



WINTER 2010

ME^{TRICS}

MECHANICAL ENGINEERING
A. JAMES CLARK SCHOOL of ENGINEERING

A NEWSLETTER FOR ALUMNI AND FRIENDS OF THE DEPARTMENT OF MECHANICAL ENGINEERING AT THE A. JAMES CLARK SCHOOL OF ENGINEERING, UNIVERSITY OF MARYLAND.

2009-2010

Year in Review

IN THIS ISSUE:

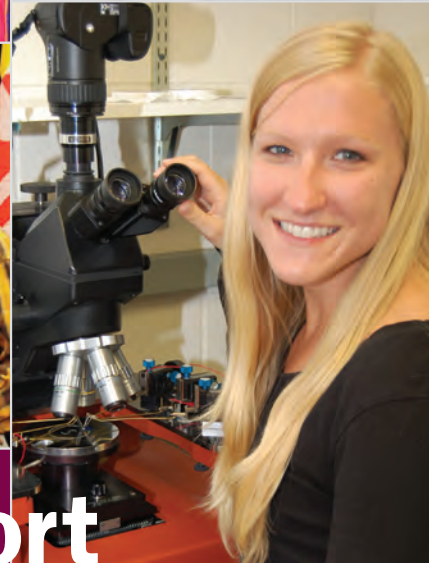
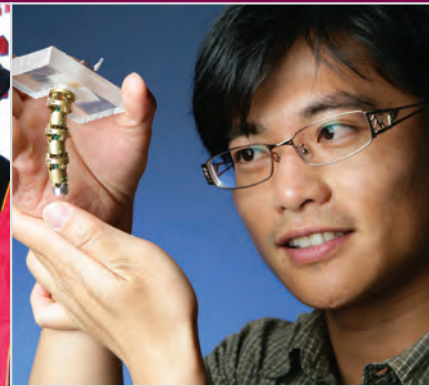
CHAIR'S MESSAGE

FAST FACTS

DEPARTMENT HIGHLIGHTS
RESEARCH
CENTERS
FACULTY AND STAFF

ANNUAL REPORT
GRADUATES
EVENTS
FUNDING

STUDENT HIGHLIGHTS



and Annual Report



BAR-COHEN

Changing of the Guard

ME Says Goodbye to Esteemed Chair

Change is afoot as ME says goodbye to its esteemed chair and begins the search for the future leader of the department. Distinguished University Professor and Chair of the Department of Mechanical Engineering Avram Bar-Cohen resigned as ME Chair in August 2010 after nine years of exceptional leadership. Professor of Mechanical Engineering and Associate Chair Balakumar Balachandran succeeded Bar-Cohen as Acting Chair in September 2010.

Bar-Cohen will retain his faculty appointment with ME, but will take leave to temporarily serve the nation as a Program Manager for the Defense Advanced Research Projects Agency (DARPA). In this new capacity, Bar-Cohen will support programs on thermal energy science and systems. Upon completion of his two-year appointment with DARPA, Bar-Cohen will return to campus and continue his scholarly activities.

Throughout his career, Bar-Cohen has been influential in advancing the field of thermal packaging through his efforts as a researcher, instructor and administrator. He has co-authored a wealth of textbooks, path-finding articles, and journal papers that have impacted the course of thermal packaging research. A Fellow of IEEE, Bar-Cohen has received numerous awards, including the prestigious Luikov Medal (2008) from the International Centre for Heat and Mass Transfer, and is an Honorary Member of the ASME. Under Bar-Cohen's tenure, ME achieved a high level of scholarship and national visibility while continually maintaining its rank as one of the top 25 mechanical engineering programs in the country.

Bar-Cohen's successor, Balakumar Balachandran, joined the UMD faculty in 1993, and served as the department's Director of Graduate Studies (DGS) from 2006-2010. During his tenure, Balachandran was instrumental in increasing diversity within the department's graduate student population, enlarging the number of students recruited from highly-ranked undergraduate programs to unprecedented levels. He has authored and co-authored numerous publications, and serves in editorial capacities with a number of major engineering journals. Balachandran is a Fellow of AIAA and ASME, where he has chaired various committees in his areas of expertise.

As ME enters this period of transition, the department offers gratitude to its departing chair and congratulations to its acting chair. ME extends heartfelt thanks to Dr. Bar-Cohen for his many years of dedicated service and wishes him well in his future endeavors at UMD and beyond.

(Additional story on back cover)

Acting Chair Balachandran Elected AIAA Fellow

Professor Balakumar Balachandran was named Fellow of the American Institute of Aeronautics and Astronautics (AIAA) during the 2010 Aerospace Spotlight Awards Gala in May 2010. The AIAA and its board of directors confer the distinction of Fellow upon outstanding AIAA members "who have made notable and valuable contributions to the arts, sciences, or technology of aeronautics or astronautics." Balachandran, an Associate Fellow of the AIAA since 2009, was nominated by Dr. Elaine Oran of the Naval Research Laboratory and the University of Michigan Department of Aerospace Engineering, who cites him for furthering the understanding of nonlinear phenomena in aerospace sciences and structural dynamics over the last two decades. A distinguished researcher and educator, Balachandran—whose research interests include nonlinear phenomena, dynamics and vibrations, and control—has authored numerous publications and is a member of ASME, ASA, AAM, IEEE, and SPIE.



BALACHANDRAN

Balachandran joined the UMD faculty in 1993, and served as the department's Director of Graduate Studies (DGS) from 2006-2010. During his tenure, Balachandran was instrumental in increasing diversity within the department's graduate student population, rising the number of students recruited from highly-ranked undergraduate programs to unprecedented levels. He has authored and co-authored numerous publications, and serves in editorial capacities with a number of major engineering journals. Balachandran is a Fellow of AIAA and ASME, where he has chaired various committees in his areas of expertise. Currently, he serves as Acting Chair of the Clark School's Department of Mechanical Engineering.

ON THE COVER:

Department Chair Avram Bar-Cohen and ME Graduate Students; Mingyen Ho; Jessica Rajkowski; Masoud Rabiei and Professor M. Modarres



Mechanical Engineering Mission

The mission of the University of Maryland's Department of Mechanical Engineering is to provide an outstanding education; conduct innovative, groundbreaking research; address the needs of citizens, industry and government; and provide related service to the campus community, as well as the community at large.

The mission shall be guided by a commitment to continuous improvement in the overall quality of teaching, research, and service. A major focus of the Department is to provide engineering education with sufficient scope to include the basic and specialized engineering training necessary for the current and emerging needs of society. The Department has a related responsibility to contribute to the advancement of knowledge by conducting research at the cutting edge of science and technology. Given the rapid advances in science and technology, the department also has a professional responsibility to provide continuing education to practicing engineers.

As part of this mission, our Department faculty and administration are driven by an obligation to serve the needs of the campus community and the community at large in the spirit of collegial cooperation.

By staying focused on our Strategic Plan and achieving its quantitative and qualitative goals, we aspire to place the Department of Mechanical Engineering at the University of Maryland among the nation's top 15 mechanical engineering programs and in the top 10 among the publicly supported research universities by 2012.

Statistics from the 2009 Faculty Activity Report

- 40** Tenured and Tenure Track Faculty
- 35** Research Faculty and Lecturers
- 28** Professional Society Fellow Memberships
- 9** NAE Members
- 8** Journal & Book Series Editors
- 48** Journal Associate Editors
- 14** Full Books (published, edited, authored or co-authored)
- 34** Chapters in Books (published, edited, authored or co-authored)
- 377** Articles in Refereed Journals
- 283** Conference Papers (archived)
- 218** Conference Papers (not archived)

Based on 2009 calendar year statistics from the Faculty Activity Report and includes: Tenured/Tenure-Track Faculty, Research Scientists, Lecturers and select Affiliated & Emeriti Faculty.

Degree Programs

Mechanical Engineering: B.S., M.E., M.S., Ph.D.
 Reliability Engineering: G.C.E.N., M.E., M.S., Ph.D.
 Professional Master of Engineering & Public Policy

Major Research Centers

Center for Advanced Life Cycle Engineering (CALCE)
 Center for Energetic Concepts Development (CECD)
 Center for Environmental Energy Engineering (CEEE)
 Center for Risk and Reliability (CRR)
 Smart Materials & Structures Research Center (SMSRC)

Instructional Divisions

Design and Reliability of Systems

· Design · Information Sciences
 · Risk and Reliability · Manufacturing

Electronic Products and Systems

· Physics of Failure & Reliability · Competitive Systems
 · Supply Chain Engineering

Mechanics and Materials

· Solid Mechanics · Materials
 · Dynamics and Control · MEMS/NEMS

Thermal, Fluids and Energy Sciences

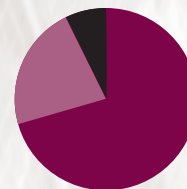
· Energy Systems · Fluid Mechanics
 · Thermal Sciences · Reacting Flows

2009-2010 Academic Calendar Statistics

Degrees Granted

- 193** B.S. Degrees Awarded
- 31** M.S. Degrees Awarded (ENME, ENRE)
- 18** M.Eng. Degrees Awarded (PME)
- 31** Ph.D. Degrees Awarded (ENME, ENRE)

Registered Majors (Fall 2009)



703 B.S.
72 M.S.
221 Ph.D.

2009-2010 Total Department Funding

Revenue **\$30,545,038**
 Expenditures **\$31,939,425**

A Global Perspective on Innovation

Professor Michael Ohadi Returns to ME after 8-Year Appointment with Petroleum Institute



OHADI

ME welcomes Professor Michael Ohadi back to the University of Maryland College Park (UMD) campus after his eight years of service at the Petroleum Institute (PI) in Abu Dhabi, UAE. Ohadi stepped down from his position as Provost and Acting President of the institution—where he was closely involved with academic programming, residence halls oversight, athletics and extracurricular activities development, and commencement ceremony organization—in early

2010. Prior to becoming Provost and Acting President, Ohadi served as the chair of PI’s Department of Mechanical Engineering.

Initially invited to take a temporary administrative position at PI, Ohadi recognized an opportunity to guide the burgeoning institute towards the upper echelon of international universities. During his time at PI, Ohadi fostered a relationship between UMD and the up-and-coming institution. His work was vital to establishing tangible connections between the energy sector of the Middle East and UMD. Ohadi states, “I worked closely with the University there to establish confidence in what UMD can do for them.” Through this experience, Ohadi learned an important lesson about the

growing necessity of international collaboration. In light of increasing globalization and evolving technology, he noted that international collaborations in research, education, and special programs are “a must” for academic institutions aspiring to be “leaders in the field.”

Since its founding in 2001, PI has grown to serve nearly 1,100 students from the United Arab Emirates (UAE) and abroad, offering both undergraduate and graduate programs accredited by the UAE’s Ministry of Higher Education. Comparing PI and UMD, Ohadi asserts, “In general, PI’s curriculum is based on an American system of education and the language of instruction for all courses is English, thus...there is not much difference between the two programs.” While this is true for undergraduate programs in engineering, he remarked that graduate studies and research programs are better established at UMD due to the graduate program’s lengthy existence and the research infrastructure supporting American universities.

When asked about what he will miss most about PI, Ohadi replied, “A fast-growing, dynamic environment with dedicated resources and strong support from the country’s leadership.” While Ohadi will periodically visit Abu Dhabi to participate in a ongoing series of teaching and educational activities between PI and UMD, he plans to use his experience in Abu Dhabi to help expand current international collaborations and foster new national and international relationships in the energy industry.

Clearing the Air

Affiliate Professor wins NSF CAREER Award, Offers Green Solutions to Soot Pollution

Being stuck behind a tractor-trailer that is belching smoke from its exhaust in bumper-to-bumper traffic is a nightmare scenario for commuters. That annoying smoke—colored black by airborne carbon particles derived from the incomplete combustion of hydrocarbons, like diesel fuel—is commonly known as soot, a deadly pollutant that accelerates the spread of fires, hastens global climate change and aggravates the lungs and bloodstream, leading to cardiovascular and lung disease. In an effort to help motorists and manufacturers defend against this toxic smoke, ME Professor and 2010 National Science Foundation (NSF) CAREER Award-winner Peter Sunderland is offering environmentally-friendly solutions for automotive manufacturers to decrease soot output and help commuters breathe easier.

Sunderland, who received the NSF CAREER Award for his research on “Soot Oxidation in Hydrocarbon-Free Flames”, has studied soot and its origins as an affiliate associate professor of mechanical engineering and associate professor of fire protection engineering with ME and the Department of Fire Protection Engineering—the only accredited undergraduate program of its type in the country—at the A. James Clark School of Engineering since 2004. A member of AIAA, ASSE, IAFSS, and ASME, Sunderland remarked that the award was invaluable

to his research on soot formation and oxidation, which has been crucial to improving the automotive industry and the public’s understanding of where soot comes from and how much damage it can cause.

Sunderland hopes his research will show automotive engineers and designers effective how to improve fuel injection in engines by analyzing and measuring soot formation and oxidation. Sunderland investigates the chemistry of the flames

that initiate soot formation and oxidation by examining two overlapping phases of soot production with a double-flame burner, which employs a bright yellow hydrocarbon flame (lower) and a faint hydrogen flame (upper). Due to its simple chemistry, the upper flame proves far easier to examine than the lower flame, allowing Sunderland to better analyze the soot production process. As the first researcher to study chemical reactions from soot oxidization using a double-flame burner, Sunderland realizes that examining the chemistry of flames can be quite



SUNDERLAND

(continued on page 5)



Cool Under Pressure

Departing ME Chair Shows How Today's Multifunctional Tech Avoids Overheating

Your iPhone has two-thousand songs, a thousand apps, and five hundred pictures stored on its hard drive. On any given day, you may open a web browser app while listening to your favorite song, all while texting your best friend. Somehow, your iPhone doesn't explode in a ball of fire from simultaneously running too many applications. You're thankful your iPhone doesn't explode, but do you know why it doesn't? Professor Avram Bar-Cohen does.

An IEEE Fellow and Honorary Board Member of the ASME, Bar-Cohen has dedicated his career to researching the most effective cooling methods for electronics. He has specifically focused his research on efficient thermal packaging, an approach to the physical design and implementation of electronic systems that accounts for thermal management. A pioneer in the field of thermal packaging, Bar-Cohen's contributions to thermal packaging research are as impressive and extensive as his accomplishments as ME Chair. He has produced a number of textbooks as well as hundreds of journal papers and path-finding articles that have guided the course of thermal packaging research. His influential work recently led to his selection as recipient of the 2008 Luikov Medal from the International Centre for Heat and Mass Transfer.

In addition to earning acclaim for his academic and research activities, Bar-Cohen has contributed his insights on thermal packaging and efficient temperature management to improving the reliability and functional capacity of today's most popular mobile and portable technologies. He has provided invaluable tools and techniques for developing smaller electronics without sacrificing reliability and functionality, including physics-based composite equations for natural convection heat transfer in parallel plate arrays and compact thermal models as fast analytical and numerical solutions for the temperature of packaged chips and populated printed circuit boards. Bar-Cohen has seen his research and modeling approaches implemented in a number of non-consumer applications, such as early CAD tools.

Collectively, Bar-Cohen's work has proved essential to the increased performance, miniaturization, and reliability of today's electronic products, with a 10x improvement in air-cooling capability and comparable finned heat sink weight reductions serving as some of the best examples of his impact. Bar-Cohen is currently investigating efficient cooling of kW/cm² on-chip hot spots and immersion cooling of kW/cm³ heat density chip stacks and 3D packages. By continuing to provide a scientific basis for thermal management of electronic systems, Bar-Cohen has changed the landscape of the modern electronics industry by encouraging the application of innovative thermal science and technology across all stages of development. Fellow ME Professor Reinhard Radermacher commented on Bar-Cohen's immutable impact on modern electronics: "Professor Bar-Cohen's research laid the foundation for today's state-of-the-art, minimum-energy solutions for the air cooling of electronics." Reflecting on Bar-Cohen's lasting effect on electronics research, Radermacher added, "His studies... established the performance limits and methodologies for cooling avionic systems and supercomputers...[and] pioneered new methods of temperature control for computer chips and printed circuit boards...[and]he has educated thousands of electrical and mechanical engineers." In an era where demand for smaller, more reliable electronic products often outpaces invention, Bar-Cohen's legacy will be irrefutable, as he has helped industry develop products that may continue to shrink in size, but never in reliability. Bar-Cohen recently departed his position as ME Chair after nine years of service. He will retain his faculty appointment with ME while temporarily serving the as a Program Manager for the Defense Advanced Research Projects Agency (DARPA), where he will support programs on thermal energy science and systems. Upon completion of his 2-year appointment with DARPA, Bar-Cohen will return to campus and continue his scholarly activities within the department.



BAR-COHEN

Clearing the Air (*continued*)

daunting, "In a normal flame, like a candle, soot is formed low in the flame and burns off near the top." He adds, "However there is a lot of overlap, making it difficult to measure the formation and oxidation rates. In this double flame, the upper flame has only soot oxidation, so there is no such overlap and thus the oxidation rates can be measured more accurately."

Sunderland plans to integrate the findings and experiments from this research into a number of his fire protection engineering courses, including ENFP 108: Hot Topics in Fire Protection Engineering and ENFP 630: Diffusion Flames and Burning Rate Theory, as well as an interactive laboratory experience he is designing for high school students.

Renewing Research Connections

CECD Continues Collaboration with Maryland-based Naval Research Center

The Center for Energetic Concept Development (CECD) recently renewed its long-standing relationship with the Indian Head Division of the Naval Surface Warfare Center (IHD NSWC). Under the leadership of CECD Director Dave Anand, CECD and IHD NSWC signed a \$10M, five-year agreement to continue collaborative research in energetics, the focused study of energy under transformation, and energetic concepts. With the renewal of research activities in 2010, CECD and IHD NSWC will continue a partnership that has endured for over twelve years.

In their recent proposal to the Naval Surface Warfare Center (NSWC), CECD promised to build on its the long-standing, symbiotic collaboration with IHD NSWC by continuing the research and development of energetic concepts and materials while investigating forward-thinking solutions to current issues in land and sea defense applications. Together, IHD NSWC and CECD will focus their collaborative efforts on exploration of energetic materials, explosives and propellants processing with an emphasis on continuous processing and lean manufacturing, explosive components and warhead technology.

IHD NSWC has collaborated with CECD since the center’s founding in 1998, contributing over \$8.9M in research support towards over 130 technical projects related to energetic concepts. Energetic concepts and materials developed by CECD and IHD NSWC are applied to a range of critical defense applications, including explosives detection, sensor technology, virtual training and high-energy launch systems. As CECD continues toward the future, their work with IHD NSWC will remain instrumental to the growth of CECD and the continual expansion of energetics research.

Beyond defense applications and energetic concepts research, CECD and IHD NSWC have established a graduate-level program dedicated to preparing the next generation of specialists in energetics. CECD also partnered with IHD NSWC to create the Southern Maryland Development Initiative for Energetic Capability, an outgrowth of a Memorandum of Understanding between CECD, IHD NSWC and the College of Southern Maryland focused on developing solutions to emerging issues in industrial and military applications of energetics.

6

Facing the Future

Unprecedented Turnout for Inaugural Maryland Robotics Day

From the transforming super sports car ‘Bumblebee’ to the compact yet functional Roomba, the public can’t seem to get enough of robots today. These technological wonders, long associated with science fiction, are quickly becoming scientific fact. For organizers of the first Maryland Robotics Day, intense public interest in robots has revealed a very important lesson: robots are extremely popular!

Over 400 people attended Maryland Robotics Day held on Sept. 10, 2010 at the University of Maryland’s College Park campus—including more than 100 high school students, local K-12 science teachers, parents, and representatives from neighboring national labs, start-up companies and defense industries. The well-received event served as the kickoff for the Maryland Robotics Center, a division of the Clark School’s Institute for Systems Research (ISR), and included an informative keynote speech from Dr. Martin Buehler, Director of Research at iRobot, that boasted a number of exciting videos of robots and robotic technology in action.

Attendees also got a hands-on look at some of the Clark School’s hottest robotics research over the course of the day. Graduate students and their faculty advisors from sixteen research laboratories showcased their robotic projects for over four hours, with many labs remaining open for visitors well past the day’s appointed conclusion.

Undergraduate students from the Science, Technology and Society honors program were also present, acting as guides to the world of Clark School robotics.

ISR Director Reza Ghodssi called the event “an excellent demonstration of our strength and expertise in robotics at Maryland.” He added, “We are now officially located on the world robotics map.”



S.K. GUPTA

Maryland Robotics Day will serve as the annual showpiece for the Maryland Robotics Center. The Center, led by ME Professor S.K. Gupta, consists of 25 faculty members spanning Aerospace Engineering, Bioengineering, Biology, Civil and Environmental Engineering, Computer Science, Electrical and Computer Engineering, and Mechanical Engineering. With an eye toward the future and overwhelming public support, the Maryland Robotics Center is poised to move robots and robot technology away from the stuff of dreams and closer to reality.



Pecht Elected SAE Fellow

Professor Michael Pecht, founder and director of the Center for Advanced Life Cycle Engineering (CALCE), was recently elected Fellow of the Society of Automotive Engineers (SAE). He received this prestigious honor at the 2010 SAE World Congress. Pecht joins an illustrious list of engineers and researchers who have attained the distinction of SAE Fellow since its inception in 1975. SAE bestows Fellow status on a select group of members “who have made a significant impact on society’s mobility technology through leadership, research, and innovation.” Pecht was elected SAE Fellow for his contributions to automotive reliability.

As the driving force behind CALCE since 1986, Pecht guides one of the world’s leading research teams in the field of electronics reliability, including many applications in automotive electronics and avionics. His physics-of-failure approach to electronics reliability has widely influenced mobility technology. Industry leaders such as Boeing, Daimler, Ford, General Electric, General Motors, Honda, Lockheed Martin, NASA, Nissan, Northrop Grumman, and Rolls Royce have all benefited from Pecht’s expertise. A leader in developing the prognostics and health management (PHM) of electronics field, Pecht founded the world’s first research consortium on PHM and authored the quintessential PHM textbook, *Prognostics and Health Management of Electronics*. Pecht has also been instrumental in creating the PHM Centre at the City University of Hong Kong and he is a sought-after consultant, lecturer and keynote speaker on PHM-related issues.



Less Filling, More Reliable

Professor Michael Pecht Advises on Reliability for Nissan’s New Electronic Car

The modern automotive consumer is constantly searching for ways to not only reduce expenses when purchasing a new car, but also to reduce their carbon footprint when commuting. Nissan is poised to offer consumers a solution to their financial and environmental concerns with the company’s new electric car, the LEAF. Globally recognized for producing quality automobiles, Nissan turned to the founder of ME’s Center for Advanced Life Cycle Engineering (CALCE) for advice on ensuring the electronics reliability of their new green venture.

CALCE founder and director Michael Pecht, one of the world’s leading experts on electronics prognostics and reliability assessment, was recently invited to discuss methods for ensuring the reliability and performance of the LEAF and its electronics systems at Nissan Headquarters in Kanagawa, Japan. Nissan is especially interested in electronics reliability as it prepares to introduce the 100% electric LEAF. The zero-emission compact will rely on power from a 24kWh lithium ion battery pack and is anticipated to exceed 100 miles of travel before a recharge is necessary. Recharging time for the LEAF is estimated at 8 hours. In addition to the impressive miles per recharge estimates and short recharge duration, the LEAF also features LED headlights and taillights, and an energy-recovering braking system. Nissan engineers predict the LEAF will have a 10-year lifespan, a prediction the automaker aims to guarantee with Pecht’s guidance.

During his visit to Nissan, Pecht addressed advanced reliability methods and prognostics with his speech “Problems and Countermeasures of Electronic Products Reliability that Enterprises Face.” Following his presentation, Pecht discussed the need for advanced diagnostics and prognostics in Nissan’s new design and test methods with the company’s top engineering and design teams. Pecht followed his productive discussion sessions with an extensive tour of Nissan’s next generation power engine modules. Thanks to Pecht’s visit, Nissan understands that assessing and ensuring the reliability of their vehicles’ electronics systems is critical to success in the marketplace.



DR. MICHAEL PECHT WITH SAE PRESIDENT DR. ANDREW BROWN, JR.



FROM LEFT TO RIGHT: FUMIYUKI KOMIYAMA FROM NISSAN, PROF. QIANG YU FROM YOKOHAMA NATIONAL UNIVERSITY, PROF. MICHAEL PECHT, AND TAKASHI SERIZAWA FROM NISSAN.

A Vision for Innovation

ME Professor Awarded ASME Worcester Medal, Re-Appointed to AIAA Board of Directors



A.K. GUPTA

The American Society of Mechanical Engineers (ASME) awarded the 2008 Worcester Reed Warner Medal to Distinguished University Professor of Mechanical Engineering Ashwani K. Gupta, in recognition of his significant contributions to combustion engineering research. The annual award, presented to Gupta at the 2009 ASME Power Conference, is given to individuals who provide “outstanding contributions to the permanent literature of engineering.”

According to Gupta, the Worcester

Award is critical in recognizing researchers who have contributed to publications that “have made a substantial impact in the engineering community.” Gupta will add the Worcester Award to a growing list of professional awards that includes the ASME George Westinghouse Gold Medal (1998), the ASME James Harry Potter Gold Medal (2003), and the ASME James N. Landis Medal (2004).

A Fellow of the ASME and the American Institute of Aeronautics and Astronautics (AIAA), Gupta has continued to achieve distinction as an expert in the field of combustion engineering with his re-election to the AIAA Board of Directors in April 2010. Gupta was re-appointed Director of the AIAA Technical Propulsion and Energy Group, a

position he has held since 2007. This appointment marks Gupta’s second unanimous election to the position and demonstrates the undeniable impact of his leadership on the AIAA and the Technical Propulsion and Energy Group.

As Director of the Technical Propulsion and Energy (P&E) Group, Gupta is responsible for accumulating an extensive body of knowledge on current issues in propulsion, power, energy and related environmental concerns. In this capacity, Gupta will assist the AIAA in developing position papers for the U.S. Senate and House of Representatives to use when identifying priority issues and guiding aerospace policy development. In addition, Gupta will oversee the breadth of AIAA efforts and technical activities in propulsion and power. He will also guide the development of the twelve technical committees at the heart of the P&E Group and coordinate the development of P&E-related conferences and short courses as part of his oversight responsibilities.

During his tenure as P&E Group Director, Gupta will continue his academic and research responsibilities with ME, where he has served as a faculty member since 1983. Gupta’s current research is focused on energy conversion, fuel conversion efficiency, environmental pollution, alternative fuel production, fuel reforming, waste-to-clean fuel conversion, propulsion and power. Beyond his primary research, Gupta is developing new fuels to enable clean and efficient combustion for powering advanced propulsion and power systems.

Creating New Frontiers

Professor Nikhil Chopra Leads NSF Grant on Wireless Sensors, Robotic Networks

Assistant Professor Nikhil Chopra was appointed principal investigator of a three-year National Science Foundation (NSF) grant examining fundamental issues in network control and distributed coordination of wireless sensor and robotic networks in August 2009. Chopra, who holds a joint appointment with the A. James Clark School of Engineering Institute for Systems Research (ISR), will lead the \$300K project, “Fundamental Advances in Control of Wireless Sensor and Robotic Networks,” which will potentially revolutionize the contemporary framework for understanding delay instability and spatio-temporal synchronization in cyber-physical systems.

A specialist in synchronization and control of networked dynamical systems, Chopra will investigate cyber-physical systems used in environmental monitoring, search and rescue, and health care with the assistance of ME undergraduate and graduate students, members of the ISR and local high school students, through the University of Maryland’s ESTEEM program. By exploiting the intrinsic properties of cyber-physical systems, Chopra and his research team will ensure stability, high performance, scalability and modularity despite deleterious network effects. Beyond performance testing, Chopra’s primary goal will be to develop a framework for control algorithms used in robotic systems with input/output communication delays. This framework will be applied to a communication management module for addressing medium access delays and data losses.

Chopra will also develop synchronization algorithms for real-time coordination between robotic systems and a scheme for ensuring clock synchronization. The results of this project will introduce methods for solving delay-instability, synchronization, and coordination problems in wireless sensor and robotic networks without sacrificing the system performance. The findings and methods gleaned from this project are expected to broadly impact current knowledge of wireless sensor and actuator networks, with express benefit to both private and public sector organizations and also expand the current ME curricula.



CHOPRA

A recipient of numerous scientific achievement awards, Chopra earned the William A. Chittenden Award for outstanding graduate research and the 2003 Vodafone Graduate Fellowship. In addition to his ME responsibilities, he serves as a Co-Chair, IEEE RAS Technical Committee on Telerobotics and a Reviewer for IEEE Transactions on Automatic Control, IEEE Transactions on Robotics, IEEE Transactions on Control Systems Technology, Automatica, SIAM Journal on Control and Optimization, and the Asian Journal of Control and Mechatronics.



Growing Ranks

ME Welcomes New Faculty, Dr. Amir Riaz

The Department is pleased to welcome Dr. Amir Riaz to the Clark School and ME community. Riaz joined ME in the Spring 2010 semester as a tenure-track Assistant Professor of Mechanical Engineering in ME's Thermo-Fluid and Energy Sciences Division. His instructional responsibilities will include co-teaching ENME 331: Fluid Mechanics with Professor Elias Balaras and developing a graduate-level computational multi-physics course, enabling students to combine knowledge from the areas of fluid dynamics, heat and mass transfer, and reaction effects into an integrated simulation framework.

Riaz began his association with ME in 2009 as a Research Assistant Professor. In his initial capacity with ME, Riaz continued his career-long investigation of methods for perturbation analysis of interfacial instability in multiphase flow and numerical methods for quantifying the long-term nonlinear evolution of unstable flow structures. Riaz brings years of experience in oil and gas reservoir management and carbon dioxide sequestration research to ME, along with a number of professional and academic accomplishments. He received his Ph.D. in Mechanical Engineering from the University of California, Santa Barbara (2003) and continued his research with a post-doctoral fellowship in petroleum engineering at Stanford (2003-2006).

Expanding on his research and instructional activities, Riaz holds memberships in several professional societies, including: the American Society of Mechanical Engineers (ASME); the American Physical Society (APS); the American Geophysical Union (AGU); Society

of Petroleum Engineers (SPE); the European Association of Geoscientists and Engineers (EAGE); and the Society of Industrial and Applied Mathematics (SIAM).

On the precipice of his first semester, Riaz was notably excited about his new position, "I see this...as a great opportunity to extend my work in exciting new directions with the help of brilliant graduate students here at UMD, which will help expand the frontiers of science in multiphase fluid mechanics." Riaz plans to use a unique strategy to establish a challenging, exciting classroom environment, "My approach will be to engage the students in a process of motivational and creative learning by encouraging an attitude of critical reasoning and problem solving...[and] demonstrating the application of foundational concepts to simple and clear, yet challenging, problems in everyday life and industry through both classroom instruction and interactive projects." Reflecting on the possibilities of impacting the field of mechanical engineering through his teaching, He added, "I look forward to...advancing knowledge in this field by working to establish a world class research effort based on...interdisciplinary and collaborative research."



RIAZ

Serving with Grace and Distinction

ME Staff Members Honored for Over 20 Years of Service

Veteran Department of Mechanical Engineering staff members Juanita Irvin and Isabelita Brown were honored for dutifully serving the A. James Clark School of Engineering at the school's 2009 Staff Appreciation Event. As two of twelve honorees, and the only ME staff to be honored, Irvin and Brown received stunning etched crystal awards from the Clark School in addition to engraved plaques, topped by a sculpted glass globe, from the University.

Irvin and Brown have been vital members of the ME administrative staff since the late 80s, with each serving in multiple capacities since beginning their respective tenures. Irvin currently manages financial matters for ME as the department's Senior Business Manager for the department, and Brown welcomes new staff while assisting existing ME employees with payroll and J-1 visa processing as one of the department's Payroll/Personnel Coordinators. Brown reminisced on the joy of welcoming new employees, "It's one of my favorite parts of the job." The joy and commitment Brown brings to the faculty, staff and students of ME is infectious and was noted by former ME Chair Dr. Avram Bar-Cohen. "Lita Brown is a fixture in the Department of Mechanical Engineering. There are few faculty who remember a time when she was not part of the administrative staff."



IRVIN



BROWN

As valued members of the ME community, Brown and Irvin are a continuing part of the success of ME, within and beyond the walls of UMD. Bar-Cohen remarks on the unquestionable value of both esteemed team members: "[they] are our treasures." With long, accomplished careers still ahead, both of these treasured employees are eagerly looking forward to contributing to the ME mission of education and community for the foreseeable future.

2009-2010 Ph.D. Graduates

Graduate name followed by title of dissertation and faculty advisor.

