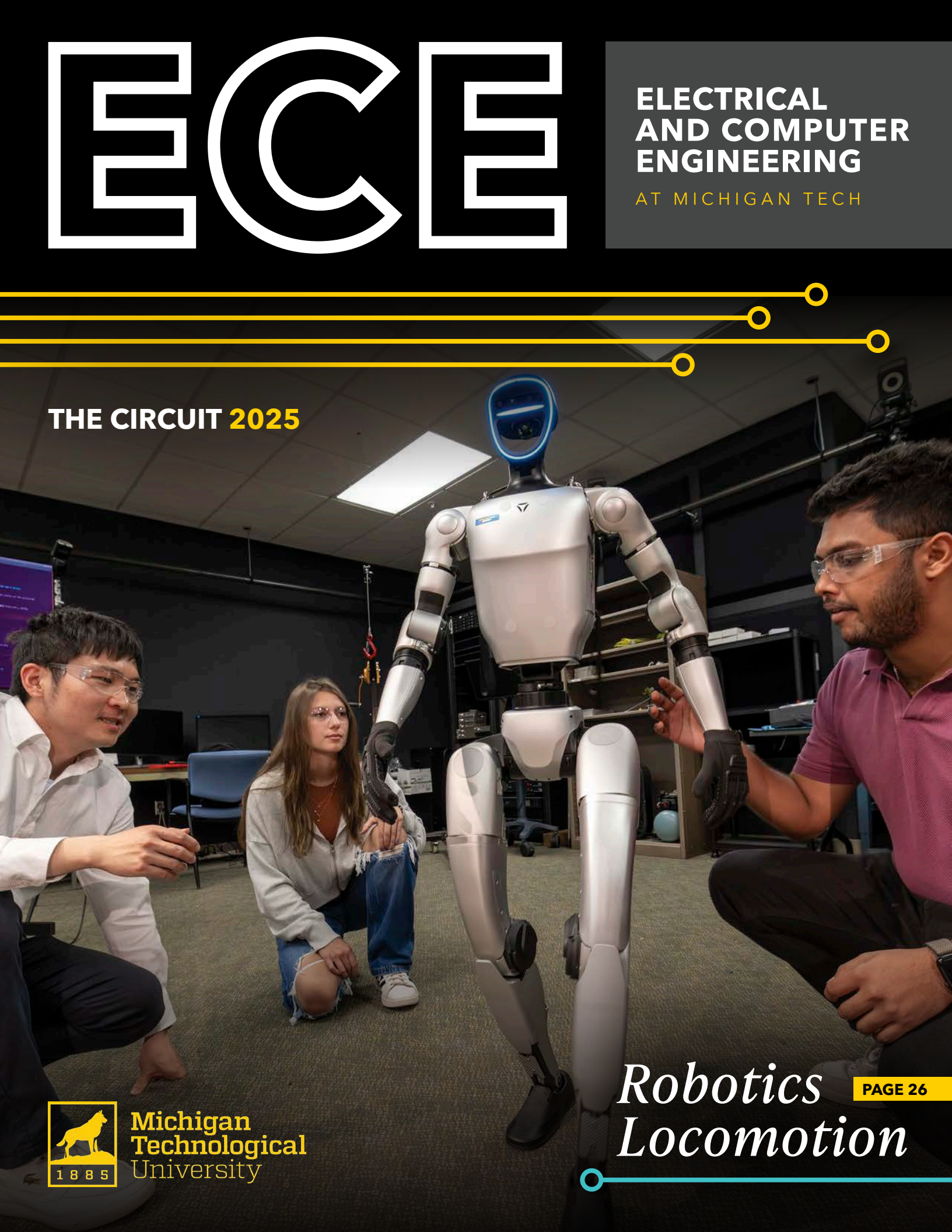
ECE

ELECTRICAL AND COMPUTER ENGINEERING

AT MICHIGAN TECH

THE CIRCUIT 2025



Michigan Technological University

1885

Robotics Locomotion

PAGE 26

GREETINGS *from the Beautiful Keweenaw!*

WAYNE WEAVER, PH.D.
Chair and Professor

As I look out from the EERC toward the Portage Canal, the view is a stark reminder that we do things a little differently here at the top of the map. We are remote, we are rugged, and we are home to some of the most resilient engineers in the world. It is a privilege to welcome you to the latest issue of the ECE Department Magazine. I am honored to serve as the new ECE Department Chair, stepping into a role that allows me to support a community I have been a part of since 2007.

We are entering a transformative period for the university, underscored by our recent designation as an R1 research institution by the Carnegie Classification. This historic milestone places Michigan Tech among the nation's top tier of doctoral universities with "very high research activity"—and notably, makes us the only rural R1 institution in the state.

WHILE THIS STATUS ELEVATES OUR GLOBAL STANDING, OUR CORE MISSION REMAINS STEADFAST: TO EDUCATE ENGINEERS WHO NOT ONLY THEORIZE BUT ALSO DESIGN, BUILD, AND INNOVATE.

THIS MAGAZINE CELEBRATES BOTH THE INNOVATION AND THE DEEP ROOTS OF OUR STUDENT BODY.

In our Student Spotlight, "Family Tradition," we meet the Dilworth family—all five of them—who have made Michigan Tech ECE a true generational legacy. You will also find an update on our Enterprise program in "Leading with Resolve," which details the perseverance of our AutoDrive Challenge II team as they push the boundaries of autonomous vehicle technology. Our students continue to demonstrate they are industry-ready.

A prime example is the team that secured a third-place national finish in the 2025 Bright Manufacturing Challenge. Excellence was also on display at the 25th Annual Design Expo, where the Supermileage Systems Enterprise took top honors and Team 212 (Crimmins Renewable Energy Distribution) secured first place in Senior Design.

Our faculty are driving the research that underpins our R1 status, and in this issue, we highlight four faculty members whose work is shaping the future. Tan Chen is featured in "Controlled Interaction," which covers his NASA-funded research on robotic locomotion, musculoskeletal models, and hyper-gravity simulation.

In the realm of manufacturing, Chris Middlebrook is leading a "Shared Mission" in PCB fabrication; his work with the MEDC and industry partner Calumet Electronics was instrumental in securing a significant U.S. Department of Defense grant to scale up advanced packaging.

Innovation continues with Paul Bergstrom, who is "Advancing the Mobility Market" through a collaboration with ThermoAnalytics to improve battery simulation technology drastically.

Additionally, Kaichen Yang explores "Perceiving the World," detailing his NSF-funded work on securing AI systems through real-world sensing. The strength of our department lies in our people, past and present.

In our Alumni Highlight, "On Solid Footing," we catch up with Michael Pulick. We also feature Kit Cischke in "Imparting Knowledge and Experience," a look at how our alumni return to the classroom to shape the next generation of engineers.

We must acknowledge the significant loss of Professor John Lukowski, who passed away on June 27, 2025. For over four decades, John was a cornerstone of this department after joining the faculty in 1984.

John was a three-time recipient of the HKN Professor of the Year award and was known for his dedication to his students and genuine investment in their success. We extend our deepest sympathies to his family and are grateful for his enduring legacy. As we move forward, we remain committed to upholding the values that John instilled in us.

I invite you to connect with me directly—whether to share a story, an idea, or just to say hello. You can reach me via email at wwweaver@mtu.edu or by phone at 906-487-1461.

Sincerely,

Wayne Weaver

ON THE COVER: Tan Chen, Isabella Langmaid, and Dhanush Biligiri evaluate the result of their reprogramming walking gait dynamic controls on a commercial humanoid robot in the Robotics, Locomotion, and Applied Control (ROLAC) Lab.

Story on page 26 →

STUDENT HIGHLIGHT

FAMILY TRADITION *at Tech*

FOR MOST FAMILIES, COLLEGE MEANS SCATTERING SIBLINGS ACROSS DIFFERENT CAMPUSES AND CITIES.

But for the **Dilworth family**, Michigan Tech has brought everyone together. **Larry** '22, **Gracie** '24, **Christie**, **Hollie**, and **Shelbie** have each found their place in the College of Engineering at Michigan Tech.

Their roots to Michigan Tech began with their father, Lawrence Dilworth '80, who first studied in ECE at Michigan Tech and is now living in Ann Arbor, Michigan, where he manages IT infrastructure and integration. The story continues with the eldest Dilworth, Larry, who chose electrical engineering and is now nearing the end of his PhD.

Gracie followed soon after, finishing her bachelor's degree in electrical engineering before diving deep into research on power systems as she also works toward her doctorate.

Christie, a senior in electrical engineering, has loved her photonics and electromagnetics classes and is planning to extend her studies with graduate school.

Hollie, in her second year, brings her love of math into electrical engineering and considers one day becoming a professor.

"With my siblings at Michigan Tech, I was aware Michigan Tech was a good engineering school. Having my siblings all here made it easy for me to decide to make Michigan Tech home."

"I enjoy helping people and have always thought of teaching as a career. Once I graduate, I am thinking of working toward a PhD in math and becoming a professor," says Hollie.

The youngest, Shelbie, just started her first year in chemical engineering—branching out into a different field than the others, but still reassured to have four siblings ready to show her the ropes.

What makes their journey special isn't just that they all ended up at the same university—it's how much they lean on each other. The four sisters, Gracie, Christie, Hollie, and Shelbie, share an apartment together.

"Having all my siblings together is something I never expected. I had always figured we would be spread out all over the place at different colleges. We all have similar skillsets and ended up as engineers, so it is really great that we have the opportunity to support one another in similar fields," says Christie.

Gracie appreciates the support siblings offer. "Beforehand, I knew things like what classes were offered, who to talk to for certain things, or the best places to study and hang out on campus," she says.

FROM COOKING MEALS TOGETHER TO PROVIDING ACADEMIC GUIDANCE, THE DILWORTH FAMILY HAS BUILT A NETWORK OF SUPPORT THAT BLENDS FAMILY LIFE WITH THE CHALLENGES OF ENGINEERING SCHOOL.

"Having been here the longest, I am familiar with the courses and the curriculum, so I offer pointers and advice to support my siblings," says Larry.

Beyond family presence at Michigan Tech, the size of the campus, access to nature, and the supportive faculty all contributed to the Dilworth siblings' individual decisions to make Michigan Tech their home away from home.

Their collective presence on campus represents both tradition and forward-looking ambition—a unique story of siblings bound by shared values, mutual support, and a passion for engineering.

DILWORTH FAMILY

Dilworth Family L-R: *Shelbie, Hollie, Christie, Gracie, Larry*

"I WAS ALREADY REALLY COMFORTABLE WITH MICHIGAN TECH BEFORE I EVEN ENROLLED BECAUSE OF THE THINGS I LEARNED FROM MY BROTHER."

–GRACIE DILWORTH

2024 UNDERGRADUATE STUDENT AWARDS

SKYLAR BRAWLEY

2024 DEPARTMENTAL SCHOLAR

MIRANDA MEYERS

2024 MARTHA SLOAN ENDOWED SCHOLARSHIP

CARSON BELYK

2024 CARL S. SCHJONBERG OUTSTANDING UNDERGRADUATE

JACOB HEERINGA

2025 CARL S. SCHJONBERG OUTSTANDING UNDERGRADUATE

OWEN HARTWIG

2025 DEPARTMENTAL SCHOLAR

KYLA DEWICK

2025 MARTHA SLOAN ENDOWED SCHOLARSHIP

2025 UNDERGRADUATE STUDENT AWARDS

SU23 - SP24 ECE DOCTORAL DEGREES

STUDENT NAME	PROGRAM	ADVISOR	DISSERTATION TITLE
Cheng Fan	Electrical Engineering	Kaichen Yang	Adaptive Modulation for Underwater Acoustic Communication Based on Reinforcement Learning
Gaurish Shreedhar Gokhale	Electrical Engineering	Bruce Mork	Transient Simulations of Power Systems with Inverter Interfaced Resources
Evan G. Lucas	Electrical Engineering	Timothy C. Havens	Finer Details of Language Modeling: Text Segmentation, Working Within Resource Limits, and Watermarking
Mehnaz Tabassum	Electrical Engineering	Aurenice Oliveira	Advancing Vehicular Communication Systems: An Evolution from DSRC to 5G NR C-V2X Technology for Enhanced Safety, Reliability, and Efficiency in Intelligent Transportation Systems

2023 GRADUATE STUDENT AWARDS

MEHNAZ TABASSUM

JONATHAN BARA AWARD FOR OUTSTANDING GRADUATE TEACHING ASSISTANT

NOAH ZINS

MATT WOLFE AWARD FOR OUTSTANDING GRADUATE RESEARCH ASSISTANT

2024 GRADUATE STUDENT AWARDS

VARSHA VIJAY KUMAR

JONATHAN BARA AWARD FOR OUTSTANDING GRADUATE TEACHING ASSISTANT

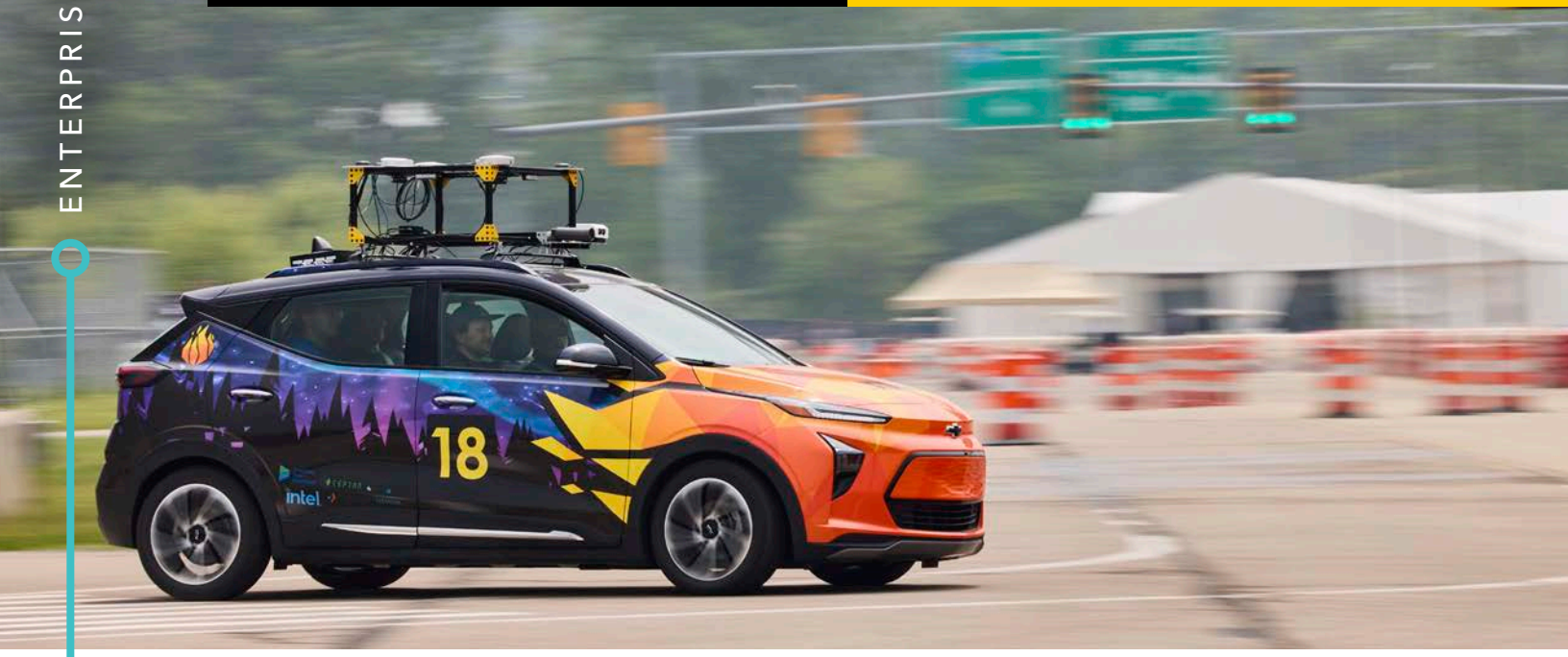
JAMES DAVIS

MATT WOLFE AWARD FOR OUTSTANDING GRADUATE RESEARCH ASSISTANT

SU24 - SP25 ECE DOCTORAL DEGREES

STUDENT NAME	PROGRAM	ADVISOR	DISSERTATION TITLE
Madhureeta Das	Computer Engineering	Kaichen Yang	Enhancing Privacy While Revealing Vulnerabilities: Strategies for Adaptation, Optimization, and Model Extraction
Casey D. Majhor	Electrical Engineering	Jeremy P. Bos	Performance Characterization and Optimization of a Point-Cloud-Based Path Planner in Off-Road Terrains
Md Aamir Rahmani	Electrical Engineering	Bruce Mork	Modeling of Inverter-Based Resources for Hardware-in-the-Loop Testing of Protection and Control Schemes

