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ME-EM 2006 Annual Report

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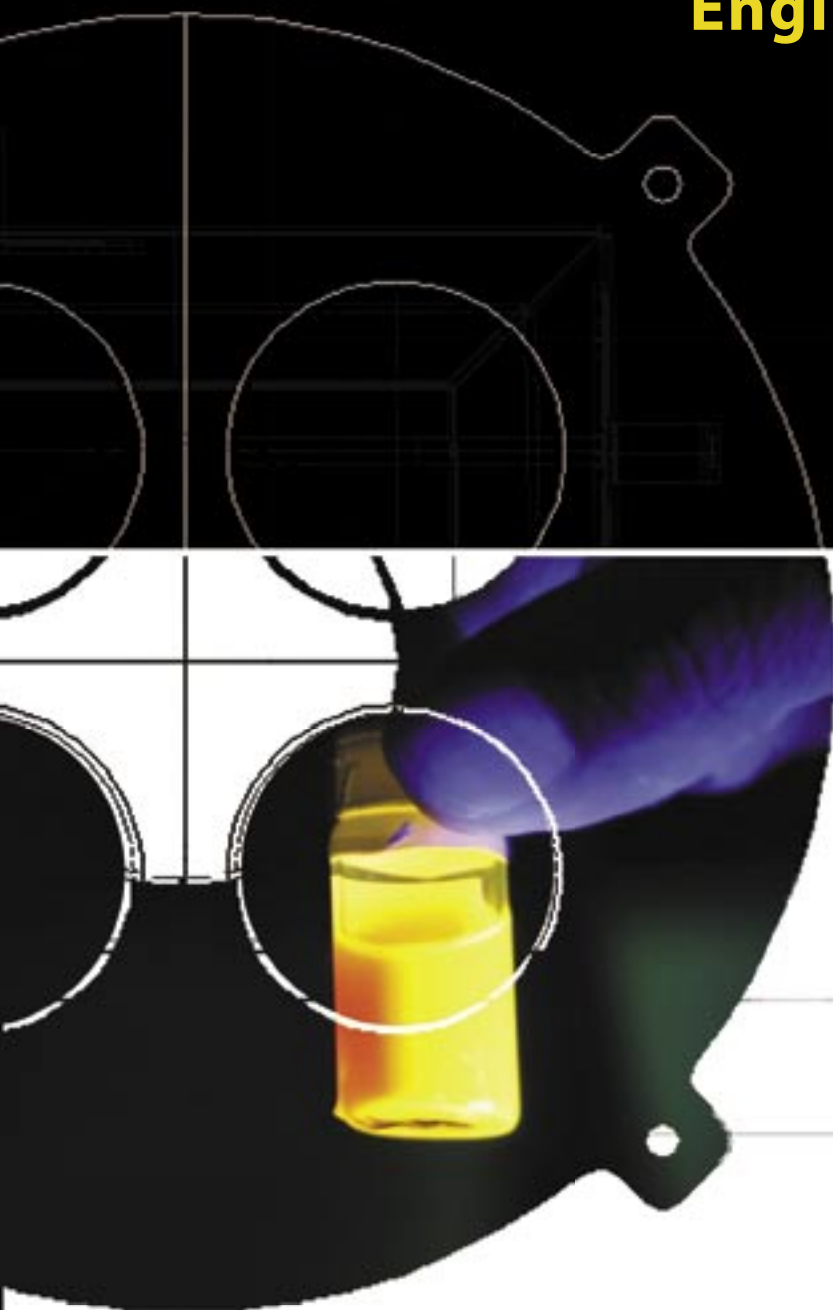
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Department of Mechanical Engineering- Engineering Mechanics



2006

Annual Report

MichiganTech



Message From the Chair



William Predebon

2006 has been a year of great change and progress for the Department of Mechanical Engineering-Engineering Mechanics. In addition to exemplary education and groundbreaking research, we have taken significant steps toward achieving our vision: to be a nationally recognized mechanical engineering department that attracts outstanding students, faculty, and staff.

As with all great ventures, moving to the forefront of a new era of technology and research requires a renewed dedication of purpose and commitment to excellence. In order to better realize our vision, the faculty voted this year to restructure the department, retaining the aspects that have served us well thus far and adding features that will propel the ME-EM Department into the next phase of development. It is my belief that the reorganization was timely, and I am certain that the new structure will be a driving factor in the future success of the department. It will promote engagement of faculty in research enterprises, foster synergy, and better prepare us to respond to large collaborative, interdisciplinary research initiatives. Most importantly, it will encourage intra-ME-EM Department technical area, inter-department, inter-college/school, and inter-university collaboration. Strengthened by these alliances, the ME-EM Department will move forward together, as a cohesive, cooperative group.

In the pages of this Annual Report, you will discover the spirit of integrity, passion, and curiosity that drives our faculty, alumni, and students in their remarkable accomplishments. You will find inspiration in stories of groundbreaking research that stimulates the imagination and challenges the boundaries of the impossible, and connect with faculty dedicated to educating the engineers of the future. You will meet alumni who have revolutionized industry standards and practices, and be introduced to the students who will shape the future of engineering and the world.

I invite you to become a part of our innovative ME-EM community, joining with us as we forge a new path into the future of engineering. As always, we look forward to your feedback, comments, and support.

A handwritten signature in black ink that reads "William W. Predebon".

William W. Predebon
Professor and Department Chair

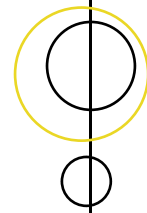


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ON THE COVER: A vial of fluorescing semiconductor quantum dots that are used to excite opto-electronic proteins for a nanosensing system. *Part of Dr. Craig Friedrich's protein nanosensor research—for more information, see page 6.*

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An Overview of the ME-EM Department

Comments on the Strategic Plan

Overview of the ME-EM Department

In 2005, the ME-EM Department achieved the first major goal of our Strategic Plan: to be in the top 50 Mechanical Engineering departments nationwide. As we began the transition toward achieving our 2012 goal—to be a top 25 ranked department—it became clear that a major departmental reorganization was needed in order to propel our research and education into the next stage of development. Mindful of the strengths of the original structure, the faculty convened to plan a new, innovative organization that will undoubtedly have a considerable effect on our growth and future success.

Research Caucuses

As technology advances, interdisciplinary research is paramount to the success of any research program. Thus, a driving factor in the decision to restructure was the need to reorganize the ME-EM research enterprise. Our new structure centers around six research caucuses which are designed to better prepare us to respond to large collaborative interdisciplinary research requests for proposals, to foster synergy, to engage more faculty in the research enterprise, and to encourage intra-ME-EM Department technical area, inter-department, inter-college/school, and inter-university collaboration. Our long-term goal is for these caucuses to become university centers or institutes, and eventually, national centers:

- Advanced Power Systems
- Engineering Education Innovation
- Multi-Scale Systems and Sensors
- Multidisciplinary Mechanics and Modeling of Multifunctional and Multi-Scale Materials
- Multidisciplinary Engineered Dynamic Systems
- Space Systems

This new configuration, while it broadens the range of research possibilities, will inherently and structurally provide for continuous improvement of the quality of our undergraduate experience.

Mission

Prepare engineering students for successful careers

Vision

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

EXECUTIVE COMMITTEE

Dr. John E. Beard
Design and Dynamics Systems Area Director

Dr. Lyon Brad King
Energy Thermofluids Area Director

Dr. William J. Endres
Manufacturing and Industrial Area Director

Dr. Gopal Jayaraman
Solid Mechanics Area Director

Dr. Gordon G. Parker
Research Director

Paula F. Zenner
Director of Operations and Finance

Dr. Donna J. Michalek
Associate Chair and Director of Undergraduate Studies

Dr. Carl A. Anderson
Associate Chair and Director of Graduate Studies

Dr. William W. Predebon
Department Chair

Comments on the Strategic Plan

As the ME-EM Department moves to achieve its 2012 goal of the Strategic Plan—to be ranked in the top 25 Mechanical Engineering departments nationwide—our education program and research continue to improve. This year, the *2008 U.S. News and World Report: America's Best Graduate Schools* ranked our graduate program 54th nationally and 3rd in Michigan, among 164 doctoral-granting Mechanical Engineering departments.

We have made significant progress in the growth of our research expenditures and in the growth of the number of externally supported PhDs, which are the key ingredients to reaching the top 25. We have done so while continuing to improve the quality of our undergraduate program, as evidenced by achieving a 25th national ranking of our undergraduate program among 148 doctoral-granting Mechanical Engineering departments in the *2005 U.S. News and World Report: America's Best Colleges*.

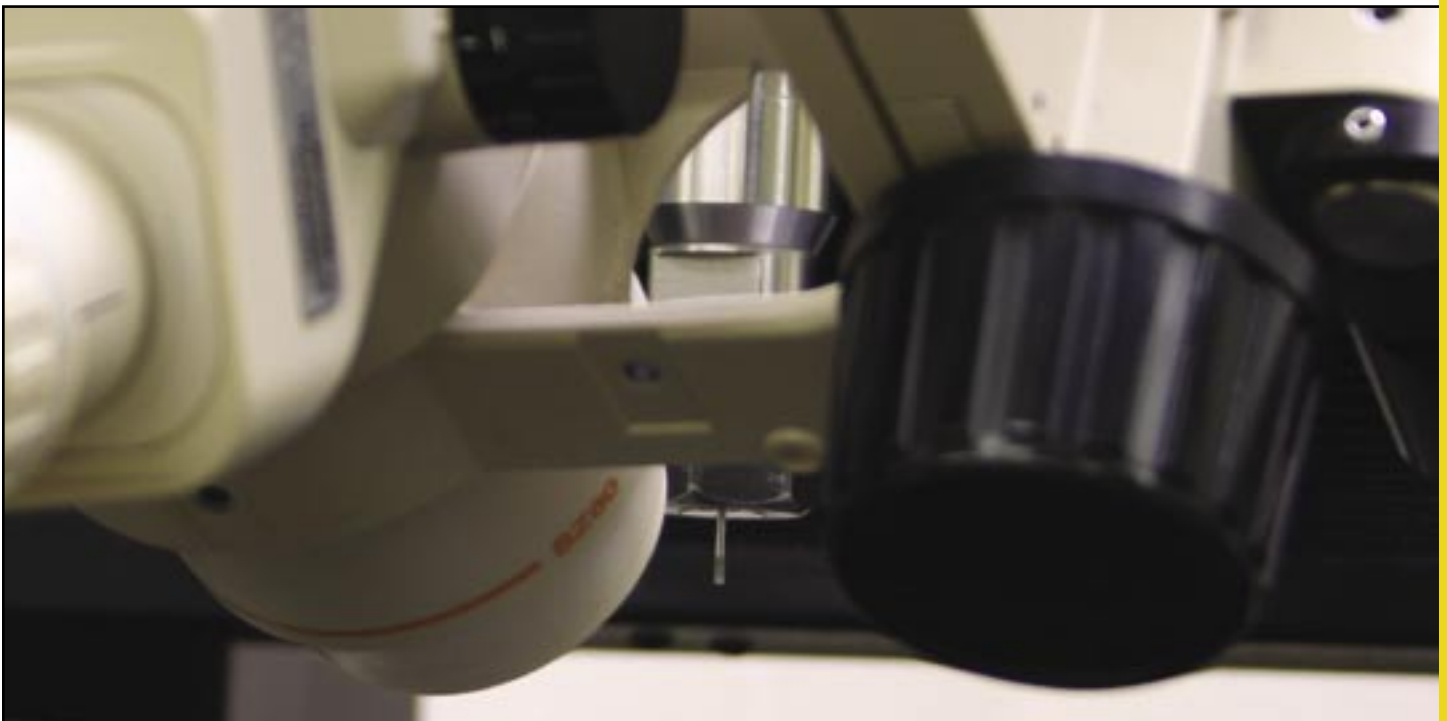
Research Expenditures Soar

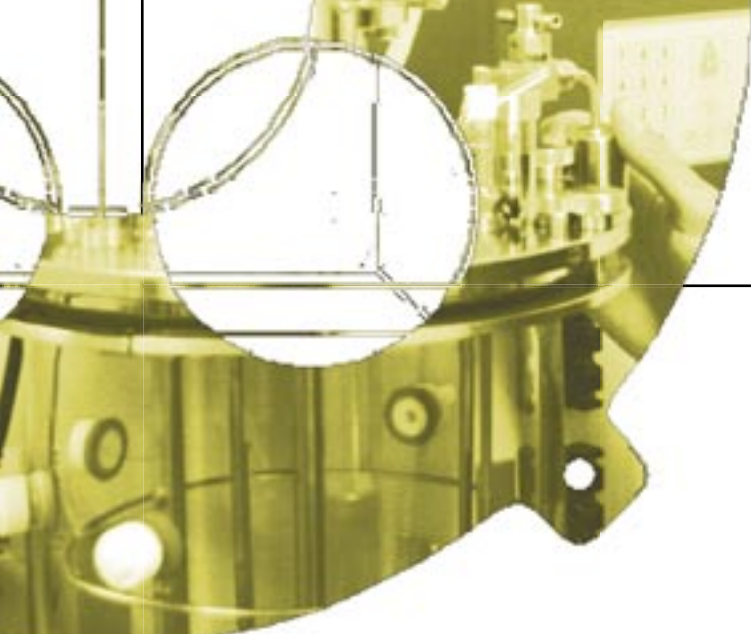
In 2006, research expenditures rose, surpassing \$10 million. As we adjust to the new department structure, we will begin to glimpse the enhanced possibilities that result from cross-departmental collaboration. Over this period of transition, it has become increasingly clear that such partnerships will better

prepare us to respond to large, interdisciplinary research initiatives. The ME-EM faculty has embraced the change, and is actively pursuing research partnerships that will dramatically affect society and expand the scope of human possibility. Supported by generous external funding from sources that include the NSF, NASA, DOD, DARPA, DOE, AFOSR, and the U.S. Navy, they are working with industry leaders to change the face of technology and engineering.

ME-EM Community

While sustaining a vigorous, rapidly expanding research program, the faculty demonstrates an abiding dedication to educating the engineers of tomorrow. They are an inspiration to their students and peers as they publish groundbreaking research results, initiate revolutionary proposals, and serve as an example to the Michigan Tech community. Following the example of their instructors, our students learn to question conventional methods and to create innovation as they pioneer solutions to emerging global issues. And, as always, our alumni continue to echo the spirit of adventure and entrepreneurship upon which the university was founded as they blaze new paths in industry and education.

