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METRICS
MECHANICAL ENGINEERING

A newsletter for alumni and friends of the Department of Mechanical Engineering

INSIDE

International Cooperation Established with Abu Dhabi Institute

Education and Energy Research Collaboration Established Between Clark School & Petroleum Institute of Abu Dhabi.

This fall a cooperative agreement was sealed between the University of Maryland and The Petroleum Institute (PI) of Abu Dhabi, United Arab Emirates, to establish an Education and Energy Research Center (EERC). The agreement seeks to initiate and develop collaborative educational and research activities in the field of energy sciences and engineering, and to enhance the undergraduate, graduate, and continuing education programs of both institutions by providing "point of contact" services and orientation for 60 institute scholars who will study at top U.S. universities. The center will be funded with $2.2 million per year for a two-year contract, which is the first phase of a long-term agreement.

His Excellency Dr. Yousef Omeir bin Yousef, Chairman of the Board of the Petroleum Institute and CEO of Abu Dhabi National Oil Company visited the University of Maryland in March to meet senior members of the Maryland administration. Dr. Bin Yousef was also given a tour of the campus and research facilities and formally signed the agreement with university President C.D. Mote, Jr., Provost William E. Destler, and Prof. Saul Sosnowski, Director of the Office of International Programs.

From left to right: Dr. Ali Haghani, Chair of Civil and Environmental Engineering; Dr. Michael Ohadi; Dr. Greg Jackson; Avram Bar-Cohen, Chair and Distinguished University Professor of Mechanical Engineering; Dr. Ashwani Gupta; Dr. Reinhard Radermacher attend the Petroleum Institute's first undergraduate graduation ceremony.

Also present to receive Dr. Bin Yousef were Dr. Nariman Farvardin, Dean of the A. James Clark School of Engineering; Dr. Avram Bar-Cohen, Chair and Distinguished University Professor of Mechanical Engineering; Dr. Herbert Rabin, Director of Maryland Technology Enterprise Institute;

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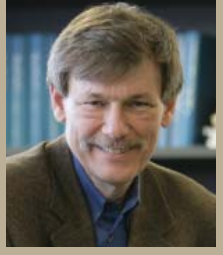

Message From the Chair

NEW BEGINNINGS: The start of the fall semester marked several new beginnings for the department - completion of the Department's Strategic Plan, the arrival of three new faculty members, and the signing of a new international research and exchange agreement.

The Department's 5-year Strategic Plan, **"Becoming a Program of Distinction,"** was prepared under the guidance of the Department's Faculty Advisory Committee during the past two years. The Plan focuses on education, research, and outreach as the primary functions of the Department and defines a strategy for strengthening the Department in these three dimensions. Six Strategic Initiatives are included in the Plan. **Strategic Initiative 1** focuses on undergraduate students and is aimed at educating a high quality technology workforce for the state, the region, and the nation. **Strategic Initiative 2** is targeted at the graduate program and seeks to enhance the quality, visibility, and impact of the Ph.D. graduates while continuing to prepare M.S. students for diverse roles in industry and national laboratories. **Strategic Initiative 3** deals with building an outstanding research program to support the continued economic development of the state, the region, and the nation through creation of new scientific and technological knowledge. **Strategic Initiative 4** calls for continued enhancement and consolidation of the Department's physical infrastructure to support the goals of Initiatives 1, 2 and 3. **Strategic Initiative 5** highlights steps we must take to ensure an environment that promotes diversity and fosters a spirit of collegiality. **Strategic Initiative 6** focuses on the Department's outreach to Federal laboratories and Centers, international institutions, and the global professional community, building national and international visibility and strengthening the Department's role and effectiveness in technology transfer. Copies of the ME Strategic Plan are available by emailing *jcb@umd.edu* .

This issue of the METRICS provides extensive evidence for the Department's commitment to becoming a Program of Distinction and the efforts underway to implement each of the six stated Initiatives. It is particularly noteworthy that the three new faculty members joining the Department this fall (see page 3) represent important steps in the implementation of Initiative 3, which recognizes that Mechanics and Micro/Nano Systems, Energy Systems, Risk and Reliability, Advanced Manufacturing and Design, and Fluid Mechanics are the Department's primary research themes and that efforts must continue to build and expand these domains of excellence, while developing new areas of high impact potential. Profs. Teng Li and Santiago Solares enhance our expertise in micro/nano fabrication and computational nano mechanics and Prof. Jaydev Desai will help initiate the Department's efforts in biomedical devices, with emphasis on medical robotics.

The recent signing of the agreement establishing the Energy Education and Research Collaboration (EERC – as described in the lead article), which is housed in the Department and supported by the Abu Dhabi National Oil Company, is well aligned with Initiative 6 and will lead to significant international recognition for the Department's efforts in energy engineering. The growing international presence of the CALCE and CEEE Centers and the anticipated national impact of the recently announced Energetics Technology Center in Southern Maryland, championed by the Department's CECD Center, further reinforce the Department's extensive and highly successful outreach efforts.

It is also to be noted that early this fall the Department completed the move of faculty, students, and staff of the Center for Risk and Reliability into the Glenn Martin Hall and adjacent buildings. This move and the planned relocation of Profs. DeVoe and Smela's laboratories into the Glenn Martin Hall, are in support of Initiative 4. When completed, these relocations will materially improve the research environment and communication among the Department's faculty and staff.

It is my expectation that achieving the quantitative and qualitative goals identified in the Strategic Plan will place and sustain the Department of Mechanical Engineering at the University of Maryland among the nation's top 15 Mechanical Engineering programs among all universities – public and private – and top 10 among the publicly supported research universities by 2011. We are counting on your support!

International Cooperation

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Dr. Ali Haghani, Chair of Civil and Environmental Engineering; and Dr. Michael Ohadi, Professor of Mechanical Engineering. Ohadi has been at the Petroleum Institute for the past year to transfer "best practices" from Maryland and to lay the foundation for the EERC.

The cooperation was further celebrated when A. James Clark School of Engineering Professors Avram Bar-Cohen, Ali Haghani, Michael Ohadi, Greg Jackson, Ashwani Gupta and Reinhard Radermacher traveled to Abu Dhabi in June to meet members of the PI faculty and administration and to attend the Petroleum Institute's first undergraduate graduation ceremony.

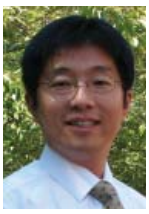
In 2001 Dr. Bin Yousef proposed the creation of a premier engineering school in support of the petroleum/ natural gas and broