Greetings from MIE Department Head Sundar Krishnamurty:

Happy fall! We are delighted to share with you the extraordinary achievements of the MIE students and faculty for the 2016-2017 calendar year, as well as the fantastic growth of the department, both in faculty hiring and enrollment.

In 2011 the department graduated 83 undergraduate students. In 2016, we graduated 192 students. This represents 131 percent growth over five years, an astonishing statistic by any measure. Mechanical Engineering is the largest major in the College of Engineering, and we are proud of our students’ success: for the class of 2016, 92 percent of our graduates reported having either a job or going to graduate school within six months of graduation, with an average starting salary of $63,000. Our undergraduates and graduate students continue to garner awards and accolades: this last spring graduating senior Victor Champagne received both the 21st Century Leader award and the Jack Welch Scholar Award, while graduate students Hanna Johlas and Alexander Smith received coveted graduate fellowships from the National Science Foundation.

This past year we hired a record number of five new faculty members: two assistant professors in the area of medical device manufacturing, an assistant professor of manufacturing, as well as two professors of renewable energy, including an endowed Chair of Renewable Energy. This endowed chair is being filled by Krish Thiagarajan, who is currently the Alston D. and Ada Lee Correll Presidential Chair in Energy and the leader of the Marine Ocean and Offshore Research Group at the University of Maine. This fall we look forward to embarking on four more searches, which would bring our faculty up to 38 tenure-track professors, a 31 percent increase in only two years!

In particular, the hiring of potentially three new faculty members in the area of manufacturing dovetails with our department’s leading role in the Center for Personalized Health Monitoring at UMass Amherst, which includes the new Roll-to-Roll Manufacturing and the Advanced Digital Design and Fabrication (AddFab) facilities as part of a $95-million statewide effort to drive the manufacturing industry forward in the region. And the hiring of two additional faculty members in renewable energy provides critical leadership strength and expertise in both ocean engineering - further bolstering our pioneering research programs in offshore wind energy – and the integration of renewable energy into the electrical grid. These key areas of energy research catapult our already top-ranked renewable energy program into the next level of worldwide reputation and research opportunity.

This past year our faculty received superb recognition in the form of awards, grants, and other honors, including the following: Don Fisher was selected to deliver the campus-wide Distinguished Faculty Lecture; Erin Baker received the prestigious Armstrong Professional Development Grant; David Schmidt received the 2017 Outstanding Teacher in the College of Engineering Award, and was also selected as a Fellow of the Society for Automotive Engineers; Chaitra Gopalappa received a $1.5-million NIH grant to address critical HIV issues; Juan Jiménez is the co-PI on a $937,848 grant to study cerebrovascular disease and computer simulations; Yubing Sun received a $400,000 NSF grant to study neural tube defects; Jenna Marquard is the director of the “Human Factors Core” of a five-year, $1.23-million collaborative grant from the National Institute of Nursing Research in the NIH; and, finally, Assistant Professor Jae-Hwang Lee has co-authored an article on cold spray additive manufacturing in the prestigious Nature Scientific Report.

This year also brought changes to our department’s administrative team. We bid farewell and a heartfelt “thank you” to our associate department head and undergraduate program director, Jim Rinderle, who has been appointed an associate dean in the College of Engineering, and to our graduate program director, Jonathan Rothstein,
who is returning to full-time teaching and research. Please join me in welcoming Professor Ana Muriel as the next associate department head, Professor Stephen de Bruyn Kops as the new undergraduate program director, Professor Yahya Modarres-Sadeghi as the new graduate program director, and Professor Berndt Schliemann as the new chief undergraduate advisor. We look forward to working with them as we start the new academic year.

We are also excited in the year to come to build upon the continued support of our industry partnerships, alumni, and friends. In that vein, I would like to welcome our two new industry advisory board chairs, Paul Washburn and Marty Ross, who will take over from our dedicated and indefatigable retiring chairs, Dave Anderson and Tom Lyden, to whom we owe a big round of thanks!