Summer 2009 (7)

Omar Abdelaziz Ahmed Abdelaziz (ENME)

Development of Multi-Scale, Multi-Physics, Analysis Capability and its Application to Novel Heat Exchanger Design and Optimization
Reinhard Radermacher

Mohamed Chookah Aleyabi (ENME)

Structuring a Probabilistic Model for Reliability Evaluation of Piping Subject to Corrosion-Fatigue Degradation
Mohammad Modarres

Ashis Gopal Banerjee (ENME)

Real-Time Path Planning for Automating Optical Tweezers Based Particle Transport Operations
Satyandra Gupta

Stephen Mark Brown (ENRE)

Development and Validation of Methodology for Fix Effectiveness Projection During Product Development
Ali Mosleh

Alan Lawrence Gershon (ENME)

Multi-scale Mechanical Characterization and Modeling of Hierarchically-Structured Materials: Synthetic Nano-Enhanced Polymers and Natural Palmetto Wood
Hugh Bruck

Eric Maxeiner (ENME)

Physics of Breaking Bow Waves: A Parametric Investigation Using a 2D+T Wave Maker
James Duncan

Jonathan M. Winkler (ENME)

Development of a Component Based Simulation Tool for the Steady State and Transient Analysis of Vapor Compression Systems
Reinhard Radermacher



Fall 2009 (11)

Ebrahim Saeed Abdulla Al-Hajri (ENME)

Prediction of Heat Transfer and Pressure Drop of Condensing Refrigerant Flow in a High Aspect Ratio Micro-Channels
Michael Ohadi

Mohamed Saeed Alshehhi (ENME)

Electrostatic Gas-Liquid Separation from High Speed Streams – Application to Advanced On-Line/On-Demand Separation Techniques
Michael Ohadi

Kevin A. Coyne (ENRE)

A Predictive Model of Nuclear Power Plant Crew Decision-Making and Performance in a Dynamic Simulation Environment
Ali Mosleh

Katrina M. Groth (ENRE)

A Data-Informed Model of Performance Shaping Factors for Use in Human Reliability Analysis
Ali Mosleh

Vinh Khuu (ENME)

Evaluation of Thermal Interface Materials and the Laser Flash Method
Michael Pecht

Sachin Kumar (ENRE)

Development of Diagnostic and Prognostic Methodologies for Electronic Systems Based on Mahalanobis Distance
Michael Pecht

Vivien Renaud Francis Lecoustre (ENME)

Numerical Investigations of Gaseous Spherical Diffusion Flames
Peter Sunderland

Mary F. Leibolt (ENME)

Noise Control of an Acoustic Cavity Coupled with a Vibrating Plate Treated with a Spatially Varying Constrained Viscoelastic Layer
Amr Baz

Lesia Moore Ross (ENRE)

Methodology for Detection and Assessment of the Impact of Informal Process on Organizational Output
Ali Mosleh

Varun Singh (ENME)

Development of an Advanced Heat Exchanger Model for Steady State and Frosting Conditions
Reinhard Radermacher

Calvin Homayoon Shirazi (ENRE)

Data-Informed Calibration and Aggregation of Expert Judgment in a Bayesian Framework
Ali Mosleh

2009-2010 Ph.D. Graduates (continued)

Spring 2010 (13)

Ihab A. Ali (ENME)

Characterization and Modeling of Two-Phase Heat Transfer in Chip-Scale Non-Uniformly Heated Microgap Channels
Avram Bar-Cohen

Vikrant Chandramohan Aute (ENME)

Single and Multiresponse Adaptive Design of Experiments with Application to Design Optimization of Novel Heat Exchangers
Shapour Azarm

Atul Bhargav (ENME)

Model Development and Validation of Palladium-based Membranes for Hydrogen Separation in PEM Fuel Cell Systems
Gregory Jackson

Edvin Cetegen (ENME)

Force Fed Microchannel High Heat Flux Cooling Utilizing Microgrooved Surfaces
Michael Ohadi

Gayatri Cuddalorepatta (ENME)

Evolution of the Microstructure and Viscoplastic Behavior of Microscale SAC305 Solder Joints as a Function of Mechanical Fatigue Damage
Abhijit Dasgupta

Luke Joseph Currano (ENME)

Latching Microelectromechanical Shock Sensor Systems: Design, Modeling and Experiments
Balakumar Balachandran and Miao Yu

Payam Delgoshaei (ENME)

Microscale Heat Transfer Measurements During Subcooled Pool Boiling of Pentane: Effect of Fluid Properties and Bubble Dynamics
Jungho Kim



James Daniel Diorio (ENME)

Experimental Investigations of Capillary Effects on Nonlinear Free-Surface Waves
James Duncan

Lei Nie (ENME)

Temperature Cycling Reliability of Reballled and Reworked Ball Grid Array Packages in SNPB and SAC Assembly
Michael Pecht

Rishi Raj (ENME)

Development of a Boiling Regime Map and Gravity Scaling Parameter for Pool Boiling Heat Transfer
Jungho Kim

Vineeth Vijayan (ENME)

Combustion and Heat Transfer In Meso-Scale Heat Recirculating Combustors
Ashwani Gupta

Shenglan Xuan (ENME)

Generic Dynamic Model for a Range of Thermal System Components
Reinhard Radermacher

Liyu Yang (ENRE)

End-of-Life and Constant Rate Reliability Modeling for Semiconductor Packages Using Knowledge-Based Test Approaches
Joseph Bernstein



(ENME) - Mechanical Engineering
(ENRE) - Reliability Engineering



RYAN JAMES, M.S. '10 AND FITZGERALD "FITZ" WALKER, GRADUATE ADVISOR



DIANA ORADEI, B.S. '10 AND JASMINE WHITTAKER, B.S. '10

(CECD) - Energetic Concepts
(ENME) - Mechanical Engineering
(ENRE) - Reliability Engineering

2009-2010 M.S. Graduates

Summer 2009 (9)

Farhan Choudhary (ENME)

Balakumar Balachandran

Payam Delgoshaei (ENME)

Jungho Kim

Timothy Fitzgerald (ENME)

Balakumar Balachandran

Nicholas Garcia (ENME)

Balakumar Balachandran

Jennifer Ezu Hu (ENME)

Gregory Jackson

Sachin Kumar (ENRE)

Michael Pecht

Yasir Majeed (ENME)

Abhijit Dasgupta

Grigorios Panagakos (ENME)

Elias Balaras

Rishi Raj (ENME)

Jungho Kim

Fall 2009 (10)

Andrew Charles Chaloupka (ENME)

Peter Sandborn

Kaushik Chatterjee (ENME)

Mohammad Modarres

Gaurav Chawla (ENME)

Santiago Solares

Dae Il Kwon (ENME)

Michael Pecht

Alexander Blacque Meissner (ENME)

Michael Zachariah

Andrew Noel O'Connor (ENRE)

Ali Mosleh

Lyudmyla Panashchenko (ENME)

Michael Osterman

Siddharth Patel (ENME)

Gregory Jackson

Masoud Rabei (ENRE)

Mohammad Modarres

Matthew Brody Tucker (ENME)

Teng Li

Spring 2010 (12)

Thomas James Brodrick (ENME)

William Fourney

John Bush (ENME)

Reinhard Radermacher

Matthew Charles Colvin (ENME)

Amr Baz

John William Gerdes (ENME)

Satyandra Gupta

Rubyca Jaai (ENME)

Michael Pecht

Ryan Thomas James (ENME)

Ashwani Gupta

Mark Alan Levin (ENRE)

Donald Barker

Marc Jon Montemerlo (ENRE)

Mohammad Modarres

Andrew C. Mueller (ENME)

Reinhard Radermacher

Jessica Elizabeth Rajkowski (ENME)

Sarah Bergbreiter

Michael Siemann (ENME)

Jungho Kim and Nikhil Chopra

Scott Austin Yamada (ENME)

William Fourney

2009-2010 M. Eng. Graduates

Professional Master of Engineering Program

Summer 2009 (3)

Seth Adams (ENME)

Kevin Bailey (ENME)

Timothy J. Eller (ENME)

Fall 2009 (5)

John B. Fogle (ENME)

Abraham Micheal (ENME)

Miguel Angel Polanco (ENME)

Adam Brand (CECD)

Michael Tinnirello (CECD)

Spring 2010 (10)

Jose Luis Gines (ENME)

Mason A. Green (ENME)

Brian Grubel (ENME)

Tyler Jones (ENME)

Chang Hyun Lee (ENME)

Noah A. O'Connor (ENME)

Matthew Phillip Para (ENME)

Lalinde Mauricio Perez (ENME)

Scott Eric Posey (ENME)

David Ralph Redding (CECD)

Faculty* Awards and Recognition

The Annual Faculty Awards Reception was held on May 14, 2010. This event brings together the mechanical engineering family to celebrate our faculty's achievements. (May 2009 – May 2010)

External Awards

- Avram Bar-Cohen** - Recipient of the Luikov Medal, ICHMT
- Yunho Hwang** - Distinguished Service Award, ASHRAE
- Ali Mosleh** - Elected to the National Academy of Engineering
- Michael Pecht** - 2010 Exceptional Technical Achievement Award, IEEE Components Packaging and Manufacturing Technology Society
- Alex Severinsky** - 2009 Thomas A. Edison Award, ASME
- Peter Sunderland** - NSF CAREER Award

Society Fellows

- Bala Balachandran** - Elevated to AIAA Fellow
- Michael Pecht** - Elevated to SAE Fellow

Publication Awards

- Shapour Azarm** (with Mian Li and Nathan Williams) - Best Paper Award, "Interval Uncertainty Reduction and Single-Disciplinary Sensitivity Analysis with Multi-Objective Optimization," 2009 Design Automation Conference, ASME
- Sarah Bergbreiter** (with Aaron P. Gerratt and Ivan Penskiy) - Best Conference Paper, "Integrated Silicon-PDMS Process for Microrobot Mechanisms," 2010 IEEE International Conference on Robotics and Automation
- Ali Mosleh** (with Brian J. Hall) - Evans-McElroy Award for 2009 Best Paper, "Bayesian Methods for Evaluating Reliability Growth of Discrete Systems under a Delayed Corrective Action Strategy," 2009 Annual Reliability and Maintainability Symposium, RAMS
- Ali Mosleh** (with R. Kazemi-Tabriz and M. Dierks) - Best Paper Award, "Methodology to Manage Risk in Complex Healthcare Settings," 2009 Annual Conference of the Society for Risk Analysis
- Peng Wang** - 2009 Outstanding Reviewer Award, Journal of Heat Transfer, ASME



BRUCK



JACKSON

University Promotions and Appointments

- Moustafa Al-Bassyouni** promoted to Research Assistant Professor
- Hugh Bruck** promoted to Professor
- Greg Jackson** promoted to Professor
- Amir Riaz** appointed Assistant Professor
- Peter Sunderland** promoted to Associate Professor, with tenure

Patent and Invention Recognition

- Avi Bar-Cohen and Bao Yang**, "Thermal Management of Systems Having Localized Regions of Elevated Heat Flux," (U.S. Patent 7,654,311)
- Serguei Dessiatoun**, "Compact Heat Exchanging Device Based on Micro-fabricated Heat Transfer Surfaces," (U.S. Patent 7,571,618)
- Don DeVoe** (with Cheng Lee), "Two-dimensional Microfluidics for Protein Separations and Gene Analysis," (U.S. Patent 7,641,780)
- Henry Haslach** (with James Borrelli), "Crutch-Like Mobility Assist Device with Rotatable Footer Assembly," (U.S. Patent 7,581,556)
- Henry Haslach** (with James Borrelli), "Tilttable Underarm Support Mechanism and Crutch-like Mobility Assist Device Using Same," (U.S. Patent 7,673,640)
- Miao Yu** (with Hyungdae Bae) - Finalists, Physical Sciences, Office of Technology Commercialization, University of Maryland

