

ME@MSU

DEPARTMENT OF MECHANICAL ENGINEERING

Using Mechanical Engineering Skills in Non-Traditional Roles

Mechanical engineering encompasses the generation and application of heat and mechanical power and the design, production, and use of machines and tools. As one of the oldest and broadest engineering disciplines, this has been a concise explanation of the field for many years. However, today the field of mechanical engineering is diversifying and researchers are utilizing their basic mechanical engineering skills in non-traditional areas to produce unique research results. The Department of Mechanical Engineering in MSU's College of Engineering is no exception to this trend as numerous members of the faculty and staff undertake innovative research work. Here are three examples.

Biomechanical Research Applies Basic Engineering Principles to the Human Body

Tamara Reid Bush, assistant professor and director of MSU's Biomechanical Design Research Laboratory (BDRL), focuses her research on the measurement of kinematics and kinetics to objectify interactions. "In the past, much of my research has centered on seating products,"

says Bush. "However, I have expanded my scope and am collaborating with the MSU College of Osteopathic Medicine and the College of Human Medicine, as well as the College of Nursing and the School of Packaging." Her biomechanical research covers a wide array of topics, including medical devices, musculoskeletal dysfunction, hand function, and sports biomechanics.

Bush was considering going to medical school as she was completing her bachelor's degree in mechanical engineering. "At the time, ME was predominately automotive based. I do like working with cars; but, for me, the future of being an automotive-related mechanical engineer didn't seem very exciting." At the suggestion of a colleague she took a serious look at biomechanics research and worked with a biomedical engineer and a physician who were studying movement patterns of children with cerebral palsy. "I was using all the engineering principles that I had learned but applying them to the human body. Biomechanics research merges the challenges of engineering with the challenges and diversity of the human body. I found it fascinating." So

she earned a master's and doctorate at MSU in biomechanics.

Bush's enthusiasm for the field is evident the minute she starts talking about the research currently underway. One project with the MSU College of Osteopathic Medicine (COM) involves head and neck research. Using a motion capture system with passive markers, Bush and her

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Tamara Reid Bush (left) and April Osterle, an ME junior who is working in Bush's lab, show off equipment used for biomechanical research.

New Chair of the Department

Professor Alejandro Diaz has been appointed chairperson of the Department of Mechanical Engineering. Diaz, who has a BS, MS, and PhD in aerospace engineering from the University of Michigan, joined the ME faculty at MSU in 1986.

His research interests include optimal design of structures and materials, topology optimization, and the use of finite element methods in design. His most recent

work involves the design and optimization of electromagnetic metamaterials with RF applications, vibration control and energy harvesting in flexible space structures, and the realization and applications of negative stiffness in electro-mechanical and structural systems.

Diaz is a fellow of the American Society of Mechanical Engineers and vice president of the International Society for Structural and Multidisciplinary Optimization. 🌟





from the Chair

ALEJANDRO DIAZ

I ended my column last time with the words “The outlook is bright and I look forward to sharing this excitement with our new chair next year.” I did not imagine then that I would again be the one to write to you as the chair of the department. But as Niels Bohr once said, “Prediction is very difficult, especially if it’s about the future.” And at the end of May, I was appointed chair with the support of the faculty and our dean. I am honored by this expression of confidence from my colleagues and look forward to continuing to work with them and with our alumni, supporters, and friends to meet the education and research challenges in the department’s future.

The economic downturn has presented the department with significant challenges but we have steered clear from harm. The faculty size is now slightly smaller but with higher productivity, our research output increased significantly over the past year, to \$8.3 million in 2009-10. This growth in funding supports vibrant and diverse research, spanning a wide range of topics, some of which are featured elsewhere in this newsletter. Increased funding also supports a healthy and growing graduate program. This fall we will welcome an outstanding new crop of graduate students to join our rapidly growing research efforts.

It is always a pleasure to share good news from the department. Several members of our ME faculty received well-deserved awards. Brian Feeny became a fellow of ASME. Tonghun Lee received the SAE Ralph R. Teetor Award, Eann Patterson received the 2010 M. M. Frocht Award of the Society of Experimental Mechanics, and Indrek Wichman received the 2010 Withrow Teaching Award. Several students received important recognitions. And our SAE Baja Team placed 8th out of 89 registered entries in the Wet World Challenge national competition in June.