Sincerely,

Sundar Krishnamurty

BAKER APPOINTED TO ARMSTRONG PROFESSIONAL DEVELOPMENT PROFESSORSHIP

MIE Professor Erin Baker has been approved by the university system’s Board of Trustees to receive the Armstrong Professional Development Professorship. The Armstrong Professorship was established in 2001 with an endowment of $850,000 by John and Elizabeth Armstrong of Amherst and a $650,000 matching grant from the University of Massachusetts President’s Distinguished Professorship Initiative. It is awarded for a three-year period “to a faculty member who is at the beginning of his/her career and has demonstrated substantial achievement and great promise in his/her area of teaching and research.” Baker is the director and principal investigator of the UMass Offshore Wind Energy Program (Wind Energy IGERT), created in 2011 through a $3.2-million grant from the National Science Foundation (NSF) Integrative Graduate Education and Research Traineeship (IGERT). As MIE Department Head Sundar Krishnamurty summarized her credentials, “Professor Baker is a world-recognized leader in her field of energy economics. Overall, Professor Baker has been the principal investigator on peer-reviewed awards totaling more than $5 million, with Co-PIs from a broad set of departments around campus. Professor Baker’s research productivity includes more than 35 refereed journal publications, 47 conference presentations, 19 invited workshop presentations, and 24 invited lectures.”

MIE ALUMNUS MARSHALL JONES INDUCTED INTO NATIONAL INVENTORS HALL OF FAME

UMass Amherst alumnus Marshall Jones, who earned his M.S. and Ph.D. degrees in our MIE department, was inducted into the National Inventors Hall of Fame on May 4 for his pioneering work on industrial lasers. The induction ceremony is billed by the National Inventors Hall of Fame as “The greatest celebration of American innovation...Here we honor and celebrate the world’s foremost inventors and their contributions to society.” Jones is a General Electric engineer who holds more than 50 U.S. patents and is recognized as one of the foremost authorities in the field of laser material processing.

GOPALAPPA RECEIVES $1.5-MILLION NIH GRANT TO ADDRESS CRITICAL HIV ISSUES

The number of persons newly infected with the human immunodeficiency virus (HIV) in the U.S. is about 50,000 each year and has not decreased since the late 1990s. To address this critical problem, the first National HIV/AIDS Strategy (NHAS) was developed in 2010, with a goal to reduce incidence by 25 percent by 2015; but, since that goal was never met, it was delayed until 2020. Now Professor Chaitra Gopalappa of our MIE department is receiving a grant of $1,567,348 from the National Institutes of Health (NIH) to answer several critical questions posed by the NHAS and to develop a new model and methods necessary for analyses of these crucial problems.

One fundamental impact of Gopalappa’s research will be to help create an efficient NHAS, a national plan that serves as a “roadmap” for implementing interventions to reduce the incidence of HIV infections. The title of Gopalappa’s NIH project is “Evaluating Portfolio Interventions for HIV Incidence Reduction in the United States: Development of a Novel Agent-Based Decision-Analytic Model for Dynamic Evaluations of Interventions.”
Jiménez Works on International Team of Researchers Receiving Nearly $1-Million Grant to Study the Pathobiology of Cerebrovascular Diseases

MIE Professor Juan Jiménez is a co-principal investigator with Dr. Kristian Valen-Sendstad from the Simula Research Laboratory of Oslo, Norway, on a $937,848 grant from the Research Council of Norway to study a critical question: “Are Computer Simulations Misleading Us About the Pathobiology of Cerebrovascular Diseases?”

The group will develop numerical methods to accurately resolve the flow field in the human cerebral vasculature. In an in vitro flow chamber, Dr. Jiménez’s group will expose endothelial cells that make up the inner layer of blood vessels to the flow fields present in the cerebral vasculature and that were identified in the numerical simulations. The in vitro experiments will help identify genes that play a role in the development of cerebral aneurysms.