ENTERPRISE HIGHLIGHT



LEADING *with Resolve*

Engineers at Michigan Tech continue to advance their skillsets not only in the classroom, but as members of the Robotic Systems Enterprise (RSE) competing in the AutoDrive Challenge II.

Advisors **Jeremy Bos** and **Darrell Robinette** are in year four of coaching their students to deliver on product design, safety, and solution management for a fully autonomous vehicle. Sponsored by General Motors and the Society of Automotive Engineers (SAE), RSE members are about to kickoff their final year (year five) of creating an SAE level-four autonomous vehicle through dynamic and static challenges that compound each year.

OVER THE SUMMER, STUDENTS SUCCESSFULLY COMPLETED AUTONOMOUS OPERATION WITH A COMPETITION AT MCITY IN ANN ARBOR, FEATURING CHALLENGES BASED ON MAPPING AND ROUTE PLANNING.

"The dynamic challenges this year with the vehicle at Mcity were localization, where our students had to take the vehicle through a predefined course," says Robinette. "After moving from the start line, the challenge includes cutting GPS and the vehicle had to traverse through the course using LiDAR sensors to navigate down a hill, around a traffic light, through a metal tunnel, and with a railroad crossing stop."

Students work diligently from semester kickoff and beyond finals to prepare for the challenges at Mcity. "Our Enterprise students integrated an HMI (human-machine interface) stack in the vehicle with the 18-20 waypoints in Mcity that we map into our navigation system. Upon arrival, the AutoDrive Challenge II organizers gave us a route that skips around to only five or six waypoints," says Robinette.

"This forces our students to develop flexibility in their map and path planning with a minimal number of button presses to feed into the HMI."

Beyond dynamic challenges, the students are also faced with static challenges. This year's focus was on developing a robust sensor suite for adverse conditions.

"Our students' specific challenge was on autonomous vehicle bullying with paintballs on the LiDAR to blind the vehicle. They developed a prototype, similar to motorcycle tear-offs, that go over the LiDAR and when it detects clouded vision, it pulls a tear off to clear the LiDAR lens."

THE STUDENTS BUILT A PROTOTYPE AND FOLLOWED THE ENGINEERING PROCESS TO DIAGNOSE, DETECT, AND DEMONSTRATE, AND INTEGRATED IT INTO THE VEHICLE DIAGNOSTIC AND CONTROL SCHEME.

This year, students had a larger focus on validation and testing while following a safety rubric. The vehicle safety and testing team was led by Nick Johnson, who ensured each student had a role in the research, engineering, and the presentation of their work.

"The beautiful thing about the Enterprise program is the personal growth of the students—taking responsibility for what they are assigned to do, leading and managing people, providing clear direction and requirements," says Robinette.

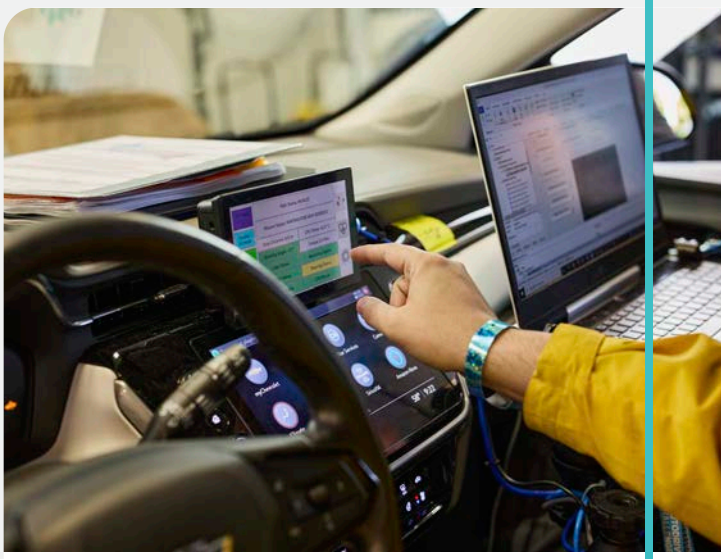
"There is no replacement for having students who step-up and have that leadership skill."

With effective and engaged leadership, the students were able to take the ambiguity of the validation and testing requirements and develop a comprehensive testing rubric to score well.

"Our students did very well in this aspect of the competition, maybe the best we've ever done, with a second place finish in our concept design and safety systems requirement portions," says Robinette.

"No matter the final results, our students focused on figuring out the problem and solving it. If it fails, they learn from it and improve it for next time. We teach our Enterprise students to be resilient and successful, but also that if they don't succeed, to figure out why and get a solution in place. That tenacity is something GM and other employers value."

The RSE students will have another year to elevate their skills and make improvements through year five with a new focus on vehicle cybersecurity. SAE and GM have extended the AutoDrive Challenge II into a fifth year as cybersecurity becomes an even more critical aspect of mobility systems.



"The AutoDrive Challenge II gives our students from MAE, ECE, mechatronics, and robotics a chance to mimic industry—learning to start with the math and model-based development before moving into prototyping and hardware," says Robinette.

"It's not about engineering the car, but about what you need the car to do."

While the RSE team awaits the new rules and the challenges for year five, the students are hard at work updating the vehicle based on issues they discovered in the competition.

IN TRUE MICHIGAN TECH STYLE, THEY ARE ON TASK EACH DAY, STRENGTHENING THEIR CORE CAPABILITIES AND LOOKING AHEAD WITH CONFIDENCE GAINED THROUGH EXPERIENCE.

OPEN SOURCE HARDWARE ENTERPRISE (OSHE)

The Open Source Hardware Enterprise (OSHE) is a vibrant enterprise that focuses on creating diverse projects that benefit the community and follow the spirit of open-source ethics. Projects in the enterprise range from creating a miniature factory that produces custom chocolate bars to trying to recycle 3D prints to create new filaments or assisting the College of Forest Resources and Environmental Science with tracking Lyme disease in the local forests.

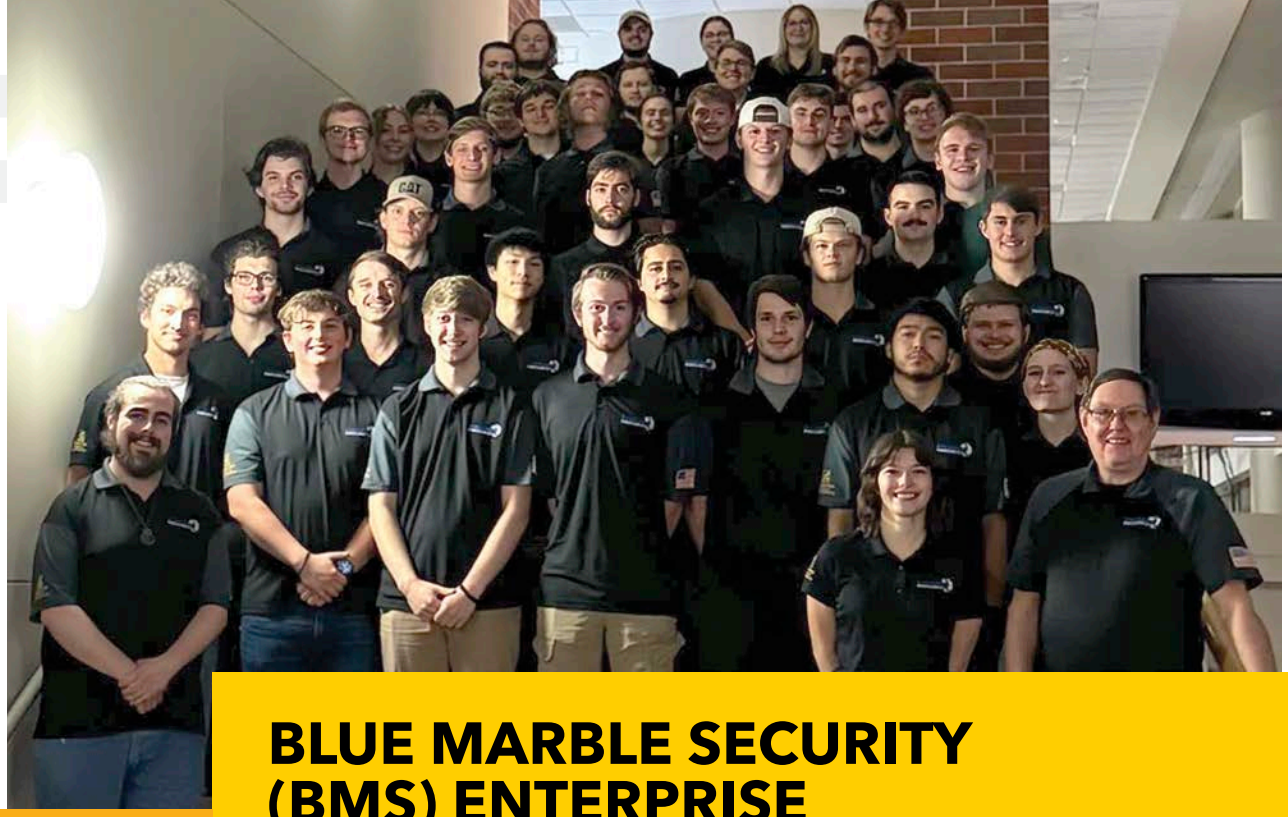
ADVISOR:
SHANE OBERLOIER, ASSISTANT TEACHING PROFESSOR

2023-24 PROJECTS	DESCRIPTION	SPONSOR
ATX Power Supply	Design and prototype an open-source, high-powered ATX power supply. The first prototype is split up into three printed circuit boards (PCBs): EMI filtering & PFC, LLC Converter, and DC-DC Converter. These PCBs are made larger than the ATX form factor to provide ample space for the testing and debugging phase.	Plexus
Hibernacula Manipulation	Develop an experiment focused on mitigating the harmful effects of white-nose syndrome on bats in abandoned mine hibernacula. The CFRES and DNR aim to lower temperature within mines to reduce the growth rates of the fungus responsible for white-nose syndrome, while maintaining temperatures adequate for bat hibernation.	College of Forest Resources and Environmental Science (CFRES) and Michigan DNR
Flex Automation HMI for Industrial Applications	Utilizes easily accessible materials to create a Human-Machine Interface (HMI) screen that can interface with ABB Robots. The screen communicates with the robot, displays important information, performs movement tasks, and other similar operations to a regular HMI screen at a fraction of the cost.	ECE Department

ADDITIONAL ONGOING OSHE PROJECTS INCLUDE:
Electric Viola, Laser Tag, Restruder, Kewee Meter, BREAD BUNS, BREAD DAQ, Tesla Coil, and AR glasses.

2024-25 PROJECTS	DESCRIPTION	SPONSOR
RecycleBot	Helping household 3D printer users cut down on costs and waste material. Waste is reduced and costs cut by melting down old 3D printer filament and mixing in a percentage of new material to maintain standards of material properties. RecycleBot is a modular design that includes an extruder, a cooling module, a rewinder, and a vacuum unit.	ECE Department
Synthesizer	Develop a budget-friendly, musically useful subtractive synthesizer instrument with multiple base sound wave shapes and adjustable parameters for filtering and sound amplitude via direct user input or a time-varying envelope output. This project also aims to be a useful educational piece for designing every aspect of a hardware synthesizer from scratch, which involves designs for direct digital synthesis (DDS) methods, sending and receiving data using standard digital communication protocols, analog and digital signal processing, and multi-rail power delivery solutions.	
Thunniform Robot	Build on the OpenFish project by improving mobility, adding buoyancy control, adding wireless control capability, and adding some form of camera support. The type of swimming form utilized for this project is thunniform swimming, which uses the caudal or "tail" fin to move forward and side to side. The term thunniform swimming means to swim "like a tuna."	

ADDITIONAL ONGOING OSHE PROJECTS INCLUDE: BREAD BiOS, Digital Multimeter, Filament Flip-Flop, Husky Clean, IRL Subtitles, Multi-FX Pedal, and Open Mobility. **SPONSORS INCLUDE:** General Motors Foundation, Techtmann Lab, Keweenaw Ecological Innovations, ECE Department



BLUE MARBLE SECURITY (BMS) ENTERPRISE

ADVISOR:
GLEN ARCHER, TEACHING PROFESSOR

This student-led enterprise focuses on securing the future through the thoughtful use of technology. The team specializes in engineering design and product development. BMS has developed a culture that fosters high professional standards, creativity, and productivity. BMS defines the word "national security" through the provision of technological support to the defense, corporate economy, and personal well-being of the nation and all its people.

