Ribbon-cutting Ceremony Celebrates Naming of the Altra Industrial Motion Innovation Shop

On January 30, the Mechanical and Industrial Engineering (MIE) Department hosted the ribbon-cutting ceremony for its Altra Industrial Motion Innovation Shop, which provides space outfitted with the latest industry tools, instruments, and computers to support MIE projects undertaken by students and faculty, including all of their design, modeling, manufacturing, and testing activities. The groundbreaking shop was named in honor of Altra Industrial Motion, whose President and CEO is Carl Christenson (‘82 B.S., ’84 M.S., Mechanical Engineering), for its lead gift to support the fundraising effort to modernize the space. The campaign provides students and faculty with state-of-the-art equipment, including new 3D printers, a water jet cutter, and a 4-axis milling machine along with entirely new space for the Supermileage Vehicle, Makerspace for undergraduates, and a fully equipped MEMS laboratory for undergraduate instruction.

Mr. Christenson spoke at the ribbon cutting, along with MIE Department Head Don Fisher, MIE Professor Sundar Krishnamurty, and Associate Dean John Collura, followed by a tour of the advanced equipment led by Rick Winn, the professional technician in the Innovation Shop.

Message From Donald Fisher

I hope that your summer has been a good one. My wife and I spent several weeks in Ireland. I wish we could have stayed longer! It has been another extraordinary year for the Department. Through a generous gift from Altra Industrial Motion we now have a machine shop that is the envy of everyone in the College. Our undergraduates, graduate students and faculty continue to garner prestigious awards. This is the third year in row that our faculty have received an National Science Foundation CAREER award. Our undergraduate enrollments continue to be the largest in the College (over 700). We have hired three new faculty in the areas of biomedical devices, materials and systems engineering. We are in the process of searching for another two new faculty this year. Sadly, our community saw the passing of a student and beloved faculty member. Opportunities for you to help us honor them in the coming year are described at the end of this newsletter. Please stop by the office if ever you have any questions, no matter how small they might be. I look forward to meeting all of our new first year students in just a matter of a few weeks!

The UMass MIE Altra Industrial Motion Innovation Shop was created in 2012 with the goal of updating the machine shop and creating a space for students to conceive, design and prototype the future. With generous help from Altra Industrial Motion and alumni donations, the old space was reenergized with new equipment and upgraded facilities. This new space gave room for the Mechatronics and Supermileage Vehicle courses to flourish, but the space was not done growing. It was still missing something and this past year a group of students worked to progress the space even further by giving their peers the parts and tools that they need to continue to invent in a safe and innovative fashion. This small group of students, comprised of sophomores and juniors, planned, proposed and implemented their dream of an MIE makerspace within the Innovation Shop and this fall semester the MIE student makerspace will be up and running.

The tools and supplies the space will provide for students are simple but necessary and fall outside the scope of the machine shop. The group of students behind the project have worked with the department to purchase and store equipment such as soldering irons, hot glue guns and tape measures. These are all simple items, but they can be very difficult for individual students to obtain and without these items on hand many prototyping projects are nearly impossible. Now that these items are available inspired students will find that the only thing standing in the way of completing their project is the project itself. Coming this fall common electrical components will also be available for purchase at a department subsidized rate, encouraging the mechanical and industrial engineering students to explore cross-disciplinary projects. As a high tech addition to the student space a Makerbot...
Replicator 2X 3D printer will give students the design freedom they have been asking for at a price range that they can afford. To improve the physical usability of the space, several large whiteboards have been purchased for empty wall space, old shelving has been redone and new project boxes are available for students to temporarily store their current projects. As all of these pieces come together the MIE makerspace inside of the Innovation Shop is shaping up to change the culture and focus of the MIE engineering students for the better. By giving the students space and tools the student group responsible for the progression of the space hopes to encourage interactions between students of all grades to foster an engaged community of engineers who design, build, and create together.

