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ME-EM eNewsBrief, December 2022

Department of Mechanical Engineering-Engineering Mechanics, Michigan Technological University

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ME-EM

Michigan Tech eNewsBrief

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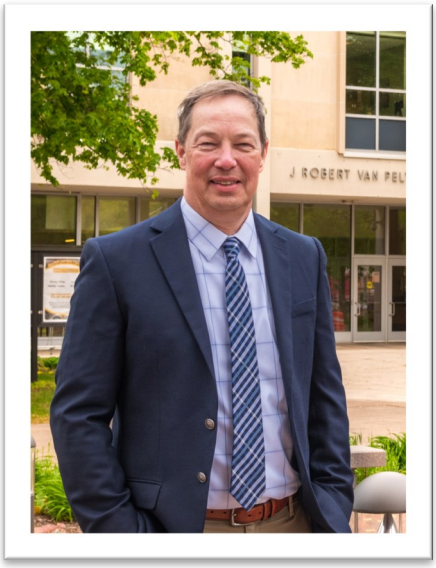
Greetings from Dr. Jason Blough, Interim Chair of the Department of Mechanical Engineering-Engineering Mechanics at Michigan Technological University. For the latest news and info about our faculty, students and staff, please visit our website at www.mtu.edu/mechanical. Visit us on Facebook, Instagram and Twitter.



Greetings from the Chair

This is an exciting time of year on campus and in the department. Winter Carnival is this week so the students are working diligently trying to get the month-long statues finished. Having built five snow statues when I was a student I understand the pressures to do a GREAT job. One year I tracked hours at my fraternity—we put in about 3000 man hours! Although it's difficult for the students trying to balance classes and Winter Carnival, they astonishingly pull it off every year with great success!! I am sure they will do it again this year. Broomball is going strong too, so there is lots of energy on campus every night.

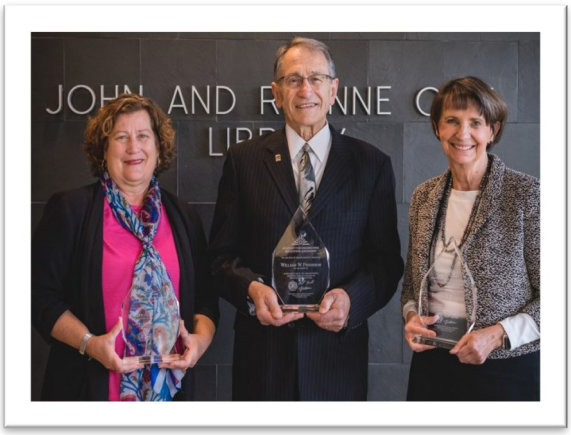
In the newsletter, you will read that the department has had another successful quarter receiving research funding and publications. Our faculty, staff, and students were recognized in the press and with prestigious awards. Hard work is the culture of our department, and of course, our students play hard too. MTU is pushing hard to raise enrollment, especially with the "best of the best" potential students, and our remarkable record of success and collective achievements make it easy to talk with enthusiasm about our department and boast of our accomplishments. Thank you for the work every-one, it certainly makes one of my jobs easier in attracting the inspired and exceptional students that Michigan Tech is known for. *Go Huskies!*

IN THIS ISSUE:

Alumni and Friends News, Accomplishments & Awards

Dr. Sheryl Sorby (BS '82 Civil Engineering, MSEM '86, and PhD ME-EM '91) and **Dr. William Predebon**, both ME-EM professor emeriti, and Dr. Debra Larsen, PE (BS'78 and MS '81 Civil Engineering were inducted into the Michigan Technological University Academy for Engineering Education Leadership.

Dr. Janet Callahan, Dean of the College of Engineering, hosted the ceremony on October 28, 2022 to celebrate these outstanding educators for their leadership in Engineering Education. Read more about these MTU legends in the COE Blog.



2022 Engineering Education Leadership Academy inductees: Dr. Sheryl Sorby, Dr. Bill Predebon and Dr. Debra Larsen.

Michigan Technological University

Alumni and Friends News, Accomplishments & Awards

Design World Online mentioned Michigan Tech in a Q&A with alumni **Dana Myers** *(BSME '07)*, who is currently a global product manager specializing in building product portfolio strategies.