2023-24 PROJECTS	DESCRIPTION	SPONSOR
GM EMI Low Cost Pick Point	Develop a commercial off-the-shelf (COTS) vision system for unexpected part detection in the manufacturing process.	General Motors Manufacturing Initiative
GM EMI Digital Twin	Develop and analyze a "digital twin" of a GM manufacturing cell that can be used to simulate processes without physical parts.	General Motors Manufacturing Initiative
Submersible Power Simulator	Design and implement a simulator to train U.S. Navy Special Operations forces in the operation and maintenance of a small submersible vehicle. This project is paired with the Everything Tablet Project at Michigan Tech and with an Autopilot/Navigation project at the University of Dayton.	Systems Engineering Research Center (SERC)
Everything Tablet	Import and digitize training, operations, and maintenance manuals for a small submersible vehicle for use by U.S. Navy special operations forces. The Everything Tablet provides immediate access to operations, maintenance and troubleshooting information for routine and emergency actions. This device supports both training and operational deployment.	SERC
Friendly Forces	Design, build and test a device for the U.S. Army that will allow special operations forces in combat situations to securely identify friendly forces. The device must be constructed using commercial off-the-shelf components and allow special operators to construct and train local forces to operate the device.	SERC
Power Pack	Integrate a rechargeable battery into a MOLLE II rucksack frame.	ECE Department
HTVS System	Develop a heavy tracked vehicle suspension system for a 50-70 ton tracked vehicle.	Oshkosh Corporation

2024-25 PROJECTS	DESCRIPTION	SPONSOR
2024-25 projects include the bolded 2023-24 projects above, as well as the projects that follow:		
GVSC	Create a door assist for a 700-900 pound door on a military armored truck.	Ground Vehicle Systems Center (GVSC)
FTI	Work to put solar panels on the south-facing wall of the Electrical Energy Resources Center (EERC) to power our lab and potentially every floor of the building in the future.	Faith Technologies, Inc.

WIRELESS COMMUNICATION ENTERPRISE (WCE)

The WCE focuses on wireless, optical, renewable energy, user interface, and biomedical technologies. WCE functions much like an engineering company with a variety of different project teams. These small project teams allow team members to be very involved in project work and provide ample opportunity for them to gain technical skills, business presentation skills, and leadership experience.

ADVISOR:
KIT CISCHKE, TEACHING PROFESSOR

2023-24 PROJECTS	DESCRIPTION	SPONSOR
LiDAR iPhone App	Sizing bolts and nuts with an iPhone.	ECE Department
Stellantis Battery Monitoring System	Create a fully functioning data acquisition (DAQ) system to electronically monitor the continuity of solder joints during the thermal cycling test.	Stellantis
SERC Drone Video Streaming System	A cellular drone control module.	SERC

2024-25 PROJECTS	DESCRIPTION	SPONSOR
Stellantis Battery Monitoring System	Bluetooth battery management system.	Stellantis
Pfizer Inventory Management Software	A historian software for Pfizer's control systems.	Pfizer
Snowmobile Collision Warning System	An infrared, machine-learning-based early alert system for snowmobiles with support from Bo-Boen Snowmobile Club.	Bo-Boen Snowmobile Club
Underwater Blue Laser Communication System	Prototyping a digital communication system through the medium of salt water	ECE Department
User-friendly LED Controller	User-Friendly LED (UFLED) is developing a product and process to allow users to chain together multiple LED matrices and program them using an application.	ECE Department
Fake USB Camera	The webcam emulator team is developing a device that stores visual media and presents it as a camera feed to a host computer.	ECE Department

ROBOTIC SYSTEMS ENTERPRISE

ADVISORS: **DARRELL ROBINETTE, JEREMY BOS**

The Robotic Systems Enterprise (RSE) focuses on seamlessly integrating exceptional knowledge in electronics, robotics, and programming to solve real-world engineering problems. All majors are welcome—the team depends on more than just the skills and talents of engineering and science majors. RSE produces solutions that contribute to industry, recreation, and medical research.

2023-24 PROJECTS	DESCRIPTION	SPONSORS
AutoDrive Challenge II	The AutoDrive Challenge II kicked off in September 2022 for the introduction of the year one challenges. AutoDrive Challenge II is a four year autonomous vehicle competition between several universities in the U.S. and Canada. Each university is required to engineer and build the SAE J3016 level 4 autonomous vehicle by the end of year 4. SAE J3016 level 4 is High Driving Automation, which means the operator is not required to take control of the vehicle until an emergency or the operator is willing to take over. General Motors, the main sponsor for the SAE AutoDrive Challenge II will provide a Chevrolet Bolt EUV to all universities competing in the AutoDrive Challenge II in Summer 2023. The competitors need to modify parts of the vehicle every year to incrementally increase the complexity and abilities of the vehicle. Various sub-teams will tackle different competition aspects, including a Mobility Innovation Challenge, MathWorks Simulation Challenge, Software Requirements & Specifications Team. Teams will also construct various aspects of the vehicle itself, including a sensor/computer mount, perception system, control system, and CAN communication system.	GM SAE MathWorks Siemens Ushr Hexagon Cepton

SUB-TEAMS: Innovation/Accessibility, Mapping and Planning, Perception, Build, Project Management, Simulation, and Controls.

2024-25 PROJECTS	DESCRIPTION	SPONSORS
AutoDrive Challenge II	AutoDrive Challenge II is a five year competition to create an SAE Standard Level 5 Autonomous Vehicle from a GM-donated 2022 Chevrolet Bolt EUV. The team is broken into Perception, Planning, Control and Simulation, Human Machine Interface, Safety and Testing, and Project Management. Main deliverables for year four include creating a redundant localization system based in LiDAR to mitigate GNSS attenuation effects, optimizing the HMI to include address selection, diagnostics, and a GUI interface, the Design Your Own Challenge event that involves creating an in-house testing course to score the vehicle based on CAN logs, and optimizing collision boundaries in perception data for a cleaner and more realistic perceived environment.	SAE, GM, Intrepid, Cepton, Hexagon, Danlaw, Intel, NovAtel, Nexteer Automotive, OXTS, CTech Manufacturing, Dynamic Map Platform, Siemen

SUB-TEAMS: Planning, MathWorks+Controls, HMI, Perception, and Safety and Testing.

2023-24 SENIOR DESIGN TEAMS

TEAM NAME	PROJECT DESCRIPTION	SPONSOR	ADVISOR
View Factor Calculation	Research, implement, and evaluate third-party ray tracing libraries to inform possible performance enhancements to TAI's view factor calculation software.	ThermoAnalytics (TAI)	John Lukowski
Republic Mountain Lake Renewable Energy Substation Evaluation	Develop a 138/34.5 kV substation at Republic Mountain Mine site to be integrated with the Alternative Energy Enterprises (AEE) renewable energy generation system.	Republic Mountain Lake, LLC	John Lukowski
Accelerometer Sensing Pack	Develop a small battery-powered device to record acceleration data at a specific resolution for a minimum of one week to allow Kimberly-Clark to test how shock and vibrations affect their products.	Kimberly-Clark	Trever Hassell
Monitoring Harmonic Distortion Levels in Power Systems	Develop a system of devices that could be used to monitor increasing levels of harmonic distortion in U.S. power systems using ITC-standard devices.	ITC Holdings	John Lukowski
Waupaca Foundry Automated Cast Cleaning	Autonomously remove all core sand from the passages of a cast metal part with complex internal passages and verify the passages are clear of blockages.	Waupaca Foundry	Trever Hassell
Waterfowl Retrieval System - Fowl Fetcher	Develop a robot to safely locate a dead duck, traverse different types of terrain easily, and return it to the hunter with minimal outside control.	William Lepak	Tony Pinar
Real-time Hazard Evaluation and Mitigation Instrument (R.H.E.M.I)	Utilize SICK's Multiscan100 LiDAR in a R.H.E.M.I, or Real-time Hazard Evaluation and Mitigation Instrument, relying on tactile pressure points to alert the user of nearby potential hazards.	SICK and the ECE Department	Tony Pinar
Low Cost Motor Controller	Develop a portable and modular motor drive system equal in functionality to the current in-lab motor drive unit to demonstrate the capabilities of the ECE Department's power labs, power electronics and electric machines and drives.	ECE Department	Trever Hassell

EAC CHAIR Rob Cooke, Calumet Electronics (far left)

TEAM MEMBERS: (second from the left to the right) Tony Pinar, Zoey Mishler, Chase Pelletier, Alex Beltz, Nathan Soule, and Alexander Kwapisz.

SPRING 2024 LARRY KENNEDY INDUSTRY INNOVATION AWARD

R.H.E.M.I.

REAL-TIME HAZARD EVALUATION AND MITIGATION INSTRUMENT

ADVISOR
Tony Pinar

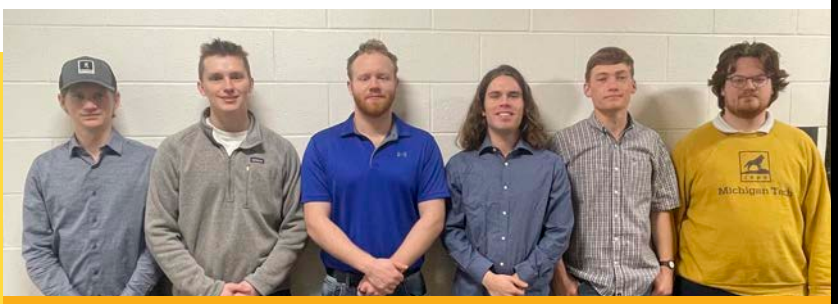
SPONSOR
SICK and ECE Department

SPRING 2025 LARRY KENNEDY INDUSTRY INNOVATION AWARD

BATTERY INDICATOR SYSTEM

ADVISOR
Flavio Costa

SPONSOR
Our Next Energy (ONE)



TEAM MEMBERS L-R
Liam Raasakka, Tom Huotari, Owen Armstrong, Charles Osmun, Greg Gaudreau, and Andrew Holland.

Pictured: *Zach Tauriainen and Nicholas Pierce*

2025 SENIOR DESIGN AWARDS

FIRST PLACE CRIMMINS RENEWABLE ENERGY DISTRIBUTION

TEAM MEMBERS
Zach Tauriainen
Nicholas Pierce
Brett Najmowicz
Emily Moyer
Luke Leslie
Marcus Wu

ADVISORS
Trever Hassell
Tony Pinar

SPONSOR
Roger Crimmins

2024-25 SENIOR DESIGN TEAMS

TEAM NAME	PROJECT DESCRIPTION	SPONSOR	ADVISOR
ITC Capacitor Bank Protection Team	Implement resilient protection for a capacitor bank using real-time impedance measurements to address system and environmental changes using microprocessor relaying.	ITC Holdings Co.	Trever Hassell
Improved Performance of Windows Build System	Address the inefficiencies in the current Windows build system caused by outdated components, including Perl scripts. The project will reduce build times, enhance reliability, and future-proof the system.	Microsoft	Tony Pinar
Battery Indicator System for Stationary Power Storage System	Develop an at-a-glance status display for the end of a shipping container, providing a clear visual representation of the system's state, as well as a dedicated controller to manage the display, process data from the Aries Grid system, and drive the indicator grid effectively.	Our Next Energy (ONE)	Flavio Costa
Crimmins Renewable Energy Distribution	Conduct a study to determine the feasibility of implementing a solar field at the previous Presque Isle Power Plant site. Evaluate equipment design options, perform a financial analysis, and determine baseline costs and a potential payback period.	Roger Crimmins	Trever Hassell & Tony Pinar
Consumers Energy Wildfire Mitigation	Develop a wildfire mitigation plan for Consumers Energy in their distribution area in northern Lower Michigan to implement on low-voltage distribution lines to reduce the risk of a forest fire.	Consumers Energy	Trever Hassell
LiDAR-based Ice Detection (LID)	Create a system utilizing LiDAR that to alert pilots to ice building on their plane's wings in real time by developing ROS2 code that will translate LiDAR data, for distance and reflectivity, to determine if icing is present or not.	SICK/ECE Department	Tony Pinar
MTU ECE Kiosk	Create an interactive kiosk for the ECE Department to provide students with key information including the construction of the physical kiosk and website.	ECE Department	Britta Benedict

ALUMNI HIGHLIGHT

Michael Pulick and his wife, Elizabeth, with Blizzard T. Husky.

ON SOLID *Footing*

For **Michael Pulick** '86, Michigan Tech wasn't just the place he earned his electrical engineering degree—it was the place that shaped how he approaches every challenge in life.

PULICK NOTES:

"Equation after equation, my courses taught me how to solve problems. That discipline gave me confidence. No matter the uncertainty, I knew I had a process I could rely on."

Like many students, he didn't arrive in Houghton with a clear path. He sampled chemistry, mechanical engineering, and civil engineering before finding his passion in controls within electrical engineering. But it wasn't only the classroom that left a mark.

DURING HIS JUNIOR YEAR, PULICK JOINED THE BLUE KEY NATIONAL HONOR SOCIETY. A YEAR LATER, HE FOUND HIMSELF ELECTED PRESIDENT AND LEADING THE UNIVERSITY'S SIGNATURE WINTER CARNIVAL.

"It really stretched me," he recalls. "Budgets, personality conflicts, public speaking—it was all new. Suddenly I was preparing speeches, doing TV and radio interviews, and coordinating a big team. Those experiences became the foundation for everything I would do later in life."

After graduation, Pulick joined General Electric's highly regarded Manufacturing Management Program. The role put him straight into the action—overseeing quality control, managing teams, and keeping plants running. One assignment had him supervising 50 union employees building washing machines.

"I asked the steward if I could try each job for 20 minutes over the course of a week," he says. "It was humbling, but it taught me a lesson I've never forgotten: don't ask people to do something you're not willing to do yourself."

That mindset—and a willingness to take risks—quickly set him apart. When an idea he proposed didn't pan out, GE leaders didn't see failure. They saw courage and initiative.

PULICK NOTES:

"My biggest mistake became my greatest opportunity."

Over the next decade, Pulick moved through a variety of leadership roles at GE while also earning his MBA in Chicago. Eventually, he joined W.W. Grainger, one of the largest industrial supply companies in the world. There, he rose to President of Grainger US, then President of Grainger International, leading businesses across Asia, Europe, and Latin America.

"Grainger gave me the chance to grow in a culture that aligned with my values," he says. "As a leader, you have to bring clarity and focus—that's something that goes all the way back to my Michigan Tech days."

Through all of it, Pulick never lost touch with the university that helped launch his journey. He's served on the College of Business Advisory Board, chaired the Michigan Tech Fund Board, and today—along with his wife Liz—serves as Co-Chair of Michigan Tech's $350 million capital campaign, the largest in the University's history.

IN 2024, HE WAS HONORED WITH MICHIGAN TECH'S DISTINGUISHED ALUMNI AWARD, A RECOGNITION THAT MEANT MORE TO HIM THAN ANY CORPORATE TITLE.

"Michigan Tech didn't just prepare me for a career," Pulick reflects. "It gave me the confidence to lead, the values to guide me, and a community I still care deeply about. That's why Liz and I are committed to helping Tech reach its next level—for the students who will be standing where I once stood."