**SMV Team Repeats Fourth Place Finish While Getting 1,142 MPG**

The Supermileage Vehicle (SMV) Team from the UMass Amherst Mechanical and Industrial Engineering Department placed fourth and was among five teams to achieve 1,000 miles per gallon at the annual Society of Automotive Engineers Supermileage® Competition held on June 5 and 6 at Eaton’s Proving Grounds in Marshall, Michigan. The UMass SMV team’s vehicle achieved an eye-popping 1,142 miles per gallon, 132 mpg better than the team’s impressive fourth-place finish from last year. This is the 35th year of the competition, which placed fourth and was among five teams to achieve 1,000 miles per gallon at the annual Society of Automotive Engineers Supermileage® Competition held on June 5 and 6 at Eaton’s Proving Grounds in Marshall, Michigan. The UMass SMV team’s vehicle achieved an eye-popping 1,142 miles per gallon, 132 mpg better than the team’s impressive fourth-place finish from last year. This is the 35th year of the competition, which

**MIE Undergraduates Show off Fascinating Inventions**

On December 5, the MIE 415 Senior Capstone Design course held its fall-semester poster contest, and the winning team of students created an invention to improve the quality of life for children with Pediatric Multiple Synostosis Syndrome, a rare genetic disorder characterized by multiple bone fusions involving the face, limbs, and middle ear. The winning team, composed of MIE seniors Brian Cormier, Andrew Friedlieb, Catherine Paquin, and Kyle Morrell, and College of Nursing student Emily Gardner, created a working robotic arm for five-year-old Ryan Wade, an independent and charismatic boy with the disabling syndrome. Ryan is unable to use his arms and perform many activities of daily life without assistance. The team developed an extremely light, durable, flexible, and adaptable actuating arm which allows Ryan to adjust his glasses, wipe his mouth with a napkin, feed himself crackers, and potentially do other common activities without caregivers. The winning team was assisted by a portion of the recent $125,000 grant from the National Science Foundation to enable “Integrative Capstone Design Experiences for Engineering and Nursing Students,” awarded earlier this year to MIE Professors Frank Sup and Sundar Krishnamurty, who teach the MIE 415 course, and Professor Cynthia Jacelon of the UMass College of Nursing.

This May, the winning capstone team of William Douglass, Adam Glick, Michael Olson, and Gene Rush produced the “Delicatessen Glove Donning Machine,” which automates the action of food-service employees while pulling on those cumbersome, rubbery, hygienic gloves required by law. The prototype attained a system reliability of 92 percent, reduced donning time from eight to five seconds, and made the process more hygienic.

**Kaikai Wins Community Service Award**

Mechanical engineering major Moijue Kaikai has been selected for a UMass Amherst award by the Provost’s Committee on Service-Learning because of his array of community service activities during his undergraduate career at the university. “I am writing to congratulate you!” said John Reiff, the director of UMass Civic Engagement and Service-Learning. “You were nominated by [Mechanical and Industrial Engineering Professor] Erin Baker for an award, the Academic Engagement for Community Transformation Award, which recognizes your leadership, academic excellence, and contribution to a community.” Kaikai has been accepted for graduate school into the UMass IGERT Offshore Wind Energy Program in the MIE department.

**MIE Student Impresses Congressman Kennedy**

Justin Calderara, an undergraduate in the Mechanical and Industrial Engineering Department, figured prominently in a video about Representative Joseph P. Kennedy III, chairman of Gov. Deval L. Patrick’s STEM (science, technology, engineering, and mathematics) Advisory Council, when the congressman toured the recently completed University of Massachusetts Amherst Life Science Laboratory and Integrated Sciences Building. Calderara took part in lively student discussions with Congressman Kennedy concerning the university’s STEM Diversity Institute and its Integrated Concentration in Science (ICONS) program. After trading observations with Calderara and a tableful of other UMass undergrads, Congressman Kennedy called the group “tremendously impressive.” View the video at [http://www.umass.edu/newsoffice/article/congressman-joseph-p-kennedy-iii-tours](http://www.umass.edu/newsoffice/article/congressman-joseph-p-kennedy-iii-tours).