Michigan Tech alumni **Mike Milosh** *(BSME '81)* was quoted by the Detroit News in a story about the "torturous legal odyssey" involving gold coins and bars recovered from the wreck of the S.S. Central America in the late 1980s.

According to a 2013 Michigan Tech News story, Milosh designed, built and operated the remotely operated underwater vehicle used in the recovery operations.

ME-EM Faculty & Staff Awards and Accomplishments

Dr. Jason Blough (BSME '90, MSME '91), ME-EM interim chair and distinguished professor of the Department of Mechanical Engineering-Engineering Mechanics, has been selected as the 2023 recipient of SAE International's Ralph K. Hillquist NVH Lifetime Achievement Award. Established by the Noise & Vibration Conference Committee, this award recognizes those individuals who have shown a continued contribution to ground vehicle voise, vibration and harshness (NVH) over a period of 15 years or more. According to the award notification, Blough has "been instrumental in shaping the sound package material industry over the last 30 years, alongside unmatched dedication and commitment to industry and SAE." He was nominated for the award by **Dr. Darrell Robinette** (BSME '04, PhD '07) (Assoc Prof, ME-EM). 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 routinely teaches many experimental NVH techniques in both classroom settings and industry short courses, and serves as the SAE Clean Snowmobile Team faculty advisor under Tech's Advanced Motorsports Enterprise. Formal recognition of the award will occur during the 2023 SAE Noise & Vibration Conference, being held May 15-18. Congratulations to Dr. Blough on this significant achievement.

Dr. Kartik Iyer *(Asst Prof, ME-EM/ Physics)* and **Ashvin Vinodh** *(ME-EM, PhD student)* are co-authors of a letter published in Physical Review Research.The letter is titled "Asymmetry of Velocity Increments in Turbulence."

Dr. Brad King *(Prof, ME-EM)* was quoted by ABC 10 in a story on the new rocket factory opened by his company, Orbion Space Technology.

Dr. Aneet Narendranath (MSME '09, PhD, '13), (Assoc Teaching Prof, ME-EM) has been selected as one of nine international scholars for the International Alliance to Advance Learning in the Digital Era (IAALDE) VISTAS Colloquium Series. In a first phase, IAALDE has called for ambitious midcareer researchers, pretenured or recently tenured, who are developing and implementing a long-range research vision (think: 5-10 years ahead) and are therefore interested in discussing their research vision with peers from multiple societies and different disciplinary backgrounds. The goal of the VISTAS (Vision, Inspiration, Synergy, and Transformation Across Societies) Colloquium Series on Learning and Technologies Research is to create a discussion space where researchers can connect with one another to explore ideas across multiple disciplinary and society perspectives. It is envisioned to inspire transformative research and to improve our societies by better connecting researchers to one another and to cross-disciplinary ideas. A graduate of Michigan Technological University, Narendranath's teaching interests include classical mechanics, numerical methods for differential equations and symbolic solution packages. His research interests focus on numerical solutions and applications to engineering of nonlinear partial differential equations and low Reynolds Number fluid physics. Congratulations to Dr. Narendranath on achieving this honor!

Dr. Vinh Nguyen (Asst Prof, ME-EM), Dr. Jason Archer (Asst Prof, HU), and Dr. Tan Chen (Asst Prof., ECE) shared their research at a ROBOT101 Event on November 11, 2022. Their presentation focused on robots at work and considered the ways robots are radically redefining our conception of the workplace.

Dr. Paul van Susante (Asst Prof, ME-EM) presented "Lunar In-Situ Resource Utilization to Unlock the Solar System" at the Earth, Planetary, and Space Sciences Institute (EPSSI) in November. Dr. van Susante discussed what payload to transport via moon and Mars missions to create sustainable space exploration and develop a thriving space economy, while opening up the solar system and bringing the unlimited energy and resources of space into the economic sphere of Earth. Read the abstract here.

Michigan Technological University 1885

New ME-EM Faculty and Staff Members

Mary Kozmor joined the ME-EM office staff in November as an Administrative Aide.

Mary brings to the front office a phenomenal set of customer service and organizational skills gained from her previous position at Fitzgerald's Hotel & Restaurant for the past five years.

