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## Inspire e-News 08-09 2016

College of Engineering and Applied Sciences

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[Read Full Story](#)



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[Read Full Story](#)



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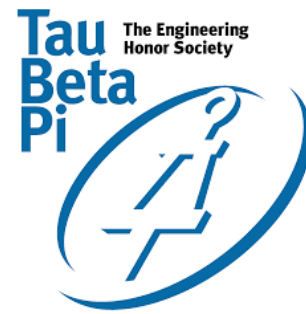
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Borders chapter  
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Engineers tie for first  
place at conference  
in Croatia



Tau Beta Pi chapter  
recognized  
for service



Ready  
to  
stampede?




ALUMNI  
SPOTLIGHT:  
Simone Abrams

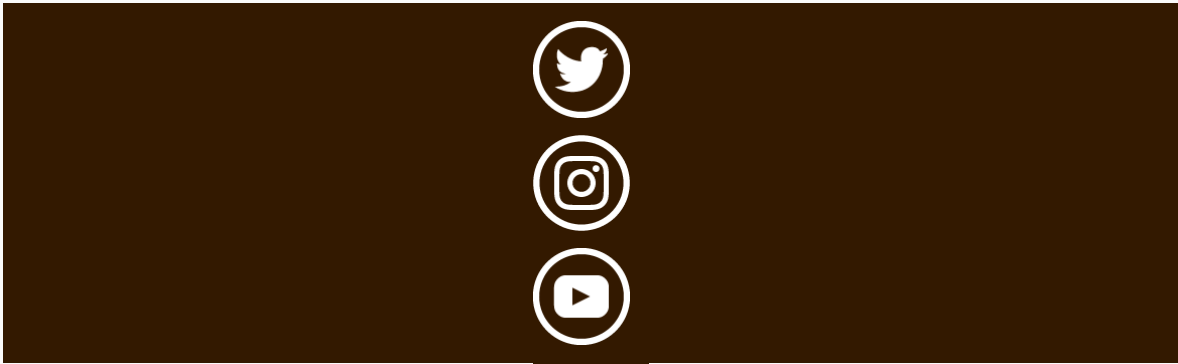


FACULTY  
FEATURE:  
Damon Miller

## Upcoming Events

 Send us YOUR news!





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Part of Fall Welcome activities, and hosted by STEP (STEM Talent Expansion Program), Passport Day is an annual event when all incoming freshmen and transfer students are invited to visit open labs, learn about opportunities in the college, meet new classmates, faculty and staff. Students receive a “passport,” which is stamped for each activity they attend and can earn them prizes. The event was started in 2011 as a way to acclimate students to the college. For the first time this year, international students also were included.



Dean Toutanji signing students' passports

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"The students enjoy the event and the faculty and staff of our college always look forward to hosting and welcoming our new students at the college," said Anetra Grice, STEP program manager and organizer of Passport Day. "Students roam the building visiting various labs and meeting our faculty and staff members. Some events are things to do and others are things to see. Our registered student organizations are also on hand to give demos and meet-and-greets for students who may be interested in joining."



According to data from previous Passport Day participants, students who attend the event have a statistically higher GPA than students who chose not to attend.

New students also are invited to a Kick-Off BBQ Sunday, Sept. 11 at 5 p.m. at the gazebo in the Valley Pond area.

