ME-EM 2012-13 Annual Report

Department of Mechanical Engineering-Engineering Mechanics, Michigan Technological University

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Collaborative Research: Bridging University Boundaries
Growing Beyond Traditional Limits


I am proud to report on the many new developments since our last annual report. This issue covers a longer span of time as we shift our coverage from calendar years to academic years. Our department has been very dynamic over this period, as we are committed to continuous improvement and increasing our level of excellence beyond benchmark institutions. Our faculty have begun a process of revising our undergraduate ME curriculum, building innovative course designs along a more flexible, dynamic path for future engineers. The new curriculum design includes many concepts from American Society of Mechanical Engineer’s Vision 2030 and the National Academy of Engineering’s Engineer 2020 initiatives.

Our research activities have likewise developed rapidly, with our research centers increasingly focused on problems at the interface of disciplines, and collaboration blurring academic boundaries. This broader vision of research also underlies our goal of growing one or more of these centers to a national level, supported by federal agencies and industry.

We also feature in this report the numerous awards achieved by the ME-EM faculty and staff, and we welcome several new faculty and staff members. Our Presidential Council of Alumnae and our Academy continue to grow with new inductees, and we look forward to their guidance in coming years. In our next annual report we will discuss our plans for substantially growing our MS and PhD programs.

As state appropriations continue to shrink, we rely ever more on donations from alumni and industry sponsors to achieve our vision. Because donors often wish to direct their gifts, the enclosed envelope provides several categories to choose from, including the Peace Corps Master’s International Program fund and the Undergraduate Curriculum Revision fund, both featured in this report. On behalf of the students, faculty, and staff, thank you for your interest and support.

William W. Predebon
Professor and Department Chair
wwpredeb@mtu.edu
ME-EM Research

Diverse research funding sources support multiphysics and core research activities despite federal sequester.

ME-EM research expenditures have held steady throughout the federal sequester. This is a testament to the value of this work to our industry and government partners, who chose to reduce their costs elsewhere. Our culture of collegiality and innovation have paid dividends in the form of trust and commitment.

Our research centers, as the following pages illustrate, play a leading role in advanced technology development by fostering the depth of partnership and collaboration demanded by multiphysics research. By pressing ever-further into the nano- and molecular levels, the phenomena defy university silos. We serve society by reaching beyond traditional boundaries and advancing education through research, not only at Michigan Tech, but also through our collaborative efforts with university and industry partners worldwide.

**ME-EM Research Expenditures: 2001-2013**

- 01-02: $6.3
- 02-03: $6.1
- 03-04: $7.5
- 04-05: $8.9
- 05-06: $10.2
- 06-07: $11.5
- 07-08: $12.7
- 08-09: $13.2
- 09-10: $13.5
- 10-11: $14.9
- 11-12: $14.0
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**Fiscal Year**

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**MISSION**

Prepare engineering students for successful careers

**VISION**

Be a nationally recognized mechanical engineering department that attracts, rewards, and retains outstanding students, faculty, and staff—be a department of choice nationally

**ON THE COVER**

Dr. Mark Grieb (’08) conducted his MS and PhD research through the Multi-Scale Technologies Institute before embarking on his career with the US Army Research Lab in Baltimore, MD.
ME-EM Research Centers

How bridging university boundaries can bring about rapid innovation:
Q&A with ME-EM Department Chair William Predebon

Q: The research centers are the focus in this report. Why highlight them now?
It is an important and critical time for research across disciplines. The National Science Foundation and other agencies are becoming more and more competitive, and in order to continue to receive funding, our centers have put an emphasis on multidisciplinary research. The centers are a vehicle for faculty collaboration on large-scale funding opportunities. In addition, one of our departmental goals for the next five years is to establish a national center through university and industry collaboration.

Q: How do the research centers impact graduate education?
The centers create opportunities for multidisciplinary research, which then provides graduate students an avenue to get involved in the research process with faculty in a range of departments and colleges. The centers encourage graduate students to engage in peer-to-peer collaboration across departments and disciplines. Since the research centers involve many faculty members, there is more opportunity for large-scale funding, which in turn provides greater research potential for graduate students.

Q: What aspects of Michigan Tech make it a suitable environment for interdepartmental research?
The University’s small size works to our advantage and makes us more agile. Our faculty can collaborate with other faculty and researchers across departments, college- and school-wide, and together we form a tight-knit community. There is an acknowledgement and appreciation for interdepartmental research across the Michigan Tech campus.

Q: Why is it important to bridge university boundaries?
Bridging university boundaries is important because we know very well that we do not have all the answers. However, we do have the broader ecology of trust rooted in our relationships nationwide. In the environment we are creating, these nationwide partners will innovate more rapidly than anywhere else in the nation.

Q: Is this the new focus of the department?
Bridging university boundaries has been our focus for some time, and now, in terms of establishing a national center, it is critical because no university has all the expertise required to solve the major challenges our nation faces.

Q: What collaborations does Michigan Tech currently have in place?
Many of our centers have already begun collaboration with other departments at Michigan Tech and at universities across the United States. The Michigan/AFRL Center of Excellence in Electric Propulsion (MACEEP), for example, is working with researchers from the University of Michigan, Penn State, Colorado State, University of Washington, and UCLA to encourage partnerships that advance innovation.

Q: What feedback do you have from industry on the research centers?
Our research centers provide industry partners with a one-stop shop for research in an area or areas that are of interest to them. These industry partners display a true willingness to work with our centers, in some cases because of the level of graduate student involvement.

Q: ME-EM research is substantially funded by industry. Does this make your research teams more accountable in terms of delivering innovation?
Industry-based research traditionally helps to ground the faculty, and those innovations help advance fundamental research as well. Having our graduate students involved in this process helps to obtain a new level of practical knowledge and innovation for our industry partners.

Q: What impact have the research centers had so far?
We have been keeping track of metrics since we transitioned to centers, and the data shows that, in several cases, the number of proposals has increased, more of our faculty are engaged in research, and grant funding has risen, which means more support for graduate students.

Q: Many universities have lost funding for research through the sequester, but ME-EM research funding has held steady. What accounts for this stability?
Our funding has remained steady because of the diversity of research within the department. In addition to Mechanical Engineering, our department houses Aerospace Engineering, Manufacturing, Industrial Engineering, and Engineering Mechanics. At many universities, our department would be divided into many departments. So, while some areas in Mechanical Engineering have reduced funding, other areas have offered increased funding.

Q: An alumnus is featured on the cover of this report. What does that signify?
Our success is measured by the success of our alumni. Dr. Mark Griep, on the cover, is an example of our many alumni who have been very successful in their fields.
CENTER FOR AGILE & INTERCONNECTED MICROGRIDS (AIM)

Co-Director: Dr. Gordon P. Parker, ME-EM (left)
Co-Director: Dr. Rush D. Robinett III, ME-EM (right)

Mission: Solving future, long-term technical challenges of our nation’s energy objectives through microgrid modeling, control, and optimization.

Purpose: Agile microgrids of the future will efficiently use stochastic generation, stochastic loads, and minimal energy storage to deliver power in both structured and unstructured environments. Their intelligent, multimode use of vehicles, high penetration of renewable sources, and system-level efficiency offer the promise of reducing fossil-fuel consumption.

aim.mtu.edu
THE AIM TEAM:
Dr. Jason Blough, ME-EM
Dr. Laura Brown, Computer Science
Dr. Dan Fuhrmann,
Electrical and Computer Engineering
Dr. Lucia Gauchia Babe,
Electrical and Computer Engineering, ME-EM
Dr. Steven Goldsmith, ME-EM
Dr. Myounghoon “Philart” Jeon, 
Cognitive and Learning Sciences
Dr. Nina Mahmoudian, ME-EM
Jay Meldrum, Keweenaw Research Center
Dr. Michele Miller, ME-EM
Dr. Gordon Parker, ME-EM
Dr. William Predebon, ME-EM
Dr. Rush Robinett, ME-EM
Dr. Mahdi Shahbakti, ME-EM
Dr. Allan Struthers, Mathematical Sciences
Dr. Mark Vaughn, ME-EM
Dr. Wayne Weaver, Electrical and Computer Engineering

For a list of the team members' research focuses, visit aim.mtu.edu/people
ADVANCED POWER SYSTEMS RESEARCH CENTER (APSRC)

Director: Dr. Jeffrey D. Naber, ME–EM

Mission: Developing critical technologies for clean, efficient, and sustainable power systems.

Purpose: As a multidisciplinary organization, the APSRC fosters large, collaborative research efforts in the areas of clean, efficient, and sustainable power systems technologies. The center develops fundamental and applied knowledge that is required for the next generation of low-emission, high-efficiency vehicles and power generation.

me.mtu.edu/research/power
THE APSRC TEAM:

Dr. Jeff Allen, ME-EM
Dr. Carl Anderson, ME-EM
Dr. Susan Bagley, Biological Sciences
Dr. Ezra Bar-Ziv, ME-EM
Dr. John Beard, ME-EM
Dr. Jason Blough, ME-EM
Dr. Bo Chen, ME-EM
Dr. Bahne Cornelsen, Chemistry
Dr. Jim DeClerck, ME-EM
Robert Delonge, ME-EM
Dr. William Endres, ME-EM
Dr. Stephen Hackney, Materials Science & Engineering
Dr. John Hill, ME-EM
Dr. Gopal Jayaraman, ME-EM
Dr. Dana Johnson, School of Business
Dr. Jaclyn Johnson, ME-EM
Dr. John Johnson, ME-EM
Dr. Mark Johnson, School of Technology
Dr. Seung-Hyun Kim, ME-EM
Dr. V.C. Rao Komaravolu, ME-EM
Dr. Pasi Lautala, Civil & Environmental Engineering
Dr. Seong-Young Lee, ME-EM
Dr. Nina Mahmoudian, ME-EM
Dr. Charles Margraves, ME-EM
Dr. Dennis Desheng Meng, ME-EM
Dr. Scott Miers, ME-EM
Dr. Jeff Naber, ME-EM
Dr. Amitabh Narain, ME-EM
Dr. Greg Odegard, ME-EM
Dr. Gordon Parker, ME-EM
Dr. Fernando Ponta, ME-EM
Dr. William W. Predebon, ME-EM
Dr. Mohan Rao, ME-EM
Dr. Tony Rogers, Chemical Engineering
Dr. Mahdi Shahbakhti, ME-EM
Dr. Reza Shahbazian-Yassar, ME-EM
Dr. David Shonnard, Chemical Engineering
Dr. Kazuya Tajiri, ME-EM
Dr. Franz Tanner, Mathematical Sciences
Charles Van Karsen, ME-EM
Dr. Wayne Weaver, Electrical and Computer Engineering
Jeremy Worm, PE, ME-EM
Dr. Song-Lin (Jason) Yang, ME-EM

For a list of the team members’ research focuses, visit me.mtu.edu/research/power/investigators
MICHIGAN/AFRL CENTER OF EXCELLENCE IN ELECTRIC PROPULSION (MACEEP)

Director: Dr. Lyon B. King, ME–EM

Mission: Advancing spacecraft propulsion as a USAF Center of Excellence.

Purpose: MACEEP is focused on four thrust areas: Advanced Plasma Propulsion Systems for large spacecraft; Advanced Electrospray Propulsion Systems for microsats, nanosats, and picosats; Modeling and Simulation to support the advanced propulsion thrust areas; and Spacecraft Power Electronics for plasma and electrospray propulsion power processing.
THE MACEEP TEAM:
Dr. Jeff Allen, Michigan Tech, ME-EM
Dr. Iain Boyd, Michigan, Aerospace Engineering
Dr. Chang Kyoung Choi, Michigan Tech, ME-EM
Dr. John Foster, Michigan, Nuclear Engineering
Dr. Alec Gallimore, Michigan, Aerospace Engineering
Dr. Lyon B. King, Michigan Tech, ME-EM
Dr. Deborah Levin, Penn State, Aerospace Engineering
Dr. Richard Wirz, UCLA, Aerospace Engineering
Dr. Azer Yalin, Colorado State, Mechanical Engineering

For a list of the team members’ research focuses, visit me.mtu.edu/MACEEP
MULTI-SCALE TECHNOLOGIES INSTITUTE (MuSTI)

Director: Dr. Craig R. Friedrich, ME–EM

Mission: Creating knowledge leading to functional systems that incorporate nanotechnologies and microtechnologies, and disseminating that knowledge.

Purpose: MuSTI brings together functional elements to form systems where the relative size of the components within the system spans from the nano through the micro and into the macro domain. The systems focus of MuSTI integrates technologies with relative feature sizes that are orders of magnitude apart, and operating characteristics that are size dependent.

me.mtu.edu/institutes/MuSTI
THE MuSTI TEAM:
Dr. Ossama Abdelkhalik, ME-EM
Dr. Jeffrey Allen, ME-EM
Dr. Paul Bergstrom, Electrical & Computer Engineering
Dr. Jason Blough, ME-EM
Dr. Chang Kyung Choi, ME-EM
Dr. Qingli Dai, Civil & Environmental Engineering
Dr. Craig Friedrich, ME-EM
Dr. Ashok Goel, Electrical & Computer Engineering
Dr. Mahesh Gupta, ME-EM
Dr. Patricia Heiden, Chemistry
Dr. John Jaszzczak, Physics
Dr. Lyon B. King, ME-EM
Dr. Seong-Young Lee, ME-EM
Dr. Miguel Levy, Physics, Materials Science & Engineering
Dr. Haiying Liu, Chemistry
Dr. Dennis Desheng Meng, ME-EM
Dr. Gregory Odegard, ME-EM
Dr. Ravindra Pandey, Physics
Dr. Gordon Parker, ME-EM
Dr. Ranjit Pati, Physics
Dr. Mo Rastgaard, ME-EM
Dr. Reza Shahbazian-Yassar, ME-EM
Dr. Tolou Shokuhfar, ME-EM
Dr. Kazuya Tajiri, ME-EM
Dr. Yoke Khin Yap, Physics

For a list of the team members’ research focuses, visit me.mtu.edu/institutes/MuSTI/research
New Classrooms Provide Increased Interactivity
The ME-EM Department celebrated the opening of two state-of-the-art multimedia classrooms with a dedication and ribbon cutting during Michigan Tech’s 2013 Winter Carnival.

Thanks to a generous donation from the families of Paul (’65), Sean (’90), and Todd (’92) Fernstrum, rooms 402 and 406 in the R.L. Smith Building are now fully renovated.

The new classrooms reflect the department’s revision of its undergraduate curriculum, including course changes and pedagogical changes that involve the use of modern instructional technology. “I approached Paul Fernstrum, explained our vision, and asked for his help to fund the new classrooms,” says ME-EM Department Chair William Predebon. “Paul and his family really stepped up to the plate.”

Room 402, named the Fernstrum Family Adaptable Classroom, features a seamless combination of interior and technical design. The room was remodeled, redesigned, and equipped with stunning technology. Two state-of-the-art projectors, two projector screens, two LCD monitors, Echo360 lecture-capture hardware and software, and a podium with a PC and Crestron controller all work together to allow more faculty interaction with students and course material. The classroom design and layout lends itself to small-group work with whiteboards on each of the four walls, many of them portable for student use. The comfortable and stylish desks can be adapted easily and/or moved to accommodate group discussions, teaming, or traditional lecture layouts. Electrical outlets in the floor and along each wall allow students to power laptops or other electronic devices. The well-designed color scheme and new carpet establish a professional and comfortable atmosphere that promotes creativity in teaching and learning.

Rooms 406 and 407 were combined and renovated to create one large classroom—now room 406—named the Fernstrum Family Classroom. Previously the two classrooms had no technology and were minimally utilized, if at all. Now the room is furnished with many of the same features as room 402 and was booked solid for its first semester.

An impressive team of ME-EM faculty and staff, Michigan Tech Facilities staff members, and a design consultant worked together to plan the renovation and maximize the impact of the Fernstrum donations. “The goal was to offer faculty the opportunity to break the traditional mold of a lecture-only approach to teaching,” says ME-EM Associate Professor Greg Odegard. “Instructors now have the ability to adapt the room layout to their needs. They can easily switch from lecturing to roaming the room to helping individual groups of students.”

The renovations have not only given faculty more opportunity for teacher-student interaction, they’ve also allowed instructors to cover more curriculum in class. Thanks to the new technology, John and Cathi Drake Professor Gordon Parker discovered that he could cover about thirty percent more material during his first semester in the remodeled 402. “It’s a remarkable space,” Parker says. “Thanks to the Fernstrum family, I’ve changed my whole approach to teaching—and students learn faster and deeper than ever before.”
Evolving ME Student Course Work

Three forces drive the ME-EM Department’s decision to revise the undergraduate curriculum: the rapid pace of technological change, the complexity of problems that engineers face, and the need for innovation.

The ME-EM Curriculum Revision Committee, currently led by the Director of Undergraduate Studies, Associate Professor Michele Miller, recognizes that the dynamic nature of business and technology requires an adaptive approach.

Published studies call for a change in mechanical engineering curriculum, as incoming students bring a different profile of abilities, computer literacies, and motivations to the classroom and lab. “We need more integration of professional practice and engineering science,” says Miller. “In addition, we want to do a better job giving students practice with predictive modeling tools from the first to fourth years.”

First-year and fourth-year ME students undertake a significant amount of project work in their engineering courses. The second and third years, however, contain less project experience. The middle years are heavily focused on math and theory, with less application. To remedy this, teams of faculty are developing four new second- and third-year classes that integrate laboratory and project-based experiences involving open-ended problems. This integration requires team-teaching, as solutions often necessitate a blend of simulation, instrumentation, and analysis.

