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ME-EM eNewsBrief, September 2022

Department of Mechanical Engineering-Engineering Mechanics, Michigan Technological University

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ME-EM

Michigan Tech eNewsBrief

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Greetings from Dr. Jason R. Blough, Interim Department Chair & Distinguished Professor, Department of Mechanical Engineering - Engineering Mechanics (ME-EM) at Michigan Tech. For your convenience, we have bolded the names of all **ME-EM alumni, students, faculty and staff** in the eNewsBrief. For the latest news and info about our faculty, students and staff, please visit our website at www.mtu.edu/mechanical, and visit us on Facebook, Instagram and Twitter.

Greetings from the Chair

As the Interim Department Chair and a ME-EM department member for nearly 20 years, I'd like to start by thanking Dr. Bill Predebon for his 25 years of service as the department Chair and his unending drive and energy to transform and move our department forward. Thanks to his leadership, it is a very different department than when he took over. Bill leaves behind unfathomably large shoes to fill! Congratulations Bill on your retirement and thank you again for your service and support of the department!

Since I may be new to many of you, let me briefly give you my background. I am a Yooper who bleeds Black and Gold! I grew up in the Copper Country and received my BMSE and MSME from MTU in 90' and 91' respectively. I then went on to work at GM at the Noise and Vibrations Center in Milford, MI for two years before leaving for the University of Cincinnati to pursue my Ph.D. Upon finishing my Ph.D. I returned to MTU to lead the NVH group at the Keweenaw Research Center for five years before joining the ME-EM department. My research areas are signal processing, dynamic measurements, and NVH, and all my research has been industry funded.

In cooperation with the leadership team in the department, we will continue to push the department forward and work hard to maintain our reputation of graduating excellent engineers. We will continue to look to our great alumni for support of all types to help us pursue our mission. Thank you for your continued support!

IN THIS ISSUE:

Past Events

(ME-EM) officially opened the **Nucor Metrology Center** on Tuesday, Sept. 20, with a donor appreciation event recognizing **Nucor Corporation** for its generous support of the Center. **Milwaukee Tool** and **Nexteer** were also recognized for their equipment donations to the Center.

"We thank Nucor for their very generous donation of $100,000 to establish the Nucor Metrology Center in the ME-EM department here at MTU," said Jason Blough, interim department chair. "We would also like to thank Milwaukee Tool, Nexteer and Richard Crosby for their assistance in enhancing the capabilities of the facility. Industry support has always allowed us to offer outstanding experiences to our students and to grow our research portfolio and capacity in ways that would not otherwise be possible."

"We want to see our students use their hands for physical engineering, and that happens in measurement," said Rachel Store, Michigan Tech research engineer and head of the Nucor Metrology Center. "The students will take data to document their product performance, all while better understanding their product quality through metrics."

The Nucor Metrology Center provides students with the resources to make highly accurate measurements for their project components, advancing the Michigan Tech College of Engineering's objective to provide world-class undergraduate and graduate education to support a diverse workforce and societal needs.

ME-EM Department - New Hires

We are happy to introduce the newest additions to the ME-EM department's faculty:

Dr. Amir Hussain Idrisi joined the ME-EM faculty this fall as an Assistant Teaching Professor. He brings over five years of teaching experience at S.R.M.S. College of Engineering and Technology in India. Dr. Idrisi earned his PhD in Mechanical Engineering from United Arab Emirates University, his Master of Technology in CAD-CAM and Bachelor of Technology in Mechanical Engineering from Uttar Pradesh Tech University.

Dr. Idrisi's areas of research/ expertise include metal matrix and polymer matrix composite: fabrication techniques, and physical and mechanical characterization, as well as additive manufacturing: internal crack analysis in metal or composite components, relating process conditions to static and dynamic mechanical properties, and upcycling. Dr. Idrisi is looking forward to contributing his teaching experience in fracture mechanics, failure analysis and additive manufacturing to our ME curriculum.

Dr. Ye Qi joined the ME-EM faculty this fall as an Assistant Teaching Professor. She came to us from Montgomery College where she held an adjunct faculty appointment. Dr. Qi earned her PhD in Mechanical Engineering from Georgia Institute of Technology, and her MS and BS degrees in Mechanical Engineering from Beijing Jiaotong University.

Dr. Qi's areas of research/expertise include surface modification of cutting tools: mechanochemical surface modification through shot peening, surface texture through shot peening, EDM, and laser machine, as well as tribology: fluid lubrication of laser textured surface through CFD model, and wear of laser textured surface for dry and solid lubricated contact. Dr. Qi looks forward to teaching manufacture-based courses and collaborating on projects that combine teaching and research in manufacturing related areas.

Dr. Vinh Nguyen joined the ME-EM faculty this fall as an Assistant Professor. Prior to joining the ME-EM department, Dr. Nguyen worked as a National Research Council Fellow with US National Institute of Standards and Technology (NIST). He earned his PhD in Mechanical Engineering, an MS in Electrical Engineering and Mechanical Engineering from Georgia Tech, and a BS in Electrical Engineering and Mechanical Engineering from Rensselaer Polytechnic Institute.

Dr. Nguyen's areas of research/expertise include Manufacturing, Human-Robot-machine interaction, Processes (3D printing, machining, and assembly) and machine learning and big data analytics, as well as automated driving: verification and validation, predictive safety quantification and sensor fusion.

Dr. Shangyan Zou joined the ME-EM faculty this fall as an Assistant Professor. Prior to joining the ME-EM department, Dr. Zou held postdoctoral researcher positions at Oregon State University and Iowa State University. He earned his PhD and MS degrees in Mechanical Engineering from Michigan Tech, and his BS from Nanjing Forestry University.

Dr. Zou's areas of research/experience include dynamics and control: dynamics modeling of marine energy systems, fluid-structure interaction, optimal control/nonlinear control and state estimation, as well as multi-agent systems techniques: coordinated control and consensus learning. Dr. Zou hopes to contribute to broad ocean-related research (e.g., oceanographic, resource assessment) and lend his support on the numerical and experimental side.

MECHANICAL ENGINEERING-
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Faculty/Staff Awards/ Accomplishments *(cont.)*

Dr. Ana Dyreson (Asst. Professor, ME-EM) was mentioned in a Daily Mining Gazette story examining the potential use of abandoned mines in the Upper Peninsula for hydro pumping electrical storage.

Dr. Dyreson was one of five panelists for the Sustainable and Resilient Communities Social Network and Research Collaborative (SRC-Squared) Panel Discussion on Resilience Research, hosted by the Tech Forward Initiative on Sustainability and Resilience.

Dr. L. Brad King's (University Professor, ME-EM) startup company, Orbion Space Technology, was featured in the University of Michigan's Public Engagement & Impact communication. The story was also picked up by Mirage News, IndiaEducationDiary.com, and University of Michigan News.

Dr. Jeff Naber (University Professor, ME-EM) was quoted in a WJMN Local 3 story about the opening of the U.S. Dept. of Energy's newest Solar Energy Regional Test Center in Calumet. Naber's quotes were also picked up by Grand Rapids' WOOD TV8.

Dr. Naber will be featured at the Michigan Tech Research Forum (MTRF) on Oct. 12. Dr. Naber's presentation is titled "The Changing Landscape in Transportation Energy Utilization." Additional details can be found on the MTRF website. The Forum was developed by the Office of the Provost in coordination with the Office of the VP of Research to showcase and celebrate the work of Michigan Tech researchers and strengthen discussions in our community.

Dr. Naber, recipient of Michigan Tech University's 2022 Research Award, was featured in a Michigan Tech News story. The story was also picked up by WiredFocus.

Dr. Paul van Susante's (Assistant Professor, ME-EM) Planetary Surface Technology Development Lab's submission TEMPEST was selected as a Level 1 winner of NASA's Watts on the Moon Phase 2. As a Level 1 winner, they will receive $200,000 and move on to compete at Level 2. Read more about the award in the ME-EM News blog.

Yongchao Yang (Assistant Professor, ME-EM) was selected to give the Society of Experimental Mechanics (SEM) 2023 SAGE Publishing Young Engineer Lecture, which is one of the keynote lectures that will take place at the SEM IMAC Conference in Austin, Texas in early 2023. The conference hosts 500+ attendees and is important to the field of structural dynamics. The award recognizes "an SEM Member in early- to mid-career who demonstrates considerable potential in the field of experimental mechanics."

Alumni & Friends News, Accomplishments & Awards

Pamela Rogers Klyn (BSME '93) Senior VP, Corporate Relations and Sustainability at Whirlpool Corp, delivered the First-year Engineering Series lecture to Michigan Tech's incoming engineering majors.

Over 1,000 students attended Pam's lecture "Effort Creates Opportunities", about her career path as she advanced from student at Michigan Tech through advancing roles at Whirlpool. Read more about in the COE blog.

Danise Jarvey (BSME '83) retired this September after dedicating over 24 years to the University.

Danise most recently worked as the Director of Academic Services in the MMET department, and served as an undergraduate academic advisor for the ME-EM department from 2007-16.

Former Provost Max Seel, Professor Emeritus of Physics and former provost and vice president of academic affairs at Michigan Tech, passed away Sept. 14 at the age of 72. Max was a beloved member of the Michigan Tech community, leaving his native Germany in 1986 to join the University faculty as an associate professor of physics. Read Dr. Seel's full obituary.

Wayne Winkler (BSME '19) and his team at Georgia-Pacific developed a breakthrough technology to divert and transform garbage into recyclable materials, decreasing the amount of solid waste destined for landfills or incinerators, and transforming multiple waste streams into valuable commodities. Read more in Waste360.

Student Accomplishments & Awards

Rasoul Bayaniahangar, Xuebin Yang and **Jiachen Zhai** (ME-EM, Ph.D. candidates) were among the recipients of Graduate Schools Fall 2022 Finishing Fellowships. Congratulations to all nominees and recipients. Read more about the awardees on the Graduate School Newsblog.

Sam Lange (sr., ME) took the individual win in the men's race at the cross country season opener, the Vic Godfrey Open, on 2 September 2022. His final time was 18:27.7 and was named the GLIAC Cross Country Player of the Week.

Blake Pietila (sr., ME) was named to the Preseason All-CCHA Team for hockey. Pietila started all 37 games for the Huskies in 2021-22 and was a four-time CCHA Goaltender of the Week.

The Daily Mining Gazette covered a moment of silence and gathering held by Iranian students at Michigan Tech to honor Mahsa Amini on Monday (Sept. 26). Amini, 22, died after being detained by Iran's morality police for allegedly wearing her hijab improperly. Her death has sparked protests and calls for reform throughout Iran. Ph.D. students **Khatere Kashmari** and **Rasoul Bayani** (both Ph.D.s, ME-EM) were quoted in the story. The gathering was also covered by Michigan Tech's student newspaper, The Lode.

Students from the Michigan Tech's Aerospace Enterprise and Society of Women Engineers (SWE) represented Michigan Tech at the first annual Women in Aviation Day in Wausau, Wisconsin. Participating students were: From Aerospace: **Heather Goetz, Seth Quayle and Nolan Pickett (mechanical engineering)**. From SWE: **Sophie Stewart and Katherine Rauscher (mechanical engineering)**. This event was hosted by the Learn Build Fly organization, which does incredible volunteer work in engaging their community in aviation. As summarized by Wausau's WSAW-TV NewsChannel 7. Read more in Tech Today.

Department Accomplishments

The US News Undergraduate College Rankings for 2022-2023 were published on 12 September 2022. Our undergraduate mechanical engineering program is ranked 35th. This is a significant achievement made possible by the faculty and staff of the department.

Upword and the Keweenaw Report picked up a Michigan Tech press release on the opening of the Nucor Metrology Center in the Department of Mechanical Engineering-Engineering Mechanics. The opening was marked with a donor appreciation event recognizing Nucor Corporation for its generous support of the Center. Jason Blough and Rachel Store (ME-EM) were quoted in the release.

University News & Awards

Michigan Tech will be hosting the 2023 Toyota U.S. Cross Country Ski National Championships presented by Hampton Inn & Suites of Houghton at the Tech Trails from 2 - 7 January 2023. This is Houghton's sixth time hosting the national championships.

The Michigan Tech women's basketball team held the 15th-highest GPA in NCAA Division II for the 2021-22 academic year and is included in the Women's Basketball Coaches Association Top 25 award. The Huskies had a cumulative GPA of 3.734. Tech has been in the Top 25 for 14 of the past 15 years. Additionally, ten individual players earned GLIAC All-Academic Excellence honors and one individual player was a GLIAC All-Academic honoree.

John Lehman, Michigan Tech's vice president for university relations and enrollment, was quoted by WLUC TV6 in a story about Michigan Tech's and Northern Michigan's fall enrollment numbers.

Canada's University Magazine listed Michigan Tech as No. 3 in its list of the top 10 colleges in Michigan.

RadioResultsNetwork and Business North picked up a Michigan Tech News story about the return of the University's in-person fall Career Fair on Sept. 21.

The Mining Journal covered Michigan Tech's 33rd Parade of Nations, which was held Sept. 17.

Women in STEM Wednesdays

The ME-EM department is proud to feature current students and community members on the ME-EM news blog and Instagram sites in celebration of Women in STEM Wednesdays!

University News & Awards *(cont.)*

The Daily Mining Gazette and WLUC TV6 picked up a Michigan Tech Athletics press release about the number of former Huskies participating in NHL preseason training camps. The NHL regular season starts Oct. 7, and twelve former Michigan Tech hockey players are at the NHL training camps. **Brian Halonen (BSME '22)** of the New Jersey Devils is among them.