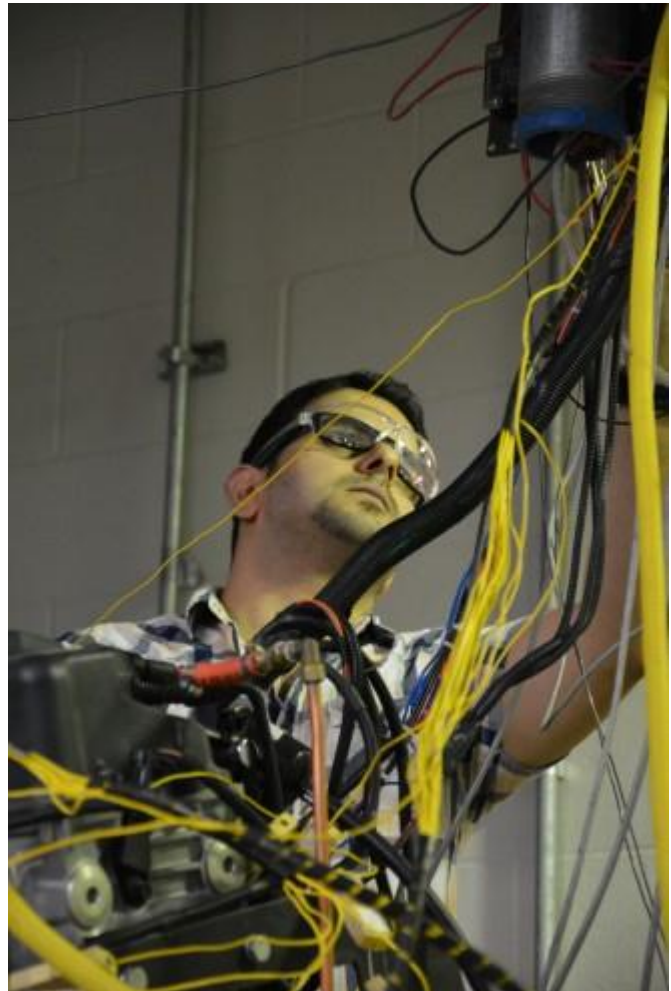
## Auto lab upgrades make it a premier teaching and research facility

WMU's Automotive Laboratory recently received \$400,000 in upgrades, making it one of the premier auto testing labs in southwest Michigan and an even more valuable resource for students, faculty and industry.

"With the significant new investment in the lab, we've greatly expanded its potential," said Dr. Claudia Fajardo, associate professor in mechanical and aerospace engineering who conducts research in the lab.

The lab provides hands-on opportunities for students to work with automobile systems and subsystems, learning how to understand, and improve upon, drive trains, power plants, steering systems, braking mechanisms and safety issues.

"Outside of a sophisticated university setting, the machinery our students use can only be found inside automotive companies themselves," Fajardo said. That equipment includes chassis dynamometers, fuels and lubricant test equipment and now, an engine test cell, equipped with engine dynamometers.



*The lab provides hands-on learning opportunities for students*

Undergraduate and graduate students interested in automotive-related courses and senior design projects have used the lab but previously were limited by the air flow system. The lab also is used by students for extracurricular projects such as building and maintaining the Society of Automotive Engineers (SAE) Formula SAE vehicle.

Formula SAE team manager Evan Weese, a senior in mechanical engineering, said the team already has plans to set up its engines in the new test cell. "Utilizing the newly installed

instrumentation will allow us to see results quickly and make changes accordingly,” he said. “The end product will be a more powerful, drivable and reliable engine.”

“We are excited about the improvements to the lab and broadening its usefulness to enrich our students’ experience,” Fajardo said. In addition to academic activities, the lab also supports industry-sponsored research projects. Collaborators in the past have included organizations such as DENSO, Toyota and the US Army’s Tank Automotive Research Development and Engineering Center.

“We now offer a modern facility to our research partners,” she said. “We have dedicated space for testing automotive components and systems. Our faculty has great expertise in wide-ranging engineering disciplines and our lab technicians are highly skilled.”

In addition to automotive manufacturers and suppliers, other groups that could benefit from testing and research at the lab include engine manufacturers and manufacturers and suppliers of motorcycles and recreational vehicles. “The lab will soon have powertrain data acquisition and control capabilities similar to that in industry,” said Dr. Richard Meyer, assistant professor of mechanical and aerospace engineering. “We’ll be able to validate powertrain models as well as explore how to best control them to, for example, reduce fuel usage and emissions.”

Fajardo noted that the improved lab offers great promise to advance the transportation industry as WMU collaborates with manufacturers to test and improve current and new technologies. “At the same time we are giving a new generation of engineers the practical experience and exposure to the automotive industry to make them versatile and successful in their fields,” she said.



## Rueshaber awarded prestigious NASA fellowship

WMU doctoral student Shawn Brueshaber is interested in planets. Very interested. And NASA noticed. Brueshaber, who is working on his Ph.D. in mechanical engineering, recently received a NASA Earth and Space Science Fellowship. Of the 180 applicants in the fellowship’s planetary science research division, he was one of only 28 selected to receive the \$30,000 annual award.

