wonderful people already. Our children are in a bilingual school and unlike many international schools, about 85 percent of their classmates are Brazilian nationals. We appreciate that this opportunity is offering

our children a real immersion experience within the culture. This is an unexpected benefit my job has provided for our family.

I also feel that working in this country offers a tremendous opportunity for professional growth. Economically and governmentally, this is a difficult time for Brazil. The challenges we encounter on a regular basis are helping to push me out of my comfort zone, technically and culturally.

Did you have any specific preparation or training for an international assignment?

My family and I received cultural training (including our children) in the U.S. prior to our departure. We have all participated in at least two-three hours of Portuguese lessons a week for the past six months and will continue through the end of the year. There was also a lot of preparation needed to leave our U.S. home, sell cars, update medical verifications, and pack all of the necessities for a family of five. A lot of documentation was required for me to obtain a work visa and this process began several months prior to our departure.

What brought you to WMU's College of Engineering and Applied Sciences?

When I came to WMU, I had not decided on a major. Throughout high school, I was very interested in physics and spent my free time working on cars and small engines. I had a great advisor, Dr. Richard Hathaway, who encouraged me to apply those interests to pursue a mechanical engineering degree. I still find enjoyment in the work I do every day.

Describe your favorite Bronco moment.

I have many great memories and life-long friendships from my time at Western, but without a doubt, my favorite Bronco moment was meeting my wife, Heather, while we both lived in Fox Hall during our freshman year. We've been married now for almost 16 years. I also have fond memories of time spent under the tutelage of Dr. Koorosh Naghshineh, and of course, as I mentioned earlier, Dr. Hathaway.

Anything else we should know?

I've been able to use my mechanical engineering background to tackle complex technical challenges within Powertrain design and manufacturing. Outside of the technical aspects of engineering, the other skills I learned at WMU: critical thinking, problem solving, communication, and teamwork have been essential to my success within a global corporation.

Here's a quote I like from Mary Barra, CEO of GM. It's a philosophy I've embraced: She said, "Early in my career, I learned that when presented with a new opportunity – start with yes. Even if there are aspects of the position that aren't familiar, it's an excellent chance to develop and learn."