Mary is just a few classes away from completing her BS in Theater and Entertainment Technology, with a minor in Art, here at Michigan Tech. She loves animals and enjoys volunteering at the Copper Country Humane Society walking dogs and socializing cats. Mary enjoys spending time with her two cats, playing "Magic", adding to her knife collection and all things "Twilight."

Sarah Sohlden *(BSME '00)* joined the department in October as an Academic Advisor.

Sarah is a graduate of MTU with a BS in Mechanical Engineering. Sarah has worked for companies like MSX, Partsolutions, GS Engineering, and this past summer she became a certified Driver's Ed Instructor with Drive America. After teaching her first couple of classes, she realized just how passionate she is with helping students. She is thrilled to be here and has enjoyed getting to know everyone and learning EVERYTHING the advisors have to do. In her free time Sarah spends time with her husband and two kids doing anything that involves being outdoors, especially hunting and fishing!

Dr. Chad Walber *(BSEE '03, BSME '05, MSME '09, PhD '12)* joined the ME-EM faculty this spring as a Visiting Professor of Practice. Prior to joining the ME-EM department, Dr. Walber worked as a research and development engineer for over 10 years at PCB Piezotronics. Dr. Walber earned his BS, MS and PhD in Mechanical Engineering at Michigan Tech as well as a BS in Electrical Engineering.

Dr. Walber's areas of expertise include sensors and instrumentation, dynamic systems testing, sound and vibration, digital signal processing, metrology, and piezoelectrics. Dr. Walber is looking forward to teaching dynamic systems-based courses and collaborating in various test and measurement projects.

Student Accomplishments/Awards

Rasoul Bayaniahangar, Xuebin Yang & Jiachen Zhai *(ME-EM, Ph.D. candidates)* were among the recipients of Graduate Schools Fall 2022 Finishing Fellowships. Their ME-EM advisors are **Drs. Sajjad Bigham** *(Assoc Prof),* **Jeff Naber** *(Prof),* and **Seong-Young Lee** *(Prof),* respectively. Read more in the Graduate School Newsblog.

Ethan Blough *(so., EME)* was quoted by WLUC TV6 in a story about an appreciation luncheon hosted by Michigan Tech fraternity Lambda Chi Alpha members for area first responders, who helped save their fraternity house in Houghton from a fire in June. The story was picked up by Michigan News Source.

Ayush Chutani *(ME-EM, Ph.D. student),* was awarded a GLRC travel grant to attend the COP27 in Sharm El-Sheikh, Egypt. Ayush was part of the Michigan Tech delegation led by Sarah Green *(Chem)* that joined more than 35,000 attendees at the annual summit. His advisor is **Dr. Ana Dyreson** *(Asst Prof, ME-EM).* Read more about the Graduate School Newsblog.

Maci Cornish *(fr., EME)* knows what floats her boat. A walking encyclopedia of Great Lakes Shipwreck history, the Fitz-obsessed first-year engineering student welds as a hobby, works summers as first mate on a tour boat and is studying for her 100-ton captain's license. Meet Cornish, a Munising, Michigan native who hopes to someday pilot Michigan Tech vessels, in Stories from Husky Nation.

Sam Lange *(so., EME)* was mentioned in a WLUC TV6 story after being named GLIAC Men's Runner of the Week. Lange led the No. 16 Michigan Tech cross country team with a first-place individual finish at the Vic Godfrey Open on Sept. 2. Sam earned all-region accolades at the Midwest Regional Championships in New Orleans and was named to the GLIAC Academic Excellence Team.

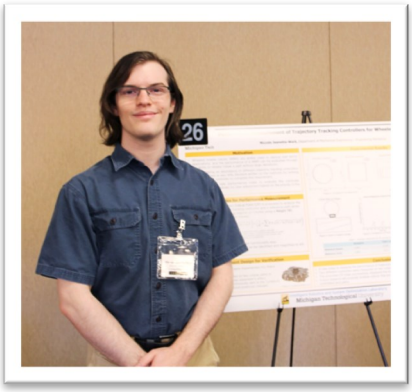
Student Competitions & Team Awards

The 2022 Three Minute Thesis competition, organized by the Graduate Student Government of Michigan Tech, wrapped up with great success. Seventeen participants competed at the MUB Ballroom for a place at the finals. Each presentation was scored by a panel of judges from diverse academic backgrounds. The judges for the finals were Will Cantrell *(Grad School/Physics),* Andrew Storer *(Interim Provost/CFRES)* and Mark Rhodes (SS).