Brueshaber is studying the polar vortices of Jupiter, Saturn, Uranus and Neptune, looking at atmospheric and planetary variables and using numerical simulations to determine if a polar vortex is favored and the fluid dynamic characteristics of the vortices.

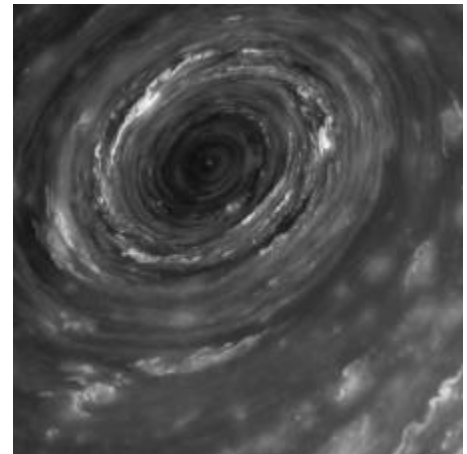
“Of all the vortices in the solar system, Saturn’s most resembles a terrestrial hurricane and may be fed by thunderstorms, like a hurricane on Earth,” Brueshaber explained. “It is probably a permanent feature despite being completely in shadow for seven years in winter and completely illuminated for a 7-year summer. Neptune, on the other hand, appears to have a large, warm-core, but transient polar vortex.”

He said Jupiter’s polar environment is a mystery. “Only one spacecraft and no ground-based telescope has ever clearly glimpsed Jupiter’s poles,” he said. “Some have predicted no polar vortex will exist there but the Juno spacecraft arriving this summer will solve the mystery.”

Why the differences in the polar atmospheric dynamics of these worlds? Brueshaber is looking at what combinations of planet size, rotation rate, and vertical temperature profiles favors or suppresses the emergence of a polar vortex.

Western Michigan University does not have an atmospheric science or planetary science department, making this particular NASA fellowship rather unusual for a WMU student. Brueshaber credits his advisor Dr. William W. Liou, professor of mechanical and aerospace engineering, for finding a way to fit his research interests into the doctoral program. Liou approached a planetary scientist at Hampton University in Virginia, who agreed to aid Brueshaber’s research.

“This work fits in nicely with what we do in the computational engineering physics lab,” Liou said. “Receiving this highly competitive fellowship is a reflection on Shawn’s rigorous work and dedication.”





## Sunseeker team looking forward to showcasing new solar car



The 2016 solar car team poses with their new solar car design

Western Michigan University has a new Sunseeker 2016 solar car and the team will be looking forward to competing in the American Solar Car Challenge's Formula Sun Grand Prix in 2017. The new vehicle was nearly ready to compete in Pittsburgh at the 2016 American Solar Car Challenge this summer, but did not overcome a slow start and unexpected hurdles. Since then, the team continues to refine and test the new car and demonstrate its progress and handiwork by participating in a rigorous schedule of events in Kalamazoo and throughout Michigan.

The car made appearances in August at the Red Barn Spectacular at the Gilmore Car Museum – the “Grand Daddy” of West Michigan car shows – and at the Woodward Dream Cruise in Detroit, a celebration that draws more than 1 million spectators each year. In the coming months, Sunseeker 2016 will be seen at many WMU and community events, including the Kalamazoo Holiday Parade. The team typically takes WMU's solar car to some 40 or more public and private events each year.

The WMU Sunseeker solar car team is comprised of a core group of about 20 to 30 students with many more supporting and lending a hand throughout the academic year. Student team members are predominantly from the College of Engineering and Applied Sciences, but it is open to all

WMU students and academic disciplines. While the 2015-16 team had a slow start and bumpy road in developing a new car -- and when completing a car appeared impossible a few months before summer racing -- the team got to the finish line in building it.

“This amazing group of students worked tirelessly to build, integrate, troubleshoot, and complete a fully operational new vehicle,” said Dr. Brad Bazuin, associate professor of electrical and computer engineering and faculty advisor for the team. Unfortunately, the team and completed car ran out of time to pass all required testing and qualifications to race in 2016.

“Everything about the new car has changed from the previous car,” Bazuin said. “Every major subsystem of the car has been modified. The tires and wheels are different, the body is different. There are significant electrical upgrades, a new driver’s compartment and a more aerodynamic design.” The car also features a new battery based on the same lithium ion cells that Tesla uses in the company’s electric cars.