Michael Pulick receives the Distinguished Alumni Award.

IMPARTING KNOWLEDGE *and Experience*

Reaching students in an engaging manner and ensuring they demonstrate proficiency in coursework are core tasks of educators. **Kit Cischke** has dedicated the past 20 years to improving his students' learning experiences, and it shows.

Last fall, he received the Innovative and Out of Class Teaching Award from the Jackson Center for Teaching and Learning at Michigan Tech, which speaks to the unique approaches he brings into the classroom.

Following attendance at an Atlanta conference, Cischke was introduced to a new grading model that moved away from traditional points-based grading scales.

"I have taken every assignment and made it pass/fail. If the students meet the specifications, they pass. If we care about them learning the material, we should give them opportunities to remediate where they didn't learn it and give them the chance to rework things, while building reflection into the process," says Cischke.

The transition to pass/fail structure has enabled Cischke's students to contemplate problems in their work, growing through their errors. The structure changes the focus from earning points to mastering the material covered in class.

CISCHKE SEEKS A POSITIVE APPROACH TO EVALUATING STUDENT PERFORMANCE, LOOKING FOR WHAT THEY GOT RIGHT SO THEY CAN BUILD ON IT–FOCUSING ON A 'YES, IF' PHILOSOPHY.

"What can we do to make the students' lives easier that makes learning the material and doing the work easier? Learning is hard; it should be an uncomfortable process," says Cischke. "We joke around in the classroom in a way that helps students make humorous connections to the material, which I find essential for student engagement and in ensuring they grasp the material."

Using another conference session as a growing point for his teaching process, Cischke has updated his curriculum to include problem-based learning opportunities, where students can make connections between the material and real-world scenarios.

"I created an ambiguous assignment, where the students automate a soda machine. I find that with an ill-formed problem and not a lot of detail, they really dig into the specifications of the problem, explore, and become self-motivated," says Cischke.

WITH POINTS REMOVED FROM THE GRADING SYSTEM, ASSIGNMENTS LIKE THESE MOTIVATE STUDENTS IN A DIFFERENT WAY.

One of the students that nominated him for the award noted that, "The main thing you are trying to accomplish here is happening. Your assignments are more interactive, you ask questions that make you think, and make you put in effort to come up with a right answer and I can definitely say I have not had that experience with any other instructor/professor."

While learning should create challenges for students, Cischke focuses on making the learning fun.

"Students get wildly creative and I get to watch that. The biggest thing ultimately is that I love watching my students graduate and do cool things and I get to know that I had an impact on their career," says Cischke.

Kit Cischke (left) receives the Innovative and Out of Class Teaching Award from Michigan Tech's Provost, Andrew Storer.

"The experience gained from Enterprise is so useful in the real world, because it's so much like working in a professional setting. The practical experience is so powerful. I would imagine that most stories Enterprise students tell during job interviews come from Enterprise experiences—teamwork, entrepreneurship, budgeting," says Cischke.

Beyond the award for Innovative and Out of Class Teaching, Cischke was also recognized with one of eight inaugural Enterprise Distinguished Service Awards. These new awards celebrate 25 years of the Enterprise program.

After helping to found one of Michigan Tech's original Enterprise teams as an undergraduate student, Cischke has served as the advisor to the same Enterprise, the Wireless Communications Enterprise (WCE), since returning to Michigan Tech as a faculty member.

When asked about receiving one of the inaugural Distinguished Service Awards, Cischke says, "It has been an honor to be a part of what I think is one of the most distinguishing aspects of engineering education at Michigan Tech. Watching the students do what they do has been a reward in and of itself."

"There are a lot of former Enterprise students who have gone on to do amazing things, and to be a part of that as an advisor—and to receive recognition for what goes into advising—is icing on the cake," says Cischke.

EXTERNAL ADVISORY COMMITTEE

The mission of the External Advisory Committee is to serve the Department of Electrical and Computer Engineering in an advisory capacity, providing counsel to the department chair and the faculty from the viewpoint of industry. The aim of these activities is to improve the quality of electrical and computer engineering education at Michigan Tech and create connections between ECE graduates and industry employers. Each year, the EAC presents the Larry Kennedy Innovation Award to a Senior Design team.

Rob Cooke presenting the 2024 Larry Kennedy Innovation Award during the Spring 2024 Undergraduate Banquet.

Eric Johnson presenting the 2025 Larry Kennedy Innovation Award at the Spring 2025 Undergraduate Banquet.

ELLEN BAUMAN
IBM

KEITH BEHNKE
STRYKER

SCOTT BLECKE
GREAT LAKES ENERGY

ESTER BUHL
ITC

BRENT CARLSON
3M ENGINEERING

TONY CHAMPAGNE
NEXTEER

ROB COOKE (CHAIR)
CALUMET ELECTRONICS

DEREK DOUGHERTY
EATON

SEAN FULLER
GENTEX

BEN GALLOWAY
DEMATIC

GRACE GRIESE
GM

ERIC JOHNSON
PLEXUS

STEVE KENNELL
FMTCS

KURT LAFRANCE
CMS ENERGY

ERIC LARSON
3M

JON LARSON
SCHWEITZER ENGINEERING LABORATORIES

KEN LEISENRING
FORD

GIOVANA LEMKE
SYSTEMS CONTROL

BILL LEPAK
CLEVELAND CLIFFS

STEVE MATHE
HARRIS

BRETT MCNALLEY
MILWAUKEE TOOL

MATT MERRY
MICROSOFT

MATT NIXON
GENTEX

DAVE PERRY
RETIRED

KEVIN SAARI
MJ ELECTRIC

NATHAN SALIGA
FCA

NIRMAL SINGH
DTE ENERGY

RADE TRIMCESKI
META

FACULTY HIGHLIGHT

SHARED *Mission*

When the Michigan Economic Development Corporation's (MEDC) sought grant applications to support semiconductor education and training programs across the state, **Dr. Chris Middlebrook** was uniquely positioned to respond. Having heard from industry on the topic, he was already engaged in workforce development efforts for the electronics manufacturing industry.

Reaching out to regional manufacturers, Middlebrook was able to identify a market to serve through the proposal, formalizing interest with rapidly growing Calumet Electronics.

"The proposals focused on micro-credentials and expansion—expanding the ECE lab space to provide more students hands-on experiences in the lab and draw them in to the program and career pathways," Middlebrook says.

"Michigan Tech holds an advantage in that we are an agile R1 research university with capacity for student-focused industrial workforce programs. We can develop and nurture electronics/semiconductor manufacturing workforce development programs at Michigan Tech here, in addition to our core mission, with lab facilities that are scaled and tailored to the student experience."

Students make circuit boards by selectively etching away copper to leave traces that connect components.

THE PRINTED CIRCUIT BOARD (PCB) FABRICATION LAB SPACE MODIFICATIONS WILL ALLOW THE DEPARTMENT TO INCREASE SPACE AND ENHANCE EQUIPMENT TO TRAIN MORE THAN 70 STUDENTS ACROSS TWO SEMESTERS.

With the micro-credentialing and technician-focused courses, Middlebrook works closely with state partners such as Calumet Electronics to validate the curriculum, understand industry needs and challenges, and expand Michigan's qualified personnel entering the workforce.

Dr. Middlebrook explains the process of manufacturing printed circuit boards to students in the PCB Fab Lab.

"Calumet Electronics is encouraged by the growth and expansion of workforce development in advanced electronics and semiconductors. Our future is dependent on having highly educated and skilled people who have been exposed to these topics," says Rob Cooke, chief business officer.

With Calumet Electronics located only 12 miles from campus, the facility offers unique opportunities to hold events to broaden Calumet Electronics' contextual knowledge and have a meaningful lasting impact.

"We held a series of three separate events two Saturdays in a row where participants attended a lecture on electronics packages and assembly of components and paired that with a hands-on lab event assembling components onto bare printed circuit boards, so the employees can see firsthand what happens after the manufactured printed circuit boards leave Calumet Electronics," says Middlebrook.

"Creating these opportunities helps with employee retention and builds meaningful knowledge of the crucial role they hold in the supply chain."

These grants are being offered in response to Michigan's increasing demand for skilled technicians, operators, and engineers in the electronics/semiconductor industry. Ultimately focused on building a workforce to attract and retain companies to the state of Michigan, Middlebrook's grant highlights the commitment of the state to electronics/semiconductor manufacturing in supplying automotive, aerospace, electronics, and durable goods industries.

The grant comes in two pieces: one segment focused on back-end semiconductor curriculum for technician and maintenance micro-credentials in the amount of $1.2 million and an additional $838,000 focused on expansion of the talent pipeline and development of a concentration in advanced manufacturing of semiconductors, advanced substrates, assemblies, packaging, and testing.

"THESE GRANTS HAVE ALLOWED US TO ENHANCE, CHANGE, AND IMPROVE COURSE OFFERINGS, AND THE LAB EQUIPMENT, SPACES, AND THE SYSTEMS WHERE THE TEACHING OCCURS–FUNDING THE HUMAN TIME AND EFFORT TO REDESIGN AND DEVELOP THE COURSES," SAYS MIDDLEBROOK.

Students inspect tree-shaped printed circuit boards partway through the manufacturing process.

The new concentration in advanced manufacturing of electronics and semiconductors will create opportunities for ECE students, allowing them to seek jobs with their degree in industry, but also use their concentration to provide future employers with assurance of production knowledge. Beyond that, the new micro-credentials can be utilized by technicians and operators seeking careers or already in the electronics/semiconductor industry looking to expand their skillset without requiring a full bachelor or master's coursework.

The new micro-credentials will be offered in both intensive (short-format) or longer courses with a hybrid model to complete instruction online through the Michigan Tech Global Campus or on-campus in summer training sessions.

An appeal to the younger generation will also be made through the grant offerings with scholarships for Michigan Tech's Summer Youth Programs and Women in Engineering to train students in the focus areas of electronics/semiconductor design, fabrication, assembly, and testing–sparking an early interest.

"We are looking to create a partnership with universities and the K-12 school systems to help students better understand there are connections to human problems and grand challenges–building awareness and encouraging the importance of math at the elementary and middle school levels," says Middlebrook.

"If they build it, they're likely to return."

FACULTY HIGHLIGHT

Evaluating terrain classification and adaptive gait-switching algorithms on a legged robot. (L-R: Shivayogi Akki, Anders Smitterberg, Tan Chen)

CONTROLLED *Interaction*

With a research philosophy focused on unlocking the potential for real-world applications, **Dr. Tan Chen** is collaborating with graduate students and across departments to solve engineering challenges in robotic locomotion.

Chen combines his experience in both mechanical and electrical engineering to expand the possibilities of robotics and automation control. His research projects in human and legged locomotion span quadruped, biped, and humanoid robots.

CHEN AND HIS TEAM WORK TO CONTROL THE INTERACTION BETWEEN ROBOTS AND THE ENVIRONMENT THROUGH BOTH STATIC AND DYNAMIC MOTION PATTERNS TO ULTIMATELY ACHIEVE NEAR-HUMAN LOCOMOTION, STRIKING A BALANCE BETWEEN STABILITY, EFFICIENCY, AND TERRAIN ADAPTABILITY.

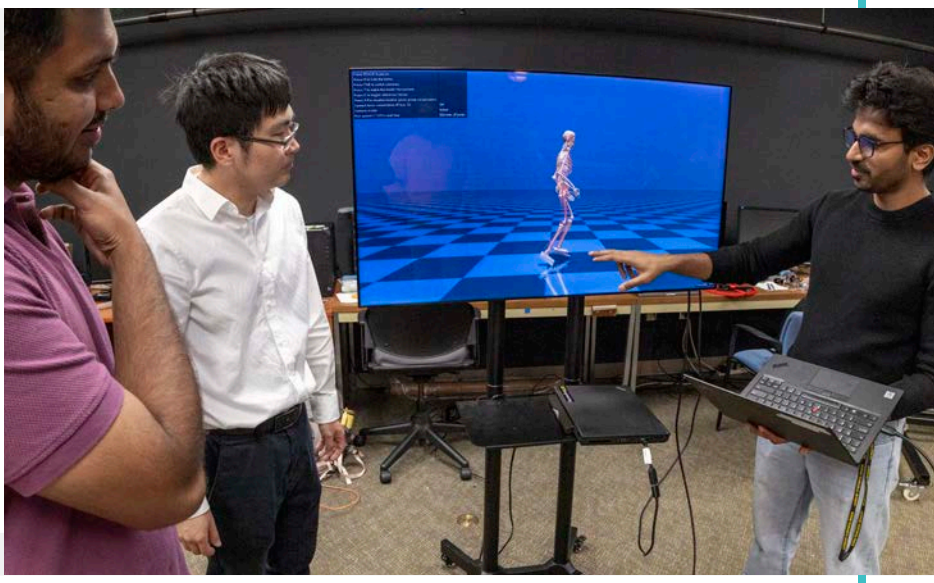
"This level of control enables us to use passive dynamics to let gravity drag the leg—to place the foot and follow natural motion," says Chen. "It's not only a matter of considering dynamics for where the foot should go, but allowing gravity to be part of the solution."

THROUGH A TWO-YEAR GRANT FUNDED BY NASA, CHEN AND HIS THREE GRADUATE STUDENTS HAVE $300,000 TO ACHIEVE THREE GOALS IN THE LUNAR ENVIRONMENT:

- Use template models to explain fundamental mechanics between robots and the environment.
- Build a musculoskeletal model and high-fidelity environment and apply it.
- Develop a hyper-gravity simulator to test the findings with human experiments.

"WE ARE WORKING TO REPRESENT THE LUNAR LOW-GRAVITY ENVIRONMENT THROUGH SIMULATION."

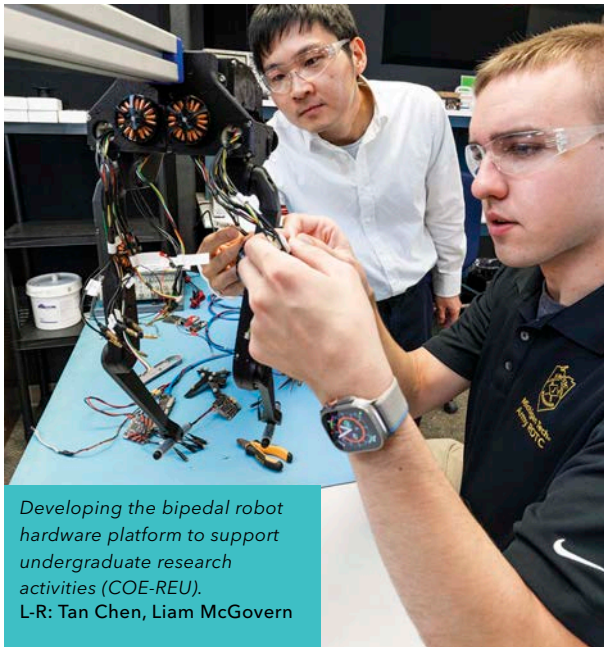
"By doing that, one fundamental question we are working to address is how humans walk on the moon and exploring how to make the gait more efficient," says Chen.