Congratulations to **Udit Sharma** *(PhD candidate, ME-EM)* who placed third in the finals, and to **Revanth Mattey** *(PhD candidate, ME-EM)* who earned the "People's Choice" award. Their ME-EM advisors are **Dr. Jeff Allen**, *Professor & Director of Undergraduate Studies*, and **Dr. Susanta Ghosh**, *Assistant Professor*, respectively.

The Institute of Computing and Cybersystems (ICC) announced the winners of the **Computing Showcase Poster Session** of October 10. Visit the showcase's Research Poster Session page to view the poster abstracts and photos from the event. Winners from the ME-EM department are listed as follows:

Undergraduate - Second Place Winner: Niccolo Jeanetta-Wark *(sr., EME)* "Performance Measurement of Trajectory Tracking Controllers for Wheeled Mobile Robots"



Niccolo Jeanetta-Wark, second place winner of the undergraduate student division of the ICC Computing Showcase poster session.

Graduate - First Place Winner: Shashank Pathrudkar *(Ph.D. candidate, ME-EM)* "Interpretable machine learning model for the deformation of multiwalled carbon nanotubes". His advisor is **Dr. Susanta Ghosh**, *Asst Prof, ME-EM.*


Shashank Pathrudkar, first place winner of the Graduate student division of the ICC Computing Showcase poster session.

NASA announced that Michigan Tech's Planetary Surface Technology Development Lab, led by **Paul van Susante**, *Assistant Professor, ME-EM)* has advanced to Level 2 of the Break the Ice Lunar Challenge. The team will build and test a full-size prototype in Level 2, and will receive a share of the Level 1 $500,000 prize. Read all about it in the ME-EM News.

University News & Awards

The Open Access collection represents each college on campus: College of Engineering: 58% Michigan Tech was one of three universities in the state cited in an MLive editorial as having increased enrollment since 2011. The letter from the editor was written in reference to a five-part series of reported stories about enrollment from MLive earlier in the month.

Michigan Tech and Houghton are featured in the podcast: Behind the Mitten - Episode 42: "All over the state - Mackinac Island, Keweenaw Peninsula and Flint" which aired on Oct. 22-23, 2022. The 10-minute interview with our Michigan Tech admissions director, Beth Fitzpatrick, starts around 22:11.

Grand Rapids' WOOD TV8 mentioned Michigan Tech in a story about fun things to do during winter break including the 57th annual Great Lakes Invitational hockey tournament. This year's GLI competitors are Michigan Tech, Western Michigan, Michigan State & Ferris State.

Michigan Tech President Rick Koubek was quoted by Crain's Detroit Business in a story about an $8.14 million grant awarded to Michigan Tech by the U.S. Department of Energy to "develop and advance critical technologies and processes needed to recycle and reuse electric vehicle batteries." Lei Pan (ChE) will lead the project, according to another quote from Koubek in a Nov. 16 press release from Sen. Debbie Stabenow. Pan appeared in Crain's story's lead image, with a caption explaining that his training in mining engineering allows him to apply mineral separation techniques to battery component separation. Radio Results Network and ForeignAffairs.co.nz picked up the senator's press release. The award was also mentioned by Green Car Congress, which listed Michigan Tech as one of 10 recipients of a total $73.9 million awarded by the DOE.

Past Events

The **ME-EM Senior Recognition Banquet/Order of the Engineer Ceremony** was held on December 7 in the Memorial Union Ballroom. 56 seniors attended the ceremony. **Dr. L. Brad King** (Prof, ME-EM), and CEO of Orbion Space Technology gave the keynote address.

Dr. Bill Endres *(Assoc Prof & SCD Program Director),* recognized three of our ME seniors, **Jake R. Jones**, **Audrey C. Levanen**, and **Rachel E. Reiz,** with the Fall 2022 Outstanding Senior Capstone Design Student award.