**Dr. Tomboulian Goes to Washington**

Dr. Briana Tomboulian, a NASA Graduate Research Fellow who earned her Ph.D. from the UMass Amherst Mechanical and Industrial Engineering Department in June, has been chosen by the American Society of Mechanical Engineers (ASME) to serve as the 2014-2015 ASME Congressional Fellow. The goal of ASME Congressional Fellows is to advise legislators on key science and technology issues that are often
beyond the grasp of non-scientists. According to ASME, for more than 40 years Congressional Fellows have filled this knowledge gap by serving as key advisors to federal policy makers on energy, infrastructure, education, national security, technology development, and other critical national and international issues, which require general technical proficiency and specific mechanical engineering expertise.

**Cranmer Chosen for Graduate Student Lloyd Fellowship**
Alexana Cranmer is the 2013-14 recipient of the Kenneth A. Lloyd Fellowship, awarded annually to an incoming doctoral student in the MIE department who shows exceptional potential for success in his or her field, with a preference given to female applicants. Alexana joins Rachel Koh as the second distinguished Lloyd Fellow. Mr. Lloyd of Duxbury, Massachusetts, graduated from the MIE department in 1973 and is currently the vice president and general manager of Electro Switch Corporation in Weymouth, Massachusetts.

**Gaertner Chosen for 2014-15 Graduate Student Sisson Fellowship**
MIE grad student Evan Gaertner has been selected from a pool of highly qualified applicants to receive the 2014-15 Edwin V. Sisson Doctoral Fellowship, starting this coming September (2014). Sisson is a 1968 alumnus from the Civil and Environmental Engineering Department, and his fellowship fund is geared toward first-year doctoral candidates from any of the four departments in the College of Engineering who do research in sustainable energy or other environmental subjects. Gaertner’s graduate research, performed under faculty advisor Matthew Lackner of the MIE department, is focused on modeling unsteady aerodynamics of floating offshore wind turbines.

**Ph.D. Student Barron Funded for Young Scientists Summer Program**
Bob Barron, a Ph.D. candidate in Industrial Engineering and Operations Research, has been selected for the 2014 Young Scientists Summer Program (YSSP) of the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria. Barron’s participation in the YSSP will be funded by the National Science Foundation in cooperation with the National Academy of Sciences. The YSSP is a three-month research program for around 50 advanced Ph.D. students whose interests correspond with IIASA’s ongoing research. IIASA is an international research organization that conducts inter-disciplinary scientific studies on environmental, economic, technological, and social issues in the context of human dimensions of global change.

Barron’s research for the program will focus on the role that research and development, coupled with uncertainty in technological change, plays in climate policy.

**New Hluchyj Fellow, Cheryl Nicholas, Studies Alarm Fatigue**
MIE doctoral student Cheryl Ann Nicholas was also named as one of the two 2013-2014 Hluchyj Fellows. Nicholas will be conducting research with MIE Department Head Donald Fisher on the widespread issue of hospital “alarm fatigue,” caused when healthcare providers fail to respond to emergency alarm signals with sufficient urgency.

**Adams Receives Distinguished Graduate Staff Award**
Dorothy Adams was awarded the 2014 Distinguished Graduate Staff Award. This was the first-ever award of its kind created through the Dean and staff of the Graduate School. The purpose of the award was to recognize the crucial role played by staff members in supporting the campus graduate teaching mission essential to the smooth operation of the graduate curriculum, admissions, and funding. There was one campus-wide award based on nominations from current graduate students.

**DOE Project Led by Professor Ramasubramaniam Aims to Transform Fuel Cells**
The key to sustainable alternative energy sources such as biofuels, hydrogen, synthetic hydrocarbons, and fuel cells is the catalytic processes that drive the energy conversion pathways. Now MIE Professor Ashwin Ramasubramaniam has received a five-year, $750,000 grant from the U.S. Department of Energy (DOE) to study electocatalysts in direct methanol fuels cells and proton exchange membrane hydrogen fuel cells and then suggest revolutionary ways to improve them.