Other notable changes include decreasing the number of core courses from eleven to eight, and increasing the number of technical electives from three to five. Miller hopes the flexibility will motivate students even more. “Students will be able to further customize their program and develop an area of expertise,” she says.

The committee has spent the past three years identifying requirements, benchmarking other innovative programs, proposing and considering a variety of approaches, and finally working out the details of the new and revised courses. A faculty vote in spring 2013 to proceed with the revision kept the momentum going. The new curriculum will be implemented in a two-year rollout, starting with the second-year courses in 2014 and the third-year courses in 2015. It simultaneously builds on Tech’s historical strengths and responds to the forces of change, thus advancing the ME-EM Department’s leadership position in engineering education.

If you would like to support the curriculum revision, please designate your Tech Fund gift to this endeavor using the center envelope or give online at mtu.edu/mechanical/crf.

Dr. Michele Miller
MS with an International Impact

The ME-EM Department’s investment in the Peace Corps Master’s International (PCMI) Mechanical Engineering program is yielding substantial returns, and the benefits of this singular program come in many forms.

The department is helping the young program evolve, with a number of students making immediate and notable impacts on those around them. Brennan Tymrak is the 2012 National Science Foundation fellowship winner. With this prestigious three-year award, Tymrak is conducting research on various open-source technologies, some of which he intends to incorporate into his PCMI activities abroad. Three more ME students—Donald Norris in Malawi, Kevin Hale in Mozambique, and Wade Aitken-Palmer in Ghana—are working on water-related projects during their two-year Peace Corps service.

Program co-directors Associate Professor Michele Miller and Professor John Gershenson appreciate the meaningful relationships these students forge both abroad and here, with their peers, in the classroom. “When teaching a course with the kind of student who is motivated to undertake such a unique endeavor, the whole class dynamic changes,” says Gershenson. “These students have a passion for uncovering meaningful challenges, and their perspective energizes the whole group.”
The program, now in its fourth year, continues to grow by drawing from a nationwide pool of uniquely qualified candidates. “Our students appreciate that the master’s in mechanical engineering is combined with their Peace Corps service. It’s a way for them to gain practical experience and deepen their impact while earning their master’s degree,” says Miller. Many aspire to engineer solutions in the developing world for a living. PCMI student Wade Aitken-Palmer, currently serving in Ghana, is considering a water project for a small fishing community that lost its clean water access eight years ago. After he completes the PCMI ME program, Wade hopes to work with an international agency, company, or non-governmental organization (NGO) on community-based, small-scale alternative energy. “I enjoy projects that can both benefit the environment and the local population,” says Aitken-Palmer. “My experiences abroad have only increased my affinity for living and working in developing countries. This is where I will make a difference.”

Miller and Gershenson are working to build awareness of this alternative route to a master’s degree. It poses several recruiting challenges, chiefly the enlistment of motivated students who are willing to venture to parts of world that offer few conveniences and comforts. Because PCMI ME students fall outside the traditional master’s degree funding mechanisms—such as research and teaching assistantships—the program also requires awareness to build financial support. Gershenson is passionate about how these students are changing the culture of the classroom and impacting nations in development: “PCMI students have a different kind of impact than traditional students, enriching the campus environment and helping the poorest of the poor. Support for this program pays a double dividend.”

The faculty have established a fund to assist these unique individuals and are seeking donors who would like to directly support this program with financial gifts or establishment of scholarships. If you would like to partner with us, please designate your Tech Fund gift in the center envelope or give online at mtu.edu/mechanical/pcmi.
ME-EM Enrollment

Note: In a few cases, the BS enrollment data shown below differs from past publications because the official final enrollment data is only available after this publication goes to press.

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ME-EM Degrees

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PhD DEGREES

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</table>
Graduate Seminar Series

A committee of Michigan Tech faculty members organizes the ME-EM Graduate Seminar Series each year, offering graduate students opportunities to expand their knowledge base to areas of study outside their specific research. Composed of a diverse mix of renowned leaders from academia, industry, and government, the 2012-2013 Academic Year Seminar Series featured the following speakers:

**EXTERNAL SPEAKERS**

- **Brett Chouinard**, Altair Engineering, *In Pursuit of Lightweight Design*
- **Dr. Venkat Krovi**, SUNY-Buffalo, *Cooperative Payload Transport by Robot Collectives*
- **Sean Egmon**, AVL North America, *Success in Engineering is More Than an Equation*
- **Dr. Steve Przesmitzki**, United States Department of Energy Vehicle Technologies Program, DOE Fuels and Lubricants Subprogram
- **Dr. Thomas Wallner**, Argonne National Laboratory, *Model-Based Engine Algorithm Development for Control and Virtual Sensing*
- **Dr. Steven W. Shaw**, Michigan State University, *Using Nonlinear Torsional Vibration Absorbers to Improve Automotive Fuel Economy*
- **Dr. Ilias Belharouak**, Argonne National Laboratory, *Lithium Batteries: Current State and Beyond*
- **Dr. Chris Cotting**, US Air Force Test Pilot School, *An Overview of the USAF Test Pilot School, and A Framework for UAV Flying Qualities*
- **Dr. Todd Murphey**, Northwestern University, *Control Synthesis for Discrete Mechanical Systems*
- **Dr. Waruna D. Kulatilaka**, Spectral Energies LLC and Air Force Research Laboratory, *Fiber-Based Optical Diagnostics for Real-World Applications*
- **Marie Cleveland**, FedEx, *Promote your Work with a Powerful Presentation*
- **Dr. Alexander Yarin**, University of Illinois at Chicago, *From Electrosprinning to Thermal Management in Microelectronics, from Co-Electrosprinning to Nanofluidics*
- **Dr. Arnold Lumsdaine**, University of Tennessee, *Making a Star on Earth – the Future of Fusion Energy*
- **Dr. Robert Santoro**, Pennsylvania State University, *Soot Formation Studies Using JP-8 and JP-8 Surrogate Fuels*
- **Dr. Robert F. Klie**, University of Illinois at Chicago, *Chemical Analysis with Sub-Å Resolution: The Power and Challenges of Aberration-Corrected Scanning Transmission Electron Microscopy*
- **Dr. Chongmin Wang**, Pacific Northwest National Laboratory, *Nanoscale Designing Towards High Capacity, High Power Rate, Long Cycle Life, and Safe Operation for Lithium Ion Battery*
- **Dr. Rafael Fierro**, University of New Mexico, *Coordination Strategies for Robotic Networks*
- **Dr. Cortino Sukotjo**, University of Illinois at Chicago, *Current Research Trend in Implant Dentistry*
- **Dr. Christopher S. Johnson**, Argonne National Laboratory, *Advanced Materials to Enable High-Energy Li- and Na-Ion Batteries*
- **Ed Zentner**, General Motors (Retired), *Being a Life-Long Student*
- **Dr. Eric Funkenbusch**, 3M, *Membrane Electrode Assembly Development for Low Temperature Proton Exchange Membrane Fuel Cells*
- **Dr. Donggang Yao**, Georgia Institute of Technology, *General Maxwell Model with Logarithmic Strain Measurements*
- **Dr. Zachary Folcik**, Massachusetts Institute of Technology Lincoln Laboratory, *Predicting Close Approaches in Geosynchronous Orbit*
- **Dr. Jon Pharoah**, Queen’s University, *Fuel Cells and Renewable Energy... and Multi-Scale Modelling of Solid Oxide Fuel Cell*
- **Dr. Greg McKenna**, Texas Tech University, *Using Mechanics to Interrogate the Physics of Soft Matter: From the Glassy to the Rubbery States and from the Macroscale to the Nanoscale*
- **Dr. Hong G. Im**, University of Michigan, *Understanding Auto-ignition and Combustion Characteristics Through High-fidelity Simulation*
- **Dr. Stephen W. Rouhana**, Ford Research & Advanced Engineering, *Engineering Considerations in Automotive Safety - A Case Study in Ford’s Inflatable Seat Belts*
- **Kurt Schneider**, General Motors, *Importance of Structural Vibrations to Mechanical Engineers*
MICHIGAN TECH SPEAKERS

Dr. Mark R. Vaughn, ME-EM Research Professor, Energy Storage for Power Grid Integration of Renewables

Dr. Joshua M. Pearce, Associate Professor, Department of Materials Science and Engineering/Department of Electrical and Computer Engineering, The Rise of Open-Source 3-D Printing (Or How We Can Make Everyone a Mechanical Engineer)

Sunand Santhanagopalan, ME-EM Graduate Student, Scalable Nanomanufacturing for Energy Storage and Conversion Based on High-Voltage Electrophoretic Deposition

Dr. Mahdi Shahbakhti, ME-EM Assistant Professor, Low Temperature Combustion Engines: Opportunities, Challenges, and Solutions

Dr. Ezra Bar-Ziv, ME-EM Professor, Biocoal: A Drop-In Fuel in Coal-fired Power Plants

Dr. Nina Mahmoudian, ME-EM Assistant Professor, Multi-Vehicle Motion Control for Underwater Gliders

Dr. Yun Hang Hu, Charles and Caroll McArthur Professor, Department of Materials Science and Engineering, Li-N Compounds for Energy Applications

Dr. Karen Roemer, Assistant Professor, Department of Kinesiology and Integrative Physiology, The Interaction of Sports Equipment and the Human Being

Dr. Tomas B. Co, Associate Professor, Department of Chemical Engineering, Stabilization and Bifurcations of Unstable Processes with Time Delay

GRADUATE STUDENT FELLOWSHIPS

Fall 2011-Spring 2013
Aneet Dharmavaram Narendranath
Distinguished Teaching Fellowship

Ryan Foley
Cummins Engine Fellowship

Qi Gao
Finishing Fellowship

Joseph Hernandez
Alumni Fellowship

Mark Hopkins
National Science Foundation Fellowship

Robin Johnson-Cash
King-Chavez-Parks Fellowship

Michael Kivisalu
Finishing Fellowship

Anza Mitchell
GEM Fellowship

Sunand Santhanagopalan
Finishing Fellowship

Kenneth Shiel
Cummins Engine Fellowship

Iltesham Syed
Winnikow Fellowship

Brennan Tymrak
National Science Foundation Fellowship

Andrew Willemsen
NASA Fellowship
PhD Graduates

**Summer 2011 (6)**

**Bicak, Mehmet**
Advisor: Mohan D. Rao  
Analytical Investigation of Squeeze Film Dampers

**Gad El Sayed Gad, Ahmed**
Advisor: Ossama Omar Abdelkhalik  
Space Trajectories Optimization Using Variable-Chromosome-Length Genetic Algorithms

**Johnson, Jaclyn**
Advisor: Jeffrey Donald Naber  
Diesel Spray Mixing Limited Vaporization with Non-Ideal and Multi-Component Fuel Thermophysical Property Effects

**Kurita Nagasawa, Jorge**
Advisor: Amitabh Narain  
Experimental Results on Gravity Driven Fully Condensing Flows in Vertical Tubes, their Agreement with Theory, and their Differences with Shear Driven Flows’ Boundary-Condition Sensitivities

**Momeni, Kasra**
Advisor: Reza Shahbazian-Yassar  
Experimental and Theoretical Study of Microstructure Effect on Piezoelectric Property of One Dimensional ZNO Nanostructures

**Ross, Jerry**
Advisor: Lyon Bradley King  
Probe Studies of a Hall Thruster at Low Voltages

**Fall 2011 (4)**

**Mir Shah Ghassemi, Seyyed Hessam**
Advisor: Reza Shahbazian-Yassar  
In Situ Electrical, Mechanical and Electrochemical Characterizations of One-Dimensional Nanostructures

**Morrow, Duane**
Advisor: Tammy Lynn Haut Donahue  
Development of a Continuum Mechanics Model of Passive Skeletal Muscle

**Pakzad, Anahita**
Advisor: Reza Shahbazian-Yassar  
Nanomechanics of Cellulose Crystals and Cellulose-Based Polymer Composites

**Rivera, Julio**
Advisor: John W. Sutherland  
A Sustainability Study of Nanomaterials Including Societal and Occupational Implications

**Spring 2012 (4)**

**Fritz, David**
Advisor: Jeffrey Allen  
An Implementation of a Phenomenological Evaporation Model into a Porous Network Simulation for Water Management in Low Temperature Fuel Cells

**Lago, Lucas**
Advisor: Fernando Luis Ponta  
Structural Response and Dynamics of Fluid-Structure-Control Interaction in Wind Turbine Blades

**Mitra, Soumya**
Advisor: Amitabh Narain  
Development of One-Dimensional and Two-Dimensional Computational Tools that Simulate Steady Internal Condensing Flows in Terrestrial and Zero-Gravity Environments

**Syed, Illesham**
Advisor: Abhijit Mukherjee  
Numerical Investigation of Effects of Addition of Ethanol to Gasoline on Laminar Flame Speed (LFS), Autoignition, and Wall Quenching

**Summer 2012 (4)**

**Dingeldein, Joseph**
Advisor: Craig R. Friedrich  
Direct Write Fabrication of Waveguides and Interconnects for Optical Printed Wiring Boards

**Goh, Shu Ting**
Advisor: Seyed Alireza Zekavat  
Algorithms for Spacecraft Formation Flying Navigation Based on Wireless Positioning System Measurements

**Smith, Robert**
Advisor: Edward Lumdsaine  
Computational Fluids Domain Reduction to a Simplified Fluid Network

**Walber, Chad**
Advisor: Jason R. Blough  
Torque Converter Turbine Noise and Cavitation Noise Over Varying Speed Ratio

**Fall 2012 (4)**

**Chen, Liu**
Advisor: Fernando Luis Ponta  
Vortex Shedding Dynamics in Long Aspect-Ratio Aerodynamics Bodies

**Hill, Carrie**
Advisor: Lyon Bradley King  
Translation Studies on an Annular Field Reversed Configuration Device for Space Propulsion

**Li, Chengzhang**
Advisor: Michele H. Miller  
Design and Fabrication of Resonant Gas Sensor for High Sensitivity in the Presence of Air Damping

**Washeleski, Robert**
Advisor: Lyon Bradley King  
Laser Thomson Scattering Measurements of Electron Temperature and Density in a Hall-Effect Plasma

**Spring 2013 (3)**

**Hepekoski, Mark**
Advisor: Jason R. Blough  
Development of an In Situ Measurement Device for Obtaining Material Thermal Properties

**Herescu, Alexandru**
Advisor: Jeffrey Allen  
Two-Phase Flow in Microchannels: Morphology and Interface Phenomena

**Wagner, Scott**
Advisor: William John Emblom  
Analysis of a Non-Traditional Micro Tube Hydroforming Process
MS Graduates

Summer 2011 (19)

Addanki, Neelima
Advisor: Ossama Omar Abdelkhalik
Orbits Design for LEO Space Based Solar Power Satellite System

Anand, Nikhil Kaushik
Advisor: Gregory M. Odegard
Experimental Study of Physical Aging Effects on Properties of EPON 862-DETA

Gopinath, Greeshma
Advisor: Craig R. Friedrich
Experimental Study of Physical Aging Effects on Properties of EPON 862-DETA

Gunjari, Venkata Surya
Advisor: Craig R. Friedrich
Course work only

Jagadale, Pankaj
Advisor: Fernando Luis Ponta
Effect of High Order Interpolation in the Stability and Efficiency of the Time-Integration Process in Vorticity-Velocity CFD Approaches

Jaryal, Vivek
Advisor: Jeffrey Donald Naber
Course work only

Kantor, Adam
Advisor: John E. Beard
Implementation of a Variable Compression Ratio Mechanism in a Four Cylinder Engine

More, Sushant
Advisor: Amitabh Narain
Course work only

Norconk, Michael
Advisor: Seong-Young Lee
A Comprehensive Review and Application of Particle Image Velocimetry

Parikh, Nishith
Advisor: Reza Shahbazian-Yassar
Local Degradation of Mechanical, Electrical and Structural Properties of Membrane Electrode Assembly in Polymer Exchange Fuel Cells

Pete, Aamod
Advisor: Gordon G. Parker
Dynamic Modeling of Active Regeneration in Catalyzed and Non-Catalyzed Diesel Particulate Filters

Potter, Jennifer
Advisor: Charles D. Van Karsen
Comparison of Modal Analysis Results of Laser Vibrometry and Nearfield Acoustical Holography Measurements of an Aluminum Plate

Rajan, Anurag
Advisor: Fernando Luis Ponta
Effect of Mesh Distortion on the Accuracy of High Order Vorticity-Velocity CFD Approaches

Salzman, Jonathan
Advisor: John David Hill
Evaluation of Factors Affecting Speed Perception in a Driving Simulator

Thunes, James
Advisor: Spandan Maiti
Topological Changes in 2D Simplicial Meshes for the Simulation of Fracture

Trinklein, Eddy
Advisor: Gordon G. Parker
Post Processing of Multiple GPS Receivers to Enhance Baseline Accuracy

Wlodyka, Joseph
Advisor: Gregory M. Odegard
Finite Element Analysis on Titan STL3 OTR Tires

Wyatt, Michael
Advisor: Craig R. Friedrich
Course work only

Pawel, Jarek
Advisor: Jason R. Blough
Muffler Characterization with Implementation of the Finite Element Method and Experimental Techniques

Mortazavi Zanjani, Seyyedeh
Advisor: Craig R. Friedrich
Course work only

Narang, Vikas
Advisor: Jeffrey Donald Naber
Course work only

Potdar, Saurabh
Advisor: Craig R. Friedrich
Course work only

Devanayaka, Swetha
Advisor: Craig R. Friedrich
Course work only

Feng, Yiping
Advisor: Desheng Meng
Preparation of Silicon-Metal Nanocomposites Based on Electrophoretic Deposition