Musculoskeletal modeling and simulation in MuJoCo to investigate human locomotion in reduced-gravity environments. (L-R: Dhanush Biligiri, Tan Chen, Shivayogi Akki)

Using simulation and reinforcement learning, Chen and his team can better understand the interaction between humans and the lunar environment, and they are working to define energy efficiency, walking performance, and comfort.

"We are developing a detailed musculoskeletal model in a high-fidelity environment to see how a different gait may impact the musculoskeletal health of astronauts in space," says Chen. "We are collaborating with professors in sports science and kinesiology and using experimental work with humans in low-gravity environments to validate the simulation results."



Developing the bipedal robot hardware platform to support undergraduate research activities (COE-REU).
L-R: Tan Chen, Liam McGovern

IN THE FUTURE, CHEN HOPES HE CAN EXPLORE THE LONG-TERM IMPACT OF THE NEW GAIT PATTERN ON MUSCLE DEVELOPMENT AND BONE DENSITY.

"In investigating human gait in space, I hope we can design exoskeletons to help astronauts and establish training tools to keep them healthy and prepared," says Chen.

Through his research, Chen and his team are also pushing the limits of control theory in robotics, developing a controller that is both more efficient and robust.

"We are looking to leverage the geometric symmetry to design the controller, building symmetric hidden layers, and combine neural networks to build a better controller for the robot," he says. "In intelligently leveraging the symmetry, we are able to improve the efficiency for both computation and the motion."

Chen and his team are investigating all angles in the pursuit of efficient and robust robotic locomotion: controlled interaction, simulation and experiments with varying environments, control leveraging geometric symmetry, and even sports science.

ULTIMATELY, CHEN HOPES TO TRANSITION HIS RESEARCH TO FOCUS ON ROBOT-ASSISTED HEALTHCARE TO IMPROVE THE LIVES OF OTHERS.

FACULTY HIGHLIGHT

Dr. Paul Bergstrom and Razia Sultana measure the battery pack voltage during a cooling study.

ADVANCING *the Mobility Market*

Improving battery lifetime requires linking the physics behind battery cell aging with pack-scale strategies such as thermal management and charging control. **Dr. Paul Bergstrom**, in collaboration with thermal simulation company, ThermoAnalytics, and Michigan Tech's APS Labs, is conducting research sponsored by the Ground Vehicle Systems Center (GVSC) to improve battery lifetime modeling.

THE CENTRAL OBJECTIVE IS TO IMPROVE THERMOANALYTICS' BATTERY SIMULATION TECHNOLOGY THROUGH ACCURATE PHYSICAL TESTING OF EMERGING BATTERY DESIGNS.

The more complete characterization of battery behavior will allow their customers, including automotive manufacturers, to more accurately predict EV battery lifecycle and performance over time.

"If we can make battery cells better and last longer, we are making a future-looking, structural improvement in the mobility market," says Bergstrom.

With ThermoAnalytics, Bergstrom is collecting a larger dataset of charge and discharge patterns based on processes that were initially established by a Michigan Tech senior design team and expanded through ongoing collaboration.

"We are leveraging our facility in the EERC to do battery cell and battery pack testing in a large environmental chamber, where we are extending our analysis of both individual battery cells and the electrothermal characteristics of a small pack," says Bergstrom.

CURRENTLY IN THE SECOND YEAR OF FUNDING, THE $200,000 GRANT HAS ENABLED BERGSTROM TO SUPPORT A GRADUATE STUDENT TO CONDUCT THE TESTING OF BOTH INDIVIDUAL CELLS AND BATTERY PACKS OF UP TO 24 CELLS IN VARIOUS CONFIGURATIONS.

"We look at how the batteries behave when they are connected in various series and parallel combinations and what happens when they are co-influenced by stronger or weaker partners," says Bergstrom.

"We run an enhanced hybrid pulse power characterization (EHPPC) test developed here at Michigan Tech in collaboration with ThermoAnalytics to build an enhanced electrochemical model, not just the standard circuit model standardized by industry. We also use a process called electrochemical impedance spectroscopy (EIS) to nondestructively understand the transient behavior at the interfaces of the battery."

IT HAS TRADITIONALLY BEEN DIFFICULT TO INTEGRATE TEST PROBES INTO A VEHICLE BATTERY PACK, but using the lab's advanced instrumentation, each anode and cathode has a thermocouple that measures both the top and the bottom temperature while monitoring the voltage drop and currents across the cells.

Through the drive cycle process, Bergstrom analyzes the load and charge/discharge over time to evaluate the electrical performance, the temperature distribution profile, and the chemical state.

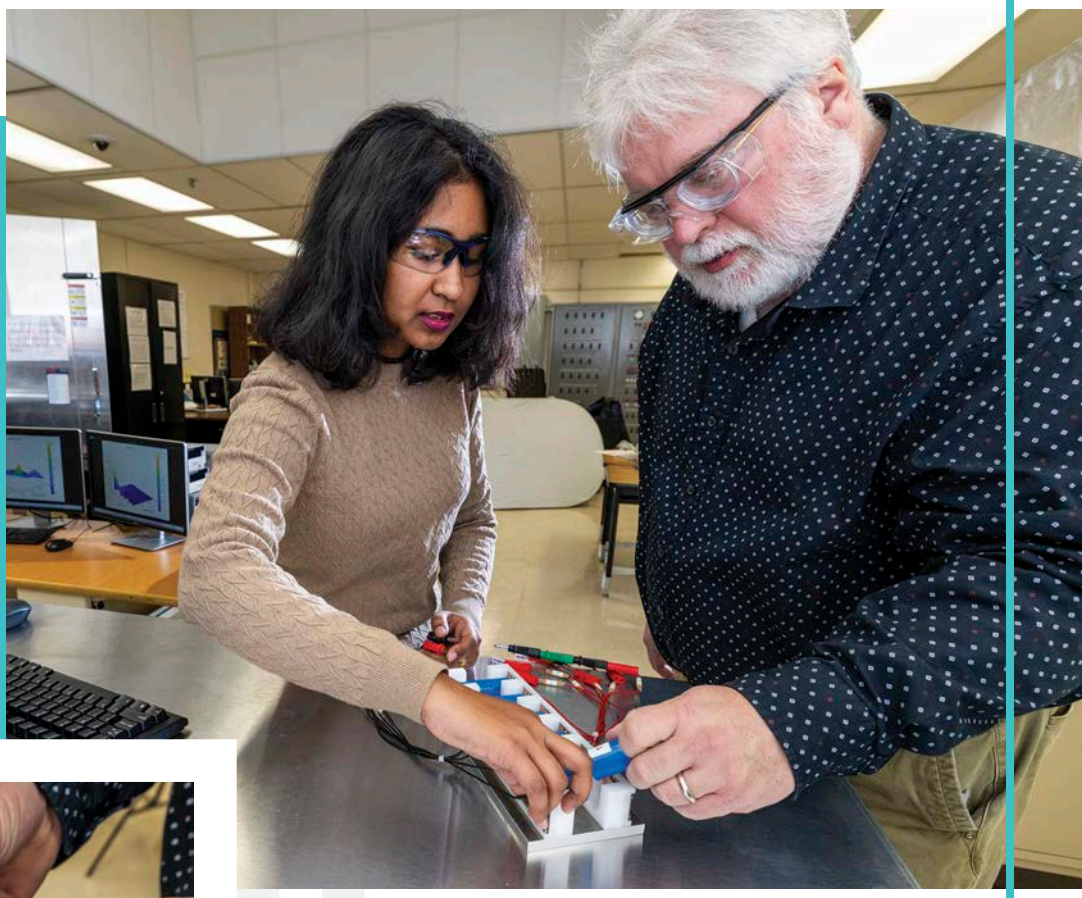
The research is improving on past methods and creating opportunities for connection with other government agencies interested in both the battery makeup and enhanced characterization.

For Bergstrom, this research and development is showcasing opportunities to improve battery cell technology beyond the automotive industry, while introducing hybridization scenarios for increased system-level efficiency.

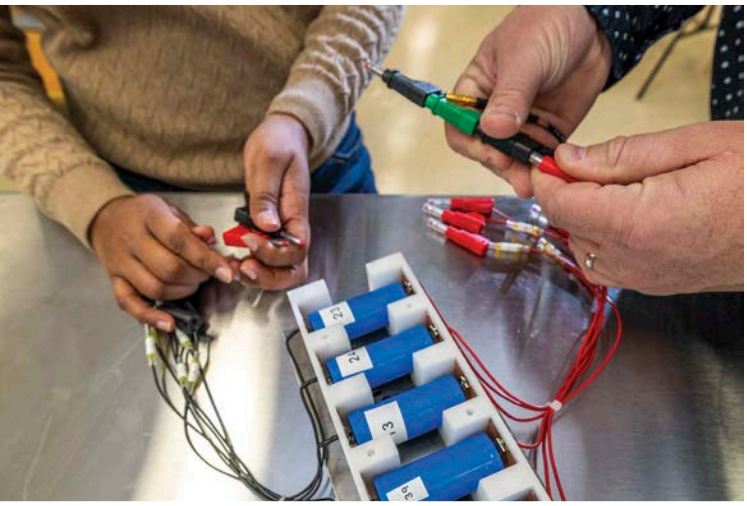
"That," says Bergstrom, "is our ultimate destination, and we are on track to get there."

"We are enhancing the modeling of batteries at the cellular level—focused on the primary physics of the cell, the electrochemistry of the cell, and how that will impact the behavior of the system as a whole," says Bergstrom.

"The ultimate goal is to develop enough smart methodology integrated into the software to optimize battery pack management."



Razia Sultana and Dr. Paul Bergstrom prepare for electrochemical impedance spectroscopy (EIS) testing.



The battery pack is prepared for EIS testing.

FACULTY HIGHLIGHT **KAICHEN YANG**

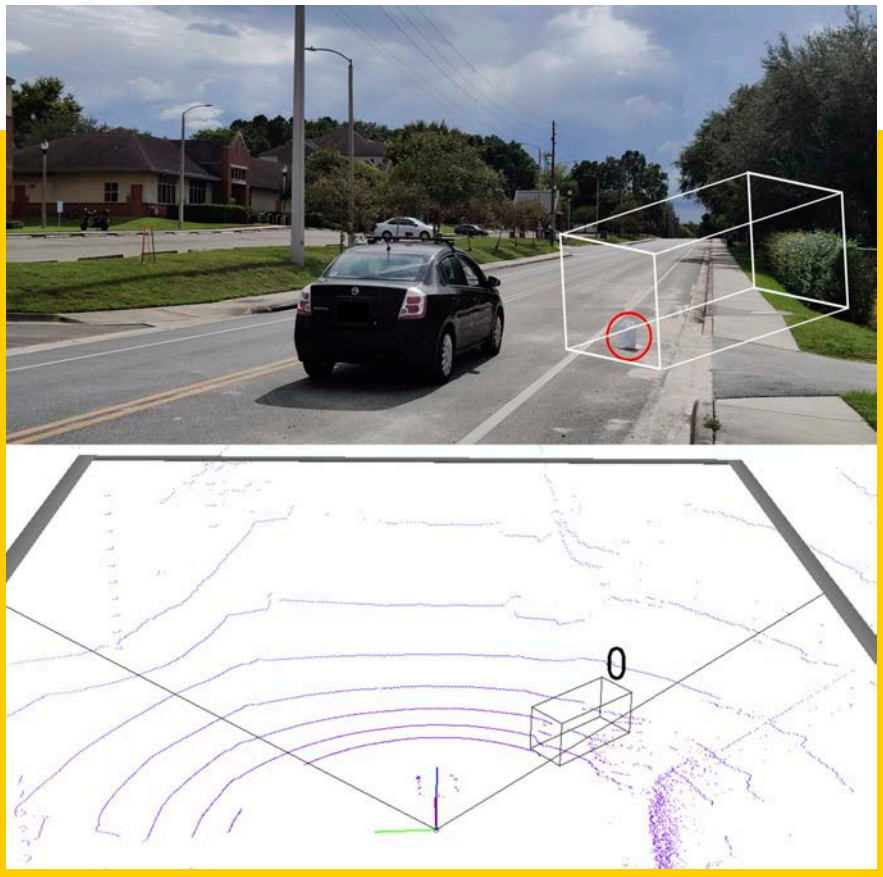
PERCEIVING *the World*

Dr. Kaichen Yang is fascinated by the way machines can learn to "see" the world.

After receiving his PhD in computer engineering from the University of Florida, he came to Michigan Tech to explore how LiDAR and camera systems can work together to help autonomous vehicles and robots sense their surroundings with greater clarity and reliability.

HIS RESEARCH BLENDS ARTIFICIAL INTELLIGENCE WITH REAL-WORLD SENSING, AIMING TO CREATE SMARTER, SAFER WAYS FOR MACHINES TO NAVIGATE.

"We use a combination of cameras and LiDAR to perceive things differently and in greater detail, at a higher fidelity than human vision," says Yang.



"This sensor-fused vision represents an opportunity to understand better how the systems can be used to sense and navigate the environment and perceive potential threats in dynamic environments."

Yang's path into this field grew out of an early interest in hardware security—understanding how vulnerabilities can be hidden in chips and electronic systems. That background gave him a sharp eye for risk, which he now applies to the fast-moving world of autonomous technologies.

With support from the National Science Foundation, he is not only working to improve the accuracy of sensor systems but also to uncover and guard against their potential security risks. In year two of a two-year, $200k grant, his current project seeks to understand and mitigate vulnerabilities in sensor fusion, while developing solutions that strengthen mobility, safety, and resilience in intelligent machines.

"Beyond developing an algorithm, the ultimate goal of the project is to look at the scenario surrounding an attack and what you can do about it—focused on minimizing potential risk from both a security and a mobility point of view," says Yang.

Excited to push the technology beyond cars and into areas like robotics and humanoid machines, Yang hopes to see a world where smart sensors and AI could make robots more capable and trustworthy partners in daily life.

DEAN'S *Teaching Showcase*

SHANE OBERLOIER, PH.D.
Assistant Teaching Professor

College of Engineering Dean Michelle Scherer has selected **Dr. Shane Oberloier**, assistant teaching professor in the Department of Electrical and Computer Engineering, for this spring's Deans' Teaching Showcase. Oberloier will be recognized at an end-of-term event with other spring showcase members and is a candidate for the CTL Instructional Award Series.

"Dr. Oberloier's focus on establishing a maker culture for his students, the campus community, and beyond, has encouraged students to tinker with their ideas and create innovative solutions, making them better engineers and entrepreneurs," says Scherer.