** The Faculty Awards list includes: Tenured/Tenure-Track Faculty, Research Scientists, Lecturers & select Affiliated & Emeriti Faculty.*



HWANG



MOSLEH

Mechanical Engineering Research Review Day 2010 - Best Posters

OVERALL BEST POSTER

In-Mold Assembly: A New Approach to Assembly Automation
 Student: **Wojciech Bejgerowski**
 Category: Advanced Manufacturing and Design

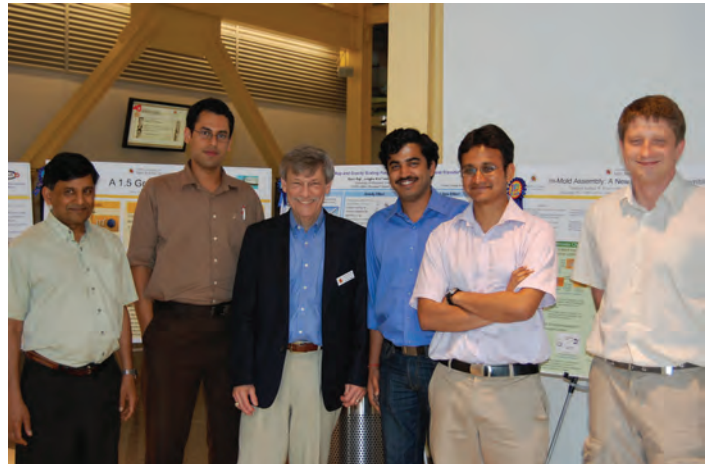
Poster: *Cold Welding Phenomenon in Adhesively Bonded Flip-Chip Interconnects*
 Student: **Koustav Sinha**
 Category: CALCE, Risk and Reliability

Poster: *Pressure-Based Prediction of Single-Phase Spray Cooling Heat Transfer*
 Student: **Bahman Abbasi**
 Category: Fluid, Flow and Thermal Dynamics (tie)

Poster: *Boiling Regime Map and Gravity Scaling Parameter for Pool Boiling Heat Transfer*
 Student: **Rishi Raj**
 Category: Fluid, Flow and Thermal Dynamics (tie)

Poster: *Waste to Energy via Effective Char and Tar Reduction*
 Student: **Henry Molintas**
 Category: Fuels, Combustion and Energy Systems

Poster: *A 1.5 Gram Ornithopter*
 Student: **Dana Vogtmann**
 Category: Mechanics and Micro/Nano Systems



LEFT TO RIGHT: PROFESSOR A. GUPTA, BAHMAN ABBASI, DEPARTMENT CHAIR A. BAR-COHEN, RISHI RAJ, KOUSTAV SINHA, WOJCIECH BEJGEROWSKI

Student Awards and Recognition

On April 21, 2010, the A. James Clark School of Engineering hosted the annual Undergraduate Honors and Awards Ceremony. The following is a list of honorees from the Department of Mechanical Engineering.

A. James Clark School of Engineering International Student Service Award

Presented to a student who demonstrates significant involvement in international engineering activities through leadership or service.
 Ethan Schaler

Department of Mechanical Engineering Academic Achievement Award

Presented to ME juniors who have attained the highest scholastic average.
 James Maresco Ethan Schaler
 Dylan Rebois

Dinah Berman Memorial Award

Presented to an engineering student who has combined academic excellence with demonstrated leadership or service to the Clark School as a freshman and sophomore.
 Dylan Rebois

Keystone Design Challenge Award

Presented to freshmen engineering design team participants who built an autonomously controlled hovercraft that completed a specified course in the minimum amount of time.

Spring 2009 Competition Winners:
 Jeffrey Braun Xiaoting Hu
 Harlan Friddle Lorin Willett
 Fall 2009 Competition Winner: Michael Lukas

Outstanding Engineering Co-op/Intern Award

Presented to students who have demonstrated scholastic excellence, exceptional work performance and remarkable potential for a successful engineering career while participating in a cooperative learning or internship position.
 Bizhan Zhumagali

Women in Engineering Service Award

Presented to the engineering student who has contributed most to furthering the advancement of women in engineering.
 Laura Anne Meyer

Student Awards and Recognition *(continued)*

The Mechanical Engineering Student Awards Reception was held on May 5, 2010. The annual event is held to recognize our students who received awards, fellowships, or scholarships during the past year.

Society of Automotive Engineers Service Award

Presented to an SAE member for outstanding service and contributions to the student chapter.

David Eng

Truman Award (NATIONAL)

The prestigious merit-based scholarship is presented each year to 60 college juniors who have demonstrated outstanding leadership and wish to attend graduate school in preparation for careers in government or public service.

Dylan Rebois

Udall Scholarship (NATIONAL)

The Udall Scholarship program recognizes 80 future leaders across a wide spectrum of environmental fields, including policy, engineering, science, education, urban planning and renewal, business, health, justice and economics.

Dylan Rebois

Graduate Awards

ASHRAE Scholarship by National Chapter

Presented to an outstanding ME graduate specializing in the HVAC area.

Jiazhen Ling

Best Dissertation

“Real-Time Path Planning For Automating Optical Tweezers Based Particle Transport Operations”

Ashis Banerjee

Best Thesis

“Modeling and Simulation of Shock and Drop Loading for Complex Portable Electronic Systems”

Alex Farahani

C. Raymond Knight Scholarship Award in Reliability Engineering

Presented to an outstanding student who best exemplifies interdisciplinary scholarship achievement.

Chao Hu

Masoud Rabiei

Dean’s Doctoral Research Award

Provided by the Clark School dean to give top doctoral student researchers special recognition.

Edvin Cetegen

Educational Advancement Foundation Graduate Scholarship

Presented by Alpha Kappa Alpha Sorority, Inc.

Sophoria Westmoreland

Future Faculty Program

Presented to outstanding Clark School Ph.D. students intending to pursue academic careers at prestigious engineering schools

Ali Al-Alili

Sophoria Westmoreland

Christine Ikeda

Zhao Zhang

Ishita Chakraborty

NSBE Graduate Student of the Year

Presented by the National Society of Black Engineers to a graduate student who displays exceptional academic achievements, extracurricular activities, personal accomplishments and leadership in engineering or other technical fields.

Sophoria Westmoreland

Mike Shinn Distinguished Member of the Year Award

Presented by the National Society of Black Engineers to a member that has exemplified all that the NSBE mission embodies, thereby encouraging members to continually strive for academic excellence while developing professional skills through organization and community involvement.

Sophoria Westmoreland

National Society of Black Engineers BCA Scholarship

Presented by the National Society of Black Engineers to an outstanding graduate student.

Patrice Gregory

Student Papers, Posters and Travel Grants

ASME Applied Mechanics Division Student Paper Competition Finalist (2009)

Presented to 15 nationwide finalists.

Zhao Zhang

ASME Applied Mechanics Division Travel Grant (2009)

Provided by ASME to attend the International Engineering Congress and Exposition.

Zhao Zhang

Graduate Research Interaction Day 2010 “Advances in Technology, Biotechnology”

Chandradip Patel

Graduate Research Interaction Day 2010 “Pushing the Boundaries of Science”

Rishi Raj

Graduate Research Interaction Day 2010 “Technology in the 21st Century”

Dana Vogtmann

NASA Travel Stipend for Aircraft Airworthiness & Sustainment 2010 Conference

Masoud Rabiei

SHS Best Graduate Paper

William Herring



The Department was pleased to host the annual meeting of the Visiting Committee on April 27, 2010

Visiting Committee Members

Mostafa Aghazadeh, Director
Intel Corporation

Arthur Bergles, Emeritus Professor
Rensselaer Polytechnic Institute

Aris Cleanthous, Engineering Manager
DeWalt Power Tools

George Dieter, Emeritus Professor
University of Maryland

Howard Harary, Acting Director
National Institute of Standards and Technology

Ed Lewis, CEO
Industrial Info Resources

T.G. Marsden, Vice President
Automotive Products
Bowles Fluidics Corporation

John Miller, Director
U.S. Army Research Laboratory

Hratch Semerjian, President
Council for Chemical Research

Alex Severinsky, Founder and CEO,
Fuelcor, LLC
Chairman Emeritus, PAICE, LLC

Sheldon Shapiro, Executive Vice President
Shapiro & Duncan, Inc.

Susan Skemp, Executive Director
Florida Atlantic University

Tom Stricker, Director - Corporate Manager
Toyota Motor North America, Inc.

Ward Winer, Chair Emeritus
Georgia Tech University

Mechanical Engineering Seminar Series

The Department was pleased to host the following seminar speakers throughout the year:

October 2, 2009

Metin Sitti, Ph.D.
Carnegie Mellon University
Miniature Mobile Robots Down to Micron Scale

October 30, 2009

Charles 'Chuck' Tucker III, Ph.D.
University of Illinois at Urbana-Champaign
Predicting Process-Induced Microstructure in Molded Composites

November 6, 2009

Eckart Meiburg, Ph.D.
UC Santa Barbara
Computational Investigation of Gravity and Turbidity Currents

November 13, 2009

Sulin Zhang, Ph.D.
Penn State University
Learning From the Bad: Virus-Inspired Design of Nanoparticles for Cell-Type Specific Drug Delivery

November 20, 2009

Mohamed El-Genk, Ph.D.
University of New Mexico
Space Reactor Power Systems for Enabling Deep Space Exploration Mission and Human Outposts

December 4, 2009

Ishwar Puri, Ph.D.
Virginia Tech
Transport of Magnetic Nanoparticles: Fundamentals and Applications

February 19, 2010

Huajian Gao, Ph.D.
Brown University
Probing Mechanical Properties of Nanostructured Materials via Large Scale Molecular Dynamics Simulations and Continuum Mechanics Modeling

February 26, 2010

David Barton, Ph.D.
University of Bristol (UK)
Bifurcation Analysis without a Model

March 12, 2010

Cornelis Peters, Ph.D.
Petroleum Institute (UAE)
Carbon Dioxide: A Blessing and a Nuisance

March 26, 2010

Daesung Bae, Ph.D.
Hanyang University (Seoul)
Development of Multi Rigid and Flexible Body Analysis Program

April 2, 2010

Jane H. Davidson, Ph.D.
University of Minnesota
SunGas: Renewable Thermochemical Fuels

April 16, 2010

Millard S. Firebaugh, Ph.D.
University of Maryland
Designing and Engineering Complex Systems