Gorgritttanagul, Patcharapol
Advisor: Amitabh Narain
The Length of the Annular Regime for Condensing Flows Inside a Horizontal Channel - The Experimental Determination of its Values and its Trends

Gumaste, Rohan
Advisor: Amitabh Narain
Computational Simulations of Latent Heat Thermal Energy Storage Systems - with Innovative and First-Principles Based Simulation for the Underlying Unsteady Melting (and Solidification) Process

Guo, Hanmeng
Advisor: Craig R. Friedrich
Course work only

Kodgule, Nikhil Sunit
Advisor: Craig R. Friedrich
Course work only

Kulkarni, Siddharth
Advisor: Craig R. Friedrich
Course work only

LeRoy, Tyler
Advisor: Jason R. Blough
Muffler Characterization with Implementation of the Finite Element Method and Experimental Techniques

Mortazavi Zanjani, Seyyedeh
Advisor: Craig R. Friedrich
Course work only

Narang, Vikas
Advisor: Jeffrey Donald Naber
Course work only

Potdar, Saurabh
Advisor: Craig R. Friedrich
Course work only

2012-13 ME-EM ANNUAL REPORT 23
Roberts, Melissa  
Advisor: Jeremy Goldman  
Selective Matrix Remodeling to Increase Interstitial Flow in Lymphedema

Sabharwal, Abhishek  
Advisor: Craig R. Friedrich  
Course work only

Sahasrabhojane, Mihir  
Advisor: Gopal Jayaraman  
Course work only

Sawai, Rohan  
Advisor: Craig R. Friedrich  
Course work only

Stank, Jordan  
Advisor: Scott Andrew Miers  
Analysis of In-Cylinder Pressure Transducer Data Quality Utilizing a SIDI Turbocharged Engine

Sukumar, Ganesh  
Advisor: Song-Lin Yang  
Implementation of Monotonic Higher Order Upwind Scheme in KIVA 4

Tayal, Komal  
Advisor: Craig R. Friedrich  
Course work only

Virdi, Jaspreet Singh  
Advisor: Craig R. Friedrich  
Course work only

Wang, Shuo  
Advisor: Chang Kyoung Choi  
Course work only

Yan, Rui  
Advisor: Jeffrey Donald Naber  
Course work only

Zhang, Fengli  
Advisor: Dana Mary Johnson  
Development of an Optimization Model for Biofuel Facility Size and Location and a Simulation Model for Design of a Biofuel Supply Chain

Spring 2012 (53)

Athipatla, Harish Chowdhary  
Advisor: Scott Andrew Miers  
Course work only

Aulakh, Harsimran  
Advisor: Craig R. Friedrich  
Course work only

Balram, Anirudh  
Advisor: Desheng Meng  
Course work only

Barot, Ankit Jitendra  
Advisor: Craig R. Friedrich  
Course work only

Bhardwaj, Rahul  
Advisor: Craig R. Friedrich  
Course work only

Chakravartula, Vasista  
Advisor: Craig R. Friedrich  
Course work only

Chaudhari, Nilesh  
Advisor: Gregory M. Odegard  
Course work only

Chen, Guang  
Advisor: Craig R. Friedrich  
Course work only

Chen, Jieyin  
Advisor: Craig R. Friedrich  
Course work only

Condle, Jasdeep  
Advisor: Scott Andrew Miers  
Analysis of Novel Waste Heat Recovery Mechanism for an I.C. Engine

Dammann, John  
Advisor: Craig R. Friedrich  
Course work only

Deshpande, Saurabh  
Advisor: Craig R. Friedrich  
Course work only

Dorle, Swapnil  
Advisor: Craig R. Friedrich  
Course work only

Jadhav, Nitin  
Advisor: Reza Shahbazian-Yassar  
Course work only

Jalan, Gaurav  
Advisor: Gregory M. Odegard  
Course work only

Kakstis, Kyle  
Advisor: Craig R. Friedrich  
Course work only

Kalra, Himanshu  
Advisor: Craig R. Friedrich  
Course work only

Kanakamedala, Aravindh  
Advisor: Craig R. Friedrich  
Course work only

Krueger, Jason  
Advisor: Craig R. Friedrich  
Course work only

Kulkarni, Prasad  
Advisor: Craig R. Friedrich  
Course work only

Kulkarni, Mandar Dilip  
Advisor: Gregory M. Odegard  
Finite Element Analysis of a 2D Representative Volume Element

Kuvalkar, Muktesh  
Advisor: Craig R. Friedrich  
Course work only

Lawyer, Kristina  
Advisor: Jeffrey Donald Naber  
Course work only

Lemmens, Ryan  
Advisor: Desheng Meng  
Microfluidic Fabrication of Advanced Microcapsules for Use in Self-Healing Material

Liu, Xinyu  
Advisor: Craig R. Friedrich  
Course work only

Marathe, Salil  
Advisor: Craig R. Friedrich  
Course work only

Moyer, John  
Advisor: Tammy Lynn Haut Donahue  
Regional Comparisons of Nano-Mechanical Properties of the Human Meniscus; Structure and Function

Nandai, Sanjeev  
Advisor: Craig R. Friedrich  
Course work only

Nayak, Anit  
Advisor: Craig R. Friedrich  
Course work only

Patel, Nimesh  
Advisor: Craig R. Friedrich  
Course work only
Patil, Ratnesh  
Advisor: Craig R. Friedrich  
Course work only

Patil, Suhas  
Advisor: Craig R. Friedrich  
Course work only

Revandkar, Vinay  
Advisor: Craig R. Friedrich  
Course work only

Rittenour, Michael  
Advisor: Scott Andrew Miers  
Cold-Start Emissions Testing of Snowmobiles Using Ethanol and Gasoline

Ruke, Tejas  
Advisor: Craig R. Friedrich  
Course work only

Sapra, Sumit  
Advisor: Craig R. Friedrich  
Course work only

Shankarlingaiah, Bharath Byranahalli  
Advisor: Craig R. Friedrich  
Course work only

Sharma, Abhinav  
Advisor: Kazuya Tajiri  
Course work only

Shiel, Kenneth  
Advisor: John H. Johnson  
A Study of the Effect of Biodiesel Fuel on Passive Oxidation in a Catalyzed Particulate Filter

Soman, Puneet  
Advisor: Gregory M. Odegard  
Mechanical Modeling of Intraneural Ganglion Cyst

Sundar Ram, Anand  
Advisor: Craig R. Friedrich  
Course work only

Ubale, Aniket  
Advisor: Craig R. Friedrich  
Course work only

Uppala, Udaya Bhanu  
Advisor: Craig R. Friedrich  
Course work only

Utturkar, Aditya  
Advisor: Craig R. Friedrich  
Course work only

Vaidya, Abhijeet  
Advisor: Craig R. Friedrich  
Course work only

Vats, Shekhar  
Advisor: Craig R. Friedrich  
Course work only

Vemuri, Ananth Padmanabha Rao  
Advisor: Scott Andrew Miers  
Performance and Emission Testing of a Small Two-Stroke Engine Using Mid-Level Ethanol Blends

Weber, James  
Advisor: Scott Andrew Miers  
Impact of E22 on Two-Stroke and Four-Stroke Snowmobiles

Yi, Ye  
Advisor: Mahesh Gupta  
Course work only

Zadgaonkar, Sagar  
Advisor: Craig R. Friedrich  
Course work only

Zhao, Yiqian  
Advisor: Jeffrey Allen  
Preparation of Highly-Ordered TiO2 Nanotube Arrays and their Application in Dye-Sensitized Solar Cells

Zheng, Jun  
Advisor: Craig R. Friedrich  
Course work only

**Summer 2012 (19)**

Armstead, John  
Advisor: Scott Andrew Miers  
Cylinder Wall Waste Heat Recovery from Liquid-Cooled Internal Combustion Engines Utilizing Thermoelectric Generators

Babaria, Kaushal  
Advisor: Craig R. Friedrich  
Course work only

Bates, Marshall  
Advisor: Craig R. Friedrich  
Course work only

Claus, Michael  
Advisor: Craig R. Friedrich  
Course work only

Eick, Steven  
Advisor: Craig R. Friedrich  
Course work only

Gray, Sarah  
Advisor: Seth W. Donahue  
Treatment of Osteoporosis in a Mouse Model of Duchenne Muscular Dystrophy using Black Bear Parathyroid Hormone

Jadhav, Koustubh  
Advisor: Craig R. Friedrich  
Course work only

Kshirsagar, Aniruddha  
Advisor: Craig R. Friedrich  
Course work only

Maslach, Dan  
Advisor: Kazuya Tajiri  
Course work only

Nagapurkar, Tejas  
Advisor: Craig R. Friedrich  
Course work only

Nelson, Kelsey  
Advisor: Robert O. Warrington  
Course work only

Peitzmeier, James  
Advisor: Mahesh Gupta  
Automated Optimization of Polymer Extrusion Dies using Finite Element Analysis

Poramapojana, Poowanart  
Advisor: Bo Chen  
Predictive Control of Hybrid Vehicle Powertrain for Intelligent Energy Management

Roberts, Laura  
Advisor: Gregory M. Odegard  
Use of Manual Adaptive Remeshing in the Mechanical Modeling of an Intraneural Ganglion Cyst

Sali, Rohan  
Advisor: Song-Lin Yang  
Two Dimensional Lattice Boltzmann Simulation of Fluid Flow through an Idealized Micro-Structure of Disordered Media

Sawant, Sachin  
Advisor: Craig R. Friedrich  
Course work only
Ms. Graduates (cont’d)

Sriram, Suraj  
Advisor: Craig R. Friedrich  
Course work only

Tan, Yang  
Advisor: Craig R. Friedrich  
Course work only

Fall 2012 (20)  
Abis, Cagri  
Advisor: Gordon G. Parker  
Kalman Filter Approaches on Crane Swing

Arvanitis, Anastasios  
Advisor: Craig R. Friedrich  
Course work only

Hackstock, Tobias  
Advisor: Craig R. Friedrich  
Course work only

Hargapurkar, Mihir  
Advisor: Gopal Jayaraman  
Course work only

Kreh, Kristopher  
Advisor: Craig R. Friedrich  
Course work only

Loveland, Dustin  
Advisor: Jeffrey Donald Naber  
Development of a Predictive Combustion Model of a Spark Ignited Engine with Gasoline Direct Injection, Variable Valve Timing, Duration and Lift Technologies

Madison, Daniel  
Advisor: Scott Andrew Miers  
Thermal Characterization of Combustion Chamber Components in a Gasoline Turbocharged Direct Injection (GTDI) Engine

Meyer, Edmond  
Advisor: Lyon Bradley King  
Course work only

Moharir, Priyanka  
Advisor: Craig R. Friedrich  
Course work only

Rice, Andrew  
Advisor: Amitabh Narain  
Assessments and Computational Simulations in Support of a Time-Varying Mass Flow Rate Measurement Technique for Pulsatile Gas Flow

Schultz, Ashley  
Advisor: Craig R. Friedrich  
Course work only

Sevik, James  
Advisor: Scott Andrew Miers  
Exhaust Emissions of Low Level Blend Alcohol Fuels from Two-Stroke and Four-Stroke Marine Engines

Solanki, Yash  
Advisor: Craig R. Friedrich  
Course work only

Suravaram, Raghur Mohan Reddy  
Advisor: Craig R. Friedrich  
Course work only

Surdi, Kaustubh  
Advisor: James P. DeClerck  
Spatial Understanding of Matrix Inversion for Inverse Force Estimation

Suresh Srikant, Sagar  
Advisor: Craig R. Friedrich  
Course work only

Wang, Yanyu  
Advisor: Jeffrey Donald Naber  
Course work only

Wiegand, Andrew  
Advisor: Scott Andrew Miers  

Worm, Jeremy  
Advisor: Jeffrey Donald Naber  
Course work only

Zhang, Anqi  
Advisor: Seong-Young Lee  
Effect of Electrical Discharge Pattern on Spark Ignited Flame Kernel Development

Spring 2013 (49)  
Agarwal, Balmukund  
Advisor: Craig R. Friedrich  
Course work only

Bhatt, Satya  
Advisor: Craig R. Friedrich  
Course work only

Bordeau, Kyle  
Advisor: Gordon G. Parker  
Agent Based, Distributed Control Strategies and Optimization of Plug-In Electric Vehicles on Smart/Microgrid Architectures

Chauhan, Nirdeshkumar  
Advisor: Craig R. Friedrich  
Course work only

Chen, Shiran  
Advisor: Craig R. Friedrich  
Course work only

Desai, Chintan  
Advisor: Craig R. Friedrich  
Course work only

Dudhwal, Ishant  
Advisor: Craig R. Friedrich  
Course work only

Gaikwad, Mayur  
Advisor: Craig R. Friedrich  
Course work only

Gawande, Swapnil  
Advisor: Seong-Young Lee  
Course work only

Gulve, Yatin  
Advisor: Gregory M. Odegard  
Course work only

Gurram, Swaroop Kumar  
Advisor: Craig R. Friedrich  
Course work only

Joshi, Ravi  
Advisor: Craig R. Friedrich  
Course work only

Jumde, Kedar  
Advisor: Craig R. Friedrich  
Course work only
Jyothi, Shashank  
Advisor: John David Hill  
Course work only

Kanikdale, Subodh  
Advisor: Jeffrey Donald Naber  
Course work only

Karkadkar, Ajinkya  
Advisor: Craig R. Friedrich  
Course work only

Knoblauch, Christopher  
Advisor: Craig R. Friedrich  
Course work only

Kudupley, Harshal  
Advisor: Jeffrey Donald Naber  
Course work only

Lahiri, Abhirup  
Advisor: John David Hill  
Course work only

Lahurikar, Omkar  
Advisor: Craig R. Friedrich  
Course work only

Laijawala, Aditya  
Advisor: Craig R. Friedrich  
Course work only

Lokhande, Sachin  
Advisor: Gregory M. Odegard  
Simulating Large Deformation of Intraneural Ganglion Cyst Using Finite Element Method

Lukade, Maulali  
Advisor: Craig R. Friedrich  
Course work only

Mahajan, Saleel  
Advisor: Craig R. Friedrich  
Course work only

Millard, David  
Advisor: Craig R. Friedrich  
Course work only

Mukkirwar, Ratnadeep  
Advisor: Mahesh Gupta  
Course work only

Nikam, Abhijit  
Advisor: Jeffrey Donald Naber  
Course work only

Pachunoori, Makarand  
Advisor: Craig R. Friedrich  
Course work only

Patil, Shirish  
Advisor: Craig R. Friedrich  
Course work only

Peddinti, Shashank  
Advisor: Craig R. Friedrich  
Course work only

Pidgeon, James  
Advisor: Jeffrey Donald Naber  
An Experimental Investigation into the Effects of Biodiesel Blends on Particulate Matter Oxidation in a Catalyzed Particulate Filter during Active Regeneration

Plunger, Bryan  
Advisor: Chang Kyoung Choi  
Course work only

Rege, Nandan  
Advisor: Craig R. Friedrich  
Course work only

Sarkar, Andrew Mintu  
Advisor: Kazuya Tajiri  
Course work only

Sontakke, Sarang  
Advisor: Craig R. Friedrich  
Course work only

Srivastava, Sanchit  
Advisor: Craig R. Friedrich  
Course work only

Su, Hao  
Advisor: Craig R. Friedrich  
Course work only

Terhune, Kurt  
Advisor: Lyon Bradley King  
Course work only

Upare, Pritam  
Advisor: Craig R. Friedrich  
Course work only

Vasudev, Puneet Kumar  
Advisor: Craig R. Friedrich  
Course work only

Zhang, Gaowei  
Advisor: Craig R. Friedrich  
Course work only

Zhou, Zhuohao  
Advisor: Seung Hyun Kim  
Course work only

Zhou, Zhuoyu  
Advisor: Seung Hyun Kim  
Course work only

Zhu, Zhengshu  
Advisor: Craig R. Friedrich  
Course work only
BS Graduates

**Summer 2011** (12)
Brandon Scott Armstrong - Magna Cum Laude
Hasti Asayesh Ardakani - Magna Cum Laude
Megan C. Beyer - Magna Cum Laude
Michael David Engesath - Magna Cum Laude
Kane A. Johnson - Magna Cum Laude
Levi A. Miller - Magna Cum Laude
Colin M. Neese - Magna Cum Laude
Jordan Keller Porter - Magna Cum Laude
Jeffrey R. Schumacher - Magna Cum Laude
Paul F. Shenkosky - Magna Cum Laude
Craig VanSickle - Magna Cum Laude
Dale Patrick Wawrzyniec - Magna Cum Laude