Dr. Bill Endres presenting the Outstanding SCD Student Awards to: Jake Jones, Audrey Levanen and Rachel Reiz.

Seniors signing their Order of the Engineer obligation certificates, "to uphold devotion to the standards and the dignity of (the engineering) profession." It is an obligation to turn to "practical use, the principles of science and the means of technology... to serve humanity by making the best use of earth's precious wealth."

ME-EM Graduate Seminar Speaker Series - October, November and December 2022

* **John Dolbow**, PhD, Professor of Mechanical Engineering and Materials Science and Assistant VP for Research at Duke University. "The Mechanics of the Pepper Experiment". Dr. Dolbow's research concerns the development of numerical methods for evolving interface problems.
* **Wayne Gersie**, PhD, Vice President for Diversity and Inclusion, Michigan Tech University. "Characteristics of a 21st Century Scholar Innovation, Research and DEIS". Dr. Gersie is responsible for providing vision, strategic leadership, and thoughtful change management for campus diversity, equity, inclusion and sense of belonging (DEIS) initiatives.
* **Javad Baqersad**, PhD, Associate Professor in the Department of Mechanical Engineering and the director of the Noise, Vibration, and Harshness and Experimental Mechanics Laboratory at Kettering University. "Optical Methods Integrated with Analytical and Numerical Techniques for System Identification and Health Monitoring of Mechanical and Biological Systems". Dr. Baqersad's research interests and expertise are related to structural dynamics, acoustics, physics-based machine learning, optical methods, multi-physics simulation, structural health monitoring, and finite element analysis.
* **Kathryn Maupin**, PhD, Senior Member of the technical staff at Sandia National Laboratories. "Enhancing Computational Simulation with Physics- and Data-Informed Surrogate Models." Dr. Maupin's research focuses on model form error quantification and multi-objective surrogate modeling.
* **Nathan Tom**, PhD, Researcher IV in Mechanical Engineering at the National Renewable Energy Laboratory (NREL). "Development of Marine Energy Technologies at the National Renewable Energy Laboratory (NREL)." Dr. Tom is currently leading a group researchers to explore the coupling between the device hydrodynamic, structural, and control design to demonstrate the economic feasibility of this next-generation technology.
* **Sekhar Rakurty**, PhD, Senior Research Engineer-Manager at the M. K. Morse Company. "Sustainable Manufacturing Processes: A Cutting Tool Industry Perspective." Dr. Rakurty has over 15 years of research and development experience in manufacturing, specifically designing cutting tools and developing sustainable manufacturing processes.
* **Shannon Fitzpatrick**, NASA Program Executive within the Science Mission Directorate/Heliophysics Division. "NASA Heliophysics, It's Not Just About the Sun; From the Sun and Moon to Mars and Beyond." In her current position , Shannon is leading the ESCAPADE mission to Mars, EUVST joint space telescope mission with JAXA and the entirety of Heliophysics Operating Missions, which include Voyager and Parker Solar Probe.
* **Hunter Williams**, PhD, Technology Development Manager at Honeybee Robotics. "Building the Lunar Electrical Grid to Kickstart Lunar Permanence." Dr. Williams has built and tested pneumatic sampling systems for use on the moons of Mars and regolith melting technology for electrolysis plants the moon.

Current Contracts and Grants

Bar-Ziv, Ezra (PI, MEEM/APSRC), and Shreyas S. Kolapkar (co-PI, ME-EM): "Solvent Targeted Recovery and Precipitation (STRAP) For Plastic Removal from Municipal Solid Waste (MSW)"; sponsor: Battelle Energy Alliance LLC / Idaho National Laboratory; total award: $70,000.

Blough, Jason R. (PI, MEEM/MARC), and L. Brad King (co-PI, MEEM): "Performance and lifetime characterization of a low-power Hall-effect thruster"; sponsor: Orbion Space Technology Inc; total award: $299.359.

Dyreson, Ana (PI, MEEM/GLRC): "Electrification and climate resilience in the rural north: challenges and opportunities"; sponsor: Alfred P Sloan Foundation; total award: $499,445.