Oberloier is the advisor for the Open Source Hardware Enterprise, where he shares his ethos of making tools, devices and products that are easy and inexpensive for others to replicate.

THE ENTERPRISE SPECIALIZES IN BUILDING LOW-COST ALTERNATIVES TO EXPENSIVE HARDWARE AND SOFTWARE SYSTEMS, AND THEN OPENLY SHARES THE DESIGNS.

This open-source process is all about collaboration so improvements can more rapidly be made. Some notable successes to come out of the enterprise include prototypes for an audible bird deterrent system, which has spun off into a startup in partnership with Jared Wolfe (CFRES), and a fully functioning ATX power supply sponsored by Plexus Corp.

This maker culture extends to other classes Oberloier teaches, where he uses things he has built to demonstrate important points. For example, he brings 3D-printed test pieces to be broken in class, countless custom circuit boards both professionally and self-manufactured, and even a musical lava lamp to demonstrate sensors and measurement. In this way, he encourages his students to experiment with their own circuits to make their own creations.

Students and the campus community are able to take advantage of Oberloier's enthusiasm for making by visiting The Alley Makerspace, where he is the director.

HE WORKS TO ENGAGE STUDENTS ON A BROADER SCALE, HELPING THEM BRING THEIR IDEAS FROM SKETCHES TO FUNCTIONING PROTOTYPES.

"He has a passion for innovative approaches to solving problems, and he has made The Alley a place where everyone has the opportunity to explore, create and prototype their ideas in a collaborative working environment," says Darnishia Morris, assistant dean of the Pavlis Honors College.

And his work with the maker community does not stop at the campus' boundary. He is the co-founder of Superior Fab Lab, which has coordinated MakerFest, an event for the local community. The objective is to inspire people to go build something, to try something new, and to ask questions and learn from the exhibitors at the festival.

"Dr. Oberloier has a remarkable ability to inspire students, especially those in the early stages of their academic journey," says Jin Choi, former ECE chair.

"He transforms complex concepts into exciting opportunities for discovery. He builds a strong foundation of knowledge while igniting a passion for engineering in his students," says Choi.

NEW FACULTY

ANNA STUHLMACHER

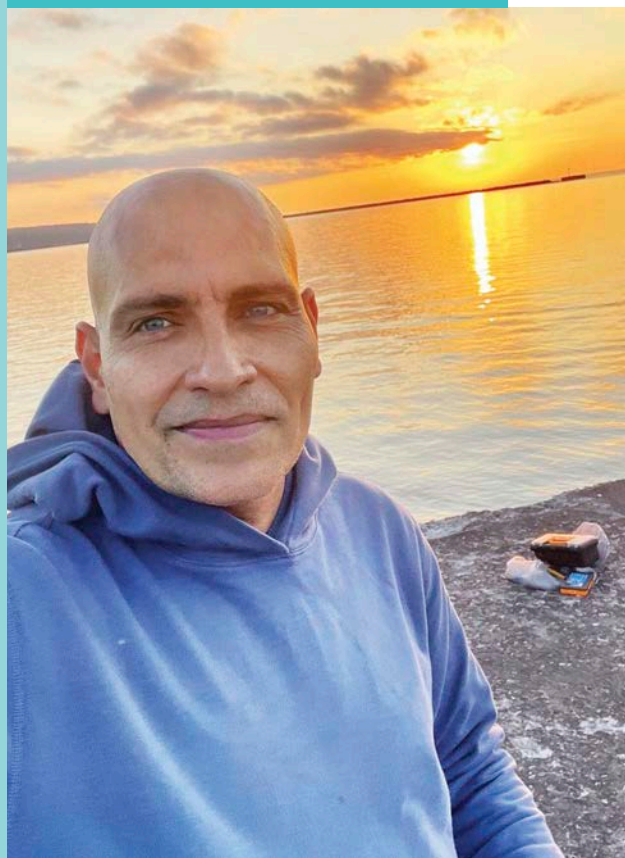
ASSISTANT PROFESSOR

- Arrived at Michigan Tech in Fall 2023.
- Received a PhD in electrical engineering from the University of Michigan.
- Research focuses on modeling and optimization of flexible resources in the electric power grid.
- Teaches electric energy systems, distributed energy resources, and power system optimization.
- Enjoys being out in nature in her free time.

BEHZAD AKBARI

ASSISTANT TEACHING PROFESSOR

- Arrived at Michigan Tech in Fall 2025.
- Earned a PhD in electrical & computer engineering and a master's in computer science from McMaster University (Canada), and also hold an master's in computer architecture from Iran.
- Completed a Postdoctoral Fellowship at Dalhousie University (Canada), focusing on robotics and artificial intelligence.
- Research interests include multi-robot collaboration, tracking and sensor fusion, and factor-graph optimization for decision making.
- Teaches courses such as digital logic, sensing and processing in robotic applications, probability & stochastic processes, machine learning and AI, and computer organization (architecture).
- Passionate about teaching and bridging theoretical models in stochastic systems and AI with hands-on robotics applications.
- Current projects involve trust-aware decision-making in multi-robot teams and modeling multi-robot navigation and perception.
- Enjoys nature, hiking, fishing, rock collecting, and home remodeling.
- Appreciates the Copper Country's natural beauty and friendly community.
- Goal is to help students connect theory to real-world engineering.



FENGYING DANG

ASSISTANT PROFESSOR

- Arrived at Michigan Tech in Fall 2024.
- Earned a PhD at George Mason University
- Main research interest is robotics, with focuses on perception and control for autonomous systems, especially marine and field robots.
- Teaches digital image processing and control systems.
- Enjoys collaborating across disciplines—engineering, environmental science, and AI.
- Passionate about mentoring students and building hands-on research experiences. We are making robotic fish in the lab!
- Loves exploring the Keweenaw's lakes and trails.
- Animal lover. (Dogs, yes! Cats, yes!)
- Enjoys sports and outdoor adventures.

YI HU

ASSISTANT PROFESSOR

- Arrived at Michigan Tech in Fall 2025.
- Earned a PhD in electrical engineering from North Carolina State University in 2025.
- Moved to Houghton in July 2025 with my family. We love the welcoming community and the natural beauty of Michigan's Upper Peninsula.
- Research focuses on power system data analysis and artificial intelligence, including grid monitoring, load characterization, and synthetic data generation.
- Passionate about combining engineering fundamentals with data-driven methods to enhance grid reliability, efficiency, and resilience.
- Enjoys collaborating with industry partners on emerging challenges in modern grids.
- Teaches EE4221—Power System Analysis for both on-campus and online students.
- Long-term goal is to build a vibrant research group at Tech that bridges academic innovation with real-world power system applications.
- Before pursuing engineering, competed in track and field, specializing in the 110-meter hurdles—and still enjoys running and outdoor activities.
- Also plays and watches soccer. Messi fan since 2005.

FULL FACULTY LISTING ON **PAGE 38**

ASHLEY HENDRICKSON

ADMINISTRATIVE AIDE

- Joined Michigan Tech in 2023 and the ECE Department in 2025.
- Academia and direct student interaction inspired her transition to this new role.
- Grew up in Dollar Bay, and now lives in Tamarack City with her husband, their three children, and their cat.
- Holds two associate degrees: medical assisting and medical billing and coding.
- Transitioned to administration after several years in healthcare as a Certified Medical Assistant.
- Enjoys vegetable gardening and preserving through canning—a relaxing, hands-on way to stay connected to nature and enjoy the rewards of hard work all year round.
- Spends the summer months camping across the Upper Peninsula.
- Finds joy in life's simple pleasures: gardening, canning, and time outdoors.

NEW STAFF

KATE MARIN

ACADEMIC ADVISOR

- Joined Michigan Tech in 2025 and quickly discovered how much she enjoys chatting with students and helping them navigate their academic and professional goals.
- Originally from Maryland, where one inch of snow guaranteed a snow day.
- Earned a BA from Franklin & Marshall College, an MS in computer science from The Ohio State University, and an MS in math from Bowling Green State University.
- Moved to the Copper Country in 2011 and absolutely loves it, noting she can "vacation without leaving home—water sports in the summer and snow sports in the winter, all within five minutes!"
- Dedicated to supporting all of her students, but has a special interest in advocating for women in STEM and encouraging them to find their confidence.
- Provides all-night diner and taxi service to her five kids—and wouldn't have it any other way.
- Loves a good math or science joke—the nerdier, the better!

STAFF RETIREMENT

DAWN PICHETTE

17 YEARS AT MICHIGAN TECH

Dawn Pichette retired in June 2025 after serving in ECE for two years, and a total of 17 years at Michigan Tech. During this time, she made a great impact in the department.

During Dawn's time in ECE, her impact to the department was so great that she won the *Making a Difference* award in the "Behind the Scenes" category. Dawn is pictured with her award.

Dawn excelled in customer service, office management, payroll, accounting procedures, event planning, and any special project that came her way.

In her retirement, she has been spending time with her daughter in Arizona, visiting her son and grandchildren in Florida, spending time on the lake relaxing and kayaking, gardening, taking walks in the forest and visiting with friends.

2025 STAFF DIRECTORY

LAUREN HUESTED
Academic Advisor (Computer Engineering) and Outreach Specialist

KATE MARIN
Academic Advisor - Electrical Engineering, Robotics Engineering

ASHLEY HENDRICKSON
Administrative Aide

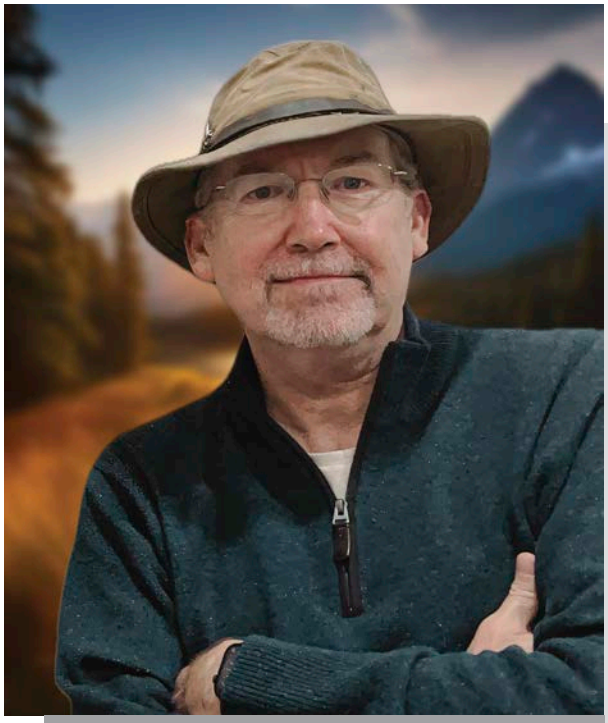
LYNN MCCORMICK ROTH
Graduate Program Coordinator

CHUCK SANNES
Laboratory Supervisor

MARK SLOAT
Research Associate

MARYANN WILCOX
Business Manager/Communications Specialist

EMERITI FACULTY



TIM SCHULZ

30 YEARS AT MICHIGAN TECH

Following a more than 30 year career in academia at Michigan Tech, **Dr. Tim Schulz** retired from the department, where he served as assistant professor, associate professor, professor, and department chair. During his time as chair, he developed a new bachelor of science degree in computer engineering and increased PhD enrollment.

Throughout his time at Michigan Tech, he has made significant contributions to develop courses at the undergraduate and graduate levels and helped format the signal and systems online courses in the master's program. He brought technology into the classroom to teach technical materials—developing online lecture videos on electric circuits and an app with randomized electric circuit problems to further educate students.

"During my tenure, I hope the students learned to learn. In the end, our job as educators is to prepare our students to learn in one year what it took us two years to learn—that's how the field progresses," says Schulz.

In retirement he is looking forward to traveling, fishing, and writing. This past year he was recognized with Michigan's Notable Books for his book *A Cast Away in Montana*.

After receiving his BS from the University of Dayton and his MS and PhD from the University of Wisconsin, **Dr. Leonard Bohmann** came to Michigan Tech in 1989 as an assistant professor in electrical engineering.

He served as the interim department chair in 2007-2008 and became the associate dean of engineering in 2007. Bohmann retired from the department in 2025.

With courses taught in power systems and energy conversion, he was recognized with the department's professor of the year award in 2007 and the Institute of Electrical and Electronics Engineers (IEEE) Student Branch Service Award in 2006.

He developed and taught courses for students in both quarters and semesters and was instrumental in the development of the online MSEE courses.

He also worked with electric utilities to develop two electric power engineering certificate programs to train and retrain engineers. His dedication to student retention and success was funded and published on numerous occasions in the development of new courses and curriculum enhancements.

LEONARD BOHMANN

36 YEARS AT MICHIGAN TECH

JOHN LUKOWSKI

41 YEARS AT MICHIGAN TECH

With 41 years of service to Michigan Tech, **John Lukowski** retired from Michigan Tech in March 2025 and subsequently passed away in June following his battle with cancer.