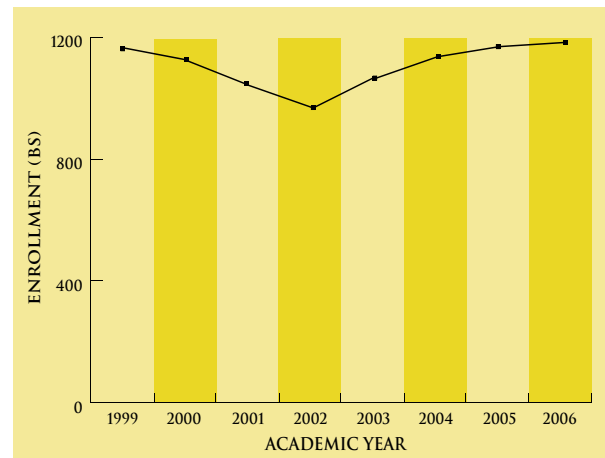
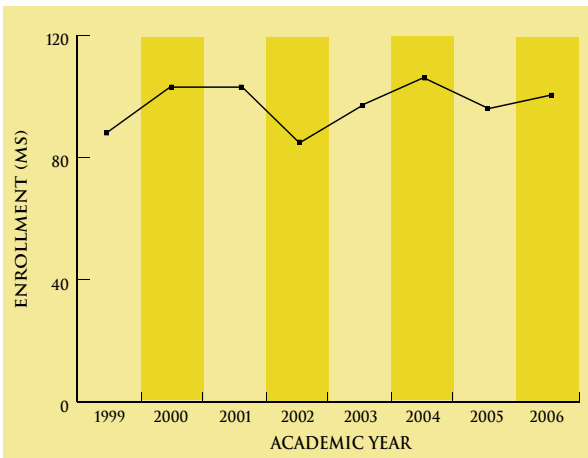
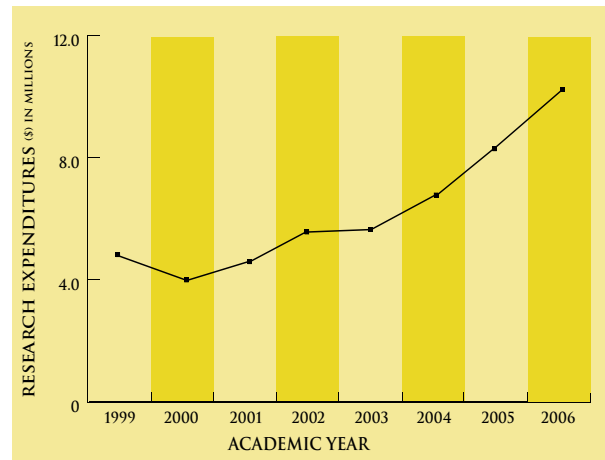
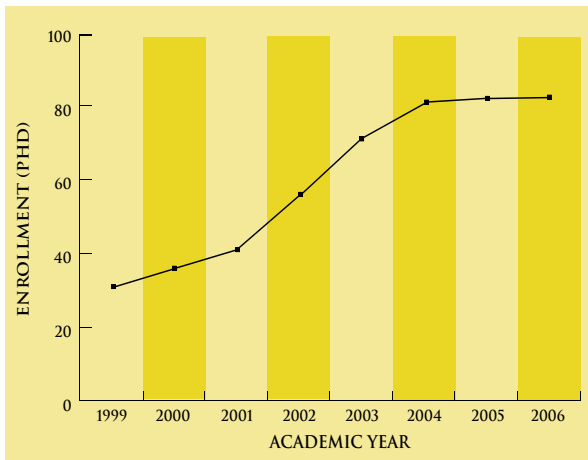




Enrollment, Degrees, and Expenditure Data

With one of the largest undergraduate programs in the US, the ME-EM Department also continues to build its PhD and Graduate student enrollments. In the 2005-2006 academic year, the ME-EM awarded 219 Bachelors, 42 Masters, and 13 Doctoral degrees. In addition, ME-EM research expenditures have dramatically increased, from just over \$4 million in the 1998-1999 academic year to over \$10 million in 2005-2006. These statistics, represented in the graphs below, reflect the ME-EM's Vision for educational excellence and its commitment to the goals outlined in the ME-EM Strategic Plan.

ME-EM DEGREES GRANTED			
	BS	MS	PHD
98-99	238	24	8
99-00	254	19	9
00-01	237	30	2
01-02	240	36	3
02-03	220	45	6
03-04	221	41	7 *
04-05	201	29	14 *
05-06	219	42	13



* Reported PhD degrees will differ from last year's annual report due to an accounting change.

External Advisory Board

The External Advisory Board (formerly the Industrial Advisory Committee) is a select group of corporate leaders, many Michigan Tech alumni, who advise the ME-EM Department, sharing their expertise and providing assistance with curriculum direction, research topics, education-and-industry partnerships, and resource development. EAB members offer their professional insight and provide valuable input that shapes the state-of-the-art engineering education taking place in the ME-EM Department.

EAB 2006-2007 Members:

Kirby Baumgard, *Staff Engineer*
John Deere Power Systems

Tom Clark, *Division Manager*
Caterpillar, Inc.

Alan Frank, *Manager, Approval Labs*
Whirlpool Corporation

Michael Hofman, *Manager, Compact SUV
Powertrain Programs*
Ford Motor Company

Tanya Klain, *Engineering Group Manager*
General Motors Corporation

John Leinonen, *Failure Analysis Associate*
Ford Motor Company/Exponent, Inc.

Brenda Moyer-Kochen, *Director, Technical
Resource Park*
Dana Corporation

Leigh Otterlei, *Plant Manager*
3M Corporation

Kurt Person, *Vice President of New
Business Development*
North Star Industries

Peter Sandretto, *Senior Manager,
Vehicle Certification*
DaimlerChrysler Corporation

Kevin Schlueter, *Director of Quality
and Engineering*
Skilled Manufacturing, Inc.



Spring 2006 Meeting Front row: Tom Clark, Peter Sandretto, Timothy Thomas, Geoffrey Weller, Alan Frank, Michael Smaby Back row: Michael Hofman, Kevin Schlueter, Jeff Zawisza, Afaneh Abdul-Hafiz, David Reed, Adil Shafi, William Predebon



Fall 2006 Meeting Front row: Donna Michalek, Kirby Baumgard, Peter Sandretto, John Leinonen, Geoffrey Weller, Timothy Thomas Back row: Carl Anderson, Hussein Zbib, William Predebon, Michael Hofman, Adil Shafi, Thomas Clark, Jeff Zawisza, Michael Smaby, Kevin Schlueter, Kurt Person, and Tanya Klain

John Schwekert, *Executive Director,
Mfg. Eng.*
General Motors Powertrain Group

Adil Shafi, *President*
Shafi, Inc.

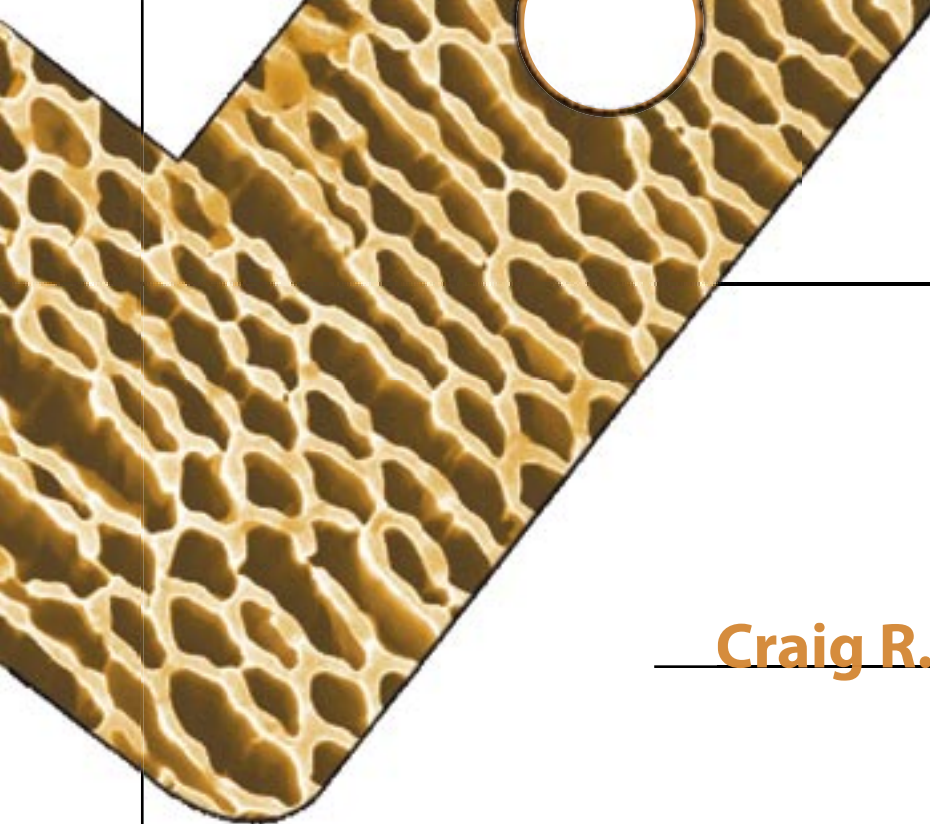
Michael Smaby, *Senior Project Engineer*
Kimberly-Clark Corporation

Timothy Thomas, *CEO*
PARTsolutions, LLC

Geoffrey Weller, *Assistant
Plant Manager*
General Motors Corporation

Jeff Zawisza, *Development Scientist*
Dow Chemical Co.

Hussein Zbib, *Professor and
Department Chair*
Washington State University



Craig R. Friedrich

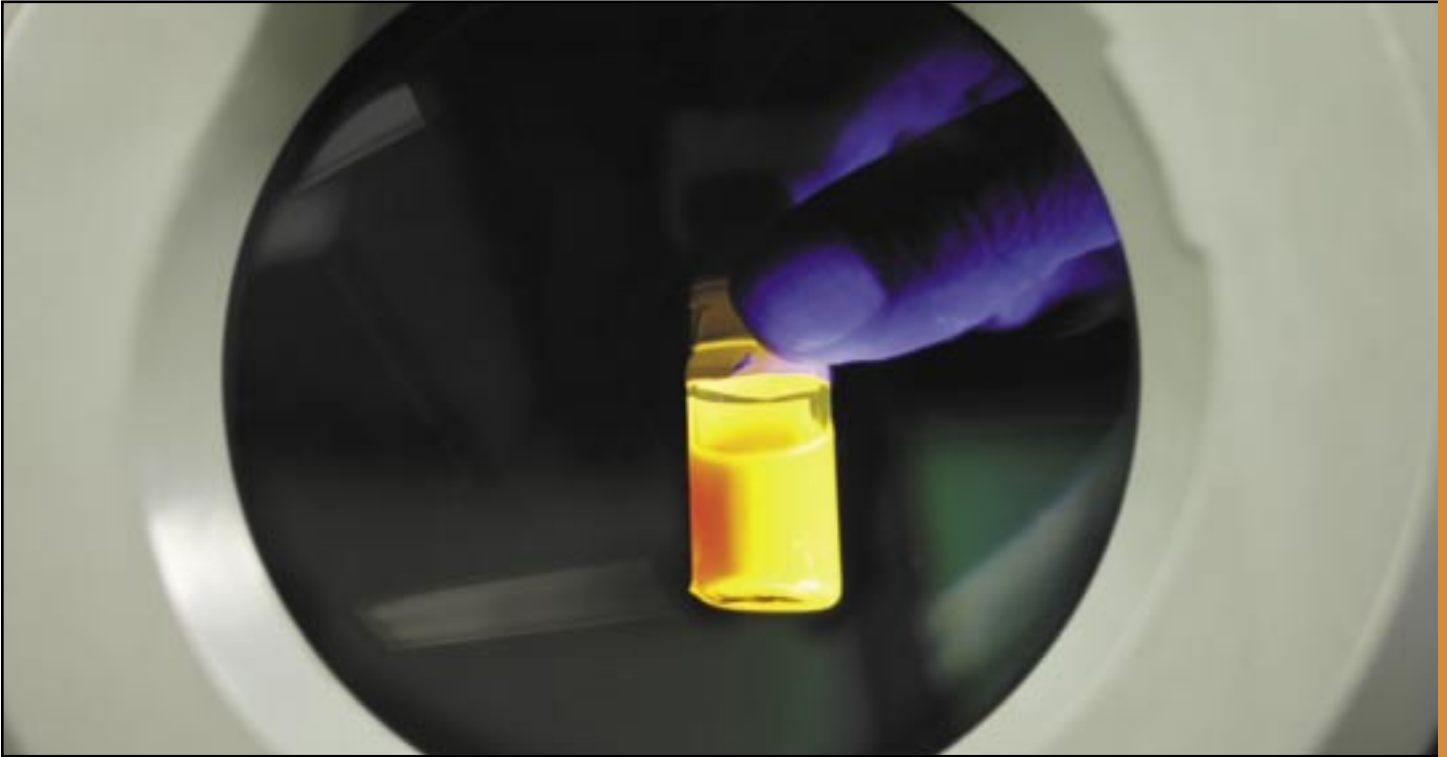
In his brightly lit laboratory, Dr. Craig Friedrich peers into the mechanism of a Langmuir-Blodgett trough, surrounded by part of his graduate research team. Glancing up at his students, he remarks, “This process uses a principle that was first demonstrated by Ben Franklin, who, with a single drop of oil, created a monomolecular film on a pond.” Intrigued, the students discuss Franklin’s theory relative to their own single molecule coating research, which will lead to the development of sensors for the detection of pathogens such as anthrax. With innovations like these protein nanosensors, Friedrich and his team are creating the modern history of nanotechnology.

In the past two decades, nanotechnology—the engineering of functional systems at the molecular scale—has moved from the realm of science fiction into reality. The emerging science has grown exponentially, and with each new development the potential applications for small-scale technologies expand. Friedrich, who has studied micro and nanotechnology for the past 20 years, says, “Nanotechnology is everywhere, and the possibilities and potential societal impacts are limitless.”

Friedrich, a Maryland native, received his BS and MS in Mechanical Engineering from Louisiana Tech and his PhD from Oklahoma State University. He returned to Louisiana Tech in 1987 to begin his research and teaching career in multi-scale technologies. Fascinated by new developments in microtechnology, Friedrich focused on micro-type research and helped develop the *Institute for Micromanufacturing*, where he pioneered machining with small-scale cutting tools—tools which, at the time, were the smallest in the world.

Nanotechnology at Michigan Tech

In 1997, Friedrich left Louisiana for Michigan Tech, and has since played a key role in coordinating the university’s involvement in micro and nanotechnology. He is active in the growing formal structure on campus that is working to coordinate nanotechnology education and research, an effort which facilitates dialogue and cooperation across departments. This type of collaboration, he says, is characteristic of Michigan Tech. “I can’t emphasize enough how easy it is to do cross-departmental research here. It’s an absolute joy.” In that spirit, Friedrich has joined forces with a team of eight faculty members on a nanotechnology contract from the U.S. Department of Defense. He comments, “It’s been a great experience, and we’ve been very successful in developing state-of-the-art technologies.” In the past two years, the team’s efforts have resulted in at least 15 nanotechnology “world firsts.” Among others, the group has, for the first time, patterned opto-electronic protein into structures as small as 100 nanometers using a steerable ion beam, and has shown that these proteins can be activated by nearby fluorescing



A vial of fluorescing semiconductor quantum dots that are used to excite opto-electronic proteins for a nanosensing system. Each quantum dot contains several hundred atoms and fluoresces at a specific wavelength depending upon its size.

quantum dots for nanosensors. “These achievements would not be possible without the outstanding support we’ve received from the university,” says Friedrich. “The administrators, the chairs, and the deans make the process seamless. We are very fortunate here at Michigan Tech.”

The Next Generation

In addition to his research, Friedrich maintains an involvement with the student community at Michigan Tech. He is the Director of the Multi-Scale Technologies Institute and helps support, along with several other faculty members, the Nanotechnology Student Association. He developed and teaches *Micromanufacturing Processes*, a graduate-level course, and also teaches an undergraduate course *Integrated Design and Manufacturing*. Friedrich speaks highly of his students, saying, “The research program here is demanding. We are doing real-world work that has a demonstrable effect on the science, and we turn out excellent graduates who have an education grounded in reality. They can compete with anybody.”

“With motivated students, university support, and cross-departmental collaboration, the future of nanotechnology at Michigan Tech is promising,” continues Friedrich. “We have many groundbreaking projects on the horizon—it’s history in the making.”



Donna J. Michalek



In the heart of Washington, DC, Senator James Inhofe prepares to question the Secretary of Defense about the United States' Strategic Offensive Reduction Treaty with Russia. Behind him, Dr. Donna Michalek—the senator's nuclear subject matter expert and the author of the questions for the hearing—watches as Inhofe straightens his shoulders and directs the first query to Donald Rumsfeld. Michalek studies the Secretary's expression as he pauses to consider, silently cheering when Rumsfeld smiles and says, "Excellent question, Senator Inhofe. That's a difficult one." Looking back, Michalek recalls her thoughts. "That simple comment was reward enough for the hard work that went into the preparation for the hearing. It was a highlight of my sabbatical year as an aide on Capitol Hill, and I came away from the experience invigorated and motivated."

Michigan Tech Professor Donna Michalek finds inspiration in diverse professional challenges. As the newly appointed Associate Chair and Director of Undergraduate Studies of the ME-EM Department, Michalek will add to her considerable list of responsibilities. In addition to teaching and research activities, she serves as the Chair of Curriculum Committee, Co-chair of Design Committee, Chair of Diversity Committee within the ME-EM Department, and the Director of Faculty Success and Diversity in the College of Engineering. She also serves outside of the university on the Board on Government Relations for the American Society of Mechanical Engineers (ASME). Michalek thrives on her full schedule, saying, "I work best when I have multiple challenges—the continual opportunities to learn energize me, and I find that these varied experiences inform my academic career."

Michalek received her BS from Clarkson University in 1985 and joined the Edison Engineering program at General Electric, earning her MS concurrently from Rensselaer Polytechnic Institute. After three years in industry, Michalek began her PhD studies in Aerospace Engineering at the

University of Texas at Arlington. In 1993, eager to undertake new academic challenges, she joined the faculty at Michigan Tech, where she could contribute to research, teaching, and building diversity.