To strengthen its interdisciplinary focus the department is seeking to establish new relationships. Two adjunct faculty joined the department during the past year. Adjunct professor John Wisend II joined us from MSU’s Facility for Rare Isotope Beams (FRIB), the university’s new National User Facility for nuclear science. Dr. Wisend is a mechanical engineer by training and a world expert in cryogenics. He will be instrumental in strengthening ties between our department and NSCL, the National Superconducting Cyclotron Laboratory at MSU. Next spring Dr. Wisend will be teaching a special topics course in cryogenics to seniors and graduate students. Adjunct professor Jim Mason joined us from Van Andel Research Institute in Grand Rapids. Dr. Mason has a PhD from the California Institute of Technology. Before joining the Van Andel Institute, he was a professor of mechanical engineering at the University of Notre Dame. Dr. Mason does research in bioengineering and orthopedic biomaterials and will be collaborating on research projects in biomedical sciences with other faculty in our college.

While it may be difficult to predict the future, it is possible to shape it. I look forward to working with colleagues, alumni, and friends to shape the future of a department that is rich in spirit and in resources, which we can use to inspire our students to discover, to innovate, and to serve. I invite all to participate in this process and to share with me your suggestions and comments. 🌱

Non-Traditional Roles

(continued from page 1)

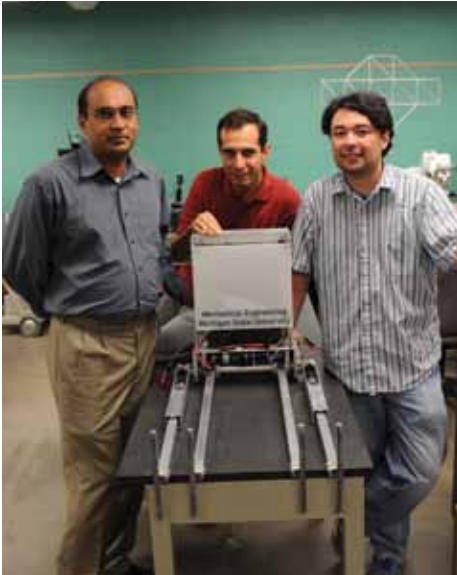
research team collect motion data from the head and the thorax during clinical assessments. “It’s a dynamics problem where we must develop a three-dimensional coordinate system for the head and one for the thorax; then we study movement of these two relevant to one another,” says Bush. Neck pain is elusive and is typically assessed by clinical palpation. “During palpation, a physician feels for cues, such as tension, stiffness, bone-on-bone contact, or asymmetry from the left to the right side to determine the origin of the dysfunction. Based on that assessment the physician can make a diagnosis and prescribe a treatment.”

Because there are currently no methods to quantify the palpation process, Bush completed a project where physicians and subjects — some with neck pain and some without — were brought to the lab. Motion patterns during the clinical assessment were collected. “We captured the movement patterns during the diagnostic process and documented differences between those with and without pain. We are now using biomechanics to begin to understand this clinical process,” says Bush, who sees the applications in the future for using these methods to teach new medical students the techniques needed for diagnosis. She and Joe Vorro (COM) recently received a grant from the American Osteopathic Association for this work.

While biomechanical research uses many traditional mechanical engineering skills, the ability to communicate and collaborate are equally important. “Physicians communicate in a different style with different terminology than engineers,” says Bush. “They use a different thought process, and they come at problems and solutions from a different avenue. Having these discussions could be frustrating if you don’t realize these differences. I have an interest in medicine, so I really enjoy the collaboration and the research.”

New Research Focuses on Biped Robotics

ME professor **Ranjan Mukherjee** became involved in research on bipedal locomotion and walking machines several years ago. Such systems are typically under-actuated; i.e., they have passive degrees of freedom and are subjected to impulsive forces and thereby pose many challenging control problems. “Currently we are developing a new biped robot and new approaches for improving biped stability and capability,” says Mukherjee. The robots are being built from the ground up, incorporating classical mechanical engineering skills, including



ME professor Ranjan Mukherjee (left) works with PhD students Rouhollah Jafari and Louis Flynn on robotics research.

mechanical design and fabrication, dynamic systems analysis, and control design. The projects also incorporate skills from electrical engineering with some electrical hardware design and programming.

