ME-EM eNewsBrief, June 2017

Department of Mechanical Engineering-Engineering Mechanics, Michigan Technological University

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Greetings from William (Bill) Predebon, Chair, Department of Mechanical Engineering-Engineering Mechanics at Michigan Tech. For the latest news and info about our faculty, students and staff, please visit our website at www.mtu.edu/mechanical. Visit us on Facebook, MEEM.

### Upcoming Events

**ME-EM Reunion Scholarship Cruise.**

Come join us for an afternoon cruise down the Portage Canal on the Ranger III on Thursday, August 3, 2017. We depart at 1:00 p.m. and will return at 3:30 p.m. (plenty of time to attend the Pasty Picnic). Cost of the cruise is $35 per person which covers the ticket for the Ranger and a $15 donation to a department scholarship. Food and beer, wine, water and soda are compliments of the ME-EM Department. Please contact Alumni Relations at 906-487-2400 or register at [Cruise](#).

MTU Graduate Students of Professor Jim Gerdeen will be getting together during the 2017 reunion on Thursday August 3, 2017 in ME-EM room 1021 from 10 am-11:30 am for a sharing time. Please let Dr. Gerdeen know if you will be attending. [jimg55esky@mediacombb.net](mailto:jimg55esky@mediacombb.net) or cell 417 861-9179.

### ME-EM Department Chair Travel

When on travel for the Department, Dr. Predebon visits with alumni to get their feedback on our programs and their career, and to give an update on the Department and the University. Please let the Department know if you would be available for a visit when he is in your area. (906) 487-2551. Dr. Predebon will be traveling to the following cities later this summer:

- July 12 to July 14 – Coeur d’Alene Idaho for the ASME Board of Governors Retreat as a member of the Strategic Advisory Committee
- Week of July 17th—Detroit, MI for Corporate Alumni Events
At its regular meeting on Friday, April 28, 2017, the Board of Trustees promoted the following ME-EM faculty members:

Dr. Jason R Blough was promoted from associate professor with tenure to professor with tenure. He is the Director of the Design Dynamic Systems Area, Clean Snowmobile Team Faculty Advisor, and SAE Faculty Advisor. Dr. Blough’s research includes dynamic measurement problems, developing new digital signal processing algorithms to understand NVH type problems and ways to improve the NVH characteristics of virtually any machine. He has made measurements on items as small as individual turbine blades to items as large as 45m diameter radio telescopes and many machines in between including automobiles, snowmobiles, MI tanks, locomotives, and appliances. He has worked on automotive and snowmobile powertrains and other vehicle components to make them quieter. Currently, he is researching the implementation of active noise control systems in passenger vehicles. Visit his website.

Dr. Nina Mahmoudian was promoted from assistant professor to associate professor with tenure. Dr. Mahmoudian is the founding director of the Nonlinear and Autonomous Systems Laboratory (NAS Lab). Her research interests lie in the area of robotics, energy autonomy, system design, dynamics and controls. Mahmoudian is working to build a road map to achieve robust continuous autonomy that advances unmanned systems ability to perform autonomous long-term missions. She works on developing analytical and computational tools for the cooperative control of a network of autonomous vehicles in complex environment using nonlinear control and stochastic analysis. Her research approach combines fundamental research with applied research to facilitate a seamless transition between academic modeling/simulation problem-solving approaches and real-world applications in air, on ground, and under sea. Visit her website.

Dr. Mahdi Shahbakhti was promoted from associate professor to associate professor with tenure. Dr. Shahbakhti’s research at Michigan Tech focuses on increasing efficiency of energy systems through utilization of advanced control techniques. His current research involves the transportation and building sectors which account for 68% of total consumed energy in the United States. Dr. Shahbakhti’s research to optimize efficiency of energy systems centers on developing and incorporating the following research areas: thermo-kinetic physical modeling, model order reduction, grey-box modeling, adaptive parameter estimation, model-based and nonlinear controls. Visit his website.

Dr. Kazuya Tajiri was promoted from assistant professor to associate professor with tenure. He is the director of the Multiscale Transport Process Laboratory (MTPL) and is the SAE Aero faculty advisor. His research interests include transport phenomena in multiscale/multiphase systems, thermo-fluid system diagnostics, modeling, and optimization, polymer electrolyte fuel cells for automotive application, renewable energy and combustion dynamics modeling. At present his two main research objectives are electrochemical devices for energy conversion and unsteady flow systems for propulsion / energy conversion. Visit his website.