April 23, 2010

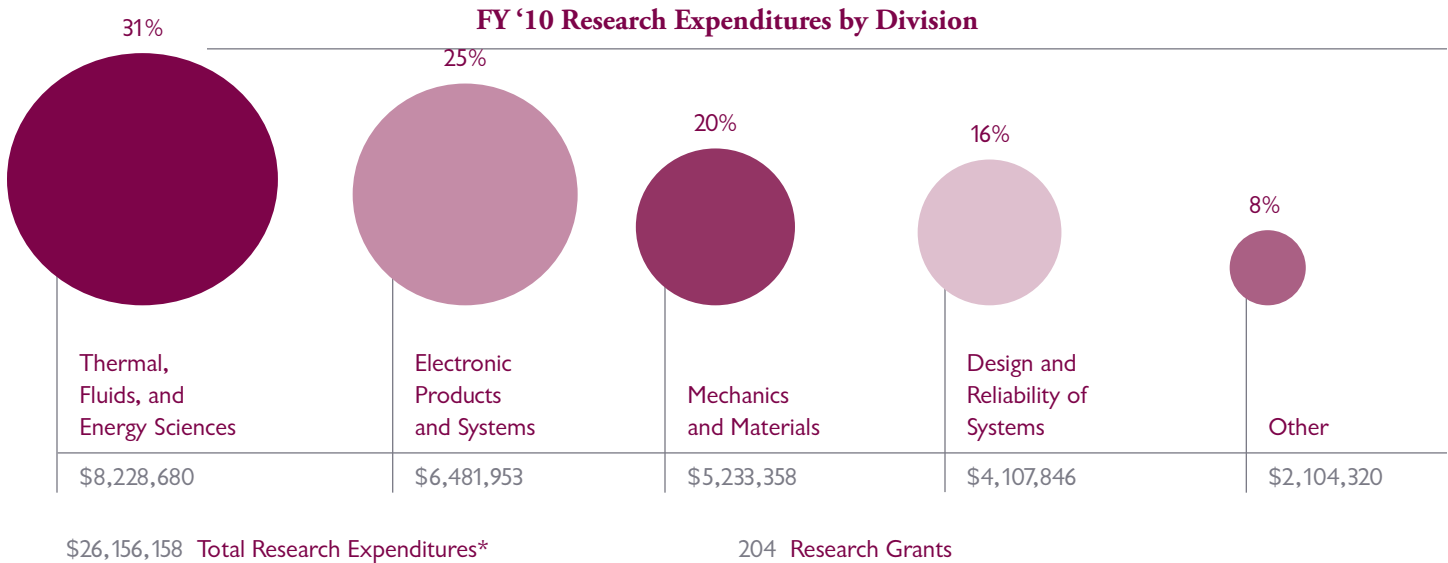
Patricia Davies, Ph.D.
Purdue University
Predicting the Impact of Noise on People: One Part of Perception-Based Engineering

For more information about our seminar series, please visit
www.enme.umd.edu/seminars



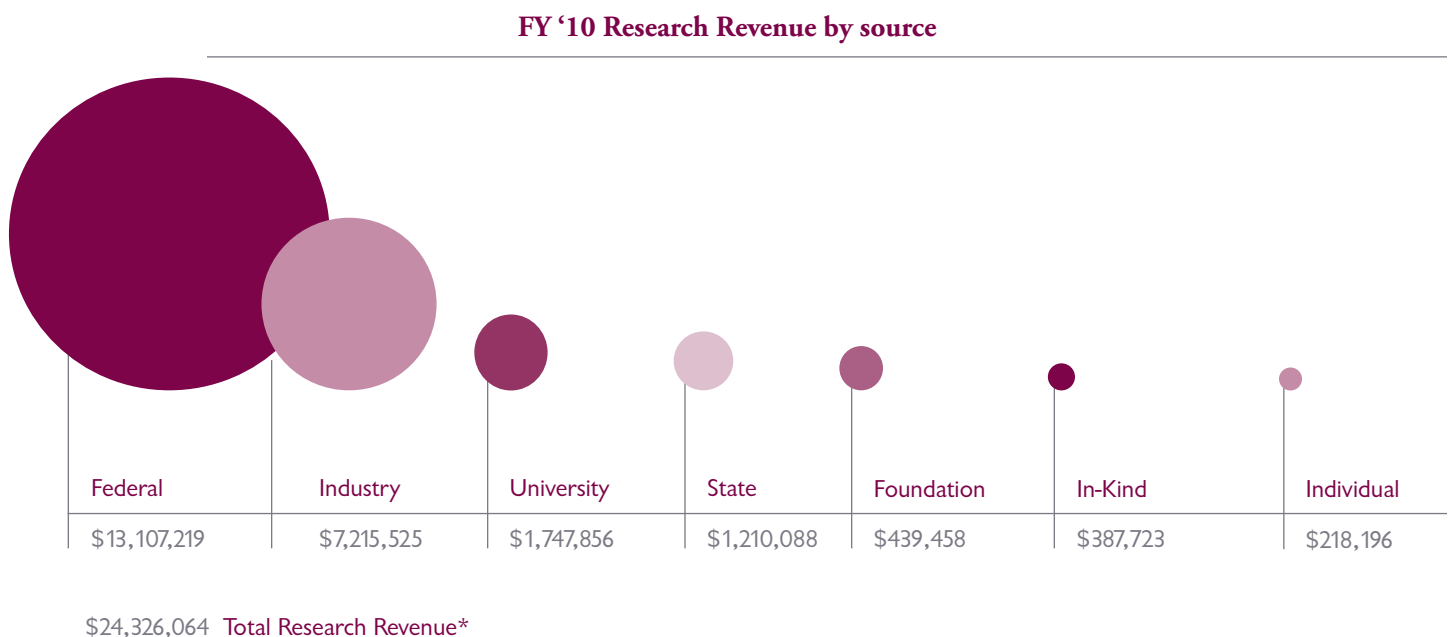
Research Expenditures

FY '10 fiscal expenditures, displayed according to research area in the chart below, indicate that 31% of the expenditures were from the Thermal, Fluids, and Energy Sciences division; 25% were from the Electronic Products and Systems division; 20% from the Mechanics and Materials division; and 16% from the Design and Reliability of Systems division.



Research Revenue

In FY '10, ME faculty participated in a variety of research efforts across the field of mechanical engineering with support from the federal and private sectors and numerous corporate contracts.



*Instructional expenditures and revenue not included in these totals.

Gold Club: ME's Top Fundraisers

Eleven faculty from the department were among the top in research funding for FY '10, bringing in \$500,000 or more:

Davinder K. Anand

Professor Emeritus of Mechanical Engineering
Director, Center for Energetic Concepts Development

Avram Bar-Cohen

Distinguished University Professor

Jaydev Desai

Associate Professor of Mechanical Engineering
Director, Robotics, Automation, and Medical Systems (RAMS) Laboratory

Don DeVoe

Professor of Mechanical Engineering
Director, Maryland MEMS and Microfluidics Laboratory

James Duncan

Professor of Mechanical Engineering
Keystone: Clark School Academy of Distinguished Professors

Satyandra (S.K.) Gupta

Professor of Mechanical Engineering
Director, Maryland Robotics Center

Mohammad Modarres

Professor of Mechanical Engineering

Michael Pecht

George E. Dieter Professor of Mechanical Engineering
Director, Center for Advanced Life Cycle Engineering (CALCE)

Reinhard Radermacher

Professor of Mechanical Engineering
Director, Center for Environmental Energy Engineering (CEEE)

Elisabeth Smela

Associate Professor of Mechanical Engineering

Michael Zachariah

Professor of Mechanical Engineering and Chemistry
Director, Center for NanoEnergetics Reserach
Director, Center for Nano Manufacturing and Metrology



FY 2009-10

Top Federal Sponsors

DARPA
Department of Energy
Department of Homeland Security
DTRA
Missile Defense Agency
NASA - Glenn Research Center
NIH
NIST
NRC
NREL
NSF
U.S. Air Force
U.S. Army
U.S. Navy

Top Corporate Sponsors

Wyle Labs
The Boeing Company
Northrop Grumman Corporation
Honeywell International, Inc.
ATEC
Applied Nanotech
Lockheed Martin Corporation
Sea Solar Power International, LLC
Strategic Analysis, Inc.
General Electric Company
LG Electronics
Ortho-Clinical Diagnostics, Inc.
Energetics Technology Center
OTEC International
Raytheon Company
Dell, Inc.
Rockwell
Qualtech, Inc.
Whirlpool Corporation
Schlumberger, Ltd.
Sherwin-Williams Company

FY 2009 Research Sponsors

American I.V. Products, Inc.
 Ames Laboratory
 Applied Nanotech Holdings, Inc.
 Arçelik A.S.
 ASEE
 ASHRAE
 ATEC, Inc.
 Atlantic Inertial Systems
 Axsys Technologies
 BAE Systems
 Baker Hughes, Inc.
 Bechtel Corporation
 Beijing CAPE Computer Software System
 Engineering Corporation
 Black & Decker
 Boeing Company
 Booz Allen Hamilton, Inc.
 Cabot Corporation
 Carrier Corporation
 Chesapeake Pharmacy
 Circle Sound Recording Studio
 Coca-Cola Company
 Complete Book & Media Supply, Inc.
 Curran Associates, Inc.
 CustomPartNet, Inc.
 Daikin Industries, Ltd.
 Daikin U.S. Corporation
 Chrysler
 Danfoss Shahua
 Defense Microelectronics Activity (DMEA)
 Defense Threat Reduction Agency
 Dell, Inc.
 Delphi
 Delta Chemical Corporation
 Delta Engineering Corporation
 DENSO Corporation
 Department of Homeland Security
 DOD-Army Research Lab
 DOD-Navy ONR
 DOE
 Dri-Eaz Products, Inc.
 DSTL
 DTRA
 E. K. Fox & Associates, Ltd.
 E.A.D.S.
 EG&G
 Electric Power Research Institute (EPRI)
 Electronic Technologies Corporation (ETC)
 EMC
 Emerson Appliance Controls
 Emerson Climate Technologies, Inc.
 Emerson Network Power
 Emerson Rosemount, Inc.
 ETC
 Exxon Mobil Corporation
 Fairchild Controls Corporation
 Fastenal Company
 Frontier Technology, Inc.
 GE Aviation
 GE Fanuc Embedded Systems, Inc.
 GE Global Research
 GE Healthcare
 General Dynamics Corporation
 General Electric Company
 General Vortex Energy, Inc.
 George Weston Bakeries, Inc.
 Georgia Tech University
 Godrej and Boyce MFG, Co., Ltd.
 Goodrich Control Systems, Ltd.
 Gree Electric Appliances, Inc.
 Guentner Company
 Hamilton Sundstrand
 Harris Corporation
 HHS
 Honeywell International, Inc.
 Hussmann Corporation
 II-VI Foundation
 Impact Education, LLC
 Industrial Technology Research Institute
 Iowa State University
 Jaggi-Gunter-Schweiz
 Johns Hopkins University-Applied Physics
 Laboratory
 Johnson Controls, Inc.
 Juniper Networks, Inc.
 Kanold Lab
 Kemet Electronics Corporation
 Kipp Visual Systems, Inc.
 KJB Motorsports
 Koch Industries, Inc.
 LG Electronics
 Lockheed Martin Corporation
 Logitrade
 Lutron
 Luvata Grenada, LLC
 ManTech
 Marlow Industries, Inc.
 Marriott International, Inc.
 McQuay
 MEI Technologies, Inc.
 Microsoft Corporation
 Midori Book Store, Co.
 Ministerie van Verkeer en Waterstaat
 MIPS Technologies, Inc.
 Missile Defense Agency (MDA)
 Mitsubishi Plastics, Inc.
 Modine
 Montgomery County Government
 Muniz Engineering, Inc.
 NASA Ames Center
 NASA Goddard
 NASA Shared Services Center
 NAVAIR
 NetApp
 Netherlands Directorate
 NIH
 NIST
 Nokia Siemens Network
 Northrop Grumman Corporation
 NovelAire Technologics
 NRC
 NSF
 NSWC
 Ortho-Clinical Diagnostics, Inc.
 Park Electrochemical Corporation
 Petroleum Institute
 Philips Electronics
 Philips Lighting
 PRENAX AB
 Qualtech, Inc.
 Raytheon
 Research in Motion, Ltd.
 Resin Designs, LLC
 Resin Technology Group, LLC
 Rockwell Automation, Inc.
 Rockwell Collins
 Rolls Royce Motor Cars, Ltd.
 SAE International
 SAIC
 Samsung Electro Mechanics
 Sanden
 Sandia National Laboratories
 Sanyo Electric Co., Ltd.
 SC Johnson & Son, Inc.
 Schlumberger Limited
 Schweitzer Engineering Laboratories, Inc.
 Scriba Welding, Inc.
 Shanghai Hitachi Electrical Appliances, Co.,
 Sherwin-Williams Company
 Silicon Power Corporation
 SolarEdge Technologies, Inc.
 Soze, LLC
 Sub-Zero, Inc.
 Sun Microsystems, Inc.
 SURVICE Engineering Company
 Techno-Sciences, Inc.
 TEDCO
 TEKELEC
 Teradyne, Inc.
 Toyota Motor North America, Inc.
 Trane Company
 Trigen Energy Corporation
 TRX Systems, Inc.
 U.S. AFOSR
 U.S. Army (ARO)
 U.S. Army Research Laboratory (ARL)
 U.S. Coast Guard
 UC Berkeley
 UMF
 United Technologies Research Center
 Universal Technical Resource Services, Inc.
 University of Rhode Island
 University of Utah
 USAMSAA
 Van Dorn Pools & Spas, Inc.
 Vectron International, Inc.
 Vestas
 Virginia Polytechnic Institute and State
 University
 Virtual EM, Inc.
 Voronstov
 W.L. Gore & Associates
 Washington Hospital Center
 Weil, Gotshal & Manges, LLP
 Western, Hattori, Daniels, & Adrian, LLP
 Weyrauch
 Whirlpool Corporation
 William Andrew Publishing
 Wispry, Inc.
 Wolverine Tube, Inc.
 Wyle Lab
 Yale University
 Zathus Networks, Inc.