"Human and animal biomechanics has a large knowledge base that can be useful for control and design of bipeds and walking machines," says Mukherjee, who earned his MS and PhD degrees in mechanical engineering from the University of California, Santa Barbara, and came to MSU in 1996. "Robotics has seen a lot of growth as the actuators, sensors, and computing and networking resources required for such systems are becoming better suited to more complicated designs."

Mukherjee's research efforts have generated more than 50 archival journal articles, 75 conference papers, and 6 patents. His research activities have been sponsored by numerous organizations, including the Air Force Office of Scientific Research (AFOSR), Army Research Office (ARO), National Science Foundation (NSF), the National Institutes of Health (NIH), Office of Naval Research (ONR), NASA, and the National Institute of Standards and Technology (NIST).

Even though much progress has been made with robotics, Mukherjee says, "There is still a lot of work to be done to create useful robots with which we can interact on a daily basis."

Biomimetics Looks to Nature for Design Ideas

Biomimetics is the relatively young science of adapting designs found in nature to engineering and technology, and **Srinivasan Arjun Tekalur**, an ME assistant professor who works at MSU's Composite Vehicle Research Center (CVRC), is using biomimetics to expand his research.*

"Studying nature is not new," says Tekalur. "There has been research for a long time that tries to mimic nature. However, putting a mechanics perspective to it is novel." Tekalur was recruited to the ME department and the CVRC from the California Institute of Technology. The position combines his passion for nature and his expertise in impact mechanics. One of the first projects undertaken by Tekalur was the study of the ramming activities of certain species. "There are several species that fight by ramming against each other, and we identified seven species that ram with high velocity. They actually run quite a distance and slam against each other," says Tekalur, who compares this to American football players who run into each other during a game. "The difference is that many times the football players suffer concussions, but the animals don't. Why is that?"

Tekalur and his research group relied on biological studies to learn how and why ramming occurs and on high-speed motion analysis to predict the velocity of the ramming and the impact forces. With the help of Barbara Lundrigan, associate professor of zoology and curator of mammalogy and ornithology at the Michigan State University Museum, they



Srinivasan Arjun Tekalur has studied the ramming activities of various species as part of his biomimetics research.

acquired horns from bighorn sheep. Then the horns were taken to the MSU radiology department for a CT scan. "Other researchers who have done this have looked at the cross section, but they simplified everything into layers of solid materials," says Tekalur. "They did not pay attention to the fine microstructure." Using computer modeling, everything about the horns was captured, including shape, geometry, microstructures, and the skull itself.

The computer simulations show that the sinus is directly connected to the horns, and Tekalur believe this aids in the transmission of the impact. "It acts like a spring that takes the impact down to the neck and does not affect the brain at all. Instead of suffering a concussion, the sheep goes on with its life."

Now Tekalur wants to figure out how that information could be of benefit for projects such as the ones sponsored by the military currently underway at the CVRC. "We believe we can offer good input on the design of helmets used by the military," says Tekalur. While the current helmets are excellent in terms of ballistic resistance, if the soldier wearing a helmet falls on the ground, for example, the impact transfers to the brain. "How can we improve the helmet against this kind of blunt impact? That is what we are working on right now."

Tekalur is also looking at seashells and cow femurs as other aspects from nature that may be useful. "All of these projects look like the most basic research, and it is because many aspects of nature have not been well understood by human beings, partly because we may be looking in a different direction than what nature has intended it to be. It is very tough for an engineer to understand all the aspects of how nature's design is done. So we are seeking the help of biologists here at MSU and other research centers to understand how these things work."

* This article on biomimetics first appeared in a CVRC research brochure published in August 2010. For a copy of the brochure contact the CVRC Director, Eann Patterson, at eann@egr.msu.edu. 🌱

– Jane L. DePriest

Alumni @ ME

SAE International Medal of Honor



Joseph M. Colucci (BS, '58), president of AutomotiveFuels Consulting, Inc., is the recipient of the 2010 SAE International Medal of Honor. The medal was presented during the

SAE 2010 World Congress this spring in Detroit. The Medal of Honor, established in 1986, is presented annually and is SAE International's most prestigious award. The award recognizes an SAE International member for his or her unique and significant contributions to SAE International and is funded through the SAE Foundation.