Alumni and Friends News, Accomplishments & Awards

Jeffrey C. Decker (BSME ’09) and his wife Cara (Hanson) Decker (BS ’10) visited six continents and 23 countries, spending the past year on a grand tour of the planet. Read about it here.

John L. Drake (BSME ’64) has been selected to receive the Board of Control Silver Medal at the Alumni Reunion Awards Dinner on August 4. The award recognizes people who, through personal and professional achievement, are outstanding examples to Michigan Tech’s more recent graduates.

Denise M. Rizzo, (PhD ‘14) received the 2017 J. Cordell Breed Award for Women Leaders at the SAE World Congress in Detroit in April. Denise is a Research and Mechanical Engineer, Powertrain Modeling and Simulation, at the U.S. Army Tank Automotive Research Development and Engineering Center.
endowment from MTS Systems Corp. The Endowment honors Jim and Bob Lally, founders of PCB Piezotronics, a high-technology sensor company headquartered in the Buffalo suburb of Depew, New York. The company was recently acquired by MTS Systems, a Minnesota-based supplier of test systems and industrial position sensors. Read the story, WLUC TV6/UpperMichiganSource reported on the gift here along with WSFA-TV (Montgomery, Alabama), WSIL-TV (Cartersville, Illinois) and numerous other television stations all over the country.

The Michigan Tech (ME-EM) Mobile Lab traveled to TARDEC in Warren Michigan the beginning of May to deliver six professional development short courses in Instrumentation and Experimentation, Hybrid Electric Vehicles and High Voltage Safety. Classes involve a mix of direction, instruction, hands-on activities, demonstrations and lab exercises. Instructors are Jeremy Worm (instructor and research engineer, ME-EM), Chris Morgan (instructor and research engineer, ME-EM), Darrell Robinette (associate professor, ME-EM), Lucia Gauchia (assistant professor, ME-EM & ECE), and Wayne Weaver (associate professor, ECE).

The Department of Mechanical Engineering—Engineering Mechanics for the second year in a row hosted high school students from Houghton, Calumet, and Lake Linden in June at a Robotics Machining Workshop. The workshop was developed by Martin Toth and Michael Goldsworthy (both senior design training specialists, ME-EM). Read the article.

New Faculty

**Dr. Parisa Pour Shahid Saeed Abadi**

Dr. Parisa Pour Shahid Saeed Abadi joins the ME-EM faculty this fall as an Assistant Professor. She received her PhD in mechanical engineering from Georgia Institute of Technology in 2009, her MS in mechanical engineering from State University of New York at Buffalo in 2006, and her BS in aerospace engineering from Sharif University of Technology, Tehran, Iran in 2006. Prior to joining Michigan Tech, she was an NIH Postdoctoral Research Fellow at Harvard-MIT Division of Health Sciences and Technology, Harvard Medical School, Brigham and Women’s Hospital. Her research interests are in the areas of mechanical behavior of materials and their applications in tissue engineering and medical devices. She received a postdoctoral research fellowship from the American Association of University Women in 2015 and was a Visiting Assistant Professor in the department of Mechanical Engineering at Stevens Institute of Technology in 2013-2014. Visit her website.

**Dr. Hassan Masoud**

Dr. Hassan Masoud joins the ME-EM faculty this fall as an Assistant Professor. He received his PhD in mechanical engineering from Georgia Institute of Technology in 2012, MS in mechanical engineering from State University of New York at Buffalo and BS in aerospace engineering from Sharif University of Technology in 2009. Prior to coming to Michigan Tech he was an assistant professor at the University of Nevada, Reno for two years. He was a lecturer at Princeton University and a post-doctoral fellow working jointly with Michael Shelley at the Courant Institute of Mathematical Sciences and Howard Stone at Princeton University. Dr. Masoud leads the Complex Fluids and Active Matter Lab, where he and his team employ the tools of applied mathematics and simple experiments to fundamentally understand the interaction of fluid flows with dynamically changing boundaries at a wide range of length and time scales. Their goal is to integrate the acquired fundamental understanding with engineering ideas to address outstanding technological and societal problems. Dr. Masoud currently serves as an associate editor of European Journal of Computational Mechanics. Visit his website.
## Faculty/Staff Awards/ Accomplishments

On Tuesday, May 9th, the following ME-EM faculty members were recognized at an awards dinner recognizing their service to Michigan Tech.