“The students are excited to showcase their car in the community,” Bazuin said. Look for the car at Bronco Bash on Sept. 9, the Engineering Expo on Sept. 21 and WMU’s Homecoming Stampede Tailgate Oct. 8. The team also plans to visit sponsors and donors to thank them for their generous support and expects to go on numerous test drives throughout southwest Michigan this coming spring and early summer, preparing to race in 2017. A complete list of sponsors can be found at [www.wmich.edu/sunseeker/sponsors](http://www.wmich.edu/sunseeker/sponsors).

## Engineers Without Borders chapter re-established at WMU

Western Michigan University has successfully reinstated an Engineers Without Borders student chapter with the hope of involving the campus community and improving the lives of people around the world for many years to come.

Engineers Without Borders USA began with an idea: connect engineers with a developing community that has specific infrastructure needs and help it design a sustainable solution. Since its inception in 2002, Engineers Without Borders USA has grown from a handful of passionate individuals to an organization of more than 16,800 members. Those members included an active Western Michigan University student chapter between 2005-10. WMU students partnered with the Lansing professional chapter and the student chapter from Michigan State University on a project in San Carlos, Honduras. Their mission was to bring clean water into approximately 100 homes throughout the mountainous village.

“We are excited about having a nationally recognized chapter here again at Western,” said Eric Pietrowicz, a senior in electrical and computer engineering and vice president of the chapter. “We invite students both inside and outside the college to help us have an impact on communities both locally and internationally.”



Chapter president Matt Van Ness, a senior in chemical engineering, said the chapter has a need for students experienced in grant writing, non-profit leadership and fundraising, web design and public relations, among other skills. “We are looking forward to reaching across departmental lines to work with students of many different disciplines and backgrounds,” he said.

Engineers Without Borders has had an impact on more than 2.5 million lives around the world. Its vast network of dedicated volunteers, ranging from first-year engineering students to engineering professionals to public health workers, partners directly with communities on projects to meet each community’s self-identified needs.

For more information send the chapter an email at [ewb.wmich@gmail.com](mailto:ewb.wmich@gmail.com) or visit the group’s Facebook page – Engineers Without Borders WMU Chapter.

## Engineers tie for first place at conference in Croatia

Two WMU engineering students traveled this summer to Josip Juraj Strossmayer University of Osijek, Croatia, to attend the International Summer Conference of Civil Engineering Students. Tyler Bayne and Eric Pietrowicz have been working with Dr. Pnina Ari-Gur, professor of mechanical and aerospace engineering, on her National Science Foundation (NSF) research grant, and tied for the first place prize at the conference with their presentations of 3D virtual laboratory projects.



Bayne, a recent WMU graduate with an M.S. in computer engineering, presented a virtual concrete compression test. Pietrowicz, a senior in electrical engineering, presented a virtual asphalt viscosity test. Bayne’s travel was supported by a graduate travel grant he earned from WMU’s graduate college, while Pietrowicz’s travel was assisted by funds from Ari-Gur’s research, the College of Engineering and Applied Sciences, and the Office of the Vice President for Research.

The complete set of interactive virtual laboratories was developed by a team directed by Ari-Gur and was supported by two research grants from Hewlett Packard, in addition to the award from NSF. The virtual laboratories were integrated into the coursework at WMU and distributed to more than 110 institutions in the U.S. and around the globe. Both Bayne and Pietrowicz received Undergraduate Research Excellence Awards for their work with the 3D virtual laboratory project.



The civil engineering conference attracted attendees from six different countries and included many activities around the city of Osijek, including a historical tour and cultural night featuring traditional foods and entertainment from each country. “It was a fantastic week-long experience for us and we made many new friends,” Bayne said.

Pietrowicz said it was an honor to represent Western and encouraged other WMU students to attend the conference in the future and present their civil engineering related projects.

## Tau Beta Pi chapter recognized for service

In recognition of “three years of outstanding service and activities,” WMU’s Tau Beta Pi chapter was awarded funds by the national organization to support The Tau Beta Pi Scholarship for Michigan Kappa. Only 19 chapters across the country earned this distinction. The College of Engineering and Applied Sciences and the local chapter will provide matching funds to enable offering two such scholarships this fall. This is the second time that the chapter has been awarded this scholarship, the first having been awarded to Erika Fojtik in spring 2015. [Tau Beta Pi](#) is an honor society that recognizes “distinguished scholarship and exemplary character” among students from all fields of engineering.