As a member of SAE International for nearly 50 years, Colucci has consistently strived to make SAE International a better organization for both its members and constituencies. Toward that goal, he has improved SAE International technical meeting paper quality, session organization, and environmental quality; strongly endorsed and encouraged participation in technical sessions and committee activities; and increased the funding for the SAE Foundation and originated objective measures for determining the success of its A World In Motion® programs.

Colucci is an SAE fellow and also is a past recipient of SAE International's Forest McFarland Award (1986) and the Edward N. Cole Award for Automotive Engineering (2001). He is a member of the National Academy of Engineering. After earning his bachelor's degree in mechanical engineering from MSU, he received a master's degree in mechanical engineering from the California Institute of Technology. He worked at the General Motors Research Laboratories and Research and Development Center for 36 years.

Alumnus Pursing PhD in Law



Matiss Davis Kukainis (BS '00) has begun studies for his PhD in law (expected 2012) at the University of Latvia, focusing on European Union Competition Law. He is a graduate of the

MSU College of Law (2004), a member of the Illinois Bar (2004), and a member of the Republic of Latvia Bar (2007). Kukainis received a master of laws in International and European Union Law from the Riga Graduate School of Law in Riga, Latvia (2007). He is a founding member of the law firm Spigulis & Kukainis, and is working as a lawyer in Riga, Latvia.

Obituaries

Harold Paul Hilbert (BS '68) of Mason, Mich., died May 8, 2010. A Pearl Harbor survivor, Hilbert was born in Long Beach, Calif., in 1935. Over the years, he lived in Honolulu, Hawaii; Lewiston, Idaho; the Bay Area in California; the Lansing area; and, for the last 33 years, Mason, Mich.

During his student years at MSU, Henry Blosser, director of the then-new cyclotron laboratory, hired Hilbert, who worked his way up from student worker to senior project engineer in charge of building and maintaining the cyclotrons and research equipment. Hilbert retired in 2000, moving on to work for his son, Sean, at Cobra Motorcycles.

The family requests that donations be made to the MSU College of Engineering's scholarship fund in Hilbert's name.

Wilfred G. "Bill" Shedd (BS '50), passed away March 29, 2010, at Parkview Hospital, Fort Wayne, at the age of 81. Born in Rockford, Ill., he had served in the Air Force during the Korean War and was the owner of Metallurgical Processing Inc., until retiring in 1999. He was a member of the MSU Alumni Association; Sigma Alpha Epsilon; Tau Beta Pi engineering honorary society; and the Winged Spartans, where he earned his pilot's license.

Joon S. Moon Distinguished International Alumni Award



Surinder Kumar Choudhari was not able to attend the awards ceremony. Picking up the Joon S. Moon Distinguished International Alumni Award for him are two of his American friends, Beverly Teeters (left), whom he considered his adoptive mother while in the United States, and Ron Sanders, a college roommate. Scott Westerman III (right), MSU's associate vice president for alumni relations and executive director of the MSU Alumni Association, presented the award to them.

Surinder Kumar Choudhari (BS '64) was selected as the recipient of the Joon S. Moon Distinguished International Alumni Award presented by International Studies and Programs at Michigan State University. The award, named for an eminent Korean-American businessman who started his academic career at MSU, recognizes international alumni who have brought special credit to MSU through professional achievements and contributions to international understanding.

Over the past 40 years, Choudhari has left an indelible mark on India and the world due to his incredible business sense and his unwavering commitment to business ethics. Shortly after graduating—with honors—from Michigan State in 1964, Choudhari returned home to India and founded his own engineering business focused on developing and manufacturing components for the automotive and construction industries. He maintained an international focus, collaborating with a German company to pioneer suspension seating in India.

Today, Choudhari's company has expanded to nine manufacturing sites, providing jobs to more than 1,000 people and providing components to major manufacturing companies throughout India. His fellow industrialists have recognized his contributions by electing him chairman of the Confederation of Indian Industries for the state of Karnataka for two consecutive years. Choudhari is widely known for his honesty, integrity, and professionalism—values that he has instilled in his namesake Surin Group companies and, with his wife, Sunita, in his three sons, all of whom have become leaders in their own right in the business world.

Students @ ME

Zonta Award



Azadeh Sheidaei, a PhD student in mechanical engineering, received a coveted Zonta International Amelia Earhart Fellowship. The award is presented to women pursuing a PhD degree

who demonstrate a superior academic record in the field of aerospace-related sciences and aerospace-related engineering. Sheidaei's adviser is ME associate professor Xinran (Sharon) Xiao.