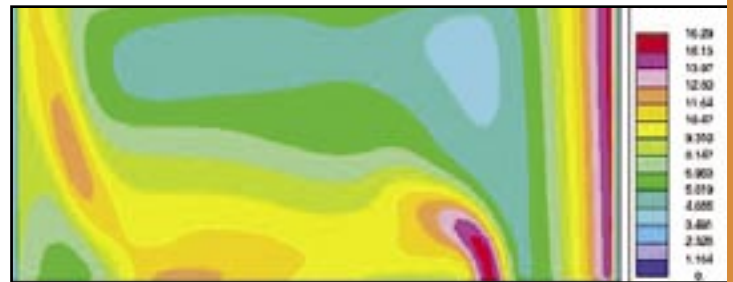
Michalek's research centers on Computational Fluid Dynamics (CFD)—specifically, the development of new algorithms and the applications of existing algorithms. The majority of her work in algorithm development is done with genuinely multidimensional solvers for the Euler equations on both structured and unstructured grids. In the area of applying existing algorithms, her work ranges from analyzing the fluid flow through a fuel injector to simulating the mist generated during a machining process. All of these efforts utilize highly quantitative techniques to gain a deeper understanding of a physical process with its improvement as the ultimate goal.

With her latest research venture, Michalek departs from standard quantitative techniques. The project, which will examine issues of diversity in Mechanical Engineering, stems



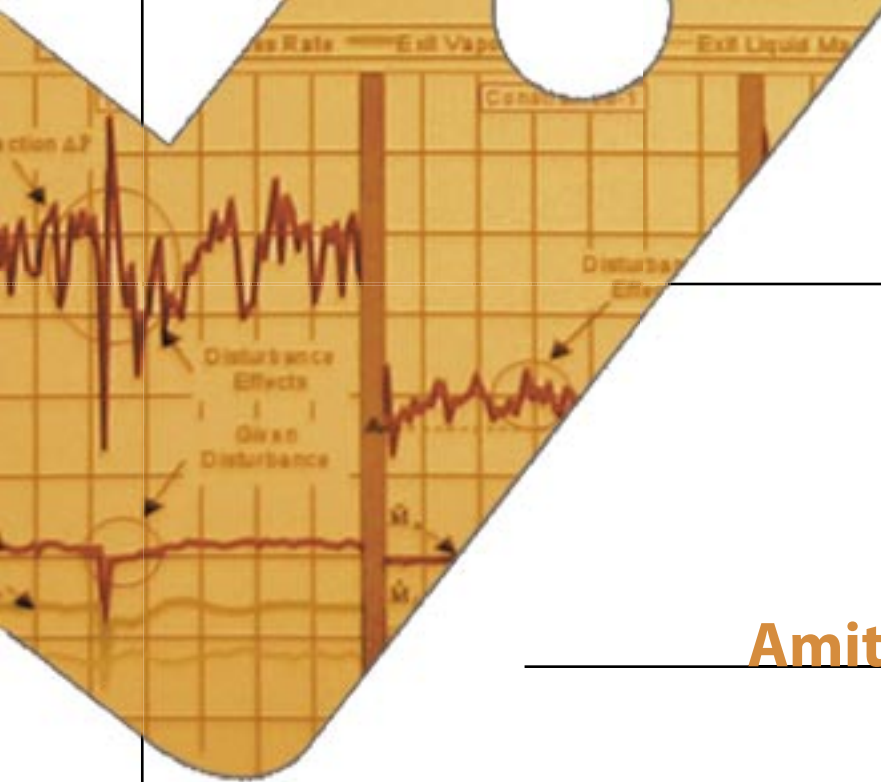
from her participation in the 2006 Institute for Scholarship on Engineering Education (ISEE). "The research aims to identify the factors that affect the choice of discipline by undecided first year women and minority engineering students at Michigan Tech. Over the course of the year, I will interview and survey students to discover the reasons that motivate their decision." Michalek hopes that her findings will aid the ME-EM department as it continues to cultivate diversity in its student body. "The climate in the Mechanical Engineering world has improved considerably over the past decade for women and minorities, and we'd like to encourage continual growth in that area. My research will help determine additional ways to achieve a more diverse student body in the ME-EM Department."

Michalek embraces the challenges posed by the qualitative methods utilized for the project, saying, "Most of my work is done quantitatively, but different approaches force me to think outside of the standard engineering 'box.' I seek out opportunities that require me to develop new practices and procedures." She cites her sabbatical year as an example. In 2002, she served as an ASME Congressional Fellow, working as an aide and subject matter expert in the office of Senator James Inhofe. In that capacity, Michalek wrote position papers,



conducted research, responded to constituent concerns, and prepared the senator for hearings. She regards the experience as a milestone in her professional development and speaks of it enthusiastically. "I witnessed the hard work, dedication, and genuine spirit of cooperation on the Hill, and came out of the experience with a firsthand understanding of the political process and how it affects academic decision-making and funding."

Michalek is confident that this knowledge will serve her well as Associate Chair. She looks forward to the next phase of her professional journey, commenting, "This position opens up another area of education and allows me to be involved on a new level. My experiences have prepared me well, and I'm thrilled to have the opportunity."



Amitabh Narain

The young boy's nimble hands turn his model airplane over and over as he examines carefully every detail of the small aircraft, seeking to discover the secrets of lift: the solid wing, the fluid air, the energy exchanged. He built the propeller driven model, saw the plane fly, and learned some things about how the plane flies, but could not see why. As his finger traces the curved wing, the "Whys?" given in books raise questions in his mind. From this moment forward, "Why?" would be the dominant mover in the career of Amitabh Narain, driving him to discover the reason underlying the empirical. It has guided him on a lifelong journey to uncover the fundamental, invisible interaction of fluids, surfaces, and energy.

Dr. Amitabh Narain is at the top of the fluid mechanics field. His groundbreaking research in two-phase flow systems is supported by grants from the National Science Foundation and NASA, and has paved the way for related research projects. Naturally inquisitive, he expresses delight in "meaningful, unexplored questions" and in the theoretical and fundamental approaches to fluid dynamics and heat transfer. He states, "I find it personally satisfying when I am able to see the entire process, from the question that sparks the research to the end application."

Narain is an American Society of Mechanical Engineers Fellow and has a record of leadership in the organization. He has organized several successful international symposia for ASME's International Mechanical Engineering Congress and Exposition conferences, served as a chair of the ASME AMD's technical committee on fluid mechanics, and actively participates as a member of three technical committees: viz. Theory and Fundamentals (K-8) Committee of the Heat Transfer Division, Multi-Phase Flow Committee of the Fluids Engineering Division, and Fluid Mechanics Committee of the Applied Mechanics Division.

Narain grew up in northeastern India in the small town of Ranchi and completed his undergraduate degree in

Aerospace Engineering at the Indian Institute of Technology (IIT) in Kharagpur. The IITs are India's premier engineering schools, and Narain earned a silver medal for being at the top of his class for each of the five years of his degree program. Upon graduation, he accepted an offer from the University of Minnesota, where he earned his MS and PhD in Aerospace Engineering and Mechanics, working on the fundamental theoretical behavior of non-Newtonian and Newtonian fluids. In 1983, he came to Michigan Tech to join the ME-EM faculty.

Two-Phase Flow Research

At Michigan Tech, Narain's main research efforts have centered on the investigation of phase-change flows and the development of an interface tracking code for two-phase flows. He has experimentally and computationally investigated methods to achieve controlled steady states in systems where the flows are typically subject to erratic and/or oscillatory behavior. He explains, "The main concern is how to introduce a condenser into a system, reach a steady state, and keep the system in that mode of operation. We found out that you can't have an uncontrolled condenser and arrive at steady state because, unlike in single phase systems, fluids in the condenser 'listen' both upstream and downstream." This two-directional "listening" results in extreme sensitivity to boundary conditions and associated instabilities. The



instabilities are more severe when the condenser is in zero gravity (NASA project).

Undaunted, Narain developed a way to isolate the condenser from “noise” in the upstream and downstream flows and to create an active control for the inlet and exit conditions to achieve steady state. He and his research team have proposed a technology to achieve steady state and to identify the range of operations for any given heat flow. The research has led to the development of a state-of-the-art experimental laboratory and a direct computational simulation tool. Narain adds, “We believe we are the first to establish, both theoretically and experimentally, new exit condition categories for condensing flows within which one must identify the better known sub-categories of different flow regimes.” A recent journal article on the experimental support of simulation results has received nearly unanimous support from the reviewers and is in press for publication.

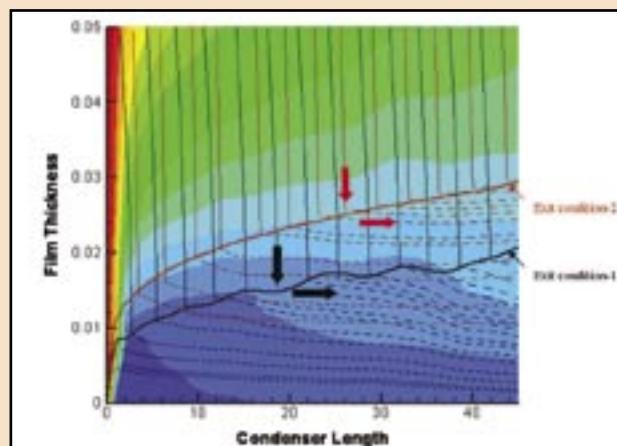
Developing Measurement Technologies

Equally satisfying, says Narain, was the development of a solution to a problem that stemmed from his two-phase flow research. In order to make accurate simulation predictions, it was necessary to make instantaneous thickness measurements of the liquid on the condensing surface without disturbing the flow. Faced with unsuitability of available instruments designed for this purpose, Narain invented a non-intrusive fiber-optic sensor that uses light beams and fluorescence to measure real-time thickness of a suitably doped dynamic liquid film. He and his students overcame obstacles of noise and signal processing, and submitted the invention report to NASA in September of 2006. Narain expresses gratitude for the generosity and support of leaders in other fields, saying, “Many professionals donated their time to guide us—and because we

were trying to invent something in a field that is not our own, that help was indispensable.” Michigan Tech, after informing NSF and NASA, is proceeding with the patenting process for this invention.

Funding for the fiber-optic sensor and the two-phase flow project has reached \$1,000,000 and includes a recent grant from NASA to extend the research until 2009. In the future, Narain expects to lead development of a more general purpose version of his interface tracking code for use in other applications. In the meantime, industry interest in Narain’s work is emerging; in early 2006, he acted as a consultant for Proctor & Gamble, modifying his code to predict temperature variations inside chemical films and gels that were moving on a conveyor and whose top surfaces were exposed to condensing steam. Dr. Narain has also successfully completed several other industry projects for Fernstrum Corp., EMP, Inc., General Motors, and Proctor and Gamble that involved fluid flow and heat transfer simulations for applications of interest to the sponsors.

As his research progresses, Narain continues to be active in the Michigan Tech community. He teaches *Fluid Mechanics* and *Heat Transfer*, and advises both graduate and undergraduate students. Narain challenges his students as he challenges himself, encouraging them to approach their understanding with a good mix of “How?” and “Why?” He cautions, “Always question what you know, and keep a sense of humility about the knowledge you *think* you have.”



With vapor moving from left to right, the streamline patterns and the interface locations are shown in the vicinity of the bottom condensing surface in a horizontal channel condenser. For different exit conditions, the results indicate different fluid physics and steady states. Simulations assist in assessing a condenser’s performance in a thermal system. The background contours indicate velocity magnitude (red for the fast vapor at the inlet and blue for the slowest liquid on the condensing surface).



Charles D. Van Karsen



At the lectern, a tall, imposing figure leans over his tablet PC and scans the eyes of his students, reading faces and body language to gauge comprehension. In this moment of silence, he senses the need to reinforce the vibrations theory he has just presented. Putting down the stylus, he steps back and asks rhetorically, “Now, where might we see this theory in action?” With that query, Professor Chuck Van Karsen, NVH expert, launches into a detailed story from his time as a consultant in the “engineering trenches,” working on the reduction of vibration in washing machines. It is here, at the intersection of engineering theory, practice, and education that Van Karsen turns everyday experience into a pedagogical tool. He says, “Teaching is my passion. I love sharing my experiences from the field.”

Van Karsen’s widely recognized NVH expertise was built upon solid engineering ground. He earned his BS and MS degrees in Mechanical Engineering from Cincinnati University, completing seven quarters as a co-op with Copeland Corporation as an undergraduate. At the recommendation of Dr. Bill Shapton, then a University of Cincinnati faculty member and later a Michigan Tech professor, Van Karsen accepted a position in Cincinnati Milacron’s NVH department after his graduation.

NVH Industry Experience

Van Karsen began his professional career at a pivotal point in the development of vibration analysis technology. He notes, “I got into the field at a very interesting time, where the technology—both on the analytical and the experimental side—was switching over from cumbersome analog equipment to high-speed digital systems. It was exciting, and I encountered something new every week.” During his 12 years in industry, he played an active role in the discovery of new methods and possibilities that arose from these emerging technologies.

After leaving Cincinnati Milacron, he spent seven years as a consultant with Structural Kinematics, solving the most complex NVH problems and ultimately establishing himself as an expert in the field. The unexpected opportunity to teach at Michigan Tech came at an ideal time, when Van Karsen was working 10- to 12-hour days and spending little time with his young family. Once again, Bill Shapton acted as a catalyst for Van Karsen’s professional advancement. He encouraged him to accept a faculty position in the ME-EM Department, where Van Karsen’s world-class expertise in NVH would be a valuable resource for students and faculty. Eager for a change of pace, Van Karsen accepted the position at Michigan Tech in 1987. He declares, “We moved to Houghton and never looked back. It was the best decision we ever made.”

Teaching Philosophy

Teaching was a natural transition for Van Karsen, who had often led seminars and technology training workshops while in industry. He states that the trick to communicating dense technical material to students is to find the fun in the



fundamentals. “You’ve got to stay technically sound, but you can’t get too serious.” In class, he draws on his wealth of industry experience to illustrate technical concepts, relating anecdotes that demonstrate practical applications of the theory.

Van Karsen also believes in the importance of hands-on learning in the classroom, finding it an effective way to engage students—often with inspiring results. “I give students a challenging problem or project to teach them to apply the fundamentals. I help them discover that when they think about the problem and proceed carefully, they can see reality through the theory. When it works, it’s great to hear them say, ‘Wow! The system responded as we predicted!’ That look of understanding and satisfaction on a student’s face is what drives me.”

Currently, Van Karsen teaches *Mechanical Vibrations*, *Experimental Vibro-Acoustics*, *Analytical and Experimental Modal Analysis*, *Mechanical Engineering Laboratory*, and *Controls*. In addition to his activities at Michigan Tech, Van Karsen maintains his involvement with industry, continuing to be a respected presence with a number of clients. He provides consulting services, offers guest lectures, and frequently presents seminars on the latest NVH developments.



Still, when asked what tops his priority list of these diverse activities, Professor Van Karsen answers, “For me, the most important thing is seeing as many successful, well-trained, prepared students as possible go out that door ready to begin their professional careers. That is my motivation, and it’s why I still love to teach after 19 years at Michigan Tech.”



Back Row: Matthew Nelsen, Robert Greenhoe, Paul Kilpela, Mary Peed, Joan Tapani, Timothy Ryan, James Bialas, Mike Olson, James Mattson **Middle Row:** Peter Bingham, Martin Toth, Gerald Dion, Michael LaCourt, Robert Whipple, JoAnne Stimac, Connie Dillman, Danise Jarvey **Front Row:** Marlene Lappeus, Kim Hicks, Renee Ozanich, Kathy Goulette, Robert Rowe. *Not pictured:* Nancy Barr, Robert DeJonge, Javier Fernandez, Henry King, Paula Zenner

The ME-EM Department staff forms the functional base of the department's education, research, and service activities. Working in three groups—administrative, technical, and computer—they support students, faculty, and alumni. Their contributions have a direct impact on the success of the ME-EM Department and the continued improvement of education at Michigan Tech.