**Professor Balasubramanian’s CAREER Award Aims to Improve Primary Care Delivery**
Hari Balasubramanian of the Mechanical and Industrial Engineering (MIE) Department at the University of Massachusetts Amherst has been issued a $400,000 grant from the prestigious National Science Foundation (NSF) Faculty Early Career Development (CAREER) Program. The award represents the 34th NSF CAREER grant issued to faculty members from the UMass College of Engineering, and the fourth during the 2012-2013 academic year. The title of Balasubramanian’s industrial engineering NSF project is “Stochastic Models for Designing the Patient Centered Medical Home in Primary Care.” The project will streamline the delivery of primary care to patients, making access more available for millions of potential patients.
**Interdisciplinary Team Led by Professor Chait Starts Clinical Testing of Drug Protocol for Dialysis Patients**

Professor Yossi Chait is part of a multidisciplinary team that has been approved by an institutional review board to begin clinical testing of a groundbreaking new protocol for administering a key drug for managing patients in the final stage of kidney disease.

“We are developing protocols for patients who have kidney disease and are undergoing dialysis and need precise, effective doses of recombinant human erythropoietin hormone,” says Chait. That hormone, also known as EPO, manages the production of red blood cells, which, among other things, controls anemia.

Other members of the team include Dr. Michael J. Germain, a nephrologist and the medical director of Renal Transplantation at the Baystate Medical Center, and UMass Professors Joseph Horowitz (Mathematics and Statistics) and Christopher V. Hollot (ECE).

The new medical protocol, based on the principles of engineering feedback control systems, promises to individualize the EPO dosage for every patient and improve his or her treatment outcomes.

**Erin Baker Awarded Distinguished Graduate Mentor Award**

Professor Erin Baker received the first-ever Distinguished Graduate Mentor Award, a campus-wide nominated award created through the Dean of the Graduate School and members of the Graduate Council. The new award was based on some or all of the following criteria: the graduate teaching and advising work that faculty did outside the classroom; ways in which they supported their graduate students’ development as scientists, scholars, teachers, or practitioners of their professions; and ways in which they helped their students to succeed in graduate school and beyond.

**Equip Yourself to Become an Engineering CEO or Company Leader**

The January 31, 2012, edition of the Wall Street Journal included an article with an intriguing title: “Move over MBAs, Here Come the Engineers!” Not only is the demand for engineers “voracious,” the article reported, but engineers increasingly are the go-to leaders chosen to head companies. The Journal recounted that in a recently published study 3,337 company founders and CEOs had advanced business degrees. This vital information provides a brilliant opportunity and also a pressing issue for engineers. How do they add the required business skills and management acumen to become company leaders? One perfect answer is the UMass Amherst Master of Science in Engineering Management Program.

Through this blended program, engineering graduates and professional engineers can acquire the fundamental theory, management skills, and practical ideas needed to pursue engineering leadership positions across numerous industries. The online or on-campus classes offered as part of the Master of Science in Engineering Management program are taught by faculty from the MIE and Electrical and Computer Engineering (ECE) Departments, as well as the Isenberg School of Management, all of whom are researchers and leaders in their field. The program is thus well suited to engineers from all disciplines as well as business graduates with engineering/analytical inclinations. Check out the program website: http://mie.umass.edu/engineering-management-ms.

**College Mourns Tragic Death of Incoming Senior**

Incoming MIE senior Hannah B. Frilot was killed on July 31 when she was struck by an automobile as she and a friend walked along the side of North East Street. The MIE department and the whole college mourn the tragic loss of this 20-year-old student, who passed away many years before her time. The Department will honor her sometime early in the fall. Please contact Professor Donald Fisher if you would like to be part of the planning committee.

**You Can Honor the Late Stephen Malkin by Supporting His Lecture Series**

The MIE department seeks to raise a minimum of $30,000 to fund the Stephen Malkin Annual Lecture Series in honor of the late Professor Malkin (1941-2013), a visionary, a leader, and, above all, an excellent mentor, who was the MIE department head for more than six years. Saint-Gobain has made a generous lead gift and the Lecture Series is already off and running. The purpose of the Malkin Lecture Series will be to attract a wide variety of expert speakers, who will inspire our learning community on issues of innovation and progress in engineering fields involved with manufacturing. Several of Malkin’s academic and professional colleagues have already contributed to the endowment, with more than $25,000 raised. Now you can help us grow the fund to a sustaining level of $30,000 and thus enable this wonderful lecture series. To make a donation go to: https://www.umass.edu/development/give/?a=649