Dyreson, Ana (co-PI, MEEM/GLRC), Tim Scarlett (co-PI, SS/GLRC), and Roman Sidortsov (PI, SS/GLRC): "Collaborative Research: NNA Incubator: Sustainable Transitions through Arctic Redevelopment (STAR)"; sponsor: National Science Foundation; total award: $79,998.

Malladi, Sriram (PI, MEEM/GLRC): "Caterpillar Hydraulic Noise Suppression through HQ Tube"; sponsor: Caterpillar Inc.; total award: $80,000.

Masoud, Hassan (PI, MEEM/AIM): "CAREER: Collective Hydrodynamics of Inertial Swimmers and Surfers"; sponsor: National Science Foundation; total award: $520,359.

Miers, Scott A (PI, MEEM) and Brian Eggart (co-PI, APSRC): "Gen2 Mini-PEMS Prototype Development": sponsor: Michigan State University; total award: $20,000.

Naber, Jeffrey D (co-PI, MEEM/APSRC), and William R. Atkinson (PI, APSRC): "Test Bed Creation for testing of Hydrogen Fuel Injectors for Heavy Duty Vehicle Applications"; sponsor: Cummins Inc; total award: $40,705.

Naber, Jeffrey D (co-PI, MEEM/APSRC), and Jeremy Worm (PI, APSRC): "Impact of Fuel Additives on Stochastic Pre-Ignition"; sponsor: Center for Quality Assurance: total award: $326,243.

Naber, Jeffrey D (PI, MEEM/APSRC): "Automatic Shut-Off Study on Vehicles Equipped with Keyless Start"; sponsor: American Center for Mobility; total award: $268,870.

Tajiri, Kazuya (PI, MEEM/MARC), and William J Endres (co-PI, MEEM): "Aerospace Propulsion Outreach Program - Electrical Power Generation"; sponsor: ARCTOS Technology Solutions LLC; total award: $6,374.

van Susante, Paul (PI, MEEM/MARC): "Design and Implementation Tools for Lunar Surface Regolith Structure Construction"; sponsor: Lunar Outpost; total award: $59,847.

van Susante, Paul (PI, MEEM/MARC): "Center for Lunar and Asteroid Surface Science (NASA SSERVI CAN); sponsor: University of Central Florida; total award: $90,000.

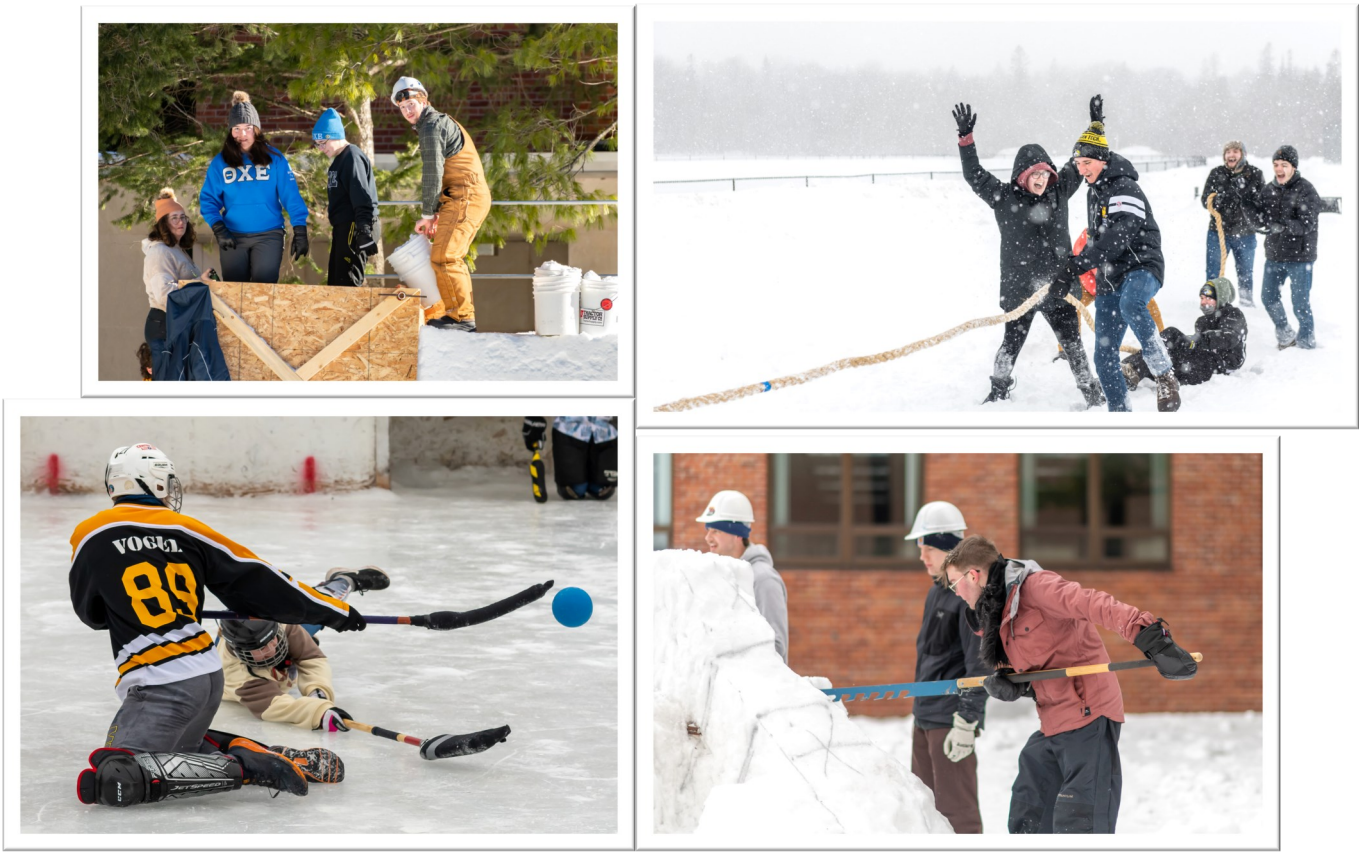
Weaver, Wayne W (PI, MEEM/AIM): "Meta-Stability of Pulsed Loaded Microgrids"; sponsor: Sandia National Laboratories; total award: $96,000.