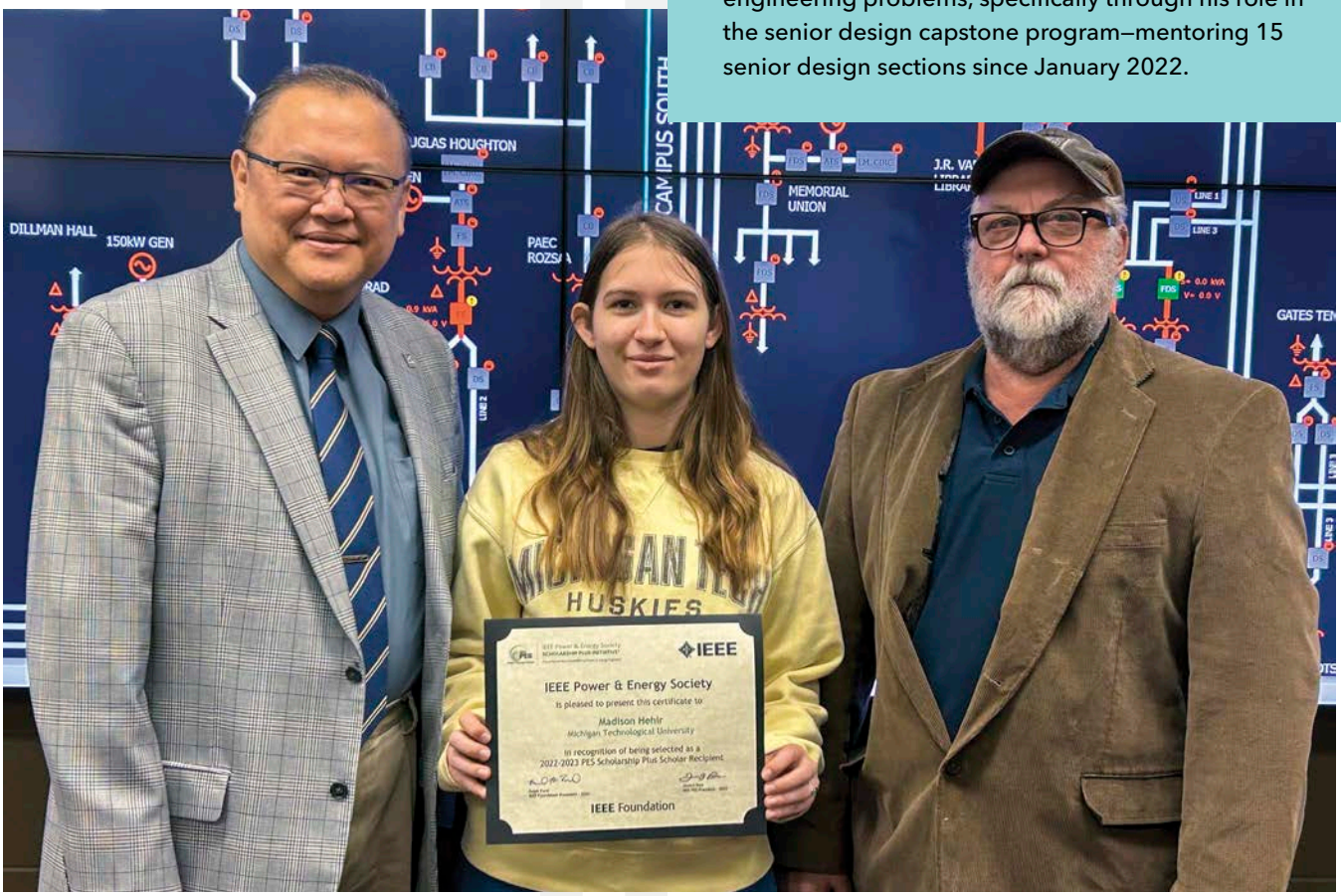
Lukowski earned both his bachelor and master's degrees at Michigan Tech in electrical engineering and worked as a product engineer at Delco Electronics before coming back to Tech in 1984 as an instructor. He served as an instructor for two years before transitioning into the role of assistant professor and later associate professor.

Lukowski had a passion for inspiring the next generation of engineers, being a three-time recipient of the prestigious IEEE Eta-Kappa-Nu Professor of the Year Award (2009, 2010, and 2022). He was also a member of Michigan Tech's Academy of Teaching Excellence. Committed to the University's success, he served as the Accreditation Board for Engineering and Technology (ABET) administrator for the department.

Passionate about education, Lukowski served multiple departments during his time at Michigan Tech, including the School of Technology, the Electrical and Computer Engineering Department, and the Materials Science and Engineering Department.

He enjoyed challenging students with real-world engineering problems, specifically through his role in the senior design capstone program—mentoring 15 senior design sections since January 2022.

John Lukowski (right) with former ECE Chair Jin Choi (left) and Madison Hehir (center), the 2022-2023 PES Scholarship Plus Scholar Recipient.



FACULTY DIRECTORY

BEHZAD AKBARI
Assistant Teaching Professor
PhD, Electrical and Computer Engineering, McMaster University, Hamilton, ON, Canada

Algorithms for state estimation, GP models for extended target tracking, dependent extended target tracking, variable-based models and factor graphs, multi-robot collaboration, modeling trust for collaborative robots

GLEN ARCHER
Teaching Professor
PhD, Electrical Engineering, Michigan Technological University

Image processing, security information operations, electronic warfare, counter-terrorism, information operations

HONGYU AN
Assistant Professor
PhD, Electrical Engineering, Virginia Polytechnic Institute and State University (Virginia Tech)

Neuromorphic engineering/computing, energy-efficient neuromorphic electronic circuit design for artificial intelligence, emerging nanoscale device design, spiking neural networks

PAUL BERGSTROM
Professor, PhD, Electrical Engineering, University of Michigan

MEMS, nanotechnology, micro-electromechanical systems, inertial pressure, micromachining materials and process technologies

LEONARD BOHMANN
Professor/Associate Dean, College of Engineering
PhD, Electrical Engineering, University of Wisconsin

Power systems, renewable energy, renewable energy generation and integration in power systems

JEREMY BOS
Associate Professor
PhD, Electrical Engineering Michigan Technological University

Atmosphere optics, autonomous vehicles and vehicular networks, industrial automation and controls, image processing, machine intelligence, statistical optics, quantum optics

BO CHEN
Professor of Mechanical Engineering and Electrical Engineering
PhD, Mechanical and Aeronautical Engineering, University of California-Davis

Intelligent mechatronics, embedded systems

TAN CHEN
Assistant Professor
PhD, Aerospace and Mechanical Engineering, University of Notre Dame

Legged locomotion, applied control, rehabilitation robotics, collaborative robots, learning-based control

JIN W. CHOI
Professor, PhD, Electrical and Computer Engineering, University of Cincinnati

BioMEMS, microfluidic devices and systems, biomedical microdevices, sensors and sensor systems, bioelectronic and healthcare sensors and devices, flexible and printed electronics and sensors, healthcare sensors and devices

CHRISTOPHER (KIT) CISCHKE
Teaching Professor/Associate Chair, Undergraduate Programs Committee Chair
MS, Computer Engineering, University of Minnesota

Parallel computing and UPC, engineering education

FLAVIO BEZERRA COSTA
Assistant Professor
PhD, Electrical Engineering, Federal University of Campina Grande (UFCG), Campina Grande, Brazil

Integration of renewable energy systems, power system protection, control and monitoring, power quality, power systems and electronics, AC/DC microgrids, high-voltage direct current (HVDC), electric power transmission systems, applications of signal processing in power systems, including machine learning in the power systems

FENGYING DANG
Assistant Professor
PhD, Electrical and Computer Engineering, George Mason University

Robotics and control, sensing and perception, data-driven modeling, learning-based control, application of artificial intelligence in robotics, robotics design (underwater/agriculture)

DURDU GUNEY
Associate Professor
PhD, Electrical and Computer Engineering, University of California-San Diego

Metamaterials and plasmonics, metamaterials, metasurfaces, photonic crystals, plasmonics, quantum computing, communications and cryptography

EXPLORE PUBLICATIONS FROM OUR FACULTY:
DIGITALCOMMONS.MTU.EDU/ECE_FP

TREVER HASSELL
Associate Teaching Professor
MS, Electrical Engineering, Michigan Technological University

Power electronics, control systems, electric drives and machinery, hybrid and electric vehicle systems, microgrids

YI HU
Assistant Professor
PhD, Electrical and Computer Engineering, North Carolina State University

Power systems, artificial intelligence, data science

CHRISTOPHER MIDDLEBROOK
Professor, Lab and Space Committee Chair, PhD, Optics, University of Central Florida

Electronic design and manufacturing, infrared detectors, optics, photonics, radiometry

BRUCE MORK
Professor
PhD, Electrical Engineering, North Dakota State University

Power systems transients (ATP/EMTP), non-l; linear dynamics and chaos theory, power systems protection, smart grid, computer simulation, transients in electrical power systems, power quality, photovoltaics renewable energy, wind energy, solar energy

SHANE OBERLOIER
Assistant Teaching Professor
PhD, Electrical Engineering, Michigan Technological University, Director, The Alley Makerspace

Open source hardware, additive manufacturing, digital design, robotics design, engineering education

AURENICE OLIVEIRA
Associate Professor/ Associate Chair and Director of Graduate Studies
PhD, Electrical Engineering, University of Maryland, Baltimore County

Optical fiber communications, wireless communications, signal processing, network security, intelligent transportation systems (ITS), communication networks and systems

ANTHONY (TONY) PINAR
Associate Teaching Professor
PhD, Electrical Engineering, Michigan Technological University

Machine learning, signal and image processing, data fusion, electronic design

TIMOTHY SCHULZ
Professor
DSc, Electrical Engineering, Washington University, St. Louis

Statistical signal processing, computational photography

ELENA SEMOUCHKINA
Professor
PhD, Materials (Engineering option), The Pennsylvania State University

Electromagnetic metamaterials, computational electromagnetic analysis, resonance phenomena in complex media: metasurfaces, high-contrast materials integration for electronic and photonic systems, materials and device characterization to microwaves

ANNA STUHLMACHER
Assistant Professor
PhD, Electrical Engineering, University of Michigan

Power systems, distributed energy resources, optimization, Interconnected critical infrastructure systems

CHEE-WOOI TEN
Professor
PhD, Electrical Engineering, University College Dublin

Power infrastructure cybersecurity, future control center framework, SCADA/EMS/DMS applications, smart home and robotic technologies, attack/defense combinatorics

WAYNE WEAVER
Chair and Professor
PhD, Electrical and Computer Engineering, University of Illinois at Urbana-Champaign

Power electronics systems, microgrids, non-linear and game theoretic controls, distributed energy resources, electric drives and machinery

KAICHEN YANG
Assistant Professor
PhD, Electrical Engineering, University of Florida

Network security, hardware security, cyber-physical system security, deep learning

CONTRACTS & GRANTS

AWARDED IN FY 2024
July 2023 - June 2024

ENGINEERING RESEARCH AND DEVELOPMENT ARE KEY TO TECHNOLOGICAL PROGRESS AND ECONOMIC REVITALIZATION, AND THE ECE DEPARTMENT AT MICHIGAN TECH IS BUSY DOING ITS PART.

Our faculty, graduate students, and undergraduates work together in modern, well-equipped laboratories to bring practical solutions to real-world problems in signal processing, wireless communications, computer-aided design, energy systems, electronic materials and devices, photonics, and much more.

TITLE	PI NAME	SPONSOR	AWARD
Travel: Travel support for SmartSP 2023	Kaichen Yang	National Science Foundation (NSF)	$8,000
Unraveling dependencies on turbulence strength and propagation geometry in models of optical scintillation	Jeremy Bos	U.S. Dept of Defense, Air Force Office of Scientific Research (AFOSR)	$42,864
CRII: FET: Building A Self-Learning Robot System with Neuromorphic Computing	Hongyu An	National Science Foundation (NSF)	$174,229
Calculation of radiation view factors via high performance ray tracing on HPCs and GPUs	Anthony Pinar	ThermoAnalytics Inc	$17,500
Accelerometer Sensing Pack	Anthony Pinar	Kimberly-Clark Corp	$17,500
Back-End Semiconductor Curriculum for Advanced Substrates, Assemblies, Packaging and Testing	Christopher Middlebrook	Michigan Economic Development Corp (MEDC)	$970,000
Student Design: Waterfowl Retrieving System	Anthony Pinar	Riverbend Lepak LLC	$3,500
Battery Management System - Phase 2	Christopher Cischke	Stellantis/North American Headquarters	$17,500
Heave Tracked Vehicle Suspension - Phase I	Glen Archer	Oshkosh Corp	$15,000
SERC 2023 NSWG 801	Glen Archer	Stevens Institute of Technology	$10,000
2023 NSWG 802 Computer-Based Electrical Simulator for Submersible Maritime Platform	Glen Archer	Stevens Institute of Technology	$10,000
2023 USASOC 03 Drone Video to Cell Tower	Christopher Cischke	Stevens Institute of Technology	$10,000
2023 USASOC 08 Friendly Forces ID	Glen Archer	Stevens Institute of Technology	$10,000
Researching Capacitor Placement on Distribution System	Bruce Mork	DTE Energy Corp	$50,000
ERI: Towards Robust and Secure Intelligent 3D Sensing Systems	Kaichen Yang	National Science Foundation (NSF)	$199,870
Investigating Lunar Bipedal Locomotion Mechanics and Predicting Human Musculoskeletal Health on the Moon	Tan Chen	National Aeronautics and Space Administration (NASA)	$148,414
CRII: RI: Towards Robust and Efficient Bipedal Robot Locomotion on the Moon through Reinforcement Learning	Tan Chen	National Science Foundation (NSF)	$174,939
DARPA STTR Bistatic Engagement Algorithms and Methodologies (BEAM)	Jeremy Bos	Electro-Optical Solutions (EO Solutions)	$100,431
Battery Testing	Paul Bergstrom	ThermoAnalytics Inc	$200,000
FractionalNets: Using Symmetric Neural Networks to Calculate Fractional-Order Derivatives	Tan Chen	Oak Ridge Associated Universities (ORAU)	$5,000

CONTRACTS & GRANTS

AWARDED IN FY 2025
July 2024 - June 2025

We are eager to tackle new challenges and always looking for new opportunities that are well matched to the interest and expertise of our faculty.

TITLE	PI NAME	SPONSOR	AWARD
CICI: UCSS: Safeguarding AI in Bioinformatics: Enhancing Cybersecurity	Kaichen Yang	Kansas State University	$240,000
SBIR EMPhotonics	Jeremy Bos	EM Photonics	$43,101
Unraveling dependencies on turbulence strength and propagation geometry in models of optical scintillation	Jeremy Bos	U.S. Dept of Defense, Air Force Office of Scientific Research (AFOSR)	$37,942
AY25 - Microsoft - ECESD - Improve performance of Windows Build System	Anthony Pinar	Microsoft Corp	$17,500
AY25 - Pfizer - WCE - Aveva PI Dashboards and Reports	Christopher Cischke	Pfizer Inc	$17,500
Quantum ENZ Materials for Midwave IR Single-Photon Detection (QEMISD)	Durdu Guney	Harvard University	$67,617
CyDERMS: Center for Cybersecurity & Resiliency of DERs and Microgrids-integrated Distribution Systems	Chee-Wooi Ten	Iowa State University (of Science and Technology)	$60,000
Expansion of Flexible Semiconductor Technician and Maintenance Micro-Credentials Talent Pipeline	Christopher Middlebrook	Michigan Economic Development Corp (MEDC)	$318,741
Creation of a Concentration in Advanced Manufacturing of Semiconductors, Advanced Substrates, Assemblies, Packaging and Testing	Christopher Middlebrook	Michigan Economic Development Corp (MEDC)	$370,000
AY25 - ONE - ECESD - Battery Indicator System	Anthony Pinar	Our Next Energy (ONE)	$12,000
AY25 Enterprise (BMS): Heavy Tracked Vehicle Suspension – Phase II	Glen Archer	Oshkosh Corp	$15,000
SERC 2024 SUB 01	Glen Archer	Stevens Institute of Technology	$3,500
AY25-SERC-Enterprise-FMTV A1P2 Door Assist	Glen Archer	Stevens Institute of Technology	$9,615
SERC 2024 SUB 02	Glen Archer	Stevens Institute of Technology	$3,650
Quantum ENZ Materials for Midwave IR Single-Photon Detection (QEMISD)	Durdu Guney	Harvard University	$79,442
Collaborative Research: Novel Robust Continuous Time-Efficient Biometric Profiling and Authentication Using Multispectral Photoplethysmography	Jin Choi	National Science Foundation (NSF)	$254,369
Investigating Lunar Bipedal Locomotion Mechanics and Predicting Human Musculoskeletal Health on the Moon	Tan Chen	National Aeronautics and Space Administration (NASA)	$150,041
Researching Capacitor Placement on Distribution System	Bruce Mork	DTE Energy Corp	$60,000
ERI: Advanced Wavelet Transform for Comprehensive Real-Time Fault Diagnosis in Next-Generation Sustainable Power Grids	Flavio Bezerra Costa	National Science Foundation (NSF)	$199,998
NSF ERI 2024	Anna Stuhlmacher	National Science Foundation (NSF)	$200,000