**Fall 2011** (58)
Drew Daniel Aiken - Magna Cum Laude
Aaron David Andersen - Magna Cum Laude
Rushil Basavaraj - Summa Cum Laude
Avery T. Becker - Summa Cum Laude
David Marc Bentoski - Summa Cum Laude
Kyle Bertil Berggren - Summa Cum Laude
Jason Edward Bernard - Summa Cum Laude
Daniel Kenton Buck - Summa Cum Laude
Bryan D. Cook - Summa Cum Laude
Tyler Brian Daavettila - Magna Cum Laude
Cory John Feivor - Magna Cum Laude
Evandro Maicon Ficanha - Magna Cum Laude
Michael David Geiersbach - Magna Cum Laude
Robert D. Gordon - Magna Cum Laude
Eric D. Hagedorn - Magna Cum Laude
Bruce James Read Hall - Summa Cum Laude
Samuel Paul Handschke - Summa Cum Laude
Izaak J. Harvey - Summa Cum Laude
John H. Hatch - Summa Cum Laude
Nathan K. Helwig - Summa Cum Laude
Benjamin Michael Herlache - Magna Cum Laude
Alexander Mark Hetteen - Magna Cum Laude
Steven Gerard Heymes - Magna Cum Laude
Gareth Bradley Johnson - Summa Cum Laude
Wesley Robert Johnson - Summa Cum Laude
Brittany S. Labinski - Magna Cum Laude
Maxwell Richard Lent - Magna Cum Laude
Qianyu Liang - Magna Cum Laude
Thomas Joseph Lindholm - Magna Cum Laude
Christine N. Lundberg - Magna Cum Laude
Benjamin R. Martens - Magna Cum Laude
Kelsey Lynne McComb - Magna Cum Laude
Grace E. Neuburg - Magna Cum Laude

**Spring 2012** (117)
Mark David Nordstrom - Magna Cum Laude
Christopher Samuel Paquette - Magna Cum Laude
Stephen H. Pardus - Magna Cum Laude
Fei Pi - Magna Cum Laude
Brittany Sharon Potton - Magna Cum Laude
Shaun Michael Range - Magna Cum Laude
Jacob Edward Rauser - Magna Cum Laude
Anthony Giovanni Rossetto - Cum Laude
Aaron Michael Rozniewski - Cum Laude
Kyle Schouward - Magna Cum Laude
Eric David Sorenson - Magna Cum Laude
Randall Glenn Stroop - Magna Cum Laude
Jason Brian Susick - Magna Cum Laude
Darrin Traczyk - Magna Cum Laude
James David Trippett - Maga Cum Laude
Brandon J. Vick - Magna Cum Laude
John R. Visser - Magna Cum Laude
Bernhard Georg-Otto Walker - Magna Cum Laude
Mingrui Wang - Magna Cum Laude
Chet I. White - Magna Cum Laude
Joshua R. Wiljanen - Magna Cum Laude
Brent Logan Woodard - Magna Cum Laude
Daniel John Woodford - Magna Cum Laude
Jiongxun Zhang - Magna Cum Laude

Bryan John Finn - Magna Cum Laude
Joseph M. Gallo - Magna Cum Laude
Braden Giacobazzi - Magna Cum Laude
Lynn R. Giesler - Magna Cum Laude
Matthew J. Goldsworthy - Magna Cum Laude
Brent T. Guimont - Magna Cum Laude
Patrick Gregorio Haas - Magna Cum Laude
Christopher Brandon Hathaway - Magna Cum Laude
John Patrick Heffron - Magna Cum Laude
Peter D. Henning - Magna Cum Laude
Michael David Hojnacki - Cum Laude
Christopher S. Hughes - Summa Cum Laude
Zacharey J. Hussong - Summa Cum Laude
Summa Cum Laude
Craig Douglas Jeplawy - Summa Cum Laude
Steven R. Johns - Summa Cum Laude
Brian Thomas Judson - Summa Cum Laude
Alex Kaidan - Magna Cum Laude
Ruiju Kang - Magna Cum Laude
Jeffrey A. Kang - Magna Cum Laude
Ronald R. Kaunisto - Magna Cum Laude
Marcel A. Kerko - Summa Cum Laude
Sean Gregory Keyes - Summa Cum Laude
Mitchell Jerome Knudson - Summa Cum Laude
Su Ting Lau - Cum Laude
Allison Marie Lebovsky - Summa Cum Laude
Eric Bradley Link - Summa Cum Laude
Hanchen Liu - Cum Laude
Evan Gordon Lucas - Cum Laude
Lukas Jacob Lund - Cum Laude
Alexander Dominick-Kenneth - Cum Laude
MacDonald - Cum Laude
Alexander Kei MacLeod - Cum Laude
Laura Lee Maciokse - Summa Cum Laude
Drew W. Maki - Summa Cum Laude
Joshua R. Manninen - Summa Cum Laude
Mikel Brian Marshall - Summa Cum Laude
Christopher Eric Martin - Summa Cum Laude
Samantha E. Meader - Summa Cum Laude
Michael G. Mermys - Summa Cum Laude
Anna Marie Miller - Summa Cum Laude
Aaron P. Moore - Summa Cum Laude
Tyler James Muckenhirn - Summa Cum Laude
Jessica Ashley Nelson - Summa Cum Laude
Michael Paul Neuville - Summa Cum Laude
Kyle William Nordling - Summa Cum Laude
Jason J. Norkoli - Summa Cum Laude
Emily Nicole Paquette - Summa Cum Laude

28 MICHIGAN TECHNOLOGICAL UNIVERSITY
Michael Justin Pelletier
Matthew H. Rebandt
Adam John Reich - Cum Laude
Daniel L. Reichert - Cum Laude
Alexandrea Kari Reid
Timothy R. Reinke
Bryan Bernard Rocheleau
Jesse Richard Rosenow
Brian M. Rukkila - Magna Cum Laude
Neil Allen Rumschlag - Cum Laude
Kelsy Lynn Ryskamp
Melinda Kay Saxton
Steven A. Schmiedeknecht
Jan Schneewind
Justin B. Schrand - Magna Cum Laude
Kyle L. Schroeder
Bret T. Schulte
Joseph Alan Selbig
James Michael Sevik - Cum Laude
Zhuang Shao
Cody James Skog
Steven D. Slater
Dallas Jiilanna Smolarek
Joseph Ryan Spice
Travis A. Spilling
Jeffrey Thomas Squires
Tyler J. Stickland
Matthew Allan Stilwell - Magna Cum Laude
Robert J. Strobel
Myles Cameron Strong
Paul Sturmer - Magna Cum Laude
Yi Sui
Colleen Marie Switlik
Joshua Adam Taggart
Lance Paul Taylor - Summa Cum Laude
Jacob G. Truitt
Brennan M. Tymrak - Summa Cum Laude
Jesse Ray Vandenberg
Ross Alan Vandenbosch - Magna Cum Laude
Kenneth M. Vanmaanen
Collin Paul Veele - Summa Cum Laude
David Perry Vipond
Shaun Michael Vsetula
Nathan Todd Wastell - Magna Cum Laude
Stephen Dean Whittaker
Baifan Wu - Magna Cum Laude
Haofei Xie
Zhi Zhang - Cum Laude
Zechen Zhang
Michael John Zukoff

Summer 2012 (11)
Eric James Boylan
Yu Ge
Daniel Franklin Green - Summa Cum Laude
Minglei Guan
Cory Wilson Karosa
Aram Kim
Benjamin Gerard Madsen
Christopher William Pollock
Nicholas D. Pomeroy
Douglas Yutaka Yossida
Binxin Zhang

Fall 2012 (82)
Majed Farhan Shalal Al-Shammari
Elizabeth Anne Andrews
Matthew George Balling
Andrea Sharon Barendregh
Stefanie C. Bass - Magna Cum Laude
Gregory Dean Belshaw
Andrew J. Bitely
Abdulrahman Blaisi
Christopher Wayne Borns
Adrienne Lynn Breisacher
Drew Dosson Brennan - Magna Cum Laude
Seth Thomas Brezee
Garret Robert Brondyke
Mitchell Thomas Brown
Andrew C. Buday
Jacob William Ceh
Han Cheng
Zachary Michael Coffman
David B. Cook
Kalysta Jean Davis - Magna Cum Laude
Jesse Robert Dillon
James M. Doornbos
Robert Paul Dreyer
Joshua Thomas Ehlert
John Michael Feldpausch
Andrew Owen Glaeser
Jason Daniel Hainer
Ryan D. Harris
Clayton M. Hendricks
Jacob Michael Henke
Josiah W. Hooker
Brett Jacob Jenkins
Kyle J. Kestila
Brian E. Killian
John J. Kosmatka
Benjamin J. Kronberg
Joshua John Landwehr
Laura C. Larsen

Brock Raymond Larson
Daniel Wayne Lorentz
Eric M. Maddelein
James V. Maerclekin
Sean M. Mazuchowski - Cum Laude
David Ira O’Connor - Summa Cum Laude
Brian Edward Oestreich
Timothy John Palosan
Kellene T. Perry - Cum Laude
Michael Joseph Pertile
Craig R. Pietila
Gary William Pleyte - Cum Laude
Philip D. Potter - Cum Laude
Nicholas Allen Ragsdale
Scott Kenneth Rhudy - Magna Cum Laude
Steve Joseph Schaezner - Cum Laude
Jared M. Schlueter - Cum Laude
Angela Nicole Schwager
Saqib Jawad Sheikh
Venkatesh Vijaykumar Shetty
Wenlong Shi
Tongzhou Shi
Paul B. Sleik - Cum Laude
Brett Joseph Sruba
Karl Patrick Stauty - Summa Cum Laude
Alicia Marie Steele
Thomas James Stutts - Cum Laude
Craig H. Suydam
Jeffrey Jay Thompson - Magna Cum Laude
John Charles Tilleman
Alexander Drake Toy
Eric Mitchell VanDrie - Magna Cum Laude
Brittany Nicole Voshol - Cum Laude
Andrea J. Walvatne
David Joseph Warakomski - Magna Cum Laude
Bryan David Warju II
Emily Ann Westerman
Robert Clayton Williams - Magna Cum Laude
David M. Woller
Shiran Wu
Zhe Yang
Alexander Anthony Yosick
Yachan Zhang
Chad James Zurich
BS Graduates (cont’d)

Spring 2013 (122)
Bethany Marie Aebl
Christopher John Anten
Dominic D. Augustine
Reid Addison Barber
Matthew Ronald Barry
Tory Duane Baughan - Magna Cum Laude
Eric Franz Baumeler
Amanda Beam - Magna Cum Laude
Lukas Lingqi Bell - Cum Laude
Dylan James Beyrle
Paul James Bork
Matthew Frederick Brechting
Francis Henry Bremer
Kyle Curtis Broetzmann
Clayton Benjamin Brown
Jacob Andrew Bruggink
Jacob Ryan Budnick - Cum Laude
Beau Carlson - Magna Cum Laude
James Elder Clevegner - Magna Cum Laude
James Robert Cook
Robert Donald Cooper
David Paul Couillard
Benjamin Hugo Daavettila - Magna Cum Laude
Gregory Colin DeVilliers
Mark DeYoung
David Charles Deisenroth - Magna Cum Laude
Peter Kelly Denney - Cum Laude
Joseph K. Diehl
Thomas Charles Dionne
Carl Thomas Drache - Magna Cum Laude
Thomas John Dulak - Cum Laude
Brian Casey Dvorak - Cum Laude
Joseph Norton Eckstein
Stewart David Eddy
Justin Michael Engwis - Summa Cum Laude
Heather Flak
Thomas Michael Freeman
Mary Perkins Gardner - Magna Cum Laude
Karl Peter Guibert - Cum Laude
Zachary Thomas Halverson
James Francis Hartel
Brandon Lee Hein
Kevin Gregory Hency
Zachary T. Hersch
Daniel Mason Hirst
Philip Gerald Hohnstadt - Cum Laude
Michael Fay Hubble
Robert Scott Jane
Jonathon Rene Juszkiwicz
Benjamin Mark Kalis - Magna Cum Laude
Jacob Michael Kempainen - Cum Laude
Chadwick Joseph Kern - Cum Laude
David Ronald Klekintveld
Benjamin Henry Kloster
Andrea Sue Klumpp
Evan Nathaniel Kobman
Nathan Daniel Koetsier - Summa Cum Laude
Ryan John Koll
Kyle Scott Kovacs
David Matthew Kravis
Andrew James Kremkow
Jacqueline Ann Kukulski - Magna Cum Laude
Jacob A. LaSarge
Jeffrey Scott LaTulip
Lorenzo Humberto Labourdeth
Aaron J. Lilly
Eric Michael Lindholm - Cum Laude
Tyler J. Losinski
Tyler Joseph Lunsford
Benjamin Alan Maguire - Cum Laude
Bradley John Massie - Magna Cum Laude
Paul Franklin Mayes - Summa Cum Laude
John E. Messina - Cum Laude
Ryan Andrew Mikolaizik
Lauren E. Nasca
Huajun Ni
Andrew Mark Nienow
Miriam Elizabeth Paquet
James Joseph Parisot
Zachary M. Peck
Dylan Richard Penn
Justin Robert Poirier
Daniel Andrew Polovich
Michael William Ponte
Nathan Roscoe Ralph
Elizabeth Mary Reinke
Michael Scott Richards
Jordan D. Ridge - Magna Cum Laude
Chelsea Nicole Ruff - Summa Cum Laude
Nathan Joseph Saliga - Magna Cum Laude
John Edward Sand
Preston James Sanford
Katherine Ann Schattl - Cum Laude
Craig William Schmid
Thomas Joseph Schmidt
Andrew Michael Schrader - Cum Laude
Glen Thomas Shaw
Xiaoyu Song
Ryan Allen Steiner
Songhao Tang
Scott Steadmon Thompson
Gareth Michael Tomlinson
Joseph Patrick Trapp
Justin D. Tumberg
Andrew Z. VerSteeg
Matthew Scott Verbiscus
Jonathon Michael Vince
Alicia Marie Walby
Craig Michael Watson
Erik A. Weigel
Logan Alexander Weisend
Brian J. Weisner
Alexander Michael Weldum
Douglas Frank Weyher
Neil Joseph White
Michael L. Wood
Andrew Michael Wybo
Xiaofan Ye
Jonathon D. Zarafonitis
Yiming Zhu - Magna Cum Laude
Paul Andrew Zimmerman - Magna Cum Laude
In her new role, Barr has launched two writing initiatives targeted at graduate students: The ME-EM Lab Graduate Teaching Assistant (GTA) Training Program and, a one-credit seminar, ME-EM 5990: Writing Skills for Graduate Research Assistants (GRA). Both initiatives have a ripple effect, greatly impacting ME-EM undergraduate and graduate students.

Undergraduate students enrolled in lab classes benefit from a new writing framework that provides GTAs with a set of guidelines, grading rubrics, and tools to deliver effective feedback. “In the past, we haven’t done a lot of instruction on how to write lab reports,” says Barr. She hopes the training program will improve consistency across courses and help GTAs build more valuable student-teacher relationships. Barr is pleased with the early results: “Graduate teaching assistants need to be comfortable with all aspects of teaching: the relationships, the communication, the material. The new training program has been very successful in helping GTAs provide feedback to their students, and it gives them more confidence in the classroom.” To evaluate the effectiveness of the program, Barr is planning a full-scale assessment of the initiative’s impact in 2015, when she can compare the final reports from fall 2012 senior design students (who weren’t affected by the new training) to the final reports from spring 2015 students (who will have gone through all three labs under the new model).

The second initiative, a one-credit writing course, targets PhD students who conduct research with faculty members. The seminar disambiguates precision-valued technical writing, focusing heavily on sentence structure, word choice, paragraph construction, and how to prepare results for publication. The course also includes a strong ESL component to address the unique needs of many PhD students. With this instruction, GRAs can deliver more focused, accurate, and effective writing and have a stronger impact on peer audiences.

The future of both programs depends largely on resource allocations, but Barr hopes the new initiatives will continue to develop and shift to mentorship programs that encourage PhD students to pursue careers in academia. “We need to effectively mentor our PhDs as teachers and researchers,” says Barr.

Whether grad students are teaching an undergraduate lab or publishing journal articles, these programs will give them the tools they need to have a greater impact on their audience. As Barr knows from experience, impact is what counts.
After the team’s Oculus-ASR took first place in early 2011, the Aerospace Enterprise was awarded a two-year follow-on contract from the Air Force Office of Scientific Research (AFOSR) to prepare for a 2015 launch. The team secured a launch date through the Space Experiments Review Board (SERB) that ranks experiments from crucial to least important. Then the Department of Defense’s (DOD) Space Test Program evaluates and ranks each of the competing satellites and payloads. Tech’s Oculus-ASR ranked thirtieth out of the sixty-two government agency experiments vying for space flight. “It’s very impressive,” says Dr. King. “That’s not sixty-two student satellites. It’s sixty-two satellites coming from big government agencies—like NASA and the Air Force—and our student-designed vehicle finished in the middle of the pack.”

In order to be ready for the 2015 launch and retain the AFOSR funding, the sixty kilogram Oculus-ASR must pass a series of reviews including the recent pre-integration test. Despite a few anomalies, the enterprise’s nanosat passed the review and is on to the next phase. During the 2013-2014 school year, the team will implement a deorbit mechanism, finalize assembly, fix the pre-integration anomalies, complete the final integration of the vehicle, and run a series of tests on the fully integrated vehicle to ensure all the systems operate as designed. Before the 2015 launch in Cape Canaveral, Florida, the nanosat must pass a pre-ship review. If it passes the review, the Oculus-ASR will be on its way to Albuquerque, New Mexico, for testing in the Air Force Research Lab. Finally the nanosat will be integrated with the launch vehicle and lifted into space, where the Oculus-ASR’s primary mission is to serve as a cooperative imaging target. By observing the Oculus-ASR, the Air Force can improve its ability to predict what any given satellite is doing by simply watching it from the ground. Tech’s Aerospace Enterprise will carry out two such data campaigns for the Air Force.

The challenges of space are unforgiving. “We are pleased to have passed so many milestones over the years,” says King. “It has taught the students to fully engage every challenge and to take nothing for granted along the path to space.”
New Faculty

**DR. RUSH D. ROBINETT III**

Rush D. Robinett III is the Richard and Elizabeth Henes Chair Professor in Energy Systems and the department’s new Director of Research. He specializes in nonlinear control and optimal system design of energy, robotics, and aerospace systems.