2010 Outstanding Graduate Student



Shahrokh Zeinali-Davarani is the department's 2010 Outstanding Graduate Student. "His work on vascular mechanics will have a significant impact on people, as it will lead

to methods that will help physicians in treating vascular diseases," says ME associate professor Brian Feeny, who nominated him for the award. "Shahrokh is always ready and willing to serve the department, for example in coordinating summer intern activities, and in membership and participation in the ME Graduate Studies Committee." Zeinali-Davarani has worked as a teaching assistant for the Mechanics of Deformable Solids laboratory. After completing his PhD, he plans to do a postdoc and then seek a faculty or research position.

NASA Fellowship

Sara Murawa, an ME master's degree student, was recently awarded a fellowship from the NASA Graduate Student Researchers Program (GSRP). The fellowship, which started this July, provides funding for Murawa to conduct research on the development of microphone technology for use in beamforming microphone arrays. These arrays are employed systematically at NASA to measure noise produced by airplanes during takeoff and landing, as well as in model testing in anechoic wind tunnels.

Murawa's research follows in the footsteps of Elliott Radcliffe (who just completed his master's

thesis work and also received GSRP funding). The overarching target of this research is to develop enabling technology to help NASA's aerodynamic research that targets the development of low-noise aviation transportation systems.

Engineering Excellence Service Award



ME senior **Trevor Deland** received a 2009-10 Engineering Excellence Service Award for distinguished service to the ME department, the college, and MSU. He was nominated by

Tamara Reid Bush, director of the Biomechanical Design Research Laboratory. Deland is the project manager of Baja SAE, serving as one of the primary machinists/mechanics and is responsible for promoting the team. Deland also serves as the vice president of Pi Tau Sigma ME honor society and is a member of Tau Beta Pi.

"In addition, Trevor maintains an excellent academic standing and works with me on research," says Bush. "We ran a study with the College of Nursing to evaluate the effects of a robotic device on symptom management for women undergoing chemotherapy for the treatment of breast cancer. As part of the device evaluation, Trevor traveled to Ingham Medical Facility during the week to test the device."

Trustees Award

Matthew Weir, an ME student from Midland, Mich., was one of 23 students honored this spring by the MSU Board of Trustees for academic achievements. These awards are granted at each commencement to graduating seniors having the highest cumulative grade point averages at the close of the semester prior to graduation. He had a 4.0 GPA. Weir is the son of Mary Bacon and Joe Weir.

SWE Award

Mechanical engineering junior **April Oesterle** received the 2010 Society of Women Engineers Alumni Award, which was presented by SWE vice president Sophie Carrel. The award was presented at an awards banquet hosted by SWE.

This summer Oesterle has a research



April Oesterle

position working with Tamara Reid Bush in the Biomedical Design Research Laboratory. She has been active in SWE, is on the e-board for ASME, and leads a group with Campus Crusade for Christ. She is from Mason, Mich., and is the daughter of Gordon and Kathy Oesterle.

Outstanding Diversity Programs Award



Brandon Gandy, a senior, received an Outstanding Diversity Program Award at an awards banquet this winter. Gandy's award was sponsored by the Eaton Corporation.

2010 Baja Team

This year, the MSU Baja SAE team had great success at the last event of the year, the Wet World Challenge held in Rochester, New York. With the help of sixth-place finishes in maneuverability and endurance, the team placed eighth out of 89 registered entries (74 teams finished the competition).

For the last race of the season, the vehicle was also required to navigate open water. The team achieved this by adding a flotation device to the bottom of the car and special fenders to the rear wheels to propel the car forward. The last event of every competition is a four-hour race that tests the endurance of the car and driver with the team completing the most laps winning the event.

MSU Baja SAE is a group of students who design, build, and race a small off-road vehicle. Each year, the team creates a new car and competes against schools from across the country and around the world in a series of three races hosted by the Society of Automotive Engineers.

The team is always looking for new members; the only requirement is to be a current MSU student. For more information, visit www.michigan-statebaja.com or look up the group on Facebook. 🌐

Teetor Education Award



Andrew Brown, Jr. (left), 2010 SAE president and executive director and chief technologist at Delphi Corporation, presents the Ralph R. Teetor Award to Tonghun Lee at the SAE 2010 World Congress.