ECE AWARDS AND HONORS

JULY 1, 2023 - SEPTEMBER 30, 2025

HONGYU AN, ASSISTANT PROFESSOR
United States Air Force Visiting Faculty Research Program (VFRP) Fellowship, Air Force Research Lab (April 1, 2025)

United States Air Force Visiting Faculty Research Program (VFRP) Fellowship, Air Force Research Lab (April 1, 2024)

NSF CISE Research Initiation Initiative (CRII) Award, NSF (July 3, 2023)

FLAVIO BEZERRA COSTA
ASSISTANT PROFESSOR
2025 Larry Kennedy Industry Innovation Award, ECE, Michigan Tech (2025)

Best Paper in the Power Systems and Smart Grid Section, 2024 IEEE Industrial Electronics Society Conference (IECON), Chicago, USA (2024)

Best Paper, 2024 IEEE PES General Meeting (November 2024)

JEREMY BOS, ASSOCIATE PROFESSOR
SPIE Fellow (January 6, 2025)

TAN CHEN, ASSISTANT PROFESSOR
IEEE CASE Peter Luh Memorial Best Paper Award for Young Researcher Finalist, IEEE CASE (August 19, 2025)

ICC Achievement Award, Institute of Computing and Cybersystems (ICC) (October 2, 2024)

ORAU Ralph E. Powe Junior Faculty Enhancement Award, Oak Ridge Associated Universities (May 2024)

Finalist of Best Poster Award, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2023) (September 26, 2023)

KIT CISCHKE
ASSOCIATE CHAIR & TEACHING PROFESSOR
Innovative and Out of Class Teaching Award, Jackson Center for Teaching and Learning (2025)

JOHN LUKOWSKI
PROFESSOR EMERITUS/EMERITA
Finalist, MTU Distinguished Teaching Award, CFTLFD

SHANE OBERLOIER
ASSISTANT TEACHING PROFESSOR
Deans Teaching Show Case, Jackson Center for Teaching and Learning (2025)

Instructional Award for Large Class Teaching, Jackson Center for Teaching and Learning (2025)

AURENICE OLIVEIRA, ASSOCIATE PROFESSOR
2023 Outstanding Branch Advisor Award, IEEE (December 1, 2023)

TIMOTHY SCHULZ, PROFESSOR EMERITUS/EMERITA
Fellow of the International Society for Optical Engineering, SPIE

Fellow of the Optical Society of America

Tau Beta Pi Member

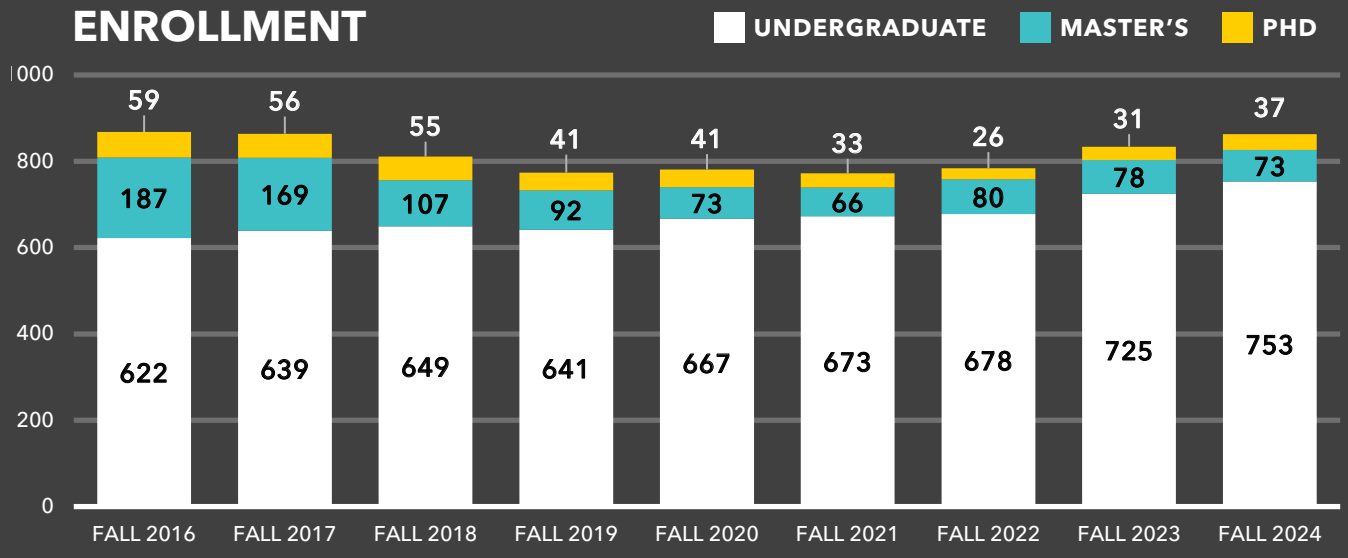
ANNA STUHLMACHER, ASSISTANT PROFESSOR
Best Paper Award, Hawaii International Conference on Systems Science (HICSS) (January 2025)

Top 10% in Fall 2024 Student Evaluations, Office of the Provost (December 2024)

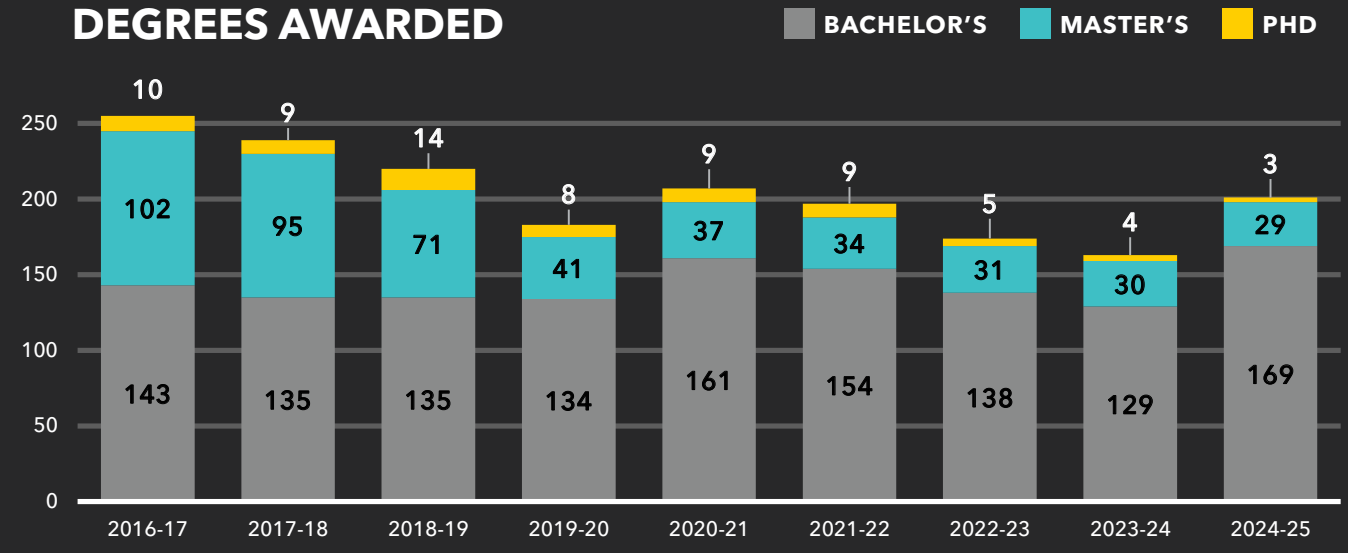
Course Innovation Grant, IDEAhub (July 2024)

ECE DEPARTMENT STATISTICS

ENROLLMENT

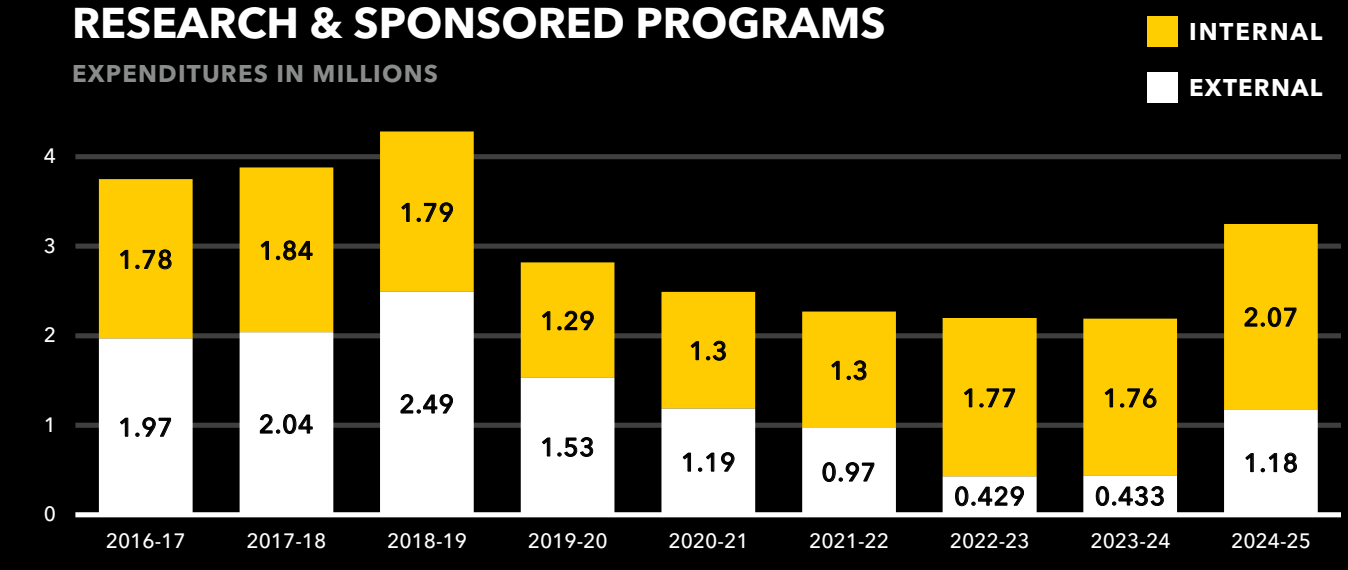


DEGREES AWARDED



RESEARCH & SPONSORED PROGRAMS

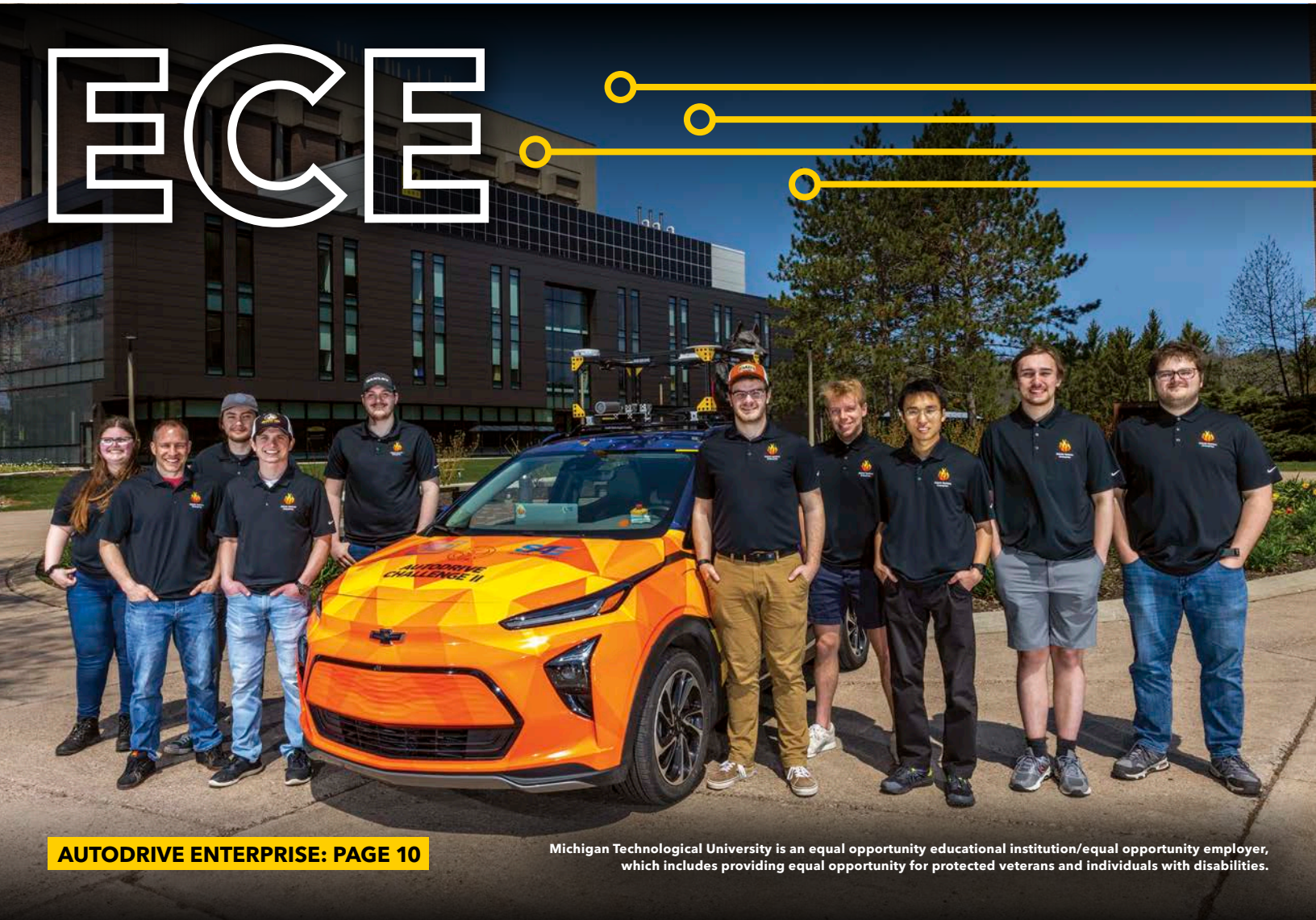
EXPENDITURES IN MILLIONS



Michigan Technological University

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
1400 Townsend Drive
Houghton, MI 49931-1295

ECE



AUTODRIVE ENTERPRISE: PAGE 10