Upcoming Husky Bites - Spring semester 2023 ~ *Mondays at 6:00 pm* ~ Register Here

- Feb 6 - Joe Foster with MTU Douglass Houghton NSPS student chapter: "Winter Carnival Geospatial Imagery"
- Feb 13 - Matt Jennings with Jennifer *Jung) Lucas: "Digging It -- Volleyball at MTU
- **Feb 20 - Anna Dyreson** *(ME-EM, Asst Prof)* with **Ayush Chutani** and **Shelbie Davis** *(ME-EM PhD students):*
- **"Solar Energy in Cold Climates"**
- Feb 27 - Dean Johnson with Applied Portfolio Management students: "Money Matters"
- Mar 13 - Tony Rogers with CPM students: "Enterprise--Consumer Product Manufacturing
- Mar 20 - Bruce Lee with Fatemeh Razaviamri: "Bio-Inspired Designs"
- Mar 27 - John Jaszczak with Patrice Cobin: "The A.E. Seaman Museum--120 Years
- Apr 3 - David Flaspohler with MTU students: "Birdwatching--Quality of Life

Browse webinars from previous semesters on the Husky Bites webpage.

Winter Carnival 2023!



Winter Carnival brings out the fun in the constant tug-of-war between attending class and hanging out with friends.

CAPSTONE CORNER

Senior Capstone Design Update

As we swing into Spring semester, we would like to thank all those who are partnering with us in the process of educating future engineers and recognize a few more of these companies who have recently started projects with our students:

- **Advanced Interactive Response Systems (AIRS)** - Valerie Obenchain, Founder and CEO
  - Project Name: *"Portable Oxygen Concentrator"*
- **Consolidated Nuclear Security, LLC** - Abe Mathews, Senior Director, Engineering Technological Operations
  - Project Name: *"Can Sealer"*
- **Paper Converting Machine Company** - Jim Kaye, Engineering Leader - 3 Projects: Non-disclosable
- **American Axle** - Ben Lively, Systems Engineer - Project Name: Non-disclosable

Contact Dr. Bill Endres (wjendres@mtu.edu) with questions about the program.

Mindset is more about how you think than what you think.

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

CAPSTONE DESIGN PROGRAM