**Dr. John Beard**
(associate professor), 25 years

**Dr. Gopal Jayaraman**
(professor, retired), 35 Years

**Dr. Nina Mahmoudian** (associate professor, ME-EM) and Donna Fard (PhD student, ME-EM) were selected to celebrate National Robotics Week by from University Marketing and Communications. They hosted a live lab tour of the Nonlinear and Autonomous Systems Lab and talked about their research followed by students demonstrating robots they designed to better navigate an obstacle course in the lab.

**Dr. CK Choi** (associate professor, ME-EM) was selected by the Vice President for Research Office to receive the Portage Health Foundation Mid-Career award, a 2017 REF award.

The Seattle Post-Intelligencer and other news outlets around the country reported on the winners of the John Johnson Award for Outstanding Research in Diesel Engines. Dr. John H. Johnson (Presidential Professor, ME-EM), is a renowned expert in the field of diesel engines.

**Dr. Scott Miers** (associate professor, ME-EM) was one of four Michigan Tech faculty members nominated for the Outstanding Faculty Award. The award is given by the Order of Omega, the Greek Life Honor Society. Fraternity and Sorority students nominate and vote on the candidates. The award recognizes faculty who are dedicated to supporting students and helping them succeed academically, demonstrate a passion for teaching and/or research, utilize innovative teaching methods, and promote academic integrity among students.

Dr. Scott Miers was the recipient of the 2017 Distinguished Teaching Award in the professor/associate professor category. Read about it [here](#).

**Dr. Mo Rastgaar** (associate professor, ME-EM) has his research on artificial ankles highlighted in Orthopedic Design and Technology. Read the [article](#).

**Dr. Darrell Robinette** (assistant professor, ME-EM) was highlighted in an article about transmissions in Car Magazine. He is developing an 11-speed triple clutch transmission jointly with GM. [Lubrizol Additives 360](#) also covered his research.

**Dr. Mark Vaughn** (research professor, ME-EM) has received a patent on a push plate, mounting assembly, circuit board, and method of assembly for Ball Grid Array Packages.

## Current Contracts & Grants

<table>
<thead>
<tr>
<th>Contractor</th>
<th>Project Title</th>
<th>Sponsor</th>
<th>Award Amount</th>
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<tbody>
<tr>
<td>Barnard, Andrew (PI, ME-EM); “Carbon Nanotube Speaker for Exhaust Active Noise Control”; sponsor: Fau-</td>
<td>“ICORPS: Software for Aircraft Analysis Design”; sponsor: National Science Foundation; total award amount:</td>
<td>$154,037.</td>
<td></td>
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<tr>
<td>Blough, Jason R. (PI, ME-EM), DeClerck, Jim and Van Karsen, Chuck (Co-PI, ME-EM); “Fixture Design and Damage Potential”; sponsor: Honeywell Federal Manufacturing &amp; Technologies, LLC; total award amount:</td>
<td>$54,930.</td>
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<tr>
<td>Blough, Jason R. (PI, ME-EM); “Evaluation of Additive Manufactured Part Integrity”; sponsor: Honeywell Federal Manufacturing &amp; Technologies LLC; total award amount:</td>
<td>$30,000.</td>
<td></td>
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<tr>
<td>Cai, Chunpei (PI, ME-EM); “ICORPS: Software for Aircraft Analysis Design”; sponsor: National Science Foundation; total award amount:</td>
<td>$30,000.</td>
<td></td>
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<td>King, L. Brad (PI, ME-EM); “Stratus Meteorological CubeSat: Payload Integration and Mission Level Design”; sponsor: University of Michigan, Michigan Space Grant Consortium; total award amount:</td>
<td>$5,000.</td>
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<td></td>
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<td>Miers, Scott (PI, ME-EM); “Performance and Emissions Evaluation of a Yamaha Engine”; sponsor: Yamaha Motor Corporation; total award amount:</td>
<td>$9,935.</td>
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<td></td>
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<tr>
<td>Morgan, Chris (PI, ME-EM), Robinette, Darrell and Worm, Jeremy (Co-PIs, ME-EM); “Delivery of Professional Development Courses in Propulsion Systems”; sponsor: US Dept of Defense, TARDEC; total award amount:</td>
<td>$115,000.</td>
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<td>Naber, Jeffrey (PI, ME-EM); “Proposal for Use of 2014 Unspent Funds in Support of Charters 12249 and 13187”; sponsor: Ford Motor Company; total award amount:</td>
<td>$31,854.</td>
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<td></td>
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</tbody>
</table>
Current Contracts and Grants Continued