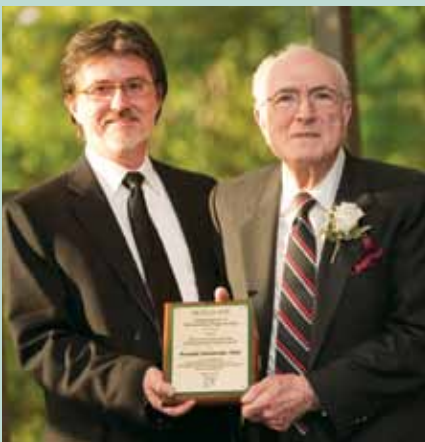
Tonghun Lee, assistant professor, has been selected as a 2010 SAE Ralph R. Teetor Educational Award recipient. One of seven awardees, Lee is cited for his “outstanding contributions” which have distinguished him as “one of the top engineering educators.”

Lee earned his PhD ('06) and MS ('02) in mechanical engineering from Stanford University and his BS ('00) in mechanical engineering from Yonsei University in South Korea. Prior to coming to MSU in 2006, he worked as a graduate research assistant in the High Temperature Gasdynamics Laboratory at Stanford University. His research interests include laser spectroscopic imaging of advanced propulsion and energy conversion systems.

The Teetor Award recognizes and honors today's younger educators who are faced with the task of preparing tomorrow's engineers at a time when greater expectations are placed upon colleges and universities to educate individuals to successfully meet the challenges that face society. The award consists of a framed certificate, a trip to a major SAE International meeting, and two years of SAE International membership. Lee received the award at the SAE 2010 World Congress, which was held this spring in Detroit.

The Teetor Program's objective is to provide an engineering atmosphere in which these young educators can meet and exchange views with practicing engineers. More than 800 engineering educators from over 200 universities and colleges have received the award since its inception in 1953. 🌻

2010 Distinguished Alumni Award



Pandeli “Lee” Durbetaki (right) receives the 2010 Distinguished Alumni Award from Alejandro Diaz.

or engineering-related field; provides leadership in engineering, engineering education, the related sciences, or technical management; contributes to the department, the college, or MSU; and is actively involved in the community.

Durbetaki is a professor emeritus in the George W. Woodruff School of Mechanical Engineering at the Georgia Institute of Technology. He has conducted research primarily in the fields of stratified charge operation of spark ignition engines, irreversible thermodynamics, and homogeneous and heterogeneous ignition of fuels. He has consulted on problems related to

Pandeli “Lee” Durbetaki (PhD '64) was honored with the 2010 Mechanical Engineering Distinguished Alumni Award at the annual College of Engineering Alumni Awards Banquet in May. Established in 2004, this award honors a graduate of MSU's Department of Mechanical Engineering who has a minimum of 15 years of professional experience in an engineering

the flammability of carpets, injury from tar explosion, fire hazard criteria for noise control products in underground coal mines, manufacture of roofing material, and design and testing of traction type transmission.

Durbetaki received his BSME from Robert College Engineering School, Istanbul, Turkey, in 1951; his MS in mechanical engineering from the University of Rochester in 1954; and his PhD in mechanical engineering from Michigan State University in 1964. He served on the faculty of both the University of Rochester (1954-1960) and MSU (1960-1964) before joining the faculty at Georgia Institute of Technology. In 1987, he was awarded the American Society of Engineering Education, Middle-Atlantic AT&T Foundation Award for Excellence in Instruction of Engineering Students, and the SAE Ralph R. Teetor Educational Award.

He served as a member of the visiting committee of the Department of Mechanical Engineering at Michigan State University from 2001-04 and is currently serving as a member of the visiting committee of the School of Engineering and Applied Sciences, University of Rochester. Durbetaki recently established an endowed graduate research fellowship in the ME department for the field of thermal sciences. The fellowship will be awarded to one or more graduate students who are starting or continuing study at the doctoral level.

Durbetaki and his wife, Elisabeth, live in Sandy Springs, Georgia. He enjoys gardening, fishing, and photography. 🌻

Faculty and Staff @ ME

Withrow Award



Professor **Indrek S. Wichman** was honored with a Withrow Teaching Excellence Award at the college's annual awards luncheon in March. He was recognized by students for his exceptional work in the classroom, characterized by "his thorough and refined teaching style, high expectations, and demanding exams." He has developed four courses and taught 16 courses while at MSU.