Schmidt Selected as Fellow of the Society of Automotive Engineers

MIE Professor David Schmidt was selected as a Fellow of the Society of Automotive Engineers (SAE). It is the organization’s premier membership grade. According to the SAE, “The Fellow grade was established in 1975 to honor and recognize important engineering, scientific, and leadership achievements to enhance the status of SAE’s contributions to the profession and to society.” Schmidt also received one of the two 2017 Outstanding Teaching Awards in the College of Engineering. Schmidt was cited by the selection committee for his commitment to redeveloping both of the first-year courses in MIE and for his history of mentoring undergraduate and graduate research students.

Lee and Colleagues Publish Foundational Research on Cold Spray Additive Manufacturing

Professor Jae-Hwang Lee, the head of the Nano-Engineering Laboratory in the MIE department, is a member of a multi-institutional and multi-disciplinary team of researchers who co-authored a fundamental materials research article on cold spray additive manufacturing published in the prestigious journal Nature Scientific Reports. Cold spray is a materials consolidation process that utilizes micron-sized particles and accelerates them at supersonic velocities through a de Laval rocket nozzle. The impacting particles undergo extreme plastic deformation and then consolidate, thus forming a dense coating with a near net-shaped quality.

Sun Receives $400,000 NSF Grant to Study Deadly and Crippling Neural Tube Defects

Neural tube defects are among the most common birth defects and affect more than 500,000 infants worldwide each year, resulting in severe health problems, including paralysis of legs, brain damage, and even death. Now Professor Yubing Sun has received a $400,000 grant from the National Science Foundation to develop a series of engineered tools to enable the investigation of the poorly understood mechanism that causes neural tube defects.
UMass Team Hits 775 MPG and Snags Fourth Place at National Supermileage Competition

At the 38th annual Society of Automotive Engineers (SAE) Supermileage Competition on June 8 and 9, the UMass team scored an impressive fourth place out of 20 collegiate teams by hitting 775 miles per gallon on the 9.6-mile course at the Eaton Proving Grounds in Marshall, Michigan. This fourth-place finish was equal to the best ever done by the UMass Supermileage Vehicle in recent years.

UMass Researchers Invent MRI-compatible Ergometer to Study Human Muscle Function

MIE Professor Frank Sup is collaborating with Professor Jane Kent of the UMass Kinesiology Department on a groundbreaking non-magnetic ergometer, which can be used in conjunction with a magnetic resonance (MR) machine to conduct pioneering MR imaging and spectroscopy studies of human muscle function. The researchers will use the new ergometer to investigate the energetic mechanisms underpinning changes in muscle function, which can yield unique insights into mobility impairments with age. “It is essentially a precision, instrumented piece of exercise equipment that can work inside of a large magnet, or MRI,” says Sup.

Fisher Delivers Distinguished Faculty Lecture on October 18

Emeritus Professor Donald Fisher, the director of the celebrated Arbella Insurance Human Performance Laboratory and the former head of the MIE department, delivered a University of Massachusetts Amherst Distinguished Faculty Lecture on October 18 of 2016. Professor Fisher was also presented with the Chancellor’s Medal, the highest recognition bestowed to faculty by the campus. The title of Fisher’s lecture was “The Eyes Have It: A Window into the Mind.”

Marquard Serves as Human Factors Core Director for New $1.23-Million NIH Grant

MIE Professor Jenna Marquard is the director of the “Human Factors Core” of a five-year, $1.23-million, collaborative grant received by the UMass Amherst College of Nursing from the National Institute of Nursing Research (NINR) in the National Institutes of Health. The NINR grant was awarded to create the new UManage Center to Build the Science of Symptom Self-Management, where scientists and engineers will develop technologies to help people with chronic illness manage fatigue and impaired sleep.

“The primary goal of the Human Factors Core is to ensure that project team members account for various sociotechnical factors in their technology designs and evaluations to better ensure that the technologies are useful, well-used, and produce anticipated benefits,” explains Marquard, a health informatics and engineering psychology researcher.