Rick Koubek, University president, was quoted by Michigan Senate Republicans in a story on Senate Bill 78, which was passed by a Senate subcommittee Sept. 27. The bill provides planning authorization for projects at many of Michigan's universities and community colleges, including MTU. It will now go before the Senate Committee on Appropriations for consideration.

John Lehman, vice president for university relations and enrollment, was quoted by the Daily Mining Gazette in a story on the latest meeting of the Houghton Planning Commission. Lehman spoke to the commission about the University's campus plan, which the University's Board of Trustees will be asked to approve at their meeting next Friday (Oct. 7).

The Daily Mining Gazette and WLUC TV6 covered the strong turnout of students for Michigan Tech's fall Career Fair, held Sept. 21 at the Student Development Complex.

SWE Hosts Evening with Industry - On Sept. 20, the Society of Women Engineers (SWE) brought together over 115 students and sponsors from 23 companies for an 'Evening with Industry'. SWE has begun planning the 2023 EWI event. If you are interested in learning more about it, please contact SWE at SWEEWI@mtu.edu.

Husky Bites Returns for Fall on Monday nights at 6 p.m Join Dean Janet Callahan (CoE) and faculty special guests for a family-friendly, 30-minute (or so) interactive Zoom webinar. Everyone — future students, friends, family, alumni, and our MTU family, all are welcome. Register online for the fall 2022 sessions, or catch up on past episodes on the Husky Bites webpage.

Fall'22 HuskyBites sessions:

- **Sept. 26:** Railroads - Back to the Future (Pasi Lautala, CEGE)
- **Oct. 3:** Multiplanetary INnovation Enterprise (Paul van Susante, ME-EM)
- **Oct. 10:** Mixing Lasers with the Atmosphere (Mike Roggeman, ECE)
- **Oct. 17:** Sensing Smells (Yixin Liu, ChE)
- **Oct. 24:** The Michigan Tech Band Experience - Wonderful Ruckus to to Symphonic Thrills (Michael Christianson, VPA)
- **Oct. 31:** Kitchen Metallurgy (Walt Milligan, MSE)
- **Nov. 7:** Restoring the Balance - Wolves and Our Relationship with Nature (John Vucetich, CFRES)
- **Nov. 14:** Free Falling (Carolyn Duncan, CLS)
- **Nov. 21:** Forged in Fire, Sculpted by Ice - Keweenaw Geostories (Bill Rose, GMES)

Current Contracts & Grants

Bar-Ziv, Ezra (PI, ME-EM/APSRC); "Solvent Targeted Recovery and Precipitation (STRAP) for Plastic Removal from Municipal Solid Waste (MSW)"; sponsor: Battelle Energy Alliance - Idaho National Lab; total award: $399,314.

Chen, Bo (PI, ME-EM/APSRC); "Integrated Control of Vehicle Speeds and Traffic Signals for Reducing Congestion and Energy Use Project Support", sponsor: Oak Ridge National Laboratory; total award: $82,800.

Dyreson, Ana (PI, ME-EM/GLRC); "Incorporating Climate Impacts into Electricity System Planning Models: Review and Case Study"; sponsor: Arizona State University; total award: $80,000.

Miers, Scott (PI, ME-EM/APSRC), Eggart, Brian (Co-PI, ME-EM/APSRC); "Design and Evaluation of a Miniature Portable Emissions Measurements System (mini-PEMS)"; sponsor: California Air Resources Board, LLC; total award: $45,000.

Narendranath, Aneet (PI, ME-EM/MuSTI), Jeff Allen (Co-I, ME-EM); "Collaborative Research: ISS: Revealing Interfacial Stability, Thermal Transport and Transient Effects in Film Evaporation in Microgravity"; sponsor: National Science Foundation; total award: $85,712.

Nguyen, Vinh (PI, ME-EM/AIM); "Development of a Robotic Testbed for Evaluation of High-Definition Maps for Autonomous Vehicles"; sponsor: National Institute of Standards and Technology; total award: $169,846.

Park, Myoungkuk (PI, ME-EM); "REF-RS: Development of an Autonomous Mobile Robot for Reconfigurable Microgrids in the Rough Terrain"; sponsor: Michigan Technological University; total award: $28,870

Sain, Trisha (Co-PI, ME-EM/APSRC); "Delivery of a Professional Development Course in Vehicle Chassis Systems Fracture Mechanics and Corrosion"; sponsor: US Department of Defense (Army); total award: $24,975.