ME-EM Staff

Barr, Nancy – Office Assistant

Bialas, James P. – System Administrator

Bingham, Peter – Training Spec., Senior Design

DeJonge, Robert – Senior Research Engineer II

Dillman, Connie J. – Research/Accounting Coordinator

Dion, Gerald P. – Manager Lab Facilities

Fernandez, Javier – System Administrator, WECN

Greenhoe, Robert – User Support Manager, WECN

Goulette, Kathy – Administrative Associate

Hicks, Kim – CAEL Coordinator/User Support Spec., WECN

Jarvey, Danise N. – Senior Engg. Academic Advisor

Kilpela, Paul M. – Research Associate

King, Henry – User Support Specialist, WECN

LaCourt, Michael A. – Engineer/Scientist

Lappeus, Marlene – Administrative Assistant

Mattson, James A. – Senior Engg. Academic Advisor

Nelsen, Matthew – Research Associate

Olson, Michael – Advancement Officer

Ozanich, Renee – Office Assistant

Peed, Mary B. Cruickshank - Director, WECN

Rowe, Robert J.- Training Specialist-Senior Design

Ryan, Timothy – Windows Support Appl. Specialist, WECN

Stimac, JoAnne – Administrator Aide

Tapani, Joan – Office Assistant

Toth, Martin R. – Master Machinist

Whipple, Robert – Research Engineer

Zenner, Paula Feira – Director of Operations & Finance

Faculty & Staff Awards

Our commitment to excellence is reflected through this year's faculty and staff awards, recognitions, and promotions. The Mechanical Engineering-Engineering Mechanics Department honors the following faculty and staff for their achievements and success.

Dr. Carl Anderson
Appointed Associate Chair and Director of Graduate Studies of the ME-EM Department and Interim Associate Dean of the College of Engineering

Dr. Oner Arici
Appointed to the rank of Professor Emeritus, 2005

Dr. Jason R. Blough
SAE Ralph. R. Teetor Education Award. Society of Automotive Engineers, 2007

Dr. Jaime Camelio
SME Kuo K. Wang Outstanding Young Manufacturing Engineer Award, Society of Manufacturing Engineers, 2007

Dr. Peck Cho
On leave at the Korean University of Science and Technology in Seoul, Korea

Dr. Tammy Haut Donahue
The Ferdinand P. Beer and E. Russell Johnson Jr. Outstanding New Mechanics Educator Award American Society of Engineering Education, 2006

Dr. Tammy Haut Donahue
Promoted to Associate Professor with tenure

Dr. Harold A. Evensen
Appointed to the rank of Professor Emeritus, 2006

Dr. John K. Gershenson
Named Associate Editor Journal Mechanical Design

Dr. John K. Gershenson
On sabbatical leave at the University of Puerto Rico, Mayaguez

Dr. Mahesh Gupta
Co-author of the ANTEC 2005 paper "Experimental and Numerical Investigation of Elongational Viscosity Effects in a Coat Hanger Die," which has been selected as one of the 'Best of ANTEC 2005' papers

Dr. John H. Johnson
Cited in the Blade, based in Toledo, Ohio. Jon Chavez's story, "Gearing Up for Better Mileage: Toledo Jeeps to Gain Efficiency by New Rules," addresses the auto industry's response to new fuel standards

Dr. Donna J. Michalek
Appointed Associate Chair and Director of Undergraduate Studies of the ME-EM Department

Dr. Donna J. Michalek
Selected to participate in the Institute for Scholarship for Engineering Education (ISEE)

Dr. Abhijit Mukerjee
Co-authored "Study of Lateral Merger of Vapor Bubbles During Nucleat Pool" that was awarded the ASME 2006 Best Paper Award in the Heat Transfer Division, ASME, 2006

Dr. Amitabh Narain
Promoted to Professor, 2006

Dr. Amitabh Narain
Fellow of the Society of Mechanical Engineering, 2006

Dr. Gordon G. Parker
Promoted to Professor, 2006

Dr. Gordon G. Parker
Appointed Director of Research, which is a new position in the ME-EM Department

Dr. Mohan D. Rao
Fellow of Society of Automotive Engineers International (SAE), 2006

Dr. Mohan D. Rao
Fellow of American Society of Mechanical Engineers (ASME), 2006

Dr. John W. Sutherland
Fellow of the Society of Mechanical Engineers, 2006.

Abhijit Mukherjee: New Faculty



PhD: University of California, Los Angeles

Experience: 2.5 years experience as a visiting research professor at RIT

Research Areas: Heat Transfer, Boiling, Interfacial Phenomena, Micro- and Nanofluidics

Catherine Rottier



Success, according to senior Mechanical Engineering student and member of the Michigan Tech women's basketball team, Catherine Rottier, is a simple matter of dedication, perseverance, and time management. "Whether it's in the classroom or on the court," she says with quiet confidence, "I find that if I

work hard and plan well, I can achieve any goal I set my mind to."

Rottier clearly applies this pragmatic philosophy to her coursework. A self-professed "lifelong learner," she speaks enthusiastically about her classes—in particular, her senior design project, an ambitious endeavor that involves the development of a portable charging device for a cellular phone and laptop computer. "It's a remarkably difficult task, and I find it fascinating to participate in the design process. The project has been a powerful lesson in the application of fundamentals to practical situations."

Despite the challenges associated with a rigorous course of study and a full athletic schedule, Rottier is happy she chose Michigan Tech. "It takes a lot of work to balance classes and basketball, but that lets me know that I'm pushing myself, improving. Overcoming challenges brings a sense of true accomplishment." With genuine gratitude, she mentions the support of family and Michigan Tech faculty as a factor in

her success. "My professors have been amazing, and I have a big family who has been behind me every step of the way. I wouldn't be where I am today without that support." After her graduation, Rottier plans to return to Michigan Tech for an MBA in the summer of 2007, and will eventually pursue a career in industrial engineering. Michigan Tech, she says, has prepared her well. "I've never regretted coming here for a moment—I've received an outstanding education, and I can't picture myself anywhere else."

Stephen Folson



As a student and senior member of the Michigan Tech men's basketball team, Stephen Folson knows the importance of teamwork. Soft-spoken and determined, he says, "To succeed in both academics and athletics is challenging, and it is essential to have a strong support network of teammates, family, and faculty."

Folson, a native of New Haven, Michigan, came to Michigan Tech for the opportunity to play basketball while pursuing his interests in math, science, and engineering. His teammates, he says, have provided invaluable encouragement and assistance on and off the court. "Their support has been unconditional. Our senior team members make it a practice to offer their experience and study skills as a resource for the younger members. This kind of mentoring builds a sense of

family and contributes to our cohesiveness as a team.” Now, as a senior team member, Folsom finds himself in the position to guide his younger teammates to success. Reticent to boast about his contribution, he says simply, “I do my best to offer advice and guidance whenever possible.”

During his third year at Michigan Tech, Folsom joined another team—the Alternative Fuels Group Enterprise. He found the group to be an ideal complement to his interest in automobiles, and speaks of it enthusiastically: “The work we are doing is timely, given current worldwide energy problems. In addition, the knowledge I’ve gained enhances my understanding of coursework and engineering fundamentals.”

After his graduation in the spring of 2007, Folsom would like to expand on his education and Enterprise experience in a position with one of the Big Three automobile companies in Lower Michigan. He comments, “I’m confident that the education I’ve earned at Michigan Tech will serve me well throughout my career and my life.”

Joseph Hernandez



Juggling multiple roles as a PhD student, husband, new father, and political activist, Joseph Hernandez is undaunted—in fact, he plans to change the world. He sums up his inspiration simply: “I want to do work that creates change and has a positive effect on society.”

A first-generation college student and a Dean’s List regular, Hernandez is passionate about issues of diversity in education. As a recipient of the King-Chavez-Parks Future Faculty Fellowship, he will spend two to three years teaching after he finishes his PhD and plans to use that position to make a difference in the lives of minority students. “Because I understand their unique circumstances and challenges, I will be able to provide guidance and advice to individual students and minority student groups. There is still much to be done to increase diversity in engineering.”

In the meantime, Hernandez tackles the problem of water management in fuel cells as a part of his PhD program. His research project, a partnership with the U.S. Department

of Energy, General Motors, and RIT, aims to enhance fuel cell performance for widespread use. (*See sidebar for more information.*) He explains, “We’re looking at capillary phenomena and two-phase flow in fuel cell systems. It’s an aggressive schedule and a large undertaking, but it’s gratifying to know that our work will have an impact on society.”

Ultimately, Hernandez plans to enter industry, where he will address the concern of alternative fuels in developing nations. “I would like to establish my own consulting firm and work with third-world countries to take advantage of their natural surroundings to provide low-cost fuel to citizens.” He cites the potential of solar energy in vast desert regions and hydrogen fuel sources for countries with ocean borders. “I don’t believe we have to rely on petroleum when there is so much potential energy to be found in other sources.”

Even as he faces global issues, Hernandez remains grounded. “There’s such a vast amount of knowledge out there, and I am privileged to use the little I have to be of service to others. Michigan Tech has been the ideal starting point for a journey of lifelong learning.”



The Microfluidics and Interfacial Transport (MnIT) research group and laboratory were established

in 2005 by Director Dr. Jeffery Allen. The mission of MnIT is to explore the fundamental physics of fluid and thermal transport at the microscale including evaporation/condensation and microscale two-phase flow with an emphasis on water management in low-temperature fuel cells. The MnIT laboratory is augmented by two additional laboratories—the Soft Lithography Laboratory for fabricating microchannel networks and the Cold Room Facility for freeze-thaw studies on fuel cell components. Currently, the group, in partnership with General Motors and the Rochester Institute of Technology, is involved in a three-year, \$2,700,000 project sponsored by the U.S. Department of Energy that aims to improve water management in fuel cells. Check out www.me.mtu.edu/mnit for more information.



Graduate Seminars

A committee of Michigan Tech faculty members put together the dynamic ME-EM Graduate Seminar Series every year. Dr. Spandan Maiti is the Chair of the committee, which creates an agenda of compelling topics for both students and faculty. The seminars offer graduate students opportunities to expand their knowledge base to areas of study outside of their specific research. Composed of a diverse mix of renowned leaders representing academia, industry, and government; the 2005-2006 Academic Year Seminar Series featured the following leaders:

EXTERNAL SPEAKERS

Prof. Kaushik Bhattacharya

California Institute of Technology
Domain Switching and Its Applications in Ferroelectric Perovskites

Prof. Iain D. Boyd

University of Michigan
Hybrid Numerical Simulation Of Non-equilibrium Gas and Plasma Dynamics

Dr. Ken Chen

Sandia National Laboratories
Elucidating PEM Fuel Cell Performance via Computational Modeling and Experimental Investigation

Prof. Wei Chen

Northwestern University
Methods for Engineering Design Under Uncertainty

Prof. K. K. Choi

University of Iowa
Continuum-Based Design Sensitivity Analysis and Optimization of Spring-back in Stamping Process

Prof. Horacio Espinosa

Northwestern University
In-Situ Electron Microscopy Testing of Nanostructures

Dr. Mohammad M. Hasan

NASA Glenn Research Center
The Design of a Condensing Heat Exchanger for Space Systems Using Porous Media

Prof. Dan Inman

Virginia Polytechnic University
Toward Autonomous Structural Health Monitoring

Prof. Kenneth Kihm

University of Tennessee-Knoxville
Micro/Nano/Bio-Fluidic Studies at MINSFET Laboratory of the University of Tennessee

Prof. Nabil Nasr

Rochester Institute of Technology
Sustainable Design and Remanufacturing

James O'Brien

Idaho National Labs
Hydrogen Production from Nuclear Energy via High Temperature Electrolysis

Mr. Richard R. Philips

United Technologies Corporation (UTC)
History of Fuel Cells and PEM Fuel Cell Design at UTC

Glen Simula

GS Engineering, Inc.
Design of Lightweight Structural Components for Military and Transportation Markets

Prof. Janis Terpenney

Virginia Polytechnic Institute & State University
Center for e-Design: IT Enabled Realization of Engineered Products & Systems

Prof. Lih-Sheng (Tom) Turng

University of WI-Madison
Injection Molding of Microcellular Nanocomposites

Dr. Jianwen James Yi

Ford Motor Company
CFD Applications in Advanced Combustion System Development

MICHIGAN TECH SPEAKERS

Prof. Jaime Camelio

ME-EM
Dimensional Variation on Assembly Systems: Modeling, Analysis, and Control

Prof. Seth W. Donahue

Biomedical Engineering Department
Hibernating Bears as a Model for Preventing Osteoporosis

Prof. Miguel Levy

Physics Department
Photonic Crystals and Magnetophotonic Crystals

Prof. Edward Lumsdaine

ME-EM
Entrepreneurship, Innovation and Competitiveness: Why Are They Important to Our Future?

Prof. Spandan Maiti

ME-EM
Simulation of fracture and failure processes in advanced materials

Prof. Amitabh Narain

ME-EM
Condensers and Internal Condensing Flows—Experiments and Direct Computational Simulations

Prof. Henry Sodano

ME-EM
Development of Eddy Current Damping Mechanisms for the Suppression of Structural Vibrations

Prof. Ghatu Subhash

ME-EM
Operational Wear and Friction in MEMS Devices

Prof. Byeng Dong Youn

ME-EM
Reliability-Based Analysis and Design Optimization for Structural Durability



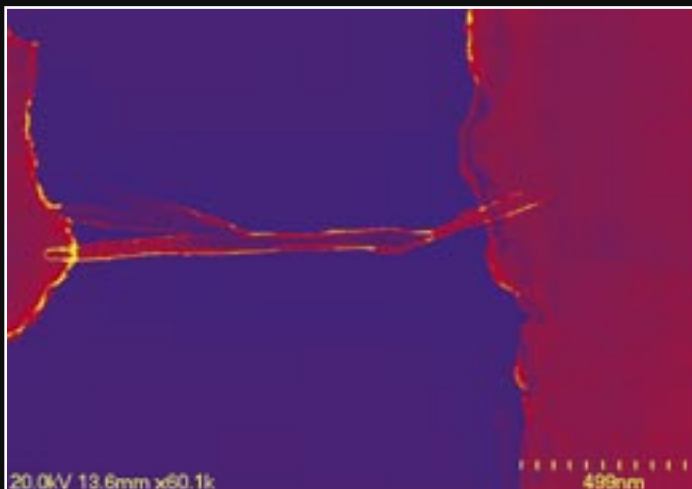
Nonlinear Crane Controls Reduce Hazardous Payload Motion

US Navy ship cranes are used for at-sea cargo transfer between ships for both military and humanitarian needs. Operation in rough seas can cause large payload motion ($\pm 5\text{m}$) in a short amount of time (30 seconds). Dr. Gordon Parker and his students are developing nonlinear control strategies for cranes that reduce these hazardous payload motions through ship motion compensation and active swing damping. Eventually, this will facilitate cargo transfer between ships while underway in extreme weather conditions.



Orientation of CNTs Creates Electrical Nanoconnections

Dr. Craig Friedrich and his team are exploring ways in which, using a high frequency electric field, carbon nanotubes (CNTs) can be oriented and deposited to make electrical nanoconnections. Here, two CNTs each 50nm in diameter and shown magnified 60,000 times, bridge a gap of 2 microns connecting gold electrodes. Traditionally, the presence of the CNTs had to be verified by inspection using a scanning electron microscope, as shown here. However, Friedrich's research has demonstrated that the changing electrical properties of the electrode gap in real time during deposition can be measured verifying the presence or absence of the CNTs without further inspection.





NVH Testing with Innovative Boundary Conditions

Students in Chuck Van Karsen's Experimental Vibro-Acoustics graduate class were given an opportunity to study a small fiberglass boat equipped with a 90 hp outboard motor that exhibited excessive levels of vibration at operator interface locations. They conducted operational testing, modal analysis, and a path characterization study of the interface between the hull, motor, and operator. Due to the timing of the project, the test track at Michigan Tech was frozen for most of the project. An innovative boundary condition that simulated the effects of having the boat in water was utilized to complete the project.

Blood Sac Stresses in Artificial Heart

Figures 1 and 2 Maximum principal stresses in a blood sac of a total artificial heart. A parametric study is underway to study the effects of geometry on blood sac stresses. Current blood sacs fail 2-5 years after implantation. A major goal is to minimize the stresses developed in the sac with each cycle and extend the fatigue life of the sac.