Odegard, Gregory M. (PI, ME-EM), Sain, Trisha (Co-PI, ME-EM), Pandi, Ravi (Co-PI, Physics), and King, Julia (Co-PI, Chem Eng); “Institute for Ultra-Strong Composites by Computational Design (US-COMP)”; sponsor: National Aeronautics and Space Administration; total award amount: $1,000,000 for the first year, $15,000,000 over 5 years. Michigan Tech leads this prestigious award with the first year, $15,000,000 over 5 years. Michigan Tech was ranked 14th in the overall ranking of the 250 top public colleges and universities for the financial aid it offers students.

Robinette, Darrell (PI, ME-EM) and Blough, Jason R. (Co-PI, ME-EM); “Development of Dynamic Torsional Measurement Capability Using Hybrid Electric Motor - Year 2”; sponsor: General Motors Holdings, LLC; total award amount: $92,457.

van Susante, Paul (PI, ME-EM); “IN-SiTU Resource Utilization (ISRU) on Mars”; sponsor: Jet Propulsion Laboratory; total award amount: $34,999.

University News/Awards

The Michigan Tech Spring Career Fair was mentioned in a Detroit Free Press article. See here.

Michigan Tech was ranked 110 nationally and third in the state as offering their students the best educational experiences by Business First. 499 public colleges and universities were ranked. Read the article.

Michigan Tech was ranked first in Michigan and 24th in the nation (out of 1,800 colleges and universities rated) for annual return on investment (ROI) by Payscale.com yesterday. Read the article.

In a ranking done by CNBC based off the Payscale.com analysis, Michigan Tech was ranked 14th of the 25 public colleges and universities that offer the highest ROI. Yahoo finance and other news outlets also reported on the study.

The Traverse City Record Eagle published an op-ed calling on the Michigan legislature to fund higher education if it wants to return the state to prosperity. The op-ed cited a recent survey of Michigan Tech graduates which showed that the state income tax paid by just one class of graduates more than offset the state appropriations received by the University. See the article here.

Michigan Tech was ranked sixth of the top 25 colleges and universities in the state by CollegeChoice.net, a website for prospective college students and their families.

Michigan Tech ranked second (out of the top ten ranked) in the state in SmartAsset’s latest Best Value Colleges report. The ranking was based on tuition, living expenses, scholarships awarded, retention rate and graduates’ average starting salaries.

Student Loan Report (SLR), a website that tracks student loan and financial aid information, has ranked Michigan Tech 53rd among the 250 top public colleges and universities for the financial aid it offers students.

The Michigan Tech hockey team will play in the first ever Ice Vegas Invitational College Hockey tournament in Las Vegas on January 5-6, 2018, in T-Mobile Arena, home of the Vegas Golden Knights, the Las Vegas NHL franchise that will begin play in the 2017-18 season.

The ABET newsletter published an article titled "Spotlight - Leonard Bohmann." Dr. Bohmann is associate dean of Michigan Tech’s College of Engineering. ABET is an organization that accredits engineering and applied technology schools and programs. See here.

Michigan Tech was named one of the 2017 Top Online Colleges for Women in STEM by SR Education Group, an online education research publisher.

Area News

Houghton was ranked tied for first in "Highest College-Hockey Fan Engagement", fourth for "Highest College Hockey-Stadium Capacity" and fifth in "Best-Performing NCAA Teams by WalletHub’s rankings for the Best US Cities for Hockey Fans, and Houghton was 23rd on the overall ranking and the first non-NHL city mentioned.
Student Competitions and Team Awards

The Aerospace Enterprise is sending off Oculus-ASR, a microsatellite launching next year as part of an Air Force mission to better track objects in space after a multitude of delays. A team on 25 undergraduate students won the University Nanosat 6 competition to launch their satellite in 2011. Dr. Lyon B. King (professor, ME-EM) is their advisor. Read the full story.

Michigan Tech was one of only 8 universities selected to participate in the SAE/GM Auto-Drive Challenge. The announcement was made on Wednesday, April 5, 2017 at the 2017 SAE World Congress held in Detroit. Media carrying the story included Michigan Tech News, Detroit Business, engadget, Clean Technica, and Hybrid Cars.

The Michigan Tech Concrete Canoe team took first place in the North Central regional competition held April 8th and 9th at Lawrence Technological University in Southfield, Michigan. The team consists of 35 students enrolled in 8 different majors including Mechanical Engineering. Read the article.

Nick Dubiel (sr, ME-EM) and Morgan Crocker (Scientific and Technical Communications) took the $30,000 first prize in the New Venture Competition, held in March at Central Michigan University. The competition was hosted by CMU and co-sponsored by the Innovation Center for Entrepreneurship in Michigan Tech’s Pavlis Honors College. A total of 29 student teams, 24 from Central Michigan, four from Michigan Tech, and one team with members from both schools competed, competed for more than $77,000 that was awarded to seven different teams. Read the article.

The SENSE (Strategic Education through Naval Systems Experiences) Enterprise attended a two-day conference on new life-saving technologies for the Great Lakes in April in Sheboygan, WI. Their research on developing a drone to help save lives was highlighted in the Milwaukee Journal-Sentinel.

Student Accomplishments/Awards

ME-EM students David Adamovicz (sr), Adam Augustyniak (sr), Raymond Coyle (jr.), Benjamin Hubbard (jr), Jacob Richards (jr), and Riley Stroven (sr) were six of the nineteen 2017 inductees into Tech’s Michigan Beta chapter of Tau Beta Pi in April. Tau Beta Pi is a nationally recognized honor society and the only one that recognizes the engineering profession. Students who join are in the top eighth of their junior class or the top fifth of their senior class.

Cayman Berg-Morales (sr, ME-EM) and John Williams will serve as football team captains for the 2017 season.

Aaron Curtiss (jr, ME-EM) was awarded the offensive lineman recipient of the Bill Hauser Memorial Award, given annually to the team’s outstanding spring player.
Student Accomplishments/Awards Continued

Drew Hanover (sr., ME-EM), received third place honors in the Pavlis Honors College Research Symposium for his poster “Engineering for Building-to-Grid Predictive Power Flow Control for Demand Response and Demand Flexibility”

Reid Sturos (sr., ME-EM) received the Harold Meese Sportsmanship Award for his accomplishments in hockey this past season.

David Walter (sr., ME-EM) was one of three Huskies named to the 2017 NFF Hampshire Honor Society. The 2017 NFF Hampshire Honor Society is comprised of college football players from all divisions of play who each maintained a cumulative 3.2 GPA or better throughout their college careers.

The player must have completed his final year of playing eligibility in 2016 or the nominee has already graduated, but will not return to team to complete eligibility. They also must have been a starter or significant contributor throughout the 2016 season.

Michigan Tech students won 11 awards at the joint SAE Noise and Vibration Conference and INCE-USA NoiseCon held on June 14, 2017 in Grand Rapids, MI.

Troy Bouman (PhD student, ME-EM), SAE NVC Best Student Paper First Place

Mahsa Asgarisabet (PhD student, ME-EM), SAE NVC Best Student Paper Second Place, Beranek Pewter Medal for Excellence in the Study of Noise Control Engineering for a Graduate Student, and INCE-USA Hallberg Foundation Travel Award

Micaela Theiry (MS student, ME-EM), INCE-USA NoiseCon Best Student Paper and INCE-USA Hallberg Foundation Travel Award

Trinoy Dutta (MS student, ME-EM), INCE-USA NoiseCon Best Student Paper

Miles Penhale (PhD student, ME-EM), INCE-USA Hallberg Foundation Travel Award

Siddharth Parmar (MS student, ME-EM), INCE-USA Hallberg Foundation Travel Award

Suraj Prabhu (PhD student, ME-EM), INCE-USA Hallberg Foundation Travel Award

Stephania Vaglica (sr., EBE), Beranek Gold Medal for Excellence in the Study of Noise Control Engineering for an Undergraduate Student

Their advisors are Dr. Andrew Barnard (assistant professor, ME-EM) and Dr. Jason Blough (professor, ME-EM).

Summer 2017
Senior Capstone Design Update

Nineteen Senior Capstone Design teams presented their final project results this past April. These were comprised of:

- 3 process development projects
- 1 process demonstration unit
- 1 dynamic simulator
- 8 product designs
- 3 one-off test units
- 1 one-off specialty process tool
- 2 one-off specialty product development tools

The wide-ranging and diverse set of design challenges was well received by the students, and the delivered units equally well received by customers.

Thank you to all who continue to support this program. The future of engineering looks very bright as a result of your interest and support.