Sain, Trisha (PI, ME-EM/MARC); "Degradation-induced Performance Loss in composites: Modeling Damage Accumulation through concurrent Environmental and Mechanical loads"; sponsor: Karax LLC; total award: $30,000.

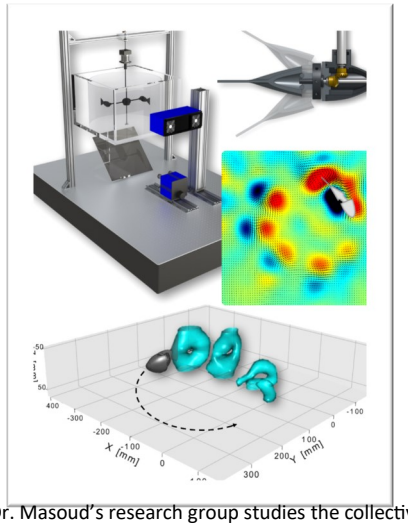
Tajiri, Kazuya (PI, ME-EM/MARC), Endres, William (Co-PI, ME-EM); "Aerospace Propulsion Outreach Program - Electrical Power Generation"; sponsor: ARCTOS Technology Solutions LLC; total award: $3,874.

Research Spotlight - Complex Fluids and Active Matter Lab (CFAM)

PI: Hassan Masoud, PhD, ME-EM Assistant Professor

Hassan Masoud, PhD is one of ME-EM's assistant professors and Principal Investigator of the CFAM Lab. This lab is where water tanks, glowing particulates, and mechanical fish lead Huskies to wondrous discoveries about the everyday flows, power, and potential found in natural locomotion. Swirling orange particles set in motion by a simulated school of fish shed light on how collective swimming impacts the locomotion efficiency of fish-like robots. It's one of several research projects the lab conducts in fluid dynamics and transport phenomena. The lab combines reduced-order models and numerical techniques with experiments to study the interaction of flowing fluid with intricate, often dynamically changing structures. Applications range from drug delivery methods to swimming robots and wave energy conversion.

Dr. Masoud's research interests include fluid mechanics, transport phenomena, and hydrodynamics of soft and active matter. Theory and high-performance computing in combination with physical experiments are employed to solve state-of-the-art problems at the intersection of engineering, physics, and biology.



Dr. Masoud's research group studies the collective hydrodynamics of fish-like swimmer using a custom-made experimental setup capable of flow visualization surrounding a school of robotic fish.

Graduate Seminar Speakers

The ME-EM Graduate Seminar Series is offered as an opportunity for graduate students and faculty to broaden their knowledge beyond their specific area of research and/or studies. A full agenda of speakers who are known nationally and internationally and represent academia, industry and government are invited to campus by our faculty members.

September 1

Vikas Srivastava, PhD

Howard M. Reisman Assistant Professor of Engineering at Brown University.

Seminar Title: "Continuum mechanics modeling and experiments for phase transition responses: From metastable steels to shock-absorbing gels".

October 6

John Dolbow, PhD

Professor of Mechanical Engineering and Materials Science, and Assistant Vice President for Research at Duke University.

Seminar Title: "The Mechanics of the Pepper Experiment".

CAPSTONE CORNER

Senior Capstone Design Update

Fall semester is well underway with 20 new SCD projects launched. Thank you to all those who are partnering with us in the process of educating future engineers through a format that we all anticipate will lead to the creation and delivery of valuable outcomes. We would like to recognize a few of these companies who have started projects with our students this fall:

- **Auto/Steel Partnership** - Mike Davenport (BSME'93), Executive Director - "Steel E-Motive Side Closure Mechanism"
- **Bissell** - Mitch Wesley, Mechanical Engineer II - Advanced Development - "Floor Cleaner Lab Test Fixture",
- **Bissell** - Jason Pruiet, Principal Engineer - Advanced Development - "Variable Orientation Wet-Dry Separator"; "Improved Vacuum Sound for Pets"; "Cordless Heated Mist Generation for Cleaning"; "Corrugated Hose Alternative"
- **Fluid Chillers** - Steve Whittaker (BSME '12) - Sales Engineer - "Cascade Chiller System Design"
- **John Deere** - Sean West, Product Development Engineer - "Undisclosed Project Title"

Contact Dr. Bill Endres (wjendres@mtu.edu) or Bob De Jonge (rdejonge@mtu.edu) (sales engineer) with questions about the program.

"Just because you can doesn't mean you should; get your "why" right."

From: *A Game Against Reality: Engineering Practice and Professionalism in a Physical World Inhabited by Humans* by William J. Endres (publication forthcoming)

CAPSTONE DESIGN PROGRAM