Figure 1

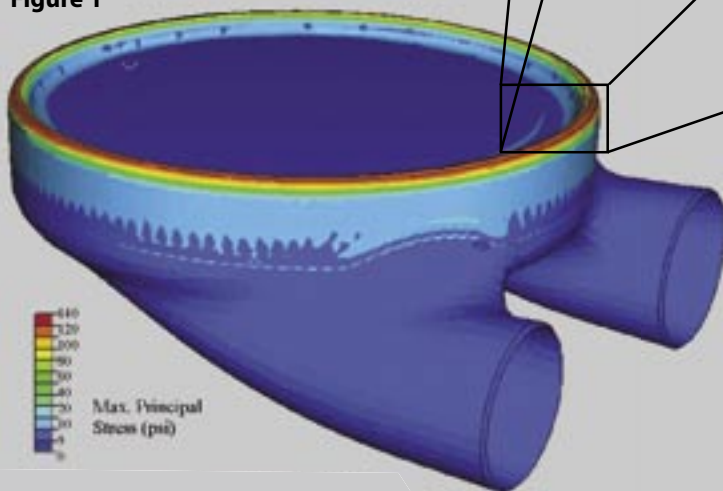


Figure 2

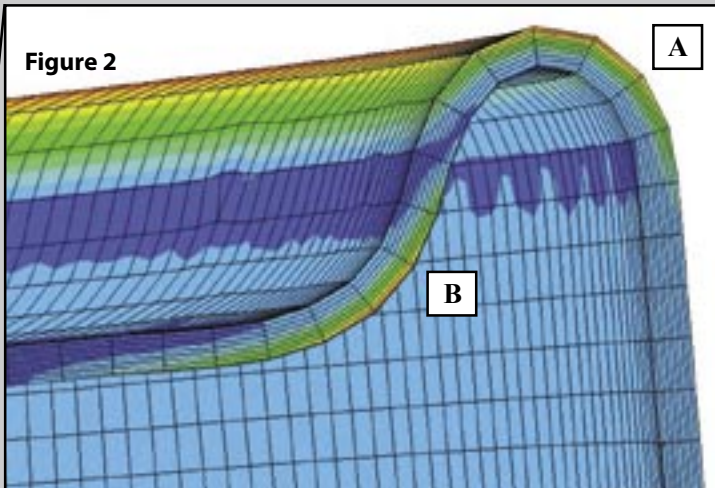


Figure 2 A close-up view of the bending region of the blood sac where peak maximum principal stresses were found. Note that locations A and B have similar stress magnitudes. The sac stresses are usually slightly smaller in the region of the blood sac that bends around the pusher plate (location B), compared to the rolling region between the blood sac and the pump case (location A). *Research by Dr. Tammy Haut-Donahue and her team*



Department Scholarships

Michigan Technological University has established a resounding reputation for outstanding students. The ME-EM Department strives to make engineering education opportunities available to qualified students from diverse backgrounds. Financial Aid scholarships are awarded to students on the basis of high academics, outstanding leadership, financial need, and underrepresentation. Following are the ME-EM undergraduate scholarship recipients for the 2005-2006 Academic Year.

Abbott, Anthony H
Abbott, Kenneth V
Ackerman, Heather
Aguila, Jorge L
Ahlem, Eric D
Ahnem, Christopher P
Aho, Heather N
Aiken, Scott J
Amlotte, Sarah M
Anderson, Beau L
Anderson, Brett R
Anderson, Gabriel B
Anderson, Greg A
Anderson, Matthew
Anderson, Nathan C
Anderson, Ryan N
Anton, Steven R
Arens, Gregory D
Arpke, Brian C
Atkinson, William R
Austin, Gregory T
Baetsen, Ryan M
Bagley, John T
Bair, Tyler M
Balogun, Nurudeen
Bambusch, Bradley J
Banwell, Lance T
Barkley, Matthew D
Barna, Nicole J
Barnaby, Michael L
Barros Neto, Osanan Lima
Bartman, Nicholas E
Bartosz, Paul M
Beadle, Autum M
Beckman, Justin L
Bedore, Richard J
Bejcek, Brian C
Belling, David A
Bendick, Kathleen M
Benes, Adam B
Benes, Philip M
Bengry, Matthew E
Berry, Kevin J
Berry, Kevin J
Besonen, Thomas P
Biery, Cameron J
Billiu, Christopher S
Billmeier, Michael K
Blank, Tyler R
Bloom, Jana M
Bobchik, Joseph P
Boertman, Matthew P
Boes, Steven T

Bojanowski, Brenton E
Bolchi, Matthew A
Bomstad, Andrew G
Bono, Adam C
Borns, Christopher W
Botero, Derek R
Bouman, Jeffery A
Bourgo, Kevin M
Bowron, Micah J
Bradley, Doug J
Bradley, Sarah M
Brandt, Colin M
Brennan, Ryan D
Brinks, Andrew J
Brouwers, Andrew J
Brown, Adam C
Brown, Ashley L
Brown, Stephanie J
Bruce, Andrew D
Brunet, Chad J
Bryson, Peter A
Buckner, Erin R
Buono, Joseph R
Burt, Fritz N
Canepa, Rachel E
Capello, Kyle J
Carl, Brian A
Carter, Steven P
Caudill, Cole J
Caughey, Richard W
Caverly, Jacob A
Cercone, Timothy J
Champion, Daniel J
Chao, Darald E
Chaphalkar, Nikhil S
Charais, Daniel R
Chivate, Shailendra
Christian, Kevin J
Cieslinski, Andrew J
Cisler, Boyd J
Clark, Michael J
Colantonio, Jacob A
Conner, Chris R
Cookingham, Kyle J
Coughlin, Christopher J
Courser, Edwin J
Cowdery, Joseph F
Cox, John A
Crandell, Beau E
Cross, Raymond T
Crouch, Molly S
Cung, Khanh D
Cunningham, Isaiah

Cybert, Aaron J
Cypher, Aaron J
Daavettila, Andrew R
Daavettila, David C
Dahlheimer, Nicholas S
Dame, David M
Davidson, Andrew P
Davis, Christopher
Dean, Catherine A
Debo, Matthew
Deffendall, Sean A
Dehlin, William J
Dehlinger, Mark J
Dehn, Lucas S
Dehring, Pierce G
DeLand, Seth B
Dennison, James W
Denomme, Michael J
Deprest, Christopher S
DeVormer, David D
Bryson, Timothy J
Dewitt, Derek J
DeWitt, Robert M
Deyo, Benjamin E
Dice, Paul W
Dillon, Justin T
Dillon, Robert J
Dion, Jeremy J
Downer, Andrew M
Drexler, Nicole L
Dubiel, Matthew J
Duesing, Peter E
Dumler, Nickolaus K
Edel, Zach J
Ehlers, Jonathan A
Ehlert, Gregory J
Elberling, Eric D
Ellis, Katrina M
Emery, Adam J
Enck, Carolyn M
Erickson, Glenn R
Escamilla, Tomas
Essex, Ryan W
Evans, Brent I
Evanski, James A
Eyster, Nathan L
Eziyi, Ifegwu L
Farrell, Nathan C
Farrelly, Grant A
Faussett, Thomas W
Feenstra, Joel R
Ferenc, William S
Ferguson, Douglas G

Figliomeni, Jonathan M
Finn, Bryan J
Folson, Stephen W
Fors, Kelsey L
Fossen, Jens E
Fralick, Brandon L
Francis, Ray A
Frantti, Neal V
Frantz, Christopher M
Freeberg, Erik A
Freed, Bryan G
Fry-Schallhorn, Lindsay D
Fuller, Jason M
Fultz, Derek W
Gagne, Alexandre
Gamble, Bailey B
Ganzel, Daniel J
Garceau, Peter J
Gardner, Jacob J
Garver, Scott W
Gerondale, Adam P
Gifford, Jonathon L
Gilbert, Adam S
Gilmer, Matthew C
Glaubitz, Tobias
Gleason, Kyle R
Gokey, Tara S
Golda, Fred N
Gomez, Andre L
Gonzalez, Juan C
Granger, Andrew A
Graziano, Michael T
Green, Patrick A
Grego, Charles J
Grimes, Brendan T
Guan, Yong E
Guitar, Jordan L
Haack, Robert M
Habegger, Adam D
Hadden, Cameron M
Hagner, Charles A
Hahn, Joshua W
Hall, Christina J
Halonon, Jesse D
Halonon, Levi J
Halt, Thomas M
Hanes, David C
Hannah, James M
Harjer, Jennifer L
Harrington, Kristopher
Harrison, Emily J
Hartwick, Elizabeth T

Harvala, Lance J
Hasslen, Eric J
Hatch, Tenasia E
Hauswirth, Kyle A
Hawkins, Brett T
Hawks, Paul C
Haycock, Meghan M
Heavener, Michael J
Hebert, Charles P
Heczko, Christopher P
Heering, Jason R
Heins, Ryan D
Heires, Kevin H
Hemenger, Alicia G
Hemingway, Chad G
Henderson, David J
Her, Vang Y
Herman, Adam J
Hernandez, Joseph E
Heubel, Eric V
Hitt, Zachary T
Hocking, Joel M
Hodges, Andrew J
Holland, Daniel P
Holmes, Matthew A
Holt, Georgio M
Honkala, Carl A
Horn, Jacob T
Howard, Brad A
Hubble, Michael F
Huesman, Wade M
Hughbanks, Zachary J
Iduma, Godwin C
Iduma, Kingsley C
Isaacson, Christopher J
Jacobsen, Eric J
Jarzynski, Steven K
Jaworski, Andrew E
Jensen, Benjamin D
Johnson, Amanda J
Johnson, David L
Johnson, Joshua P
Johnson, Sonja
Jordan, Kari L
Joseph, Elmo
Joseph, Eric D
Juhasz, Alexander E
Jungnitsch, Russell P
Kaiser, Andrew C
Kalafut, Calvin W
Kalenauskas, Eric W
Kangas, Greg A
Kantor, Adam R

Kargela, Brian D
 Karnes, Matthew R
 Kartes, Trevor J
 Kastamo, Adam P
 Katalenich, Jeffrey A
 Kauppila, Carl J
 Kellenberger, Tyler J
 Kempeinen, Matthew P
 Kempke, Daniel J
 Kendziorski, Derrick J
 Kennedy, David J
 Kero, Christopher J
 Kero, Matthew P
 Kessner, Clayton J
 Kevnick, Nicholas M
 Kiel, Haijo A
 Killeen, Matthew
 Kilroy, Brenton M
 Kim, Sang Deuk
 Kivisalu, Michael T
 Klobucher, JoAnn M
 Knepler, Carl M
 Knoebel, Ronald W
 Koebli, John F
 Kohlmann, Matthew J
 Konik, Bradley S
 Koning, Laura A
 Kootstra, David K
 Kortenhoven, Keith A
 Korth, Hans G
 Kostrzewski, Thomas J
 Kramer, James R
 Kroll, Ryan R
 Kroodsmas, Nathan D
 Krueger, Jason S
 Kukla, Ashley D
 Kunnen, Kirk S
 Kussmaul, Steven J
 Lamie, Tyler S
 Lange, Robert A
 Lau, Timothy W
 Lautner, Andrew K
 Lechnyr, Joseph W
 Lecureux, Matthew D
 Lecureux, Michael A
 Ledebuhr, Samuel A
 Lee, Hyun Jae
 Lee, Jonathan W
 Lehmann, Erik W
 Leifermann, Eric M
 Leonard, Cody M
 Leonard, Edgar J
 Lindenberg, Jason R
 Liow, Pou Chuong
 Little, Adrian M
 Littlepage, Steven M
 Lixey, George M
 Loiselle, Jacob A
 Longstreet, Aaron J
 Lord, Alex
 Loughead, Michael J
 Loukus, Roy H
 Love, Richard W
 Loveland, Dustin P
 Lowe, Dustin K
 Lowe, Nicholas C
 Ludy, Andrew J
 Luskin, Casey M
 Lyons, Trevor P
 Mackey, Shane A
 MacNeill, Chelsey A
 Malnor, Stuart M
 Malone, Cory J
 Maloney, Christine A
 Maloney, Kevin J
 Mann, Craig A
 Mann, William E
 Manninen, Paul J
 Manthei, Jesse P
 Markey, John A
 Marks, Amanda K
 Marsh, Kyle J
 Martin, James J
 Martin, Jennifer L
 Martin, Nicholas T
 Martina, Eric J
 Martz, Travis P
 Mascott, Michael L
 Mason, Blake J
 Mathues, Ryan J
 Matson, William M
 Mayo, Daniel J
 McCabe, Aaron J
 McCabe, Danielle M
 McCabe, Patrick E
 McCarthy, Michael F
 McCubbin, Nicholas
 McCullough, William
 McDonald, Mitchell A
 McElmurry, Scott M
 McHale, Brian
 McIntosh, Todd J
 McIntyre, Brandon D
 Mears, Amanda
 Mendolla, Aaron
 Menze, Ryan D
 Merony, Nicholas
 Messenger, Jacob
 Metelsky, Christopher J
 Meyer, Edmond
 Meyers, Amy L
 Middleton, Ryan
 Millard, David
 Miller, Christopher F
 Miller, Megan A
 Miller, Samuel J
 Miller, Timothy
 Mittag, Matthew
 Mleziva, Brian
 Monick, Kassie
 Mooney, Robert
 Moore, Christopher L
 Moore, Christopher W
 Moran, Jonathan
 Moran, Kevin F
 Morello, Andrew J
 Morgan, Christopher J
 Morgan, Dan C
 Moro, Erik A
 Morris, Daniel
 Morris, Ryan L
 Morris, Sean M
 Morrison, Chad
 Morse, Bradley
 Moscherosch, Ben W
 Mott, Jerod C
 Motz, Julie A
 Moura, Felipe D
 Murtland, Frank C
 Myers, Matthew
 Nagel, Gregory R
 Nauta, Andrew J
 Ness, Curtis J
 Ng, Edward
 Ng, Kenny
 Noreen, Trenton B
 Norwood, Kyle D
 Novak, Justin L
 Nummerdor, Brock D
 O'Boyle, Ryan L
 Olearnick, Joshua
 Olson, Christopher
 Ortis, Vanessa K
 Osborne, Anthony
 Osborne, Matthew
 O'Shaughnessy, Michael D
 O'Sullivan, Christopher
 Oswal, Sumet P
 Owen, Kristina M
 Padilla, Cory S
 Paiva, Christopher
 Palmreuter, Jonathan A
 Panczenko, Jason
 Parenteau, Alan R
 Parker, Seth R
 Pasquali, Dean A
 Paul, Jeremiah D
 Pavlovich, Matthew J
 Pearson, Cailee E
 Pearson, Sarah J
 Pennala, Brandon
 Pennala, Marcus J
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 Tian, Lipu
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PCA Inductee



Kimberly Turner

Kimberly L. Turner is the most recent alumna to be inducted into the Presidential Council of Alumnae (PCA) at Michigan Tech. The PCA recognizes successful Michigan Tech women for their educational excellence, past student service, professional accomplishments, and community contributions.

Turner received her bachelor's degree in Mechanical Engineering from Michigan Tech in 1994 and her PhD in Theoretical and Applied Mechanics from Cornell University. In 1999, she accepted a position as Assistant Professor in the Department of Mechanical and Environmental Engineering at the University of California, Santa Barbara (UCSB). In 2004, she became a tenured Associate Professor of Mechanical Engineering and, since 2005, has held the position of Undergraduate Program Director. She also serves as the Co-Vice Chair of Mechanical Engineering. Turner is a co-leader of the Sensors Team in the UCSB/ARMY Institute for Collaborative Biotechnology, a \$50M multi-university, multidisciplinary center housed at UCSB.

Turner's research interests are focused in the areas of Micro-Electro Mechanical Systems (MEMS) and nanosystems. At UCSB, she quickly built up her research program by securing over \$1 million a year to support her research group of eight to ten PhD students. She has received significant awards including the National Science Foundation (NSF) CAREER award, the NSF/MEXT Young Scientist Fellow, and the 2005 UCSB Academic Senate Distinguished Teaching Award. She holds several patents in her field and has published over 65 reviewed technical publications. Her work has appeared in publications including Nature and Review of Scientific Instruments. She gives many invited presentations at conferences and research universities each year.

Turner is a member of the American Vacuum Society, the American Society for Engineering Education, the Institute of Electrical and Electronic Engineers, the American Society of Mechanical Engineers, the Cornell Society of Engineers, the Society for Experimental Mechanics, Pi Tau Sigma, and the Society of Women Engineers.

While at Michigan Tech, Turner was President of Tau Beta Pi, an engineering honor fraternity. She worked as a tutor in the Mechanics Learning Center and as an undergraduate researcher in Walter Milligan's lab (Materials Science). She also pursued an interest in the performing arts, playing the french horn with the Keweenaw Symphony Orchestra.

When not involved in research or university work, Turner is active in dog training and showing with her Gordon setter, Lincoln, and her Irish setter, Aidan. She enjoys outdoor sports, including running and mountain biking. Turner resides in Goleta, California, with her husband Michael (MTU '96).

Presidential Council of Alumnae

The PCA Mission is to "encourage and support Michigan Tech female students and alumnae in accomplishing their career and life choice goals." The PCA acts as an advisory board to the University President and the Department of Educational Opportunity. PCA members assist with programs and activities that benefit all students, and the development of leadership and professional skills, especially for women.

John Calder: CEO of Cincinnati Controls, Inc.



Professional dreamer. Company leader. Global visionary.

A native of Highland Park, MI, John Calder earned both his BS in Mechanical Engineering in 1967 and his MS in Business Administration in 1977 at Michigan Tech. When he graduated in 1967, he completed nine interviews and had eight job offers. Calder began his career as a design engineer, became an applications engineer, and later a sales engineer. In 1975, he joined Dorsey-Alexander, Inc., of Cincinnati.

In 1980, Calder co-founded Cincinnati Controls, Inc., a firm that distributes microprocessors for motion control and human-machine interface. CEO of Cincinnati Controls since 1992, he attributes his professional success to hard work, his education, and to Joan, his wife of 41 years. Calder firmly believes in balance in life, evidenced by his three passions: family, work, and fun. He is also an avid hunter and gardener, and works with the Boy Scouts.

Calder affirms that his exemplary education led him down this entrepreneurial path. “Michigan Tech shows wonderful vision in combining the engineering and business disciplines,” he adds. Combining the two is “critically important,” especially in our global economy.

“Repayment for an outstanding education,” is equally important to John Calder. He has served as Vice Chair of the Tech Fund Board of Directors and Committee Chair for the ME-EM’s Phase II Building for the Future Campaign, Endowing Excellence. Already a member of the Dillman Society for his lifetime contributions to Michigan Tech, Calder plans on raising that level to the Hubbell Society in the very near future. The Calders have also supported Michigan Tech through the establishment of the ME-EM Calder Systems and Controls Laboratory.

www.cincinnaticontrols.com

Ron Starr: President of Deanlee Management, Inc.



Professional Developer. Lifetime Entrepreneur. Community Leader.

A native of Toronto, Ontario, Ron Starr received his BS in Mechanical Engineering at Michigan Tech in 1967. From there, he journeyed to Pennsylvania as a research engineer for ALCOA. Returning to Canada, Starr’s interests expanded into financial planning and later, into a position leading a company that produced playground and recreational equipment.

In 1980, Starr became President of Deanlee Management, Inc., located in Mississauga, Ontario. Deanlee Management specializes in development, planning, and land use management consultation. Offering comprehensive project management service, Deanlee has participated in commercial, industrial, and residential projects totaling close to one billion Canadian dollars.

Starr has served as a Mississauga City Councillor, a 24-year member of the Enersource Hydro Mississauga Board, and Chair of the Municipal Electrical Association. Currently the Chair of ENERconnect, Starr has also been Vice Chair of the Credit Valley Hospital, Chair of the Mississauga International Children’s Festival, Mississauga Board of Trade President, and Director of Interim Place Women’s Shelter. Awards like the City of Mississauga’s Civic Award of Recognition, Rotary Club Paul Harris Fellowship, and Queen’s Jubilee Medal reflect Starr’s ongoing commitment to his community.

“Michigan Tech definitely played a pivotal role in my life, allowing me the opportunity to be an entrepreneur in whatever role I pursued,” states Starr. Just as importantly, Ron Starr believes there are myriad opportunities to give back through one’s time, talent, or money. Starr is a trustee of the Michigan Tech Fund and was President/Chair of the Michigan Tech Canadian McAllister Foundation and Canadian Alumni Association from 1978 to 2003. www.deanlee.ca

Lawrence Mulholland: CEO of Mulholland Positioning Systems, Inc.



Product Designer. Innovator. Humanitarian.

After earning his BS in Mechanical Engineering from Michigan Tech in 1955, Lawrence Mulholland left his hometown of Saginaw, MI, to begin his career at Clow Corporation in Chicago, IL. Over the next 16 years, he worked at several other companies: Saginaw Products, Republic Corporation, and Beckton Dickinson in Los Angeles, CA.

In 1971, Mulholland founded his own company Mulholland Positioning Systems, Inc. His company designs, manufactures, and markets “products designed for the development of functional skills” for physically challenged children and adults. Mulholland’s durable, handmade equipment has positively impacted the lives of many people with cerebral palsy, spina bifida, and other types of motor development disorders. Mulholland Positioning Systems works directly with families, therapists, physicians, and clinicians to design the most effective tools for mobility.

Ever the renaissance engineer and innovator, Mulholland holds nine patents in this field. Based out of Burley, ID, Mulholland Positioning Systems has distributors worldwide including the United Kingdom, Norway, Denmark, Italy, Portugal, Spain, Japan, and Australia.

“Michigan Tech gave me the tools for my profession,” proclaims Mulholland. In recognition of its outstanding engineering education, he established the Mulholland Positioning Systems Annual Scholarship Fund in 2000, a grant awarded to Michigan Tech undergraduate engineering students. A member and past president of the Rotary Club of Oxnard, Mulholland also belongs to the American Society of Test Engineers and American Society of Manufacturing Engineers. In 2002, Larry Mulholland was inducted into the Academy of Mechanical Engineering and Engineering Mechanics at Michigan Tech.

www.mulhollandinc.com

Nagjibhai Sutariya: CEO of Saturn Electronics Corporation



Company Visionary. Driven Entrepreneur. Generous Benefactor.

Originally from India, Nagjibhai Sutariya came to the United States in 1969 to complete his Master’s degree at Michigan Tech. After graduating with an MS in Mechanical Engineering in 1971, he became a Mechanical Project Engineer at the Ford Corporation. While still working for Ford, Sutariya launched Saturn Electronics Corporation in 1985 with his two nephews, Perry and Ishvar.

Sutariya officially left Ford in 1992 in order to devote his time to propel Saturn Electronics forward as a leader in the field. Based in Romulus, MI, Saturn Electronics manufactures high-quality circuit boards for the global marketplace. Currently, Saturn Electronics is the only printed circuit board manufacturer in North America that has achieved worldwide quality certification TS16949.

Sutariya’s advice to engineering students is simple: “Go after what you want, and don’t ever quit. Keep going even after making mistakes.” The focus of Saturn Electronics has always been on quality and on learning from, but never repeating, mistakes. This philosophy has served both Sutariya and his company well. At present, Sutariya owns 50.5% of the company, which employs 140 workers. Posting \$25 million in sales in 2006, Saturn Electronics is a debt-free company.

Committed to helping the less fortunate, Nagjibhai Sutariya uses his business success to support the people in his native India. He was a major donor for a \$2.2 million, state-of-the-art hospital completed in 2006. His contribution to this rural community goes beyond financial support, as he visits the hospital every six months to oversee its general operations. www.saturnelectronics.com

Paul Gillespie: President of Semiconductor Equipment Sales Associates CEO of American Tech Manufacturing, Inc., & Dymatix Automation Systems, Inc.



Creative Problem Solver. Innovative Leader. Global Communicator.

Paul Gillespie came to Michigan Tech from his hometown of East Lansing and graduated with a BS in Mechanical Engineering in 1986. He left the state after graduation, taking a position as Test Process Engineer with Intel, a semiconductor company newly moved to Chandler, AZ. Enduring 120-degree heat and major culture shock when he arrived, Gillespie has built upon this leap of faith, continually broadening his experience around the world.

Since Intel, Gillespie has worked in project management positions across the country, from Minnesota to California, all involving the international development of manufacturing process lines in the semiconductor business. His passion for this field led him to found several companies that focus on the design and manufacturing of semiconductor equipment, successfully turning profits for all of them.

Gillespie is currently the owner and president of SESA—Semiconductor Equipment Sales Associates—in Santa Clara, CA. He is also owner and CEO of two other companies, both in San Jose, CA: American Tech Manufacturing, Inc. and Dymatix Automation Systems, Inc. His latest interest is Fastspares, a company that provides spare parts and technical support in semiconductor test and assembly equipment via the internet.

Gillespie notes, “I had always known I wanted to have my own company, and Michigan Tech taught me where to go to obtain the tools to make this happen, as well as the skills to break complex problems into manageable tasks.” Paul Gillespie also believes that communication is key in developing innovative solutions: “You can be brilliant in many technical disciplines, but if you are not able to share that knowledge effectively with others in a clear, concise manner, you will not succeed in your goals.” www.SESA.com, www.AmericanTech.com, www.Dymatix.com, www.FastSpares.com

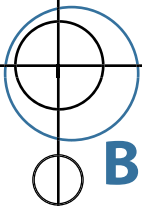


Mechanical Engineering student and Aerospace Enterprise team member EJ Meyer experiences reduced gravity while running an experiment aboard a NASA zero gravity simulator aircraft. The experiment investigates using electrostatic fields to remove lunar dust from solar cells.



The image shows the first bismuth-fueled Hall-effect thruster ever demonstrated outside of the Soviet Union. The thruster was designed and built at Michigan Tech by Dr. L. Brad King and his research team.





Building the Future

2006 ME-EM Donations

Our donors are critical to the success of the Mechanical Engineering-Engineering Mechanics Department. Their contributions assist ME-EM in *Building for the Future*, a campaign that promotes the development and expansion of our education and research.

Phase I of this campaign was exceeded and has been completed. Phase II, entitled *Endowing Excellence*, is well on its way to the goal of raising \$54 million by 2010. With these monies, the ME-EM Department will focus its efforts on attracting, rewarding, and retaining high quality faculty, students, and staff. This fund will establish endowments for faculty chairs, fellowships, scholarships, and student programs.

The following list encompasses the many people who have generously shared their resources to create an outstanding ME-EM Department. ME-EM is extremely grateful for their ongoing support.

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Contracts & Grants

ME-EM research is supported and sponsored by an expanding number of industrial partners. These partnerships strengthen and sustain the superior quality engineering research taking place at Michigan Tech. During the fiscal year 2006, 45% of all ME-EM research was supported by industry with the following active contracts and grants.

Design Dynamic Systems			
Sponsor	Title	Principal Investigator	Total Award
National Science Foundation	Senior Engineering Design Projects to Assist Disabled Persons in Michigan's Copper Country	Charlesworth, Debra <i>Co-PI: Beard, John</i>	\$156,405
Polaris Industries, Inc.	Characterization of Elastomer Snowmobile Powertrain Mounts	Blough, Jason	\$4,900
Polaris Industries, Inc.	Snowmobile Powertrain Transfer Path Analysis	Blough, Jason	\$10,000
PCB Piezotronics	Larson Davis DSS Labview VI & NVH Course Development	Blough, Jason	\$43,000
Polaris Industries, Inc.	Characterization of Seat & Handlebar Vibration of ATV's & Snowmobiles	Blough, Jason	\$60,000
Ford Motor Company	Optimization of P/T Mounting System for Steady State Drive Conditions 2006	Blough, Jason <i>Co-PI: Rao, Mohan</i>	\$156,264
Ford Motor Company	Systematic Design of Product Platform Architectures	Gershenson, John	\$21,250
Terex Handlers	A Proposal for the MTU/Terex Lean Leadership Laboratory	Gershenson, John	\$174,492
General Motors Corporation	Application of GM-GMS to the Manufacturing Systems Design	Gershenson, John	\$175,125
National Science Foundation	Product Modularity - The Link Between Product Architecture and Product Life-cycle Costs	Gershenson, John	\$372,716
Ford Motor Company	2006 Funding for a C3P, Subject Matter Expert	Lumsdaine, Edward	\$5,819
Ford Motor Company	2005 C3P Technical Administrative Support	Lumsdaine, Edward	\$140,914
Ford Motor Company	2006 C3P Technical Administrative Support	Lumsdaine, Edward	\$143,034
Ford Motor Company	2006 Support of C3P Powertrain Training	Lumsdaine, Edward	\$231,204
Ford Motor Company	2006 200 Level C3P Training	Lumsdaine, Edward	\$234,301
Ford Motor Company	2005 Support of C3P 200 Level Training	Lumsdaine, Edward	\$293,294
Ford Motor Company	2005 Support of C3P Powertrain Training	Lumsdaine, Edward	\$326,147
National Science Foundation	Creating an Entrepreneurial Culture in a Rural Setting	Reed, David <i>Co-PI: Lumsdaine, Edward</i>	\$659,108
Craft Engineering Associates, Inc.	Simulation of Aerial Delivery of Cargo from Ship to Shore	Parker, Gordon <i>Co-PI: Blough, Jason</i>	\$22,999
Craft Engineering Associates, Inc.	Simulation of Motion Control During Cargo Transfer Operations	Parker, Gordon <i>Co-PI: Blough, Jason</i>	\$22,999
Intelligent Automation, Inc.	Synchronization Control of Ship Rendezvous Operations	Parker, Gordon	\$23,000
BMT Designers & Planners, Inc.	Crane Test Bed Development	Parker, Gordon	\$85,158
National Science Foundation	Graduate Research Fellowship Program (awarded to Rebecca Petteys)	Parker, Gordon	\$87,800
International Truck & Engine	SCR Catalyst Modeling & Evaluation of Control Strategies for NOx Reduction in Diesel Engine Exhaust Aftertreatment Systems	Parker, Gordon <i>Co-PI: Johnson, John</i>	\$112,473
Anonymous	Confidential (Per Clause 16)	Parker, Gordon <i>Co-PI: Blough, Jason</i>	\$192,000
BMT Designers & Planners, Inc.	System Identification of Hydrostatic Transmission for Pendulation Control System Implementation & Simulation	Parker, Gordon	\$205,827
Ford Motor Company	Senior Design: Design, Testing and Construction of a Hemi-Anechoic Chamber for the Chassis-Roll Dynamometer Test Facility at MTU	Rao, Mohan	\$20,348

DesignDynamicSystems (continued)

Sponsor	Title	Principal Investigator	Total Award
John Deere & Company	Measurement of Acoustic Absorption of Grass Surfaces Using the In-Situ Method	Rao, Mohan	\$25,600
Battelle	Development of a Robust Speech Metric Based on Binaural Speech Perception	Rao, Mohan	\$30,289
Volvo Construction Equipment Korea	Enterprise: Study & Reduction of Interior Noise in Volvo Excavators	Rao, Mohan	\$54,261
Caterpillar, Inc.	Development & Validation of Sound Package Treatments to Reduce Noise from Caterpillar Engines	Rao, Mohan <i>Co-PI: Blough, Jason</i>	\$54,452
State of Michigan	REF: Multifunctional Piezoelectric Carbon Fiber	Sodano, Henry	\$41,064
Whirlpool Corporation	Sound and Vibration Characterization of Pro Laundry Fabric Care Machines	Van Karsen, Charles	\$35,595
University of Massachusetts Lowell	Multi-Semester Interwoven Project for Teaching Basic Core Stem Material Critical to Solving Dynamic Systems Problems	Van Karsen, Charles	\$36,242
General Motors Research and Development Center	Non-Deterministic Engineering Design Optimization for a Passenger Restraint System	Youn, Byeng Dong	\$32,301
Battelle	Uncertainty Data Acquisition & Integration of Response Surface Method to Statistics-Based Analysis & Design Methodology in Distributed Environment	Youn, Byeng Dong	\$65,067

EnergyThermofluids

State of Michigan	REF: Technique for Non-Intrusive Pressure Measurements in Microfluidic-Based MEMS Devices - A Feasibility Study	Allen, Jeffrey	\$28,176
National Aeronautics Space Administration	Microscale Investigation of the Thermo-Fluid Transport in the Transition Film Region of an Evaporating Capillary Meniscus	Allen, Jeffrey	\$50,333
National Aeronautics Space Administration	Dynamics and Heat Transfer of Evaporating Films in Reduced Gravity	Allen, Jeffrey	\$64,138
Ford Motor Company	Ford Distance Learning Program - PhD in Mechanical Engineering (MEEM)	Anderson, Carl <i>Co-PI: Naber, Jeffrey</i>	\$45,000
US Department of Energy	Direct Injection Compression Ignition Diesel Automotive Technology Education (GATE) Program	Anderson, Carl <i>Co-PI: Cho, Peck; Johnson, John; Michalek, Donna; Yang, Song-Lin</i>	\$54,074
General Motors Corporation	Experimental Determination of Turbine Blade Inlet Tip Loading	Anderson, Carl <i>Co-PI: Blough, Jason</i>	\$96,510
US Department of Education	GAANN: Enhancing the Position of the United States Through Interdisciplinary Development of Fuel Efficient Hybrid Compatible Internal Combustion Engines	Anderson, Carl	\$163,980
General Motors Corporation	The Effect of Torque Converter Design Parameters on Noise & Cavitation Characteristics	Anderson, Carl <i>Co-PI: Blough, Jason</i>	\$196,194
Visteon Corporation	Electronically Controlled Powertrain Cooling - Year 4	Anderson, Carl <i>Co-PI: Yang, Song-Lin</i>	\$393,193
John Deere & Company	Modeling of a Continuously Regenerating Particulate Trap in a Heavy-Duty Diesel Engine with Cooled Low Pressure EGR	Johnson, John <i>Co-PI: Yang, Song-Lin</i>	\$224,915
University of Michigan - Michigan Space Grant Consortium	An Investigation of Model Characteristics of an Inflatable Space Structure	King, Lyon	\$2,500
University of Michigan - Michigan Space Grant Consortium	Design of High Altitude Glider Using Composite Materials	King, Lyon	\$2,500
University of Michigan - Michigan Space Grant Consortium	High Altitude Glider	King, Lyon	\$2,500
University of Michigan - Michigan Space Grant Consortium	High Power Vacuum Arc Thruster	King, Lyon	\$2,500
University of Michigan - Michigan Space Grant Consortium	Small Satellite Deployment Dynamics	King, Lyon	\$2,500

EnergyThermofluids (continued)

Sponsor	Title	Principal Investigator	Total Award
University of Michigan - Michigan Space Grant Consortium	Electron Dynamics in Hall Thrusters	King, Lyon	\$5,000
US Department of Defense	PECASE: Spacecraft Interaction Studies of a 20-kW Bismuth-Fueled Hall Thruster	King, Lyon	\$242,115
US Department of Defense	A Vaporizing Liquid-Metal Anode for High-Power Hall Thrusters	King, Lyon	\$383,119
National Science Foundation	CAREER: Electron Fluid Dynamics in a Hall-Effect Accelerator: Using Fundamental Research to Enhance Education and Technology	King, Lyon	\$602,334
State of Michigan	REF-RS: The Development of Hydrogen & Hydrogen Duel Fuelled Internal Combustion Engine Research Programs	Naber, Jeffrey	\$36,865
Ford Motor Company	Auto-Calibration: Cold Start & Warm-Up	Burl, Jeffrey <i>Co-PI: Naber, Jeffrey</i>	\$80,143
Ford Motor Company	TI-VCT Engine Optimization	Naber, Jeffrey <i>Co-PI: Parker, Gordon</i>	\$81,742
Motorola, Inc.	Experimental Measure & Analysis for Determination of IC Engine Performance Interactions	Naber, Jeffrey	\$147,646
R.W. Fernstrum & Company	Investigation of Flow and Heat Exchange Capabilities for FERNCOOL Box Cooler Heat Exchangers (Extension)	Narain, Amitabh	\$12,218
Engineered Machined Products, Inc.	Flow Simulations for Optimized Performance of EMP (Engineered Machined Products, Inc.) Made Displacement Pumps	Narain, Amitabh	\$67,748
National Aeronautics Space Administration	Direct Computational Simulations and Experiments for Internal Condensing Flows' System-Instabilities/Dynamics in Micro-Gravity and Terrestrial Environments	Narain, Amitabh <i>Co-PI: Evensen, Harold; Van Karsen, Charles</i>	\$436,763
National Aeronautics Space Administration	Numerical Study of Low Emission Gas Turbine Combustor	Yang, Song-Lin	\$47,515

ManufacturingIndustrial

National Science Foundation	SGER: Preliminary Investigation of Selective Volumetric Sintering of Powder Metallurgy Parts	D'Souza, Roshan	\$83,113
M.K. Morse Company	Mechanics-Based Design of Metal Cutting Circular Saws	Endres, William	\$83,639
University of Michigan	An Engineering Research Center in Wireless Integrated Microsystems	Warrington, Robert <i>Co-PI: Friedrich, Craig</i>	\$1,311,902
US Department of Defense	Research and Infrastructure Development Center for Nanomaterials Research	Friedrich, Craig	\$5,806,939
National Science Foundation	GOALI: Optimum Design of Extrusion Dies Using the Estimated Elongational Viscosity of Polymers	Gupta, Mahesh	\$405,044
Kimberly-Clark Corporation	KIMBE-Data Systems Engineering Project	Pandit, Sudhakar	\$195,236
Boston Scientific Corporation	P2A2 Membership	Sutherland, John <i>Co-PI: Gershenson, John, Endres, William</i>	\$60,000
National Science Foundation	Defining a Curriculum for Service Sector Engineering	Sorby, Sheryl <i>Co-PI: Sutherland, John</i>	\$99,976

Manufacturing Industrial (continued)

Sponsor	Title	Principal Investigator	Total Award
National Science Foundation	BE/MUSES: Renewable Energy from Forest Resources: Investigating the Complex Interrelated Issues Associated with Generating Automotive Fuels from Lignocellulosic Biomass	McLean, Ann <i>Co-PI: Sutherland, John</i>	\$114,498
Caterpillar, Inc.	Predicting Environmental Performance of Manufacturing Operations/SFI	Sutherland, John	\$141,311
Caterpillar, .	Evaluation of Low Greenhouse Gas Bio-Based Energy Technologies	Shonnard, David <i>Co-PI: Sutherland, John</i>	\$180,000
National Science Foundation	IGERT: Achieving Environmental, Industrial, and Societal Sustainability via the Sustainable Futures Model	Sutherland, John <i>Co-PI: Gershenson, John</i>	\$6,519,800
Ford Motor Company	FORD-PhD: A Proposal for Advising Support Development of Hybrid Forming Dies for Superplastic Forming in Aluminum Sheet	Weinmann, Klaus	\$31,620

Solid Mechanics

University of Michigan-Michigan Space Grant Consortium	Exploring the Meniscal Tissue of the Knee Joint	Haut-Donahue, Tammy	\$2,500
University of Michigan-Michigan Space Grant Consortium	The Effect of Disuse on Matrix Production in the Knee-Joint Meniscus	Haut-Donahue, Tammy	\$2,500
Pennsylvania State University	Finite Element Analysis of Small Blood Pumps	Haut-Donahue, Tammy	\$9,951
Mayo Clinic	Microsensor for Intramuscular Pressure Measurement	Haut-Donahue, Tammy	\$50,000
US Department of Health & Human Services	Structure and Function of Meniscal Horn Attachments	Haut-Donahue, Tammy	\$244,550
Whitaker Foundation	Mechanotransduction in the Meniscus	Haut-Donahue, Tammy	\$522,931
National Science Foundation	Acquisition of High Speed Digital Imaging System for Multidisciplinary Research at MTU	Post, Scott <i>Co-PI: Endres, William; Miskioglu, Ibrahim</i>	\$214,230
State of Michigan	REF: Multiscale Modeling of Fracture Toughness of Nanostructured Viscoelastic Foam Materials	Odegard, Gregory	\$29,815
National Aeronautics Space Administration	Equivalent-Continuum Modeling of Nanostructured Polymer Composites	Odegard, Gregory	\$181,602
State of Michigan	REF: Biotechnology Research Center Technician Support to Enhance Interdisciplinary Molecular Research	Predebon, William <i>Co-PI: Tsai, Chung-Tui</i>	\$42,300
Henry Luce Foundation	Clare Boothe Luce Scholar Program	Anderson, Christine <i>Co-PI: Predebon, William</i>	\$295,611
Oak Ridge National Laboratory	Plasticity Limits for Structural Ceramics Under Instrumented Single-Grit Scratch Testing	Subhash, Ghatu	\$220,259
National Science Foundation	GOALI-Ultrafine Grained and Nanostructured Ceramics: Influence of Processing Grain Size and Strain Rate on Fracture Characteristics	Subhash, Ghatu	\$451,318
Raytheon Company	Development and Characterization of Environmentally Benign Functional Materials	Subhash, Ghatu	\$1,666,456

PHD Graduates

PHD GRADUATES & ADVISORS

Arcand, Benjamin (2005) Advisor: Friedrich, Craig R
An Active Surgical Positioning Device for a Cochlear Implant
Electrode Arra

Cheng, Huojin (2005) Advisor: Beard, John E
Model Based Experimental Investigation on Powered Gait Orthosis
(PGO)

Deaton, Larry T (2006) Advisor: Rao, Mohan D
Investigations into the Causes and Methods of Reducing Airflow
Induced Buffeting Over Vehicle Rear Windows

Fan, Xiaorui (2005) Advisor: Miller, Michele H
Force Modeling for Intermittent Grinding Processes

Hii, Wei (Wilson) (2005) Advisor: Michalek, Donna J
Transient CFD Study of Machining Mist Removal Through
Kinematic Coagulation

Hu, Xuefei (2005) Advisor: Sutherland, John W
An Experimental and Analytical Study of the Effect of Material
Microstructures on the Machinability of Al-Si Alloys

Huang, Jun (2005) Advisor: Sutherland, John W
Adiabatic Shear Banding and Shear Localized Chip Formation

Inal, Mehmet (2005) Advisor: Anderson, Carl L
Thermal Loading and Surface Temperature Analysis of the Piston
of a Small HSDI Diesel Engine

Ju, Chuanxi (2005) Advisor: Sutherland, John W
Development of Particulate Imaging Systems and Their
Application in the Study of Cutting Fluid Mist Formation and
Minimum Quantity Lubrication

Li, Hao (2005) Advisor: Subhash, Ghatu
Mechanical Behavior of Metallic Glasses and Metallic Glass
Matrix Composites

Ling, Di (2005) Advisor: Gupta, Mahesh
Simulation of Fluid-Solid Interaction in Powder Injection Molding

Luckey, S. George (2006) Advisor: Weinmann, Klaus J
Development of Finite Element Analysis Based Tools and Methods
for the Design of Advanced Superplastic Forming
Dies and Processes

Sun, Yong (2006) Advisor: Gupta, Mahesh
Optimization of Die Geometry for Polymer Extrusion

Zhang, Ping (2005) Advisor: Miller, Michele H
Investigation of Grinding Wheel Loading

MS Graduates

MS GRADUATES & ADVISORS

Acharya, Nirav S (2006) Advisor: Naber, Jeffrey D
Start of Combustion Detection Using In-Cylinder Ionization
Feedback in a HPCR Direct Injection Diesel Engine

Beggs, Larry A (2006) Advisor: Bettig, Bernhard P
Course work only

Biswas, Abhishek (2005) Advisor: Nelson, David A.
A Computational Method to Predict Human Thermal Comfort

Bulgakov, Konstantin (2006) Advisor: Parker, Gordon G
Design of a Scale Model Electric Crane

Burns, Erin A (2005) Advisor: Friedrich, Craig R
Micro-Electrode Fabrication and Ion Implantation by Focused Ion
Beam Machining

Chandan, Pratik (2005) Advisor: Gupta, Mahesh
Meshing Algorithm for Two Dimensional and Three
Dimensional Moving Boundary Problems

Charbonnel, Sylvain J (2006) Advisor: Nelson, David A
Predicting Tissue Heating Effects of RF Radiation in Humans
Using a High Resolution Voxel-Based Thermoregulatory Model

Chaubal, Shailendra S (2006) Advisor: Bettig, Bernhard P
Implementation of Modified Frontier Algorithm for
Constraint Solving

Chichester, Alan M (2005) Advisor: Narain, Amitabh
CFD Modeling of Natural and Forced Convection Regimes for a
Hull-Mounted U-Tube Marine Heat Exchanger

DeJesus, Edward (2005) Advisor: Anderson, Carl L
Blade Tip Induced Loading on a 310mm Automotive Torque
Converter Turbine Blade

Dilworth, Brandon J (2006) Advisor: Blough, Jason R
Implementation of the Time Variant Discrete Fourier Transform as
a Real-Time Order Tracking Method

Edmonds, Mark A (2006) Advisor: Vilmann, Carl R
Balancing Attributes Within a Truck Underbody Sub-System

Etap, Jeffrey (2005) Advisor: Van Karsen, Charles D
High Frequency - Low Amplitude Dynamic Characterization of
Elastomers Through Experimental Techniques

Fischer, Markus (2006) Advisor: Youn, Byeng D
Course work only

Godin, Lindsay (2005) Advisor: Donahue, Seth W
A Mechanotransduction Pathway in Bone - The Role of Calcium-Calcmodulin Dependent Protein Kinase 2(CaMKII) and Calcineurin in Bone Adaptation

Guan, Yun (2006) Advisor: Pandit, Sudhakar M
Course work only

Gugale, Shaileshkumar (2005) Advisor: Friedrich, Craig R
A Monolithic Actuated Cochlear Prosthesis Insertion Tool

Johnson, David A (2005) Advisor: Blough, Jason R
In-Situ Estimation of Powertrain Dynamic Properties

Joshi, Shantanu (2005) Advisor: Jayaraman, Gopal
Control Over Projection Using Head Tracking for a Desktop Virtual Reality System

Keske, Justin D (2005) Advisor: Blough, Jason R
Characterization of Human Vibration Exposure from the Operator Interfaces of Snowmobiles and All Terrain Vehicles

Korpela, Kurt H (2005) Advisor: Passerello, Chris E
Course work only

Lee, Phie Theng (2005) Advisor: Van Karsen, Charles D
Field Data Acquisition Apparatus Setup and Testing for Household Clothes Washers and Clothes Dryers

Lemon, Robert D (2006) Advisor: Jayaraman, Gopal
Testing and Computational Modeling of Steering Wheels for Maxillofacial Impact Loads During Crash Event

Marszalek, Melissa A (2006) Advisor: Subhash, Ghatu
Scratch Resistance of Machined Silicon Nitride

McHenry, Jeffrey A (2005) Advisor: Haut-Donahue, Tammy L
Nitric Oxide Production by Menical Explants Following Dynamic Compression

Miller, Lianne K (2006) Advisor: Goldman, Jeremy
The Effects of Bioactive Glasses and Essential Trace Elements on Angiogenesis During Skin Regeneration

Rosso, Paul (2005) Advisors: Beard, John E and Blough Jason R
A Variable Displacement Engine with Independently Controllable Stroke Length and Compression Ratio

Sharma, Arun (2006) Advisor: Subhash, Ghatu
Course work only

Singh, Paramjot (2005) Advisor: Johnson, John H
An Experimental Study of Active Regeneration of an Advanced Catalyzed Particulate Filter by Diesel Fuel Injection Upstream of an Oxidation Catalyst

Sommerville, Jason D (2006) Advisor: King, Lyon B
Emission Cross Sections for Neutral Xenon Impacted by Xe + and Xe 2+

Steele, Mike E (2005) Advisor: Haut-Donahue, Tammy L
Design and Development of a Self-Assisted, Semi-Supportive, Dynamic Walker for Gait-Training and Rehabilitation Purposes

Stocker, Robert J (2005) Advisor: Post, Scott L
Experimental Study of Direct Injection Fuel Sprays Under HCCI Conditions

Suckow, Albert K (2006) Advisor: Evensen, Harold A
Unstructured Surface Mesh Generation Through Point Cloud Interpolation

Tang, Jiping (2006) Advisor: Parker, Gordon G
Residual Vibration Reduction for Nonminimum Phase Systems Using an Input Shaping Approach

Thomas, Sudip (2005) Advisor: Friedrich, Craig R
Focused Ion Beam System Characterization for Rates of Material Removal in Silicon

Vaze, Ajit (2005) Advisor: D'Souza, Roshan
Octree Decomposition - Recomposition Based Rapid Manufacturing Process

Vengala, Prasanth R (2005) Advisor: Blough, Jason R
A Study of Active Noise and Vibration Control Using Filtered Reference Gradient Adaptive Lattice Algorithm