Students appreciate the care that he takes to explain difficult material, presenting it thoroughly and yet in a way that is easy to understand. As expressed by one of his students, Professor Wichman "taught the toughest material, but managed to make it seem doable." His courses are often identified as "challenging" and "demanding." One student writes: "The way the course was taught was different from any other course I had taken before. It was challenging and rewarding at the same time." Wichman is a second-time recipient of this award.

ASME Fellow



Associate professor **Brian Feeny** has been elected to the rank of fellow of the American Society of Mechanical Engineering (ASME). This professional organization confers the distinction of fellow on worthy candidates to recognize their outstanding engineering achievements.

He received his BS, MS, and PhD in mechanics from the University of Wisconsin – Madison ('84), the Virginia Polytechnic Institute and State University ('86), and Cornell University ('90), respectively, and then held a postdoctoral position at the Institute of Robotics ETH in Zurich, Switzerland. Feeny joined the MSU ME faculty in 1992.

Feeny is currently secretary of the Technical Committee on Vibration and Sound for the ASME, and serves as an associate editor for the *ASME Journal of Vibration and Acoustics*. His research interests are in dynamics and vibration with current activities in nonlinear dynamics, chaos, proper orthogonal decomposition, friction dynamics, and system identification.

Young Investigators Initiative Program



Tamara Reid Bush, assistant professor and director of the Biomechanical Design Research Laboratory, was recently selected to participate in the United States Bone and Joint Decade's (USBJD) Young Investigators Program. The program is designed to advance the understanding and treatment of musculoskeletal disorders through prevention, education, and research.

Young researchers who are interested in musculoskeletal dysfunction are paired with a senior investigator who has previously been funded by the National Institutes of Health. Bush was one of 20 researchers selected for the program this year. She submitted a proposal on head and neck research (see article at on page 1). She will work with the investigator at a three-day workshop in Toronto this fall on a grant for funding of this kind of research. Back home, Bush will be mentored by ME professor Steven Shaw and Lisa DeStefano, DO, chairperson, Department of Osteopathic Manipulative Medicine at MSU.

Department Promotions



Andre Benard, associate professor, has been appointed associate chairperson for the Graduate Program. Benard has served as adviser to the MSU Baja Team and his research focus is multiphase transport phenomena. He is the co-director of the Industry/University Cooperative Research Center on Multiphase Transport phenomenon (IUCRC.)



Neil Wright, associate professor, has been appointed associate chairperson for the Undergraduate Program. Wright has served on the ME Advisory Committee and his

research focus is biothermomechanics. He is the co-chair of the 2012 International Symposium on Thermophysical Properties.

2010 M. M. Frocht Award



Eann Patterson (right) receives the 2010 M. M. Frocht Award from **Wei-Chung Wang**, SEM President 2009-10, at the SEM annual convention held this summer.

Eann Patterson, director of the Composite Vehicle Research Center and a professor in the department, recently received the 2010 M. M. Frocht Award of the Society of Experimental Mechanics (SEM). The award, which honors the work of Max Mark Frocht, recognizes "outstanding achievement as an educator in the field of experimental mechanics," and is presented annually to the "Educator of the Year."

Patterson has worked in the field of experimental mechanics for 25 years and advised numerous PhD students with whom he has published more than 250 papers on subjects that include photoelasticity, thermoelasticity, digital image correlation, and their applications in fracture mechanics and the aerospace industry. He was editor of *Fatigue and Fracture of Engineering Materials and Structures* from 2001-06 and has been editor of the *Journal of Strain Analysis for Engineering Design* since 2006. He was elected a fellow of SEM in 2007.

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2010 Wet World Challenge



Trevor Deland drives the team's Baja vehicle during a suspension and traction event at the Wet World Challenge in Rochester, NY.



Members of the 2010 SAE Baja Team include (in front, holding trophy) Trevor DeLand and Andrew Cawood. Behind them from left to right are Colin Perrault, Michikazu Aono, Abby Podufaly, Jelena Paripovic, Andrew Trusty, Katie Worley, and Jenna Sandel. See story page 5.