## Ready to stampede?



Hey Broncos! Are you ready to stampede? The WMU Homecoming and Family Weekend Stampede Tailgate is scheduled for Saturday, Oct. 8 and all alumni, faculty and staff, students and Bronco supporters in the community are invited to attend. Be sure to stop in at the College of Engineering and Applied Sciences tent to catch up with other alumni, friends and faculty, see the concept vehicles and other exciting demonstrations.

The official Stampede Pre-Game Tailgate is expected to draw nearly 5,000 alumni and fans to campus before the Broncos take on the Northern Illinois Huskies in WMU's 93rd Homecoming game! For the third year, all academic colleges, athletic groups, and visiting families will gather in the same pre-game location in Lot 1 (and Heritage Hall). The tailgate includes:

- An unlimited grilled hot dog and brat buffet with assorted sides
- Bronco inspired brews and wines available to purchase in the Beer Garden
- Live entertainment, including two bands, a special musical theatre performance, and the Bronco Marching Band
- Fun, Interactive activities for the entire family, including caricature artist, football toss, carnival rides, and a scavenger hunt
- WMU colleges and programs at Campus Alley, including flight simulators, concept vehicles, photo booths, and much more
- Inside Heritage Hall, we are proud to feature history tours, a magician, and improv show

## **Date and Time**

### **Saturday, October 8**

3:30 p.m. to 6 p.m. – WMU Pre-Game Stampede Tailgate

6:30 p.m. – WMU vs. Northern Illinois kickoff

## **Location**

Lot 1, located off Oakland Drive

## **Admission**

Adult: \$15\*; Children (12 and under): \$5\*. Pre-registration is strongly encouraged

\*additional online processing fees applied

Admission to the Stampede Tailgate and game tickets can be purchased by calling the Bronco Ticket Office at 1-888-4-WMU-TIX or by clicking [here](#) to access the online ticket portal.

## **Parking**

For guest convenience, a shuttle will run from the Lawson Ice Arena parking lots (lots 63, 64, and 70) and drop guests off near the tailgate entrance on Oakland Drive. Guests are strongly encouraged to use this shuttle service. Handicap parking will be available in lots 4 and 6.

If you have any questions, please email Chris Praedel at [chris.praedel@wmich.edu](mailto:chris.praedel@wmich.edu) or call the MyWMU Concierge at (269) 387-8746 (available Monday–Friday, from 8 a.m. to 5 p.m.).



## Alumni Spotlight: Simone Abrams

Simone Abrams is a project engineer for FedEx and lives in southeast Michigan. A 1990 graduate with a bachelor's degree in manufacturing engineering, Abrams has been with FedEx for 22 years. Her connection to the college has remained strong as she has served as a mentor and top-rated guest speaker in the college's Women and Leadership in Engineering and Applied Sciences course. In fact, one student said Abrams and her presentation were the single most valuable takeaway from her time in the course. Abrams has a fun-loving, 10-year-old daughter Zoie, who has special needs. She said, "Our life is very full however I make sure to take time for the fun things in life such as traveling, golfing, and spending time with family!" Abrams can be contacted at [sabrams@fedex.com](mailto:sabrams@fedex.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?**

My first job opportunity was at Denso Manufacturing in Battle Creek as a manufacturing engineer. I remained at Denso for five years then moved on to work for FedEx where I've been for 22 years. At FedEx, I've held various engineering positions from project engineer to engineering manager as well as working at FedEx worldwide headquarters in Memphis, Tenn. Currently, I support field operations in Michigan as a project engineer.

As for surprises--only good ones! I was surprised to find that I truly enjoy core industrial engineering practices such as methods and standards (time studies) as well as improving processes for efficiency. I was quite shy and quiet as a student, never imagining I would work in a capacity in which communicating and working with the human factors of engineering would now be my passion.



### **What are you passionate about in your work?**

Sometimes people think engineers don't have much of a personality and that we're there to make their jobs more difficult by bringing on change. Knowing this, I am very passionate about my job, realizing that what I do impacts others. If someone has an issue with their job function and I can troubleshoot and offer recommendations to improve it, it's a good feeling. After 27 years in an industrial engineering capacity, I must say that I love my job--everything from developing operational plans to forecasting to finding ways to improve!