Scholars Today, Leaders Tomorrow

ME Junior Dylan Rebois Receives Two Prestigious Honors in Two Months



REBOIS

For many undergraduates, achieving elite scholastic honors can be an exceptional chore. For Mechanical Engineering Junior Dylan Rebois, it is a walk in the park. Rebois demonstrated his seemingly effortless aptitude for garnering elite academic honors when he received the 2010 Harry S. Truman Scholarship and the 2010 Morris King Udall Scholarship in a two-month period.

In March 2010, Rebois was named a 2010 Truman Scholar by the Harry S.

Truman Scholarship Foundation, a notable honor bestowed on only 60 college juniors nationwide. As one of the elite minority to earn the Truman Scholarship, Rebois became the second UMD Mechanical Engineering student to receive the award in two years, following 2008 award winner Phillip Hannam. Truman Scholars are chosen by a selection panel composed of a university president, a federal judge, a distinguished public servant and a past Truman Scholar. The \$30,000 merit-based scholarship is presented each year to college juniors who have demonstrated outstanding leadership and wish to attend graduate school in preparation for careers in government or public service.

Less than a month after receiving the Truman Scholarship, Rebois was honored again as a recipient of the 2010 Morris King Udall Scholarship. In receiving the Udall Scholarship, Rebois again found himself in exclusive company. Rebois was one of 80 Udall Scholarship recipients and one of only two University of Maryland students to receive the honor. Established by the U.S. Congress to honor former

Congressman Morris King Udall's 30-year legacy of public service, the Udall Scholarship program provides up to \$5000 for tuition and other educational expenses in recognition of future leaders in environmental fields such as policy, engineering, science, education, urban planning and renewal, business, health, justice and economics.

With his reception of the Truman and Udall Scholarships, Rebois adds two more honors to his already extensive collection of academic achievements. An Honors College member and Gemstone Program veteran, Rebois was previously a Banneker-Key scholar in 2008. In addition to his academic honors, Rebois has dedicated himself to serving the UMD and global communities as a member of the UMD Engineers without Borders chapter and numerous Student Sustainability Committees. As a member of Engineers without Borders, Rebois served as design leader during the group's recent excursion to Burkina Faso and project leader on the chapter's work in Ethiopia.

Beyond his contributions to Engineers without Borders, Rebois champions on-campus sustainability initiatives by maintaining appointments on three UMD environmental regulation committees: the Student Sustainability Committee, the Student Subcommittee of the University Sustainability Council, and the University Climate Action Plan Workgroup. Rebois easily and eagerly balances his multiple responsibilities while maintaining a perfect 4.0 average and conducting incisive research into micro-combustion visualization with Professor Christopher Cadou. Between his community-focused dedication to academics and his impressive collection of academic honors, Rebois is quickly becoming one of ME's most decorated undergraduates and cementing a path to unquestionable leadership in community-based and environmentally-focused mechanical engineering.

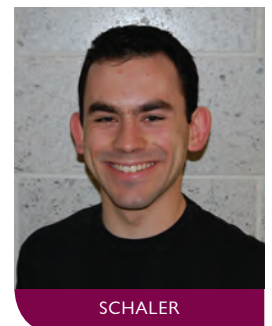
Tomorrow's Faculty

ME Junior Ethan Schaler Wins Coveted Goldwater Scholarship

The A. James Clark School of Engineering and the Department of Mechanical Engineering are proud to add ME junior Ethan Schaler to their extensive roster of honored students. Schaler is a recent recipient of the 2010-11 Goldwater Scholarship. Created by the U.S. Congress in 1986 to honor Senator Barry M. Goldwater, the Goldwater Scholarship is a premier academic achievement award granted to undergraduate students majoring in mathematics, natural sciences and engineering who are interested in research careers. The scholarship includes up to \$7500 in need-based financial assistance and is awarded annually to 300 sophomore and juniors based on academic merit, research experience and career objectives.

As one of the select few to receive the Goldwater Scholarship, Schaler expands on his growing list of superb academic and extracurricular achievements. The ME junior maintains a 4.0 GPA and conducts research on Micro-Electro Mechanical Systems (MEMS) fabrication with

Prof. Sarah Bergbreiter while juggling a number of responsibilities beyond the classroom, including membership in the UMD Engineers without Borders chapter and participation in international research opportunities. As a member of Engineers Without Borders, Schaler served as co-leader on a local project investigating storm-water management on the Anacostia River, and he played a major role in the chapter's recent sojourns to Burkina Faso and Peru. In addition to his international experiences with Engineers Without Borders, Schaler recently returned from Japan after completing a semester of study at Tohoku University and participating in research projects at RIKEN, one of Japan's largest



SCHALER

(continued on page 21)



Honoring the Future, Today

Celebrated Ph.D. Candidate Adds Awards to a Prestigious Collection

True skill and achievement rarely go unnoticed, a fact that celebrated ME Ph.D. candidate Sophoria “Nikki” Westmoreland can easily prove. Since joining the ME doctoral program in 2005, Westmoreland has been consistently recognized for her talent, innovation and academic achievements by numerous local and national organizations. With a substantial list of awards and fellowships to her name, Westmoreland, whose doctoral research concentrates on engineering design decision-making, has emerged as one of ME’s most decorated and promising doctoral candidates. This year, Westmoreland added two venerated awards from the National Society of Black Engineers (NSBE) to her collection: 2010 Graduate Student of the Year and the 2010 Mike Shinn Distinguished Member of the Year (Female).

Westmoreland received both awards at the 13th Annual Golden Torch Awards ceremony, held during the 2010 NSBE National Convention. Each award represents NSBE’s commitment to honoring the academic and professional achievements of forward-thinking engineers and student engineers of African descent. The NSBE Graduate Student of the Year award is given to a graduate student with a high GPA, documented research activities, published articles, and a demonstrated capacity for contribution and leadership in engineering or other technical fields. Similar in purpose to the Graduate Student of the Year award, the NSBE Mike Shinn Distinguished Member of the Year award presents a \$7,500 scholarship and Golden Torch Award to one male and one female member who embodies the NSBE mission. Judging for both the Shinn and Graduate Student of the Year awards is based on the fulfillment of the NSBE mission through participation in NSBE programs and other activities.

A humbled Westmoreland expressed thanks to all who supported her academic and professional endeavors, including her parents who were in attendance. “[They] sacrificed all they had for me. I know that I would not be here today if not for them.” After graciously accepting the awards at the Golden Torch ceremony, Westmoreland stated, “Words will...not adequately describe the feeling I have about accepting these prestigious awards. I am completely honored and I feel like I have been invited to join an elite club of aristocratic scholars including the past award winners and future award winners.” She added, “These awards confirmed something I already knew...people see everything I do and they see why I do it and this was a chance to honor that. This award is also important because it will allow me to be a ‘face’ for black women in engineering and sciences.”

Former ME Chair Avram Bar-Cohen spoke to Westmoreland’s capacity to be a role model, “We are extremely proud of her achievements

and delighted that one of our students can be such a compelling role model for young women considering careers in engineering and science.” He added, “Ms. Sophoria Westmoreland exemplifies the very best qualities of students in the ME graduate program – bright, self-motivated, and dedicated to using engineering principles to create a better future.”



WESTMORELAND

Westmoreland, who received a B.S. in mechanical engineering from Georgia Tech and a B.S. in general engineering (mechanical engineering concentration) from Clark Atlanta University, chose the Department of Mechanical Engineering at the University of Maryland (UMD) as the home of her masters and doctoral studies “because...The Clark School had a good reputation and was recommended by one of my undergraduate professors...[and] a close friend who is a recent ME alumna.” Westmoreland’s advisor Linda Schmidt, associate professor of mechanical engineering, commented on the dedication and enthusiasm that has fueled Westmoreland’s academic career at UMD, “She didn’t want to isolate herself just in her own work and wait to help others after she graduated. Nikki was willing to work harder to incorporate activities important to her with her graduate work.” Schmidt added, “Nikki’s commitment to contributing to the campus community...is stronger than that of any student I have met.”

In addition to her recent NSBE awards, Westmoreland has won numerous other awards, including a ‘Bridge to the Doctorate’ National Science Foundation Fellowship and a 2009 Alfred P. Sloan Foundation Minority Ph.D. Program Fellowship, sponsored by the National Action Council for Minorities in Engineering (NACME). Westmoreland is also a proud member of several professional and academic societies such as the ASME, ASEE, the Black Engineers Society (BES), and the Clark School’s Future Faculty Program. Currently, she conducts cognitive task analysis of undergraduate student design teams and their training. Westmoreland also investigates practices in current sketch level schemes/creating new coding schemes, the importance of sketching to engineering design students, and correlations between grades and report quality. To further her research in these areas, she is currently serving as a Teaching Assistant for the senior Capstone Design course, ENME 472: Integrated Product and Process Development. After completing her doctoral program, Westmoreland plans to pursue a career in academia.