In the energy arena, Robinett is focused on the distributed, decentralized nonlinear control and optimization of networked microgrids with up to 100 percent penetration of transient renewable energy sources (i.e., photovoltaics and wind turbines). At 100 percent penetration, the optimal design of energy storage systems is critical to the stability and performance of networked microgrids because all of the spinning inertia and fossil fuel of the generators have been removed from the system.

In the robotics area, his interest lies in the collective control of teams of simple, dumb robots that solve complicated problems. In the aerospace area, he is currently investigating system identification, trajectory optimization, guidance algorithm development, and autopilot design.

**DR. TOLOU SHOKUHFAR**

Tolou Shokuhfar accepted a tenure-track position as assistant professor in the Mechanical Engineering-Engineering Mechanics Department in December 2011. She was previously a post-doctoral research assistant at Michigan Tech.

Shokuhfar received her PhD in Mechanical Engineering from Michigan Tech. She holds a MS and BS in Materials Science and Engineering from Sharif University of Technology.

Shokuhfar is a member of the Biomedical Engineering Society, the Society for Biomaterials and the Materials Research Society. Her research interests include nanotechnology, nanomedicine, and orthopedic implants. She has published in journals such as *Nanomedicine: Nanotechnology, Biology, and Medicine, Applied Physics and Advanced Science Letters*.

**DR. MAHDI SHAHBAKHTI**

Mahdi Shahbakhti joins the Department of Mechanical Engineering-Engineering Mechanics as an assistant professor. He comes to Michigan Tech from the University of California, Berkeley.

Shahbakhti holds a PhD in Mechanical Engineering from the University of Alberta, and a MSE and BSE from KNT University of Technology. He taught a course on combustion engines and alternate fuels, for which he received the Zita and John Rosen Teaching Excellence Award.

Shahbakhti worked as a research and development engineer at Iran Khodor Powertrain Company for three years. He has published in journals including the *International Journal of Automotive Engineering; ASME Journal of Dynamic Systems, Measurement, and Control; and the International Journal of Engine Research*.

His research addresses some of the challenges of hybrid electric vehicles, including increasing fuel saving in hybrid drive-trains, reducing the control complexity of hybrid drive-train systems and increasing flexibility in using alternative fuel mixes.

**DR. PAUL VAN SUSANTE**

Paul van Susante joins the Department of Mechanical Engineering-Engineering Mechanics as a lecturer. He comes to Michigan Tech from the Colorado School of Mines.

He received his PhD and MS in Engineering Systems from the Colorado School of Mines. He holds a MS and BS in Civil Engineering from Delft University of Technology. Van Susante has published in journals such as *Aerospace Engineering, Terramechanics and Engineering Mechanics*. He holds memberships in the American Society of Civil Engineers and the American Institute of Aeronautics and Astronautics.
New Research Faculty

**DR. STEVEN Y. GOLDSMITH**

Steven Goldsmith is a Research Professor with dual appointments in the Department of Mechanical Engineering-Engineering Mechanics and the Department of Electrical and Computer Engineering. He is also a Senior Fellow at the Technological Leadership Institute at the University of Minnesota.

Goldsmith spent thirty-two years with Sandia National Laboratories and retired as Distinguished Member of the Technical Staff in 2011. While at Sandia he developed information and control systems for many different applications including nuclear weapons testing, particle beam accelerators, intelligent signal processing, seismic array monitoring, arms control and treaty verification, cryptography, environmental life-cycle analysis, e-commerce and international trade, electric grid coordination, collective robotics, information warfare, and cyber security.

His current research efforts are focused on intelligent agent systems and technology, particularly the development of adaptive and multi-agent systems. His current projects involve the application of intelligent agents to “smart” electric grid controls and microgrids, critical infrastructure security, automated cyber defense, and life-cycle analysis of renewable energy systems.

**DR. MARK R. VAUGHN**

Mark Vaughn is a Research Professor in the Department of Mechanical Engineering-Engineering Mechanics. Vaughn holds a PhD in mechanical engineering and a MS in biomedical engineering from The University of Texas at Austin, as well as a BS in biomedical engineering from the University of New Mexico. He began his career at the Center for Electromechanics in Austin designing and building pulsed power flywheel inertial energy storage systems and railguns. This work required him to invent new hydrostatic bearing technology.

Vaughn spent twenty-six years at Sandia National Laboratories working on a wide range of projects including advanced nuclear weapon use control systems, missile payloads, medical devices including prosthetics, wound healing, and wheelchair assistive devices, robotics, and energy storage for microgrids. He holds ten US patents.

His research interests include machine design, shock and vibration isolation, renewable energy including geothermal, grid energy storage, flywheel energy storage, hydrostatic bearings, biomedical engineering, wheelchair assistive technologies, oxygen concentrators, topical hyperbaric oxygen treatment, continuously variable transmissions, tamper detection technologies, rocket payloads, robotic joints, FEM, and heat transfer.
Faculty & Staff Awards

**Dr. Ezra Bar-Ziv**  
Received the 2012 Russell Ackoff Award for his paper “Torrefied-Biomass (Biocool) from Municipal Solid Waste for Power Production” in the *Journal of Solid Waste Technology and Management* at the Twenty-Seventh International Conference on Solid Waste Technology and Management on March 11-14, 2012, in Philadelphia, PA.

Along with Dr. John Diebel, assistant director of technology commercialization at Michigan Tech, and Jordan Klinger (ME-EM PhD candidate), awarded the top team designation by the National Science Foundation Innovation Corps (I-Corps), a new public-private partnership to help develop scientific and engineering discoveries into useful technologies. The program connects academic researchers with the technological, entrepreneurial, and business communities.

**Dr. Jason Blough**  
Selected to receive the 2011 Society of Automotive Engineers (SAE) Faculty Advisor Award. The award recognizes dedication and contributions to SAE and Blough’s SAE Collegiate Chapter. The award was presented at the SAE 2012 World Congress and Exhibition on April 25, 2012, in the Cobo Center, Detroit, MI.

**Dr. Bo Chen**  
Promoted to Associate Professor with Tenure.

**Dr. Mahesh Gupta**  
Selected to be Fellow of the Society of Plastics Engineers (SPE). He is the first faculty member from Michigan Tech to be named a Fellow of SPE.

Together with Atakan Altinkaynak (ME-EM PhD ‘10), M. Spalding (Dow), and S. Crabtree (Dow), authored “Melting in a Single Screw Extruder: Experiment and 3D Finite Element Simulations,” the second most read paper in the *International Polymer Processing Journal*.

**Dr. John Johnson**  
Selected to receive the 2013 ASME Internal Combustion Engine Award. The society awards the honor for “leadership in innovative research in the modeling of diesel engine particulate filters and after treatment systems based on extensive experimental data; for dedication in educating graduate students on diesel engines; and for leading and participating in the national studies of technology to reduce internal combustion engine fuel consumption.” The award consists of a $1,000 honorarium. Johnson will be honored at the ASME 2013 Internal Combustion Fall Technical Conference, set for Oct. 13-16 in Dearborn, MI.

**Dr. Lyon B. King**  
Promoted to Professor with Tenure.

**William Langdon**  
Received the Innovative Solutions Award at the Michigan Tech Staff Council Make a Difference Award reception.

**Dr. Seong-Young Lee**  
Promoted to Associate Professor with Tenure.

**Dr. Nina Mahmoudian**  
Invited to speak at the Academic Forum of the National Instrument Convention in Austin, Texas, held August 6-9, 2012.

**Dr. Charles Margraves**  
Honored as 2012 ME Teacher of the Year by the ME students.

**Dr. Desheng Meng**  
Promoted to Associate Professor with Tenure.

Along with Dr. Amitabh Narain, Xiaobao Geng (PhD student, ME-EM), and Pragnesh Patel, authored an article, “A self-adaptive thermal switch array for rapid temperature stabilization under various thermal power inputs,” selected for publication in the *Journal of Micromechanics and Microengineering*’s “Highlights of 2011.” Only twenty-four of the 403 articles published in 2011 were selected.

**Dr. Scott Miers**  
Received the 2012 SAE Ralph R. Teetor Educational Award. The award letter states: “The credentials and standards of excellence in education of this year’s candidates were extremely high and brought about some very keen competition. Your outstanding contributions have distinguished you as one of the top engineering educators.” Miers received the award at the 2012 SAE World Congress in Detroit, Michigan.

Selected as a 2013 finalist for the Michigan Tech Annual Teaching Award in the Assistant Professor/Lecturer/Professor of Practice category. The selections were based on over 51,000 student rating-of-instruction forms. Honored as 2013 ME Teacher of the Year by the ME students.

**Dr. Michele Miller**  
Accepted the additional appointment of Associate Chair and Director of Undergraduate Studies in the Department. She replaces Associate Professor Charles Van Karsen who stepped aside to return to full time teaching and research.

**Dr. Jeffrey Naber**  
Promoted to Professor with Tenure.


**Dr. Amitabh Narain**  
His research, “High Effectiveness Microscale Condensers and Boilers for Terrestrial and Space Applications,” was highlighted on the NSF website (CBET Thermal Systems).
Dr. Fernando Ponta
Promoted to Associate Professor with Tenure.

Highlighted in the September ASME article “Small Wind Turbines Fulfill Their Promises.”

Dr. Reza Shahbazian-Yassar
Promoted to Associate Professor with Tenure.

Selected by the NSF-International Materials Institute at Northwestern University to give an invited talk at the International Conference of Young Researchers on Advanced Materials in Singapore July 1-6, 2012. Awarded a travel grant by the International Materials Institute for Solar Energy and Environment to support his trip. Selected as a panelist at the Rush University Mentoring Program seminar. The seminar, “Tips on Getting National Science Foundation (NSF) Funding: Panel presentation from NSF Awardees,” was held on February 21, 2013.

Jillian Spagnotti
Received the Rookie Award at the Michigan Tech Staff Council Make a Difference Award reception. Her award recognizes staff members who have been at Michigan Tech for two or fewer years and have made a significant contribution.

Dr. Kazuya Tajiri
Selected as a 2013 finalist for the Michigan Tech Annual Teaching Award in the Assistant Professor/Lecturer/Professor of Practice category. The selections were based on over 51,000 student rating-of-instruction forms.

Dr. Paul van Susante
Selected as a 2012 Outstanding Reviewer for the ASCE’s Journal of Aerospace Engineering. ASCE’s reviewer recognition program gives the editors of the Society’s journals an opportunity to express their gratitude to these reviewers and to commend them for their efforts.

Jeremy Worm

Along with a team of graduate and undergraduate students and members of the Michigan Tech Chapter of the National Society of Black Engineers, brought the Michigan Tech Mobile Lab to Detroit. They met with engineers and training coordinators from two companies to showcase the Mobile Lab’s offering of hands-on short courses. The lab also provided fun-filled STEM activities for inner city youth at the Parental Boot Camp organized by Heroes Alliance of Detroit.
Faculty biographies and research interests are available online at mtu.edu/mechanical/department/faculty-staff

ME-EM FACULTY

Ossama Abdelkhalik
Assistant Professor

Jeffrey S. Allen
John & Joan Calder Associate Professor

Carl L. Anderson
Professor
Associate Dean for Research and Graduate Studies, College of Engineering

Ezra Bar-Ziv
Professor

John E. Beard
Associate Professor

Jason R. Blough
Associate Professor

Bo Chen
Associate Professor

Chang Kyoung Choi
Assistant Professor

James DeClerck
Professor of Practice

William J. Endres
Associate Professor

Craig R. Friedrich
Richard and Bonnie Robbins Chair, Professor, Associate Chair and Director of Graduate Studies

John K. Gershenson
Professor

Thomas R. Grimm
Associate Professor

Mahesh Gupta
Professor

Gopal Jayaraman
Professor

Facility & Staff Directory
ME-EM FACULTY (cont’d)

Mohan D. Rao
Professor

Charles D. Van Karsen
Associate Professor

Mo Rastgaar
Assistant Professor

Paul van Susante
Lecturer

Rush D. Robinett III
Richard and Elizabeth Henes Chair
Professor in Energy Systems
Director of Research

Carl R. Vilmann
Associate Professor

Mahdi Shahbakhti
Assistant Professor

Song Lin (Jason) Yang
Professor

Reza Shahbazian-Yassar
Associate Professor
Adjunct Associate Professor, Materials
Science and Engineering

ME-EM RESEARCH FACULTY

John H. Johnson
Research Professor
Professor Emeritus

Tolou Shokuhfar
Assistant Professor

Steven Y. Goldsmith
Research Professor

Kazuya Tajiri
Assistant Professor

Mark R. Vaughn
Research Professor

Madhukar Vable
Associate Professor

Sheryl Sorby
Research Professor
Professor Emeritus
ME-EM STAFF

Nancy Barr
Communications and Senior Design Program Advisor

Marlene Lappeus
Program Coordinator
Academic Advisor

Karen E. Bess
Staff Assistant

Robert W. Page
Laboratory Facilities Manager
Advisor, Hybrid Electric Vehicle Enterprise

Peter Bingham
Senior Design Training Specialist

Miron Perelman
Research Engineer

Robert DeJonge
Senior Research Engineer II
Senior Design Projects Coordinator

Tina Sarazin
Staff Assistant

Paula Feira-Zenner
Director of Operations and Finance

Jillian M. Spagnotti
Office Assistant

Kathy Goulette
Executive Assistant

JoAnne Stimac
Administrative Aide

Danise Jarvey
Senior Engineering Academic Advisor

Martin Toth
Master Machinist

Jaclyn Johnson
Research Engineer

Ryan A. Towles
Academic Advisor

Paul Kilpela
Research Associate

Eddy Trinklein
Research Engineer

Michael LaCourt
Research Engineer Scientist II

Connie Tuohimaa
Research & Accounting Coordinator

Bill Langdon
Training Specialist - Senior Design

Jeremy Worm
Research Engineer - Grant Writer
Formula Car Enterprise
Alumni Awards

2011 HUMANITARIAN AWARD—DR. TERRY J. WOYCHOWSKI

The first Michigan Tech Alumni Humanitarian Award was bestowed upon Dr. Terry J. Woychowski in recognition of his outstanding volunteer leadership and service to improve and enrich the lives of others.

Terry earned a Bachelor of Science degree in Mechanical Engineering, took postgraduate studies at Wayne State University, and attended the Global Executive Development Program at the Duke University School Of Business. In 2003 he received an Honorary Doctorate in Business Management from Indiana Wesleyan University.

After spending more than thirty years with General Motors Company, Terry retired in 2012 as vice president for global quality. He is a four-time recipient of the GM Chairman’s Honors.

Terry has long been active in civic and volunteer work. Just after the fall of communism in 1992, he went to northern Albania with a group from Grace Community Church in Detroit. “Of all the Eastern block countries, communism had its tightest grip on Albania,” he recalls. “It had retarded progress by what seemed like 100 years.” They helped establish a small church, which is still serving the city of Shkoder today.

Terry returned with the same group a few years later, this time traveling to the border of Northern Albania during the War in Kosovo—a time when ethnic cleansing was taking place. He helped set up a refugee camp, and transported supplies, food, clothes, medicine, and key personnel. “Many ethnic Albanian men in Kosovo had been either imprisoned or killed, or were fighting in the KLA, the revolutionary force. Their wives, children and the elderly were on their own, and Serbian military would come in and order them to leave. They walked across the Prokletije mountain range with only the clothes on their backs into Albania—a country that was itself destitute and impoverished,” he explains.

Terry received EMT training as a young engineer at GM. “I have some knowledge of medical terminology and equipment, which enables me to have higher-quality conversations with medical personnel as I try to help fulfill their needs,” he explains.

Immediately following the 2010 earthquake Terry traveled to Haiti to provide help to those in need. “Because GM had recently closed some plants, the medical facilities in those plants had supplies that were now basically ‘scrap’. The doctor in charge gave them to me—bandages, sutures and more—two large duffel bags full.” Terry used some of the supplies to treat individuals he encountered in Haiti, including the crushed hand of a girl, Marie Michelle, who had been trapped in a three-story building. But most of the contents were given to a makeshift hospital his team encountered a few days into their trip. “Those two duffel bags became the hospital’s entire inventory,” he says.

With his immediate family, Terry founded the Woychowski Charitable Foundation, sponsoring a Michigan Tech ME senior design team to build a human-powered grain processor. He formed a partnership with the World Hope organization to deploy them in sub-Saharan Africa to assist local villages in the preparation of their food staple. Yet another senior design team designed a second version, and Terry’s daughter Jamie traveled to Zambia to manufacture and distribute the grain processors.

As a member of the Board of Directors for the Engineering Society of Detroit (ESD), Terry formed a partnership between General Motors, Michigan Tech, and ESD to offer a tuition-free retraining program for displaced engineers in southeast Michigan.

As GM’s key executive liaison with Michigan Tech, Terry worked with the University in recruitment, financial grants, curricular development, and special projects. In addition, he also served as a member of the Michigan Tech College of Engineering Industrial Advisory Board. He is now a member of the Michigan Tech Board of Control.

Terry recently joined American Axle Manufacturing in Detroit as senior vice president for engineering and quality. He and his wife, Rochelle Ann, have three children and reside in Commerce Township, Michigan.
The 2012 Outstanding Service Award posthumously honored Tanya Wareham Klain, who died on December 7, 2008. Tanya earned a Bachelor of Science in Mechanical Engineering in 1990 and was a vibrant presence on Tech's campus. She was active in her sorority, Alpha Gamma Delta, Undergraduate Student Government, residence hall councils, the Alpine Ski Club, and the Michigan Tech Student Foundation. Besides earning a degree, she made friendships that endured. "Tech is famous for that—people staying together," she recalled.

After graduation, Tanya went to work for General Motors, where she advanced through several leadership positions and most recently held the position of engineering group manager in the area of body and exterior components. She was also a member of GM’s university relations and recruiting team. An ardent supporter of Michigan Tech, she was GM’s key contact with the Department of Mechanical Engineering—Engineering Mechanics.

As a Tech alumna, Tanya served on the Board of Directors of the Alumni Association and was very active in alumni events in the Detroit area. In 2004, Tanya was inducted into the Presidential Council of Alumnae in recognition of her professional accomplishments and her support for the University.

Her stewardship and leadership were based on fond memories of the University and a commitment to serve the institution. She always said that Michigan Tech transformed her life. “Coming to Tech was the best decision I ever made,” she once said. “I owe the University a lot—pretty much everything.”

The 2013 Distinguished Alumni Award went to Paul W. Fernstrum, who graduated from Michigan Tech with a Bachelor’s Degree in Mechanical Engineering in 1965. Paul is chairman and past president of Menominee-based R.W. Fernstrum & Co., a third-generation family-owned company that invented—and continues to manufacture and market—the Gridcooler keel cooler, a marine engine heat exchanger, which was developed during World War II for landing craft.

Paul began his career at RW Fernstrum as a draftsman. In 1975, he designed the first of a series of engineering programs for the Gridcooler. Today, some of the applications of the Gridcoolers include cooling of hydroelectric stations, engines, offshore wind and tidal generators, pump stations, and electronics on tsunami early-warning buoys and ROV submersibles. In 1995, he became president of the company.

As a student, Paul was in the Air Force ROTC, the American Society of Mechanical Engineers, and Alpha Phi Omega. Paul is a Michigan Tech Fund trustee, and his commitment to Michigan Tech continues in many other ways. He has sponsored Senior Design teams and most recently helped create two incredible, new classrooms in the R. L. Smith ME-EM Building (see page 14).

He has been active in local and civic organizations as a director of the Stephenson National Bank & Trust, past president of the Rotary Club, past commander of the US Power Squadron, and an elder at the Presbyterian Church. Paul is also a past Scoutmaster and district chairman for the Boy Scouts of America and has received the Boy Scouts of America Silver Beaver Award.

Sandy and Paul’s two sons, Sean and Todd, are also Tech alumni and work with their father. They also support various Michigan Tech initiatives, including School of Technology and Department of Humanities laboratories. Lisa, Sean’s wife, is also a Tech alum. Their children, Jeremy and Rachel, will be attending Michigan Tech this fall—third generation at Tech.
DOUG PARKS, GM
The fundamentals of engineering, paired with ambition and innovation, have carried Doug Parks a long way throughout his tenure at General Motors. In August 2012, Parks was promoted to Vice President, Product Programs. His new position was created after some restructuring in GM’s Global Product Development organization. The new structure eliminates redundancy, clarifies accountability, and streamlines the decision-making process. Now, twelve executive chief engineers report to Parks, each overseeing his or her product program from inception to production.

Parks, who graduated from Michigan Tech with a BSME degree in 1984, began his career at GM immediately after graduation. He has excelled in various positions at GM, from tooling engineer to global vehicle chief engineer for compact vehicles to global vehicle line executive and global vehicle chief engineer for electric vehicles, but he has always relied on the fundamentals. “Michigan Tech provided a great foundation for me,” says Parks. “The fundamentals of getting the design capable, having the right understanding to meet the requirements in an efficient manner, the fundamental underpinning of learning the trade and taking it from the classroom into the lab—those are the basics of engineering. That’s how I learned my craft.”

DR. PAUL ROGERS, TARDEC
As the Director of the US Army Tank Automotive Research, Development and Engineering Center (TARDEC), Dr. Paul Rogers understands the value of education. Rogers, who earned his PhD in Mechanical Engineering-Engineering Mechanics from Michigan Tech in 2004, leads a 1,700-person workforce of engineers, scientists, researchers, and support staff that focuses on research and development engineering for both manned and unmanned ground vehicle systems within the Army and across the Department of Defense. With an annual budget of more than $475 million, Rogers sets the strategic direction for a full range of investments that affect more than 270 Army vehicle systems. Previously Rogers served as Deputy Program Executive Officer for Ground Combat Systems and TARDEC Executive Director for Research and Technical Integration.

Rogers, also a decorated Commander in the Michigan National Guard, brings a combination of academic strength and ground truth to his work at TARDEC and can move effortlessly from a room full of executives to a room full of soldiers. “Education is crucial to being successful,” says Rogers. “We need to be students of our profession, seeking new knowledge, ideas, and experiences, so we are prepared as the uncertainties fold out in front of us.” Those experiences come from both the workforce and academia. Rogers highly values investment in academics, especially Science, Technology, Engineering, and Mathematics (STEM): “STEM is very important to the future success of our nation and crucially important to TARDEC.”
2012 ME-EM Academy Inductees

TIMOTHY P. COFFIELD
After graduating from Michigan Tech, Timothy P. Coffield (BSME 1984) went to work as a research engineer for five years at IBM Research in Rochester, Minnesota. Following that he was the principal engineer and business group manager at Cascade Engineering for seven years. In 1998, he founded Dahti Technologies out of his house, which established itself as a leader in the seating industry. Dahti Seating has worked mostly in the office-chair environment, but is developing in recreation, automotive, juvenile, marine, stadium, mass transit, and other applications. In 2006, Dahti was purchased by Illinois Tool Works Inc. Tim is currently Vice President for Product Development at Illinois Tool Works Inc. in Rockford, Michigan.

Tim has applied his innovations across a wide range of industries including automotive, office furniture, marine, tractor, aerospace, bicycle, orthotics, and health care industries. In 2008, he invented a unique orienting process allowing for the use of elastomer in demanding applications.

He is inventor or co-inventor of more than eighty US and foreign patents. His inventions are primarily in the area of manufacturing processes, plastics, and design innovations. In 1987, while working as an IBM Research & Development engineer, he co-invented IBM’s advanced suspension system, which became an industry standard disk drive design. In 1992, he invented the elastomeric encapsulation manufacturing process for Herman Miller’s famous Aeron Chair. He also co-developed an award winning bicycle seat that was highlighted in a Time Magazine annual design issue.

While a student at Michigan Tech, Tim was a ski coach for the Ski Club. Tim resides in Grand Rapids, Michigan. He has also completed a business degree from the University of Colorado.

COLLEEN L. JONES-CERVANTES
Colleen L. Jones-Cervantes (BSME 1983) is Vice President for Product Supply & Trading for ChevronTexaco, with global responsibility for the supply of non-crude oil feed stocks to Chevron’s refining system, refined products supply and trading, marine fuels marketing, and biofuels supply and trading.

Colleen started working at Chevron after graduation and has spent her career there in positions of increasing responsibility—often the only woman in those positions. She started as a project engineer in San Francisco in Chevron’s retail marketing department, and then became General Manager, Retail West, North America marketing, responsible for gasoline marketing and retail sales at nearly 3,000 Chevron and Texaco-branded stations in nine western continental states and Hawaii. She was also General Manager of Company-Owned Stores and President of Chevron Stations Inc., in which she oversaw all aspects of a network of more than 700 retail outlets. In the mid-90s Colleen spent nearly two years as a District Sales Manager with Caltex Philippines Inc. and was promoted to Vice President, Global Marketing, Asia Pacific region. While in Asia she also served on the Board of Directors for Caltex Australia Ltd., the largest refining and marketing company in Australia.

In addition to delivering business results, Colleen has a keen interest and passion for developing young professionals. She mentors employees new to Chevron, serves on the company's Advisory Board for the Hispanic employee network, and is a frequent speaker at the women’s network events. During her time in Asia, Colleen supported “Caring for Cambodia,” a charity focused on improving education and providing basic needs for school age children around Siem Reap, Cambodia.

Colleen was inducted into the Michigan Tech Presidential Council of Alumnae in 2011 and joined the ME-EM External Advisory Board in 2012. Colleen resides in Spring, Texas, with her husband, Winston, and their two daughters, Kyndra and Lauren.
ANTHONY F. RAIONDO
Anthony F. Raimondo (Tony) (BSME ’62) is currently Chairman & CEO of Behlen Manufacturing Company, a manufacturer of prefabricated buildings, grain bins, silos, and other structures, and is headquartered in Columbus, NE.

After graduation, Tony joined General Motors in 1962 as a production supervisor. He then joined Moog Inc., progressing from Manufacturing Engineer to Quality Assurance Manager to Manufacturing Manager of this unique, people-oriented aerospace company. He then spent several years at Sperry Corporation as General Manager of Vickers, a $90 million hydraulic products manufacturing operation in Omaha, Nebraska. He joined Wickes Corporation in 1982 as General Manager and led efforts to complete a successful management buyout of Behlen Manufacturing Company in 1984—a time when Behlen experienced major losses due to market changes—and Wickes emerged from Chapter 11.

Tony served as chair of the Nebraska Economic Development Commission, chairman of the Department of Labor Workers Training Board, and chairman and director of the Nebraska Industrial Competitive Alliance. In 2004, President George Bush nominated Tony for the position of Assistant Secretary of Commerce for Manufacturing and Services (manufacturing czar), a new position created to address the ailing factory sector. Tony subsequently withdrew due to presidential politics. He also ran for the US Senate in 2008.

Tony lives in Columbus, Nebraska and Bradenton, Florida with his wife, Jeanne. They are very proud of making education a family tradition: the two have four grown children, all with graduate degrees.

DONALD G. WHEATLEY
Donald G. Wheatley (BSME ’62 & MSME ’63) went to work for General Motors in 1963. He worked on the guidance systems doing vibration and fatigue analysis for the Apollo project. Out of the sixty new hires on the project, he was the only one remaining at the end. He also did some work on the main battle tank. Don then accepted an offer from Ford, where he worked on a small team to define the new Ford Maverick. He later led the team that designed and developed the Ford Bronco.

In 1982, Don invested $350 to start a business in his basement with his son, making clear and tinted Euro-Lens line headlight covers (thermo-formed) for trucks and cars, both to protect the bulb and to improve appearance. In 1984, he founded and became President of Extang Corp, making Extang’s famous “No Damage, No Drilling, Clamp-On Aluminum Frame” truck bed cover system, a tonneau cover. Extang was the first to sell this truck accessory product nationwide. Extang grew to 128 employees with three plants and sales of $18-20 million. He sold Extang in 2007.

Extang Corp. had built a fifty-foot carbon fiber catamaran, but it was not financially viable and was sold, although it continues to win races today. The resulting boat technology and patents launched Fortress Stabilization Systems, which is owned by his son Edward. His daughter, Ann and her husband, Dave then spun off Wahoo Composites/Wahoo Walls from Fortress. Wahoo builds custom carbon fiber beams for robots and has launched an energy-saving wall system. While at the helm of his business, Don liked to hire young kids who had problems in their lives and give them the chance to turn their lives around.

Don has over fifty-three patents as inventor or as co-inventor while at Ford Motor Co. and Extang. He lives with his wife Patricia in Punta Gorda, Florida.
2013 ME-EM Academy Inductees

JOHN M. BEATTIE
John M. Beattie (BSME ’63) took his first job upon graduation with the Louis Allis Company in Milwaukee, Wisconsin, where he was a design engineer on a variety of commercial, military, and NASA space projects. His expertise was in ball bearing technology and V-belt technology. In 1968, he joined the Toro Company in Bloomington, Minnesota, as a project engineer for the Riding Greensmower 3 and Groundsmaster 322. A few years later he was promoted to Director of Manufacturing and Engineering of the Turf Products Division and was instrumental in the development of the Sandpro, Greensmaster 1000, and Hydroject machines. He became Vice President of Operations of the Raincat Irrigation Division for Toro in Evans, Colorado.

John left Toro in 1976 to head his own company, Hyland Pet Products in Greeley, Colorado. He also was doing contract manufacturing at the time. In 1986, he started his own firm, Concept Engineering Corporation, specializing in consulting and new product development. He also served as an expert witness in product liability litigation.

A golf course mechanic approached Concept Engineering, asking the firm to build a service lift for mowers and turf equipment. John’s market research demonstrated substantial potential in this area of turf management, and in 1991 he established Trion Lifts Inc. John is currently the President and Chief Executive Officer of Trion Lifts Inc. He was the designer and lead engineer in the development of the Trion workstation as well as Trion’s DL 1300 Mobile Lift Table, the revolutionary Reel Conditioner, and an expanding line of maintenance tools for productive turf equipment service. Trion’s current product line includes lifts and work stations. Trion products are distributed worldwide and are found on every continent but Africa.

John is either the inventor or the co-inventor on fifteen patents. He is active as an elder in the First Presbyterian Church in Greeley, Colorado, and is the leader of various bible studies. His hobbies include skiing, sailing, house remodeling, and designing on the backs of placemats and napkins.

On July 25, 1964, John married Marilyn Cramer. They have one son, Scott, who attended Michigan Tech’s Summer Youth Program in 1986 but went on to earn his PhD in Statistics at Penn Sate.

RAY H. HERNER
While at Tech, Ray H. Herner (BSME ’54) received a Teaching Fellowship for Mechanical Engineering. After graduation he lived and worked in Alpena, Michigan, for twenty-two years. Ray’s career included working at Abitibi, a wood product plant, where he held the position of mechanical superintendent, at Petch Manufacturing Co., and as general manager at King Valve Co. He also taught evening courses for eight years at Alpena Community College as an adjunct faculty member. He developed and taught the first engineering courses there, all accredited by Michigan Tech and the University of Michigan.

In 1976, Ray accepted the position of vice president and later president of Mosier Industries in Brookfield, Ohio, a manufacturer of fluid power cylinders and actuators. While at Mosier, Ray broadened the offerings of the standard product lines and directed the design and startup of a new product line. He built the company by innovation and solving problems for his customers. He designed two complete cylinder lines, a complete valve line, and many various applications specific to individual companies.

When Ray graduated from Michigan Tech, the buzz word was “automation.” In the ’80s and ’90s, it became “computer.” Ray had the opportunity to design devices that successfully interfaced with computer control to increase product production. Over the years, his career gave him the opportunity to travel to various manufacturing companies and make extensive business contacts throughout the United States, Canada, England, France, Germany, Mexico, and Taiwan.

Ray is an inventor of eight patents in the field of fluid power. Ray has served as an advisory board member at Ohio State University. He has also established the Ray H. Herner Scholarship at Alpena Community College, a scholarship that is awarded to students enrolled in pre-engineering with plans to transfer to a four-year university.

While at Michigan Tech, Ray married his wife LaNora, who passed away in 1988. They have two children, Catherine and Steven. His grandson Ken Herner graduated from Michigan Tech in 2008 with a degree in Computer Science.
2013 ME-EM Academy Inductees (cont’d)

**TOM B. MOORE**
Tom B. Moore (BSME ’66) actually began his mechanical engineering career at an early age, repairing farm machinery and building hot rods in the small farming community of Marinette, Wisconsin, where he grew up. That interest led him to pursue automotive engineering as a career. He was greatly influenced by his parents to do one’s best, to work hard, and to always respect others.

He went to work for Standard Oil, now Chevron, as a plant engineer in Richmond, California, right after graduation, working on major plant expansions for two years. He took a year off and traveled to twenty-one countries. He returned to Denver to work for Behrent Engineering for one year and then joined Stearn Rogers Inc., an international design/construction firm, now part of Raytheon. He worked on special projects that included plutonium waste sites, natural gas facilities, and central heating plants for eight years.

Tom joined the consulting firm of RMH Group Inc. in 1978 as manager of the mechanical department. Within nine years he became a major owner and president of RMH and was president until 2006. While president, he diversified RMH to become a leader in sustainable energy design, net zero or energy neutral design, and renewable energy use in design, including solar panels, evaporative cooling, and more. As president Tom grew the business from forty employees to 120 and doubled company profits. RMH Group quickly gained recognition locally and nationally for their exceptional designs in energy efficient buildings, winning numerous awards in design, energy, lighting and environmental categories, and RMH was included in Engineering News-Record’s list of top 500 design firms in the US.

Tom was a board member and President of the American Consulting Engineers Council of Colorado, an organization representing 250 Colorado consulting firms. Now retired, Tom supports the Jeffco Action Center in Jefferson County, Colorado—a non-profit agency providing basic human services to people in financial need. He has written numerous articles for engineering and business publications and was professionally registered in ten states.

He married his wife, Wendy, on October 9, 1970. They have three grown children, Erin, Rani, and Justin, and numerous grandchildren.

**DR. VIJAY K. SAZAWAL**
After completing his doctoral degree in structural mechanics at Michigan Tech, Vijay K. Sazawal (PhD ’75) joined Westinghouse Electric Corporation in the Advanced Reactors Division as part of the design and technology team working on the Clinch River Breeder Reactor Project. His tenure at Westinghouse lasted twenty years during which time he rose through successive management positions with responsibility for fast reactors, advanced terrestrial and space reactors, nuclear defense programs, and US government programs to promote safety upgrades of Russian-built reactors in Central and Eastern Europe.

In 1995, he took a job with COGEMA Inc. as VP, Engineering and Technology, and then in 2002 went to work for US Enrichment Company Inc. (USEC) as Director, Government Programs, his current position. USEC, a leading supplier of enriched uranium fuel for commercial nuclear power plants worldwide, was a federal agency but is now privatized. Vijay coordinates and pursues advocacy for existing and new business initiatives. He is a member of the management team involved in the American Centrifuge Project, the leading initiative by USEC Inc. to build a state-of-the-art centrifuge nuclear enrichment plant based on American technology. His advice had been sought by the US State Department and US Department of Energy on nuclear export trade to India and other major commercial nuclear markets in the world. In 2011, he was appointed to the Civil Nuclear Trade Advisory Committee (CINTAC) to advise the US Commerce Department on trade issues facing the industry.


Vijay and his wife, Meenakshi, have three children and three grandchildren.
with Masco
At that time, Morry led a leveraged buy-out in concert
and changed its name to Titan Wheel International Inc.
management and business know-how to Washington.
United States in 1996, campaigning to bring sound fiscal
In 1983, Morry became President/CEO of CanAM Industries.
CanAM moved its headquarters to Quincy, Illinois, in 1990
and changed its name to Titan Wheel International Inc.
At that time, Morry led a leveraged buy-out in concert
with Masco Industry. In 1992, Morry and MascoTech
purchased the remaining interest in the company. Under
Morry’s entrepreneurial leadership, Titan has successfully
acquired and recreated previously-failed businesses in
the off-highway wheel and tire markets. Morry led the
company through its initial public offering on the NASDAQ
National Market System. After enjoying successful trading
on NASDAQ, Titan moved to the New York Stock Exchange.
Morry was nicknamed “The Grizz” by Wall Street analysts
for his tough negotiating style. He has transformed Titan
from a small wheel manufacturing business to a global
producer of off-highway wheel and tire systems.
Morry ran as a Republican candidate for President of the
United States in 1996, campaigning to bring sound fiscal
management and business know-how to Washington. He
wrote the book *Kill All the Lawyers and Other Ways to Fix
the Government* about the campaign. Morry’s philosophy:
Hard work and a little luck are the greatest combination
for success and can always make up for brains—but never
forget to keep learning.
He has established the Brent Taylor Charitable Trust —
serving educational institutions—named for Morry’s
brother who was killed in an auto accident in 1997. He
also established the Maurice & Michelle Taylor Foundation
which awards college scholarships to children of Titan
employees, as well as the Maurice Taylor & Brent Taylor
Loan-Scholarship Fund and the Titan Tire/Titan Wheel
Engineering Annual Scholarship at Michigan Tech.
Morry married Michelle Callahan on August 16, 1975. They
have three children, a son Anthony who attended Michigan
Tech, and two daughters, Maureen Sredl and Katie Rivers.

**MAURICE M. TAYLOR, JR.**
Maurice “Morry” M. Taylor
(BSME ’68) was first employed by
General Motors as a mechanical
engineer in Saginaw. A few years
later he joined Morweld Steel
Products and, in 1972, became
part owner of the American Steel
Impact Corp. in Detroit. Then, in
1974, he started Maurice Taylor & Associates and was a
representative for steel products manufacturers.

In 1983, Morry became President/CEO of CanAM Industries.
CanAM moved its headquarters to Quincy, Illinois, in 1990
and changed its name to Titan Wheel International Inc.
At the age of thirty-two, Ray accepted an offer to join
Glassmaster Company in Lexington, South Carolina, as
executive vice-president. A few years later, he became
president, and then one year later, president and CEO of
the company. He retired in 2007.

In 1973, he received the State of Oklahoma, US Senator
Dewey F. Bartlette, OKIE Award. Ray was chairman of the
Manufacture Council in Columbia, South Carolina, and
Director of the Chamber of Commerce for the Greater
Columbia area in South Carolina. The Alumni Association of
the University of Oklahoma, College of Medicine honored
him with the Amicus Medicine Award in 1980. He is listed in
the National and Heritage Registry of Who’s Who. He also
served as Church School Superintendent of St. Michael and
All Angels Episcopal Church.

While at Michigan Tech, Ray played basketball and was
elected to the Michigan Technological University Sports Hall
of Fame in 2003. Ray holds patents for innovative electrical
component design.

Ray was married to Julianne (Julie) Anderson Trewhella for
fifty-nine years. He lost her to cancer on February 11, 2013.
They have three daughters: Debbie, Joanne, and Kathleen.
He has five grandchildren and three great grandchildren.

**RAYMOND M. TREWHELLA**
Raymond M. Trewhella (BSME ’56)
began his career with Cliff Naturals
(Cleveland Cliffs) in 1956 where he
was responsible for mechanical and
electrical maintenance for forty
skilled associates and the start-
up of the first pelletizing iron ore
plant in Michigan. He left in 1960 to assume the position
of senior engineer with General Electric Company in Irmo,
South Carolina. While at GE, he received the General
Electric Company Managerial Award for Development of
the Hermetically Scaled Tantalum Capacitor.

At the age of thirty-two, Ray accepted an offer to join
Glassmaster Company in Lexington, South Carolina, as
executive vice-president. A few years later, he became
president, and then one year later, president and CEO of
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ME-EM Academy List
* Only Michigan Tech degrees listed

Frank Agosti, BSME ‘58
Carl Avers, BSME ‘62
Richard Bayer, BSME ‘44
John M. Beattie, BSME ‘63
Wilfred Bobier, BSME ‘43
John Calder, BSME ‘67, MBA ‘76
Timothy P. Coffield, BSME ‘84
John Cook, BSME ‘42
Charles Cretors, BSME ‘63
Charles Cronenworth, BSME ‘44
Robert D’Amour, BSME ‘48
Dean Diver, BSME ‘65
John Drake, BMSE ‘64, MBA ‘69
Theodore Edwards, BSME ‘50
Paul W. Fernstrum, BSME ‘65
Edward Gaffney, BSME ‘51
Joseph Gemignani, BSME ‘53
Dr. James C. Gerdeen, BSME ‘59
Dr. John Hallquist, MSEM ‘72, PhD ME-EM ‘74
Douglas J. Hamar, BSME ‘84
William Hartwick, BSME ‘48
Gerald Haycock, BSME ‘68
Ralph Hayden, BSME ‘33
Richard Hennes, BSME ‘48
Ray H. Herper, BSME ‘54
David Hill, BSME ‘65
Colleen L. Jones-Cervantes, BSME ‘83
Daniel R. Kapp, BSME ‘76
Raymond Kauppila, MSEM ‘60
Pet Knudson, BSME ‘64
Martin Laguna, BSME ‘77
Charles Lamoreaux, BSME ‘56
Charles Laurila, BSME ‘59
Gary Lawrey, BSME ‘79
Craig Lazzari, BSME ‘42
Albert Maki, BSME ‘48
Paul Masini, BSME/BBA ‘69
Tom McKie, BSME ‘47
Fred Mitchell, BSME ‘61
Bob Monica, BSME ‘50
Tom B. Moore, BSME ‘66
Lawrence Mulholland, BSME ‘55
Eric Nielsen, BSME ‘80
Merle Potter, BSME ‘58, MSEM ‘61
Norman Pratt, BSME ‘42
Anthony F. Raimondo, BSME ‘62
Dr. Kamlakar Rajurkar, MSEM ‘78, PhD ME-EM ‘81
Jack Real, BSME ‘39
James L. Reum, BSME ‘53
Dan Rivard, BSME ‘59
Richard Robbins, BSME ‘56
Dale J. Roberto, BSME ‘69
Dr. Vijay K. Sazawal, PhD ME-EM ‘75
Dr. Harold Schook, BSME ‘74, PhD EM ‘79
Fred Sherriff, BSME ‘63
James Sorenson, BSME ‘60, MSEM ‘61
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Harold Wiens, BSME ‘68
Dr. Terry J. Woychowski, BSME ‘78
Dr. Hussein M. Zbib, BSME ‘81, MSME ‘83, PhD ME-EM ‘87

Pictured above: ME-EM Department Chair Bill Predebon, John Beattie, and Michigan Tech President Glenn Mroz
Pictured top, right (from left to right): Tony Raimondo, Don Wheatley, Tim Coffield, Colleen Jones-Cervantes, and ME-EM Department Chair Bill Predebon
Pictured bottom, right: Art Weaver and Don Wheatley
External Advisory Board: Sharing Professional Insight and Expertise

The ME-EM External Advisory Board is a select group of corporate, university, and government leaders, many of whom are Michigan Tech alumni. EAB members share their expertise and provide assistance with curriculum direction, research topics, resource development, and education-industry partnership. They offer professional insight and provide valuable input—shaping the state-of-the-art engineering education that takes place in the ME-EM Department. Members can serve a maximum of two four-year terms.

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Jeff Zawisza (Co-chair)  
Dow Chemical USA

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Washington State University
Presidential Council of Alumnae

Laura K. Farrelly, Pamela Klyn, and Sylvia Salahutdin are the most recent ME-EM alumnae to be inducted into the Presidential Council of Alumnae (PCA) at Michigan Tech. The PCA recognizes successful Michigan Tech women graduates for their educational excellence, past student service, professional accomplishments, and community contributions.

LAURA K. FARRELLY

In her most recent position as Vice President of the Microsoft Alliance at NewsGator Technologies, Laura K. Farrelly (BSME ’93) was responsible for securing NewsGator’s position as a “Globally Managed” Microsoft partner. She also helped NewsGator to earn Microsoft’s 2011 US Partner of the Year award and secured $1.2M in funding from Microsoft.

As a Powertrain Product Development Engineer at Ford Motor Company, Laura developed engine and transmission programs for the heavy-duty truck and sport utility vehicle segments.

Laura has also held executive-level positions in marketing, product management, and business development at software companies ranging from $10M to $75M in revenue. She is a founding member of the Colorado CMO Group and has served as a program director of the Boulder Marketing Group.

Farrelly earned a master’s degree in Mechanical Engineering from the University of Michigan-Dearborn and an MBA in marketing and finance from Northwestern University’s Kellogg School of Management. Laura and her husband Brad Beck live in Boulder, Colorado with their two daughters, Lyra and Kate.

PAMELA KLYN

During nineteen years with Whirlpool, Pamela Klyn (BSME ’93) has held advancing roles in engineering, product development, global innovation, and sales and marketing. During this time, Pam was the first female technology director in Whirlpool’s history and also achieved certification as an OPEX Six Sigma Black Belt. Her current role is General Manager of Cooking Products for North America. In this role she is responsible for the P&L of the business as well as a multi-year business plan and product strategy.

Pam was recognized as one of the “Top 40 under 40” Business Leaders in Michigan in 2005 and in early 2012 she was profiled in the Wall Street Journal article “From Rising Star to Senior Manager.”

A member of the Michigan Tech Presidents Club, Pam has been a long-time advocate and supporter of Michigan Tech, serving as the Whirlpool Corporate Agent in the University’s Matching Gift Competition for ten years.

She has served on the Board of Directors for the United Federal Credit Union for seven years and also serves on the Renaissance Fund Board for Harbor Shores, an organization dedicated to revitalizing the Benton Harbor area.

Pam earned a master’s degree in Mechanical Engineering from the University of Michigan and an Executive MBA from Bowling Green State University. She lives in St. Joseph, Michigan, with her husband Steve and her stepchildren Parker and Cara.
Sylvia Salahutdin (BSME ’91) is the owner of seven LLCs operating under the DBA Little Caesars Pizza franchise.

Sylvia started her career “saving lives” while working for AlliedSignal selling seat belts, air bags, and electronics to various OEMs. In 1993, she was recruited by a Japanese supplier, Takata, to help start their North American sales and program management group and later was recruited by Autoliv, a Fortune 500 safety restraint company.

At Autoliv, Sylvia was the global negotiator for the General Motors Worldwide Business Unit conducting negotiations in Asia, Europe, and North America. At age thirty, she was the youngest director running the General Motors Business Unit and then the Ford Business Unit, which included sales, engineering, and program management. In 2005, Sylvia became the Director of Purchasing, managing groups in the United States and Mexico, and then was asked to help organize, train, and develop the purchasing group and strategies for Asia Pacific, which included groups in China, Japan, India, and Thailand.

After several years living and working in Shanghai, Sylvia and her husband decided to become Little Caesars franchisees as a side business. Due to the success of the first store opening, Sylvia ended up retiring from her automotive career and moving back to the US to open six more. Sylvia and her husband, Rashid (’91 Mechanical Engineering) live in York, Pennsylvania, with their two children Alexis and Nikko.

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Donors are critical to our success. With support from alumni and friends, we can continue to provide an outstanding educational experience for our students. This year, please consider directing your donation to the ME Undergraduate Curriculum Revision Fund or the ME Peace Corps Master’s International (PCMI) Fund using the enclosed, self-addressed envelope. You may also donate to these two funds online at mtu.edu/mechanical/crf and mtu.edu/mechanical/pcm. Every gift counts and will be used to make a difference.

The following list encompasses the many people who have generously shared their treasure to create an outstanding ME-EM Department. We are extremely grateful for their ongoing support. Those contributing from November 2011 to April 2013 are listed below.

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<thead>
<tr>
<th>TITLE</th>
<th>NAME</th>
<th>SPONSOR</th>
<th>AWARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Performance, Durable, Low Cost Membrane Electrode Assemblies for Transportation Applications</td>
<td>Pi: Jeffrey Allen</td>
<td>3M Corporate R&amp;D</td>
<td>$653,620</td>
</tr>
<tr>
<td>Feasibility of a Novel Concept to Produce Biocoal for Power and Enhanced Bio-Oil</td>
<td>Pi: Ezra Bar-Ziv</td>
<td>National Science Foundation</td>
<td>$69,750</td>
</tr>
<tr>
<td>Compaction of Biocoal</td>
<td>Co-Pls: Ezra Bar-Ziv and Bo Chen</td>
<td>University of Michigan-MIIE</td>
<td>$87,920</td>
</tr>
<tr>
<td>SEP: Sustainable Forest-Biofuel Pathways to Hydrocarbon Transportation Fuels: Biomass Production, Torrefaction, Pyrolysis, Catalytic Upgrading, and Combustion</td>
<td>Co-Pls: Ezra Bar-Ziv, Jeffrey Naber</td>
<td>National Science Foundation</td>
<td>$2,034,814</td>
</tr>
<tr>
<td>Engine Sensor Testing</td>
<td>PI: Jason Blough, Co-PI: Jeremy Worm</td>
<td>PCB Piezotronics Inc.</td>
<td>$12,547</td>
</tr>
<tr>
<td>Characterization of Torque Converter Cavitation Level During Speed Ratio Operation Phase I</td>
<td>PI: Jason Blough</td>
<td>General Motors Corporation</td>
<td>$102,057</td>
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<tr>
<td>Characterization of Torque Converter Cavitation Level During Speed Ratio Operation Phase II</td>
<td>PI: Jason Blough</td>
<td>General Motors Corporation</td>
<td>$94,985</td>
</tr>
<tr>
<td>Continued Research</td>
<td>PI: Bo Chen, Co-Pls: Jeffrey Naber, Jeremy Worm</td>
<td>Nostrum Energy LLC</td>
<td>$50,296</td>
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<tr>
<td>Continued Engine Research - Summer 2012</td>
<td>PI: Bo Chen, Co-PI: Jeffrey Naber</td>
<td>Nostrum Energy LLC</td>
<td>$48,070</td>
</tr>
<tr>
<td>Engine Studies Spring Semester</td>
<td>PI: Bo Chen, Co-PI: Jeffrey Naber</td>
<td>Nostrum Energy LLC</td>
<td>$42,754</td>
</tr>
<tr>
<td>Nostrum Continued Work Summer 2013</td>
<td>PI: Bo Chen, Co-PI: Jeffrey Naber</td>
<td>Nostrum Energy LLC</td>
<td>$75,600</td>
</tr>
<tr>
<td>Degradation Analysis and Optimization of Catalyst Layer in PEFC Based on Multiphysics Approach</td>
<td>PI: Seung Hyun Kim</td>
<td>Honda R&amp;D Co. Ltd., Automobile R&amp;D Center</td>
<td>$218,326</td>
</tr>
<tr>
<td>Development of Segmented PEFC with Submillimeter Resolution</td>
<td>PI: Tajiri Kazuya</td>
<td>University of Chicago Argonne LLC</td>
<td>$7,956</td>
</tr>
<tr>
<td>Water Management in Unitized Regenerative Fuel Cells</td>
<td>PI: Tajiri Kazuya</td>
<td>University of Michigan Space Grant Consortium</td>
<td>$15,400</td>
</tr>
<tr>
<td>Experimental Engine Testing with Argonne National Laboratory</td>
<td>PI: Scott Miers, Co-PI: Jeffrey Naber</td>
<td>Argonne National Laboratory</td>
<td>$86,457</td>
</tr>
<tr>
<td>Marine Engines Fueled with Gasoline/Alcohol Blends</td>
<td>PI: Scott Miers</td>
<td>University of Chicago Argonne LLC</td>
<td>$16,445</td>
</tr>
<tr>
<td>Advanced Vehicle Characterization</td>
<td>PI: Scott Miers</td>
<td>University of Chicago Argonne LLC</td>
<td>$101,805</td>
</tr>
<tr>
<td>Diesel Engine Studies - Investigation on 1.9L I4 for Combustion and Efficiency Baseline and Characterization</td>
<td>PI: Jeffrey Naber</td>
<td>Nostrum Energy LLC</td>
<td>$8,845</td>
</tr>
<tr>
<td>IC Engine Test Stage V</td>
<td>PI: Jeffrey Naber</td>
<td>Nostrum Energy LLC</td>
<td>$42,088</td>
</tr>
<tr>
<td>Rate of Injection Measurements - Comparison of Injector Nozzles/Injectors</td>
<td>PI: Jeffrey Naber, Co-Pls: Seong-Young Lee, Jaclyn Johnson</td>
<td>Ford Motor Company</td>
<td>$16,857</td>
</tr>
<tr>
<td>Continued Research - Spring 2013</td>
<td>PI: Jeffrey Naber, Co-PI: Bo Chen</td>
<td>Nostrum Energy LLC</td>
<td>$53,000</td>
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<tr>
<td>NG Engine Component Studies in Combustion Lab for Advanced Green Innovations</td>
<td>PI: Jeffrey Naber, Co-PIs: Seong-Young Lee, Jaclyn Johnson</td>
<td>Advanced Green Innovations LLC</td>
<td>$149,130</td>
</tr>
<tr>
<td>Titan Tire Testing TP72 (5 Tires) and TP73 (4 Tires)</td>
<td>PI: Jeffrey Naber, Co-Pls: Gregory M. Odegard, Paul Dice</td>
<td>Titan Tire Corporation</td>
<td>$27,315</td>
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</tr>
<tr>
<td>Ford Experimental Study Low Temperature Fuel Mixture Ignitability</td>
<td>Jeffrey Naber,</td>
<td>Seong-Young Lee, Jaclyn Johnson</td>
<td>Ford Motor Company</td>
</tr>
<tr>
<td>Comparison of Spray Characteristics for Six Diesel Injector Nozzles</td>
<td>Jeffrey Naber,</td>
<td>Seong-Young Lee, Jaclyn Johnson</td>
<td>Nostrum Energy LLC</td>
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<tr>
<td>Independent Review of High Pressure Heat Exchanger Locomotive Test</td>
<td>Jeffrey Naber,</td>
<td>Jaclyn Johnson, Seong-Young Lee, Seung Hyun Yoon</td>
<td>US Department of Transportation, Federal Railroad Administration</td>
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<tr>
<td>Collaborative Research: Nexus of Simulation, Sensing and Actuation for Aerodynamic Vibration Reduction of Wind Turbine Blades</td>
<td>Jeffrey Naber,</td>
<td>Jaclyn Johnson</td>
<td>National Science Foundation</td>
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<tr>
<td>Development and Delivery of High-Impact STEM Outreach Utilizing the Michigan Tech Mobile Laboratory in Support of TARDEC and Heroes Alliance</td>
<td>Jeremy W orm, Gregory M. Odegard, Jim DeClerck</td>
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<td>US Department of Defense, Army TARDEC</td>
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<tr>
<td>Diagnosing Induction System Degradation and Evaluation of Remedial Chemicals in Automotive Engines</td>
<td>Jeremy W orm, Jeffrey Naber, Ja clyn Johnson</td>
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<td>Illinois Tool Works Inc. (ITW)</td>
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<td>Delivering STEM Outreach Through Inspirational Hands-On Activities</td>
<td>Jeremy W orm</td>
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<td>National Instruments Corporation</td>
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<td>Short Course Delivery: Experimental Studies in Hybrid Electric Vehicles</td>
<td>Jeremy W orm</td>
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<td>Wisconsin Technical College System</td>
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<td>Delivery of STEM Outreach with Michigan Tech Mobile Laboratory</td>
<td>Jeremy W orm</td>
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<td>General Motors Corporation</td>
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<tr>
<td>Short Course Delivery: Spark Ignition Engine Management Systems</td>
<td>Jeremy W orm,</td>
<td>Jeffrey Naber, Mahdi Shahbakhti</td>
<td>D ENSO International America Inc.</td>
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<td>Michigan Tech-Nostrum (Phase III): Experimental Investigation of Hollow-Cone Injector at Engine Relevant Conditions in a Combustion Vessel</td>
<td>Seong-Young Lee,</td>
<td>Jeffrey Naber, Jaclyn Johnson</td>
<td>Nostrum Energy LLC</td>
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<tr>
<td>CFD Modeling of Water Injection Sprays to Assess Three Different Injectors</td>
<td>Seong-Young Lee,</td>
<td>Jeffrey Naber, Jaclyn Johnson</td>
<td>Nostrum Energy LLC</td>
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<tr>
<td>Michigan Tech-NOSTRUM: Characterization of Water Spray Injection at Elevated Temperatures</td>
<td>Seong-Young Lee,</td>
<td>Jeffrey Naber, Jaclyn Johnson</td>
<td>Nostrum Energy LLC</td>
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**CENTER FOR AGILE & INTERCONNECTED MICROGRIDS (AIM)** $2,734,567

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<tr>
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<th>Co-PIs:</th>
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<tr>
<td>Agent-Based Control with Application to Microgrids with High Penetration Renewables</td>
<td>Gordon G. Parker, Steven Goldsmith, Wayne Weaver</td>
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<td>Sandia National Laboratories</td>
<td>$450,000</td>
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<tr>
<td>Agent-Based Control with Application to Microgrids with High Penetration Renewables</td>
<td>Gordon G. Parker, Steven Goldsmith, Wayne Weaver</td>
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<td>Microgrid Modeling and Optimization for High Penetration Renewables Integration</td>
<td>Gordon G. Parker, Wayne Weaver</td>
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<td>Sandia National Laboratories</td>
<td>$331,000</td>
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<tr>
<td>Distributed Agent-Based Management of Agile Microgrids</td>
<td>Wayne Weaver,</td>
<td>Gordon G. Parker</td>
<td>US Department of Defense, Army Research Laboratory</td>
<td>$1,853,567</td>
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### Contracts & Grants (cont’d)

#### ENGINEERING EDUCATION INNOVATION

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<tr>
<td>Senior Design: Agile Fan Assembly System</td>
<td>PI: William Endres, Co-PI: Charles Van Karsen</td>
<td>Revcor Inc.</td>
<td>$30,000</td>
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<tr>
<td>Senior Design: Diesel Engine Air Shutoff Valve</td>
<td>PI: William Endres, Co-PI: Charles Van Karsen, Charles Margraves</td>
<td>Cummins Inc.</td>
<td>$25,717</td>
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<tr>
<td>Senior Design: Helical Gear Differential Wear Test Rig</td>
<td>PI: William Endres, Co-PI: Charles Van Karsen</td>
<td>American Axle &amp; Manufacturing</td>
<td>$26,452</td>
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<tr>
<td>Senior Design: Material Sample Prep Device</td>
<td>PI: William Endres, Co-PI: Charles Van Karsen</td>
<td>Cliff’s Natural Resources</td>
<td>$30,420</td>
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<tr>
<td>Senior Design: Lightweight Swing Gate</td>
<td>PI: William Endres</td>
<td>Chrysler LLC</td>
<td>$26,452</td>
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<tr>
<td>Senior Design: Foam Proportioning Delivery System (Team 13)</td>
<td>PI: William Endres, Co-PI: Jeffrey Allen</td>
<td>Tyco Fire Products LP</td>
<td>$28,996</td>
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<tr>
<td>Senior Design: Lightweight Axle Carrier</td>
<td>PI: William Endres, Co-PI: Michael LaCourt</td>
<td>Meritor Inc.</td>
<td>$26,021</td>
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<tr>
<td>Senior Design: Hatchback Rear Header Optimization (Team 12)</td>
<td>PI: William Endres, Co-PI: Charles Van Karsen</td>
<td>Chrysler Group LLC</td>
<td>$26,765</td>
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<tr>
<td>Senior Design: Extendable Pipelayer Boom (Team 14)</td>
<td>PI: William Endres, Co-PI: Gordon G. Parker</td>
<td>Caterpillar Inc.</td>
<td>$26,765</td>
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<td>Senior Design: Modular Low-Temperature Environment Chamber</td>
<td>PI: William Endres</td>
<td>Flexsteel Pipeline Technologies Inc.</td>
<td>$30,780</td>
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<tr>
<td>Senior Design: Rack Bearing Design Optimization (Team 10)</td>
<td>PI: William Endres, Co-PI: Michael LaCourt</td>
<td>Nexteer Automotive Corporation</td>
<td>$26,765</td>
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<td>Senior Design: Composite Fifth Wheel Design (Team 1)</td>
<td>PI: William Endres, Co-PI: Charles Van Karsen, Tammy L. Haut Donahue</td>
<td>Jost International Group</td>
<td>$30,420</td>
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<td>Senior Design: Door Check Design (Team 4)</td>
<td>PI: William Endres, Co-PI: Charles Van Karsen</td>
<td>Chrysler Group LLC</td>
<td>$26,452</td>
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<td>Senior Design: Semi-Automated Multi-DOF Pipelayer Design</td>
<td>PI: William Endres, Co-PI: Gordon G. Parker, Charles Van Karsen</td>
<td>Caterpillar Inc.</td>
<td>$26,452</td>
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**$1,098,179**
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<tr>
<td>Senior Design: Modular Dishwasher Top Rack Design</td>
<td>William Endres</td>
<td>Whirlpool Corporation</td>
<td>$27,187</td>
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<td>Fluidics, Power, and Logic Circuitry Design/Integration into Handheld Sensor Platform</td>
<td>William Endres, Robert Delonge</td>
<td>Battelle Memorial Institute</td>
<td>$32,349</td>
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<tr>
<td>Enterprise: Professional Bicycle Chain Cleaner</td>
<td>John Gershenson</td>
<td>Park Tool USA</td>
<td>$11,022</td>
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<tr>
<td>Velovations Enterprise: Highrise</td>
<td>John Gershenson</td>
<td>Saris Cycling Group Inc.</td>
<td>$5,878</td>
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<td>Enterprise: Trainer Comfort</td>
<td>John Gershenson</td>
<td>Saris Cycling Group Inc.</td>
<td>$4,409</td>
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<td>Enterprise: Fork Displacement Sensor and Shock Integration</td>
<td>John Gershenson</td>
<td>Cane Creek Cycling Components</td>
<td>$7,348</td>
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<td>Enterprise: Brake Vibration Research</td>
<td>John Gershenson</td>
<td>SRAM Corporation</td>
<td>$7,348</td>
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<td>Enterprise: Rear End Bushing Replacement for Niner Bikes</td>
<td>John Gershenson</td>
<td>Niner Bikes</td>
<td>$7,435</td>
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<td>Enterprise: Outdoor/All-Weather Bicycle Tire Pump</td>
<td>John Gershenson</td>
<td>Park Tool USA</td>
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<td>Enterprise: Disc Brake Vibration Isolator for Specialized Bicycles</td>
<td>John Gershenson</td>
<td>Specialized Bicycle Components Inc.</td>
<td>$14,870</td>
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<td>Multi-disciplinary Systems Engineering: Engaging MSI STEM Students through Space-based Capstone Design (Additional Funding)</td>
<td>John Gershenson, Michele Miller</td>
<td>Universidad del Turabo</td>
<td>$171,452</td>
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<td>Enterprise: Power Analysis</td>
<td>John Gershenson</td>
<td>Saris Cycling Group Inc.</td>
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<td>Enterprise: Brake Vibration Improvement</td>
<td>John Gershenson</td>
<td>Saris Cycling Group Inc.</td>
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<td>Enterprise: Stack Rack 2.0</td>
<td>John Gershenson</td>
<td>Saris Cycling Group Inc.</td>
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<td>NSF Graduate Research Fellowship - Technologies for Developing Countries</td>
<td>Brennan Tymrak, Michele Miller</td>
<td>National Science Foundation</td>
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**MICHIGAN/AFRL CENTER OF EXCELLENCE IN ELECTRIC PROPULSION (MACEEP)**  

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<tr>
<td>Deposition Rate of Propellant Backflow from a Magnesium Hall-Effect Thruster Graduate Research Fellowship Program</td>
<td>Mark Hopkins, Lyon B. King</td>
<td>National Science Foundation</td>
<td>$126,000</td>
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<td><em>Oculus-ASR</em></td>
<td>Lyon B. King, Adam Funkenbusch</td>
<td>University of Michigan-MSGC</td>
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## Contracts & Grants (cont’d)

### MULTI-SCALE TECHNOLOGIES INSTITUTE (MuSTI) $2,993,702

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<tr>
<td>Modeling and Data Acquisition Support for Active Motion Compensation Technology for Roll-On/Roll-Off Cargo Vessel Discharge to Floating Platforms SBIR Phase I</td>
<td>PI: Jason R. Blough, Co-PIs: Gordon G. Parker, Eddy Trinklein</td>
<td>Quantum Engineering Design Inc.</td>
<td>$20,000</td>
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<td>A New Experimental Model of Knee Joint Trauma</td>
<td>PI: Tammy L. Haut Donahue</td>
<td>National Institutes of Health</td>
<td>$207,686</td>
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<tr>
<td>Center for Diagnostic Nanosystems Phase I &amp; II</td>
<td>PI: Craig R. Friedrich, Co-PI: Chang Kyoung Choi</td>
<td>Marshall University Research Corporation</td>
<td>$712,148</td>
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<td>Modeling and Experimental Validation of Metal-Air Battery</td>
<td>PI: Tajiri Kazuya</td>
<td>Nissan Motor Co. Ltd.</td>
<td>$121,516</td>
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<td>Scalable Fabrication of Fractal Nanoparticles for Electrochemical Energy Storage</td>
<td>PI: Desheng Meng</td>
<td>National Science Foundation</td>
<td>$352,650</td>
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<td>Collaborative Research: Self-Circulating, Self-Regulating Microreactor for On-Chip Gas Generation from Liquid Reactants</td>
<td>PI: Desheng Meng, Co-PIs: Craig R. Friedrich, Steven Goldsmith</td>
<td>National Science Foundation</td>
<td>$86,261</td>
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<td>Multi-scale Modeling of Graphite/CNT/Epoxy Hybrid Composites</td>
<td>PI: Gregory M. Odegard</td>
<td>US Department of Defense, AFOSR</td>
<td>$252,555</td>
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<td>Finite Element Modeling of Internally-Reinforced Pressure Tanks</td>
<td>PI: Gregory M. Odegard</td>
<td>REL Inc.</td>
<td>$167,371</td>
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<td>Senior Design: Internally-Reinforced Pressure Tank Design</td>
<td>PI: Gregory M. Odegard, Co-PI: Michele Miller</td>
<td>REL Inc.</td>
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<td>Multi-scale Modeling of Polymer Nanocomposites (Additional Funding)</td>
<td>PI: Gregory M. Odegard</td>
<td>NASA Langley Research Center</td>
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<td>Multi-scale Modeling of Liquid Crystalline/Nanotube Composites</td>
<td>PI: Gregory M. Odegard</td>
<td>University of Oregon</td>
<td>$47,441</td>
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<td>Multi-scale Model Development and Validation of Graphene/ULTEM Composites for Structural and Noise Reduction Applications</td>
<td>PI: Gregory M. Odegard</td>
<td>National Aeronautics and Space Administration</td>
<td>$351,634</td>
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<td>Microsensor for Intramuscular Pressure Measurement</td>
<td>PI: Gregory M. Odegard</td>
<td>Mayo Clinic</td>
<td>$50,314</td>
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<td>Planning Grant: I/UCRC for Novel High Voltage Transmission Materials and Structures</td>
<td>PI: Gregory M. Odegard</td>
<td>National Science Foundation</td>
<td>$11,500</td>
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<tr>
<td>Collaborative Research: Stronger Than Glass Fibers, Stiffer Than Steel Wires: A New Perspective into the Mechanics of Cellulose Nanocrystals</td>
<td>PI: Reza Shahbazian-Yassar, Co-PI: Gregory M. Odegard</td>
<td>National Science Foundation</td>
<td>$277,650</td>
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<tr>
<td>New Insights on High-Performance Anodes for Lithium-Ion Batteries</td>
<td>PI: Reza Shahbazian-Yassar</td>
<td>American Chemical Society-Petroleum Research Fund</td>
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### NOISE, VIBRATION, AND HARSHNESS $231,682

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<tr>
<td>Buzz-Squeak-Rattle Material Study</td>
<td>PI: Charles Van Karsen</td>
<td>Bayer MaterialScience</td>
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<td>Acoustic Boom Modeling</td>
<td>PI: Charles Van Karsen, Co-PI: Gregory M. Odegard, Jim DeClerck</td>
<td>General Motors</td>
<td>$184,401</td>
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<td>Vibration Based Flow Detection in Fiber Reinforced Polymer Wraps</td>
<td>PI: Mohan Rao</td>
<td>Neptune Research Inc.</td>
<td>$43,369</td>
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Patents & Publications

* Please note: **Bold text** indicates ME-EM faculty members and *italicized text* indicates ME-EM students.

**PATENTS**


**William J. Endres:** Cutting Tool Insert Having Internal Microduct for Coolant, Patent Number 8047748 B2, November 2011

**Lyon B. King:** Self-regenerating Nanotips for Indestructible Low-power EP Cathodes, Patent Number 808930 B2, December 2011


Yarom Polsky, Mark C. Grubelich, and **Mark R. Vaughn:** Reduced-Impact Sliding Pressure Control Valve for Pneumatic Hammer Drill, Patent Number 8176995 B1, May 2012

**BOOK CHAPTERS**


**PUBLICATIONS**


Publications (cont’d)


Haut Donahue, Tammy L., Killian, Megan, Zielinska, Barbara, and Gupta, Tumul, 2011, “In Vitro Inhibition of Compression-Induced Catabolic Gene Expression in Meniscal Explants Following Treatment with IL-1 Receptor Antagonist,” Journal of Orthopaedic Science, Vol. 16, No. 2, pp. 212-220


Aifantis, Katerina, Shrivastava, Sanjiv, and Odegard, Gregory M., 2011, “Transverse Mechanical Properties of Collagen Fibers from Nanoindentation (Published online first),” Journal of Materials Science: Materials in Medicine, Vol. 22, No. 6, pp. 1375-1381


After presenting to prosthetic experts in New Delhi, India, senior design teams sightsee in Jaipur.