### **What advice would you give young women looking to pursue a degree in engineering?**

If a young woman desires to pursue engineering, my first advice would be no different than to any other person—that is, determine what engineering discipline fits your personality or strengths. As I've told students in WMU's Women and Leadership in Engineering course, women also need to feel confident in their abilities to be an engineer. As we know, engineering is predominately a male-oriented field. We even see that in the classroom. Women have to remain inspired about what they can offer a company and be confident about being able to do the job. That's my single most crucial advice ...have confidence in your abilities.

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

I studied architectural, civil and construction engineering at Cass Technical High School in Detroit. I initially planned to pursue civil engineering but my fascination with processes drew me to manufacturing engineering instead. I can remember touring an automotive factory when I was younger as my dad was employed at General Motors. I was truly enthralled seeing the assembly line concept—the process of starting with single components and then watching an automobile driven off the line as a finished product. I knew my career one day would be something in the field of engineering.

### **Describe your favorite Bronco moment.**

My recent visit a couple of years ago was actually a very rewarding Bronco moment. I was visiting campus (after 20 years) to speak at a class at the college. My young daughter was with me and I loved being able to show her where I attended college. I saw how much the campus--and particularly the College of Engineering--had changed. I was so proud to be a WMU Bronco that as I was leaving campus, I stopped by the campus store and purchased as many Bronco items that I could. My favorite is my 'WMU Broncos' vehicle license plate frame.

### **Anything else we should know?**

Having this opportunity to share with everyone my story and hopefully to 'Inspire' someone else to become an engineer gives me great pleasure. I mentored a Western student last year and the experience was just as rewarding for me. I continue to realize that 'InSPIRING' someone else in return 'InSPIRES' me. Thank you for this wonderful opportunity!

### **Getting to know you: Damon Miller**

Dr. Damon Miller spent a lot of time taking apart and building radios when he was a kid. It's no wonder he's now an associate professor of electrical and computer engineering and still building electronic circuits – but now to support his work in neural networks and chaotic systems.



“No doubt I was meant to be an electrical engineer,” Miller said. “I didn’t know what electrical engineering was at the time ... but I really liked taking things apart and seeing how they work.”

Miller joined the Western Michigan University faculty in 1997 after finishing his doctorate in computer science and engineering at the University of Louisville. He previously worked at GE Aerospace (now Lockheed Martin) in the Philadelphia area for several years after completing his bachelor’s degree in engineering science and master’s degree in electrical engineering at Louisville.

“I remember when I went to freshman orientation, they told us to look at the person on the left of us and the person on the right, and that only one of us would make it through the program,” he said. The first in his family to graduate from college, Miller admitted it was challenging. Engineering students at Louisville attended school year-round, including three required co-ops.

Now at WMU for nearly 20 years, Miller said it still feels new. “I love working closely with students in the lab, and on their senior design and research projects. I’m always learning.” His passion is electrical circuit theory and he enjoys sharing his knowledge in the classroom. For the past 10 years, he also has been the advisor for the WMU chapter of Tau Beta Pi, the engineering honor society. He said advising the Tau Beta Pi chapter has allowed him to get to know many students outside the electrical and computer engineering department.

“These are the best students in the college,” he said. “I’m continually impressed by them. I can’t believe what they accomplish inside and outside the classroom. They have jobs, they get fantastic grades and they are very active in the community.”

WMU’s Tau Beta Pi chapter has been recognized many times by its national headquarters for its numerous community service projects.

In addition to his fascination with nonlinear circuit theory, Miller’s research interests also include neural networks -- looking at the mechanisms of how nervous systems work and how the concepts can be applied to engineering systems.

“The wonderful thing about electrical and computer engineering is that our theory works very well,” he said. “We can make very accurate predictions about complex systems and then go out and build them to perform in the real world.”

When he’s not teaching or doing research, Miller enjoys spending time with his wife and three children – a son in fifth grade and daughters in seventh and 10<sup>th</sup> grades. Born and raised in Kentucky, he enjoys the outdoors, basketball, studying praying mantises and collecting old vacuum tube radios. He can be reached at [damon.miller@wmich.edu](mailto:damon.miller@wmich.edu).