Tomorrow’s Faculty *(continued)*

science and technology research centers, for the past two summers.

Upon completion of his undergraduate studies, Schaler plans to pursue a PhD in mechanical engineering with a focus on nanotechnology. Specifically, he intends to focus his post-graduate and professional

research on developing mobile (walking, jumping, flying, etc.) and networked micro-robots. Schaler hopes to parlay his PhD into a faculty appointment at a university or government research institute where he can continue to research MEMS while joining the ranks of the same innovative community that guided him towards academic success.

Terps Racing Experience Leads to Thrilling Summer Internships Seniors Watson, Guarino Apply ME Coursework to Automotive Design Internships

ME undergraduates and Terps Formula SAE racing team members Chris Watson and Will Guarino both earned unprecedented opportunities to transfer their academic knowledge into real-world experiences last summer. Watson and Guarino participated in summer internship programs with Joe Gibbs Racing (NASCAR) and Ford Motor Company's Research and Advanced Engineering department, respectively, where they put their race experience and technical know-how to the ultimate test.

Chris Watson applied his knowledge of fluid dynamics (ENME 332) at Joe Gibbs Racing where helped validate the theory behind a new computational fluid dynamics model. He implemented the model within Ford's software and designed a physical test for comparison. Watson stated that he tried to incorporate everything he's learned at UMD to "get the most realistic solution possible." Commenting on Gibbs Racing's unique approach to testing, Watson stated, "My time at Gibbs definitely reinforced the value of physical testing coupled with theoretical models...they were searching for gains less than the error in their current testing methods." Watson, who entered UMD as an information technology major, has completed courses in dynamics and automotive engineering, including the Terps Racing course (ENME 408). Through his coursework, Watson has discovered a particular interest

in aerodynamics, a concept that results in "limitless gains, especially in Formula SAE."

Not to be outdone by his Formula SAE teammate, Will Guarino spent the summer applying his research in advanced combustion strategies, including lean stratified charge combustion, to his experience at Ford. Reflecting on how his research translated to his internship with Ford, Guarino states, "The material I learned in ENME351 (Electronics I), 271 (Introduction to MATLAB), and 462 (Vibrations and Controls II) was directly relatable to the work I did, as the data acquisition systems I worked with required a lot of knowledge of measurement systems and controls." While much of his research experience came from independent study, Guarino asserted that his ME education was vital to his internship, "My UMD education was essential...in providing the basic understanding necessary to develop a specialized knowledge of engines." Guarino described his experience at Ford as "a low-stress, high budget version of Terps Racing," adding, "The only difference between the two was the availability of highly specialized and sophisticated research equipment at Ford." Energized by their experiences, Watson and Guarino are looking forward to finishing their undergraduate programs then pursuing careers in automotive engineering and design.

Exchanging Perspectives

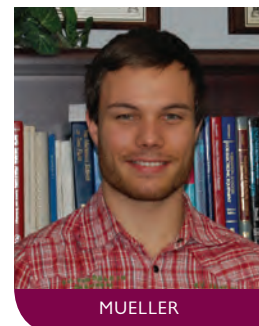
ME Welcomes Global Community of Students with Exchange Visitor Training Program

After more than 20 years of collaboration, the Exchange Visitor Training Program, a partnership between the University of Maryland and other foreign engineering schools, continues to expand. Since its origin in 1988, the program has allowed international engineering students the opportunity to work in UMD laboratories as interns and experience a different cultural environment. In an increasingly global field of study, this program is a great way for students to gain international engineering experience. The Exchange Visitor Training Program is housed in the Center for Environmental Energy Engineering (CEEE), under the direction of Professor Reinhard Radermacher. Twelve students recently visited UMD from the University of Applied Sciences in Mannheim, Germany.

The students arrived in late August 2009 to begin their six-month stay at UMD. Strictly working in labs to complete their 'practicum,' the 12 students worked as interns for six months to complete undergraduate degree requirements for their home university in Germany. According to Mary Baugher, coordinator of the Exchange Visitor Training Program, "Our program works out perfectly for that." Additionally, some students remained in the U.S. to complete a master's thesis in the same area of research as their UMD sponsor.

Once acclimated to campus, interns are integrated into ongoing research projects and are expected to provide significant contributions to the research within their field of study. The exchange students are intellectually challenged to provide them with the most rewarding experience possible. While most interns are sponsored by professors in

the mechanical engineering department, Professor William Fourney from the Department of Aerospace Engineering generally sponsors one intern as well. One of the undergraduate interns, Funda Karatas, used her internship to work with Professor Jungho Kim researching the creation of a Nusselt-Correlation for spray cooling purposes in the UMD Phase Change Heat Transfer Lab.



MUELLER

In addition to the work/study aspect, the program also provides visiting students with the chance to experience American culture. Intern Klaus-Peter Mueller has completely embraced the cultural opportunities offered by the program, stating "[I enjoy going] to the recreation center to play soccer, or visiting other cities like New York, Washington D.C., Philadelphia or Annapolis."

Mueller says the biggest difference between UMD and the University of Applied Sciences in Mannheim is that UMD is much bigger than his university. "Here you have everything you need in a small area, including the recreation center, tennis courts, and the bus system. Our campus in Germany is small. It only consists of the buildings where the classes are, laboratories and a cafeteria." He adds, "There is no housing inside the campus. All the students live around the campus, and...we have no football team." When asked if he would return to UMD after he graduates, Mueller enthusiastically states, "Yes!"

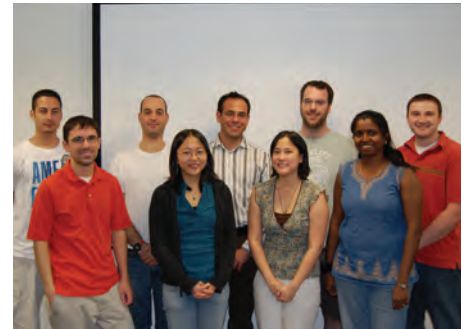
A Community of Innovators

ME Launches First Graduate Student Association

An empowered community is often the cornerstone of innovation. Through the tireless efforts of its expert faculty, forward-thinking research centers and student-focused organizations, ME provides students of every academic level with the opportunity to guide not only the future of mechanical engineering research, but the direction of their educational experience as valued members of a collegial academic community.

ME recently empowered its student community with the launch of the department's first graduate student association—MEGA. Created by ME graduate students in early 2010, MEGA was established to facilitate an ongoing dialogue between graduate students, ME and the Clark School. MEGA will also offer graduate students practical and academic advice on a range of issues from prepping for qualifiers to practicing proposal defense. Additionally, the group organizes social events such as the annual Mechanical and Reliability (ME/RE) Engineering Fall Picnic, Qualifying Exam Workshop, and Faculty Mentoring Brown-Bag Lunch Series to encourage interaction between the department's graduate students.

MEGA held its inaugural meeting in late April 2010 where students learned about MEGA's mission and met the group's officers, including President Christine Ikeda, Vice President Gilad Sharon and UMD Graduate Studies Coordinator Amarildo DaMata. To ensure MEGA remains vocal in student government, three MEGA officers will represent the group as part of the University's Graduate Student Government and UMD Graduate Committees. MEGA representatives will also actively promote MEGA, ME and the Clark School by participating in Graduate Research Interaction Day and the Prospective Graduate Student Open House. With a mission of student promotion and communication at its core, MEGA encourages current and prospective mechanical and reliability engineering graduate students to join the organization that is quickly emerging as the voice of ME's graduate student body.



FOUNDING MEMBERS OF MEGA

WE WANT TO HEAR FROM YOU, OUR ALUMNI!

METRICS is designed to keep our readers informed about the activities and accomplishments of the Department of Mechanical Engineering. We would like for you, our alumni, to keep us informed about your activities and accomplishments so that we may share them with our readers. Please send your alumni news to me_communications@umd.edu, or visit our website: www.enme.umd.edu.



MELISSA KEENER AND SAMANTHA SAWYER

great EXPECTATIONS

The Department invites you to support our mission to transform lives through exceptional educational and research opportunities by contributing to the Department through the University of Maryland's Great Expectations campaign. Your contributions support mechanical engineering initiatives such as graduate fellowships, undergraduate scholarships and named professorships. You can help make a difference with any amount!

Gifts may be submitted by check to **University of Maryland College Park Foundation (UMCPF)**. Please designate "Department of Mechanical Engineering" in the memo line and mail to:

Bala Balachandran, Acting Chair
 Department of Mechanical Engineering
 2181 Glenn L. Martin Hall
 University of Maryland
 College Park, MD 20742

To learn more, please visit: www.greatexpectations.umd.edu

METRICS is published for alumni and friends of the Department of Mechanical Engineering at the A. James Clark School of Engineering.

PRODUCTION TEAM

Editor: F. Stephenson
 Co-editor: C. Wildy
 Writers: L. Frye, F. Stephenson, C. Wildy
 Production Assistants: C. Henry, J. Levy, J. Stanley
 Designer: P. Weickert
 Faculty and Staff Photos: J. Consoli



A. JAMES CLARK
SCHOOL OF ENGINEERING

Department of Mechanical Engineering
2181 Glenn L. Martin Hall
University of Maryland
College Park, MD 20742

Farewell, But Not Goodbye

Former ME Chair Extends Best Wishes to ME Community as He Begins New Chapter

It is good to have an end to journey toward; but it is the journey that matters, in the end - Ursula K. LeGuin

Our destination is often less important than the journey we take to reach it.

After nine wonderful years in the service of the Department of Mechanical Engineering, it is with a heavy heart that I bid farewell to the faculty, staff and students of the ME community and the A. James Clark School at the University of Maryland. There are not enough words to express my sincere appreciation for the inspiration and support this community has so selflessly given me, but none of the work I accomplished in the past nine years would have been possible without this amazing collection of scholars and professionals.

First, I'd like to extend thanks to the administration of the Clark School and the University of Maryland. Your support of ME's academic, research and community initiatives has enabled thousands of faculty, researchers and students to discover new and exciting ways to innovate and improve our world.

To the faculty and staff of the department, your imagination, enthusiasm and support has helped this department flourish immeasurably. Nothing that I have conceived or imagined in the past nine years could have been done without your able assistance. For giving breath to new ideas and guiding the next generation of engineers, researchers and teachers toward their richly-deserved future, I salute you.

Last, but in no way least, I thank the students of ME, the Clark School and the University of Maryland. Your passion, creativity and curiosity have given me and my colleagues unbridled hope for the future of not just the university, but the world. You are the future, and, from where I stand, it couldn't be any brighter. I am so pleased to have served you and I wish all of you—present, past and future students—the very best in your academic and professional endeavors.

I have learned much in these years that will stay with me for the rest of my days, from the amazing creativity that drives our students to the relentless dedication that defines our faculty and staff. My time in this position has been as much a journey of growth as it was one of discovery. And what a journey it has been.

Thank you all.

Avram Bar-Cohen
Distinguished University Professor



BAR-COHEN