Walczak, Karl A (2005) Advisor: Gupta, Mahesh
The Analysis of Elongational Viscosity of LDPEs and Polystyrenes Using Entrance Loss Data

Walqui Pantigoso, Lennart J (2005) Advisor: Endres, William J
The Effects of Chip-Splitting Grooves in Metal Cutting Circular Saws

Wilbur, Don M (2005) Advisor: Shapton, William R
Automatic Transmission, Static Engagement Design Improvement Using a Systems Engineering Design Approach

Zhang, Hongwen (2006) Advisor: Subhash, Ghatu
Course work only

Zhou, Liang (2005) Advisor: Arici, Oner
Calculate Cooling Load of a Vehicle by Radiant Time Series Method

BS Graduates

FY 2005-2006

Summer 2005

Anderson, Kelly - Cum Laude
 Andrzejewski, Jason
 Carlson, Trevor
 Gidcumb, Daniel
 Gonsowski, Mark
 Herz, Eric
 Martyka, James
 McNett, William
 McQueen, Matthew
 Schoenefeld, Maria
 Shah, Amit
 Strel, Christopher
 Warmack, Adam

Fall 2005

Anderson, Robb A
 Aschinger, Michael J
 Atherton, Brandi M
 Auge, Jessica L - Magna Cum Laude
 Blecke, Jill C - Magna Cum Laude
 Bonn, Kenlyn S
 Ceane, Scott M
 Ceterski, Kenneth N
 Dainoviec, Jarod N
 Davis, Gregory A
 Dionne, Matt R
 Dohner, Jeffrey M
 Duarte, Joseph A
 Dubiel, Matthew J - Cum Laude
 Dye, Nicholas J
 Eilers, Eric J
 Embrey, Justin C
 Esser, Scott M - Magna Cum Laude
 Fecteau, Blake J - Magna Cum Laude
 Feldman, Michael J
 Fox, Ryan E
 Hanna, David J
 Hart, Brooke A
 Hock, Christopher H
 Holbrook, Matthew T - Summa Cum Laude
 Huggard, Jacob D
 Ives, Andrew T
 Jarek, Richard L
 Jeske, Susan A
 Jones, Andrew P - Cum Laude
 Keller, Lucas A
 Kneeland, Philip D - Magna Cum Laude
 Kostner, Timothy R
 Kowalke, Erik D
 Kozubal, Theodore T
 Lang, Craig T
 Lass, Amber B - Summa Cum Laude
 Lassers, Alexander B
 Lee, Kevin M - Summa Cum Laude

Lepley, Brian K
 Losiewicz, Eric P - Cum Laude
 MacDonald, Brad M
 Messenger, Aaron S
 Niemela, Carrie S - Cum Laude
 Otis, Amanda M
 Pasternak, Paul R
 Paulson, Reed J
 Peplinski, Andrew J - Cum Laude
 Reek, Aaron M
 Riffe, Jessica A
 Ruprecht, Brett R
 Scallon, Sean T - Cum Laude
 Schoo, Dusty J - Cum Laude
 Schut, Jeffrey D - Cum Laude
 Seiter, Daniel J
 Sesselmann, Kristen R
 Shaner, Benjamin J - Summa Cum Laude
 Starks, Brent P
 Stock, Jacob L - Magna Cum Laude
 Summers, Robert C
 Swanborg, Richard T
 Tait, Jed B
 Tan, Alan W
 Valchine, Eric A
 Vollenweider, Hans E - Magna Cum Laude
 Warner, James P
 Weingartz, Christopher J
 Wheeler, Kenneth W
 Wolk, Kimberly A - Cum Laude
 Zimmerman, Christopher J

Spring 2006

Abraham, Adam C
 Adkison, Daniel T
 Anderson, Christian T - Cum Laude
 Anderson, Greg A
 Anderson, Nathan C - Summa Cum Laude
 Anton, Steven R - Summa Cum Laude
 Arens, Gregory D - Summa Cum Laude
 Armstead, John R
 Aspatore, Benjamin P
 Awannegbe, Edohamen P
 Bailey, Justin R
 Balduc, Troy W
 Barkley, Matthew D
 Beckman, Justin L - Magna Cum Laude
 Bellenbaum, Richard A
 Bendick, Kathleen M - Cum Laude
 Blair, Stephen R
 Bradley, Sarah M
 Bryson, Peter A
 Burwell, Alan C
 Cafmeyer, Sean M
 Capello, Kyle J

Carl, Brian A
 Cieslinski, Andrew J
 Coolich, Casey K
 Dame, David M - Magna Cum Laude
 Debo, Matthew - Cum Laude
 Dehlin, William J - Magna Cum Laude
 Denis, Andrew M
 Derbas, Joal V
 Djiovanis, Peter G
 Dowker, Thaddeus P
 DuBay, Justin P
 Eaton, Grace C
 Edwards, Mark J
 Ehiemere, Uzoma
 Eziyi, Ifegwu L
 Feenstra, Joel R - Magna Cum Laude
 Fierst, Joseph J
 Flynn, Timothy D
 Fors, Kelsey L - Cum Laude
 Francis, Ray A
 Friedberg, Bryan R
 Fritz, David L
 Fultz, Derek W - Cum Laude
 Gagner, Matthew T
 Gerdes, James M
 Gibbs, Timothy L
 Gilmer, Matthew C - Cum Laude
 Granstrom, Jonathan M - Magna Cum Laude
 Graziano, Michael T - Magna Cum Laude
 Grochmal, Joseph R
 Haefner, Benjamin A
 Haiderer, Jeffrey R
 Hanes, David C - Magna Cum Laude
 Hanks, Matt A - Cum Laude
 Harwood, Christopher D
 Hauch, Karen N - Magna Cum Laude
 Heinzman, Gordon A
 Hernandez, Joseph E
 Heubel, Eric V - Summa Cum Laude
 Holmes, Matthew A
 Huesman, Wade M - Cum Laude
 Hughbanks, Zachary J
 Janssens, Steven H
 Jarema, Carl H
 Jordan, Kari L
 Joseph, Elmo
 Kangas, Greg A
 Kayapinar, Vedat
 Kim, Randall Y
 Koning, Laura A
 Koski, Paul W - Cum Laude
 Kreh, Kristopher A
 Lahti, Michael K
 Lautner, Andrew K

Lehmann, Erik W - Cum Laude
Lepinski, Joshua J - Cum Laude
Little, Adrian M
Lockwood, Christopher J
Loveland, Dustin P
MacNeill, Chelsey A - Cum Laude
Maloney, Christine A
Mann, Craig A
Marks, Amanda K - Summa Cum Laude
Marti, Travis M
Martin, Nicholas T
McCubbin, Nicholas E - Cum Laude
McTiver, Stuart M - Magna Cum Laude
Mendolla, Aaron C - Cum Laude
Molnar, John D
Moore, Adam C
Morrison, Chad H - Cum Laude
Moscherosch, Ben W - Summa Cum Laude
Nakhleh, Christina M
Nerone, John M
Ng, Kean S
Noe, Robert F
Olearnick, Joshua D
Osborn, Matthew J
Peaslee, Mark R
Pepin, Erik M
Pettengill, Jason P
Pipkorn, Casey J
Plummer, Bradley R - Magna Cum Laude
Pohlman, Benjamin N - Magna Cum Laude
Pruhs, William N
Prusak, Matthew J - Magna Cum Laude
Reevs, Timothy C - Magna Cum Laude
Rickli, Jeremy L - Summa Cum Laude
Robinson, Rosalyn H
Ronning, Kiel E - Summa Cum Laude
Rosinski, Ryan D - Cum Laude
Rothe, Jillian J
Rush, Bradley R
Schettler, Stephen J
Shokinji, Yuta
Sikkema, Brian J
Sliger, Stevan A - Cum Laude
Stacy, Russell E
Steele, Craig A
Storbeck, Andrew E
Stringham, Lisa B
Stump, Mitchell K
Szejkowski, Brian P
Terwilliger, Fred R
Thiel, Allison C
Tselios, Zachary W
Ulstad, Melissa A
VanAsten, Nicholas A
VanKarsen, Jeffrey C
Venema, Nicholas L
Weber, Jennifer L
Wellnitz, Casey C
Willett, Kelly L - Summa Cum Laude
Zambon, Nathan D

Order of the Engineer

All graduating seniors from the ME-EM Department are invited to join the Order of the Engineer with a public induction where they accept the responsibilities and duties outlined in the formal statement, Obligation of the Engineer. These Michigan Tech graduates, along with engineers nationwide, acknowledge the primary purpose of engineering as being a service to the public.

Fall 2005

Daniel Kapp, ME-EM Alumnus, Chief Engineer, Power Train Operations, Ford Motor Company
Keynote address

Jason R. Blough, Michigan Tech
Inductee

Jaime A. Camelio, Michigan Tech
Inductee

Byeng D. Youn, Michigan Tech
Inductee

Spring 2006

Dr. Terry Woychowski, ME-EM Alumnus, Executive Director & Vehicle Chief Engineer, General Motors
Keynote address and Inductee

Afaneh Abdul-Hafiz
Inductee

Kevin Schleuter
Inductee

Fall 2006

Mr. Richard Vandevusse, ME-EM Alumnus, President and Owner VanAire, Inc., Gladstone MI
Keynote address and Inductee

Qinagli Dai, Michigan Tech
Inductee

Abhijit Mukherjee, Michigan Tech
Inductee

Mohan Rao, Michigan Tech
Inductee

Fellowships

2005-2006

Cummins Fellowship

Paramjot Sing
Abishek Thalagavara

DaimlerChrysler Fellowship

Francis Poradek
Erin Burns

Dow Automotive Fellowship

Anand Shende

Fulbright Fellowship

Jorge Kurita Nagasawa

Henes Fellowship

Vishesh Kumar

IGERT Trainee

Karl Haapala
Julio Rivera
Margot Hutchins

John Deere Fellowship

Rayomand Dabhoiwala

Winnekow Fellowship

Ka Heng Liew

JournalArticles

2005-2006

Wee, S. K., Kihm, K. J., Pratt, D. M., and **Allen, J. S.**, 2006, "Heat and Mass Transport of Evaporating Thin Film of Binary Mixture", *Journal of Thermophysics and Heat Transfer*, Vol. 20 (2), pp. 320-326.

Altan, B. S., Purcek, G., and **Miskioglu, I.**, 2005, "An Upper Bound Analysis for Equal-Channel Angular Extrusion," *Journal of Material Processing Technology*, Vol 168, No. 1, pp. 137-146.

Purcek, G., **Altan, B. S.**, **Miskioglu, I.**, Patil, A., 2005, "Mechanical properties of severely deformed ZA-27 alloy using equal-channel angular extrusion," *Materials Science and Technology*, Vol. 21, No. 9, pp. 1044-1048.

Miers, S.A., Anderson, C. L., Blough, J. R., Inal, M.K., 2005, "Impingement Identification in a High Speed Diesel Engine using Piston Surface Temperature Measurements", *SAE Transactions 2005-01-1909*, Vol. 114-5, pp. 845-851.

Kowalski, D., Anderson, C. L., Blough, J. R., 2005, "Cavitation Detection in Automotive Torque Converters Using Nearfield Acoustical Measurements", *SAE Transactions 2005-01-2516*, Vol. 114-6, pp. 2796-2804.

Dai, Q., Sadd, M.H., Parameswaran, V. and Shukla, A., 2005, "Prediction of Damage Behaviors in Asphalt Materials using a Finite Element Micromechanical Model and Image Analysis," *Journal of Engineering Mechanics, ASCE*, Vol. 131(7), pp.668-677.

D'Souza R., 2006, "Tool Sequence Selection for 2.5D Pockets with Uneven Stock", *Journal of Computing and Information Science in Engineering*, Vol. 6 (1), pp. 33-39.

D'Souza R., 2006, "Selecting an Optimal Tool Sequence for 2.5D Pocket Machining While Considering Tool Holder Collisions", *Journal of Intelligent Manufacture*, Vol. 17, pp. 363-372.

D'Souza R., "On Setup Level Tool Sequence Selection for 2.5D Pocket Machining", 2006, *Robotics and Computer Integrated Manufacturing*, Vol. 22, pp. 256-266

Friedrich, C. R., Avula, R., Gugale, S., 2005, "A Fluid Microconnector Seal for Packaging Applications," *Journal of Micromechanics and Microengineering*, Vol. 15, pp.1115-1124.

Friedrich, C. R., Avula, R., Gugale, S., 2005, "A Fluid Microconnector Seal for Packaging Applications," *Journal of Micromechanics and Microengineering*, Vol. 15, pp.1115-1124.

Pavnaskar, S. J. and Gershenson, J. K., 2005, "Application of Value Stream Mapping to Lean Engineering." *International Journal of Advanced Manufacturing Systems*, Volume 8, No. 1, pp. 44-52.

Gupta, M. and *Sun, Y.*, 2005, "Optimization of a Flat Die Including Elongational Viscosity Effects", *International Polymer Processing Journal*, Vol. 20, pp. 380 – 387.

Eifler, R. L., Dehlin, J. M., Blough, E. R., Haut Donahue, T. L., 2006, "Glycosaminoglycan Production in Rabbit Meniscal Cells Due to Fluid Flow", *Journal of Orthopaedic Research*. Vol. 24, pp. 375-384.

Zielinska, B., Haut Donahue, T. L., 2006, "3D Finite Element Model of Medial Meniscus Meniscectomy - Changes in the Contact Behavior", *Journal of Biomechanical Engineering*. Vol. 128(1), pp. 115-23.

Haut Donahue, T. L., Hull, M. L., Howell, S. M., 2006, "A New Algorithm for Selecting Meniscal Allografts that Best Match the Size and Shape of the Damaged Meniscus", *Vol. 24(7)*, pp. 1535-1543.

Maes, J. A., Haut Donahue, T. L., 2005, "Time Dependent Properties of Bovine Meniscal Attachments: Stress Relaxation and Creep". *Journal of Biomechanics*, Vol. 36(16), pp. 3055-3061.

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

Gupta, T., Haut Donahue, T. L., 2005, "Role of Matrix Material Properties, Cell Location and Morphology on the Mechanical Environment Within Meniscal Tissue and Around the Cell", *Acta Biomaterialia*, Vol. 2(5), pp. 483-492.

Thalagavara, A. M., Shende, A. S., Johnson, J. H., Bagley, S. T. and Yang, S. L., 2005, "The Effects of Two Catalyzed Particulate Filters on Exhaust Emissions from a Heavy Duty Diesel Engine: Filtration and Particulate Matter Oxidation Characteristics Studied Experimentally and Using a 1-D 2- Layer Model", *SAE 2005 Transactions Journal of Fuels and Lubricants*, Vol. 114-4, pp. 363 - 383.

Singh, N., Johnson, J. H., Parker, G. G., and Yang, S. L., 2005, "Vehicle Engine Aftertreatment System Simulation (VEASS) Model: Application to a Controls Design Strategy for Active Regeneration of a Catalyzed Particulate Filter," *SAE 2005 Transactions Journal of Fuels and Lubricants*, Vol. 114-4, pp. 476 – 502.

Loukus, A. R., Subhash, G., and Valberg, H., 2006, "The influence of pre-forming on hydroforming of extruded aluminum tubes", *International Journal of Forming Processes*, Vol.9/1, pp. 97-119.

Maiti, S. and Geubelle, P. H., 2006, "Cohesive modeling of fatigue crack retardation in polymers: Crack closure effect". *Engineering Fracture Mechanics*, 73(1):22-41.

Adler, D.P., Hui, W. W.-S., Michalek, D. J., Sutherland, J. W., 2006, "Examining the Role of Cutting Fluids in Machining and Efforts to Address Environmental/Health Concerns," *Machining Science and Technology*, 10(1), 23-58.

Miller, M. H., Perrault, J. A., Parker, G. G., Bettig B. P., and Bifano, T. G., 2006, "Simple models for piston type micromirror behavior," *J. Micromechanics and Microengineering*, Vol. 16, No. 2, pp. 303-313.

Wright-Charlesworth, D. D., *Peers, W. J., Miskioglu, I.*, and Loo, L.L., 2005, "Nanomechanical Properties of Self-Reinforced Composite Poly(Methyl Methacrylate) as a Function of Processing Temperature." *Journal of Biomedical Materials Research Part A*, Vol. 74A, No. 3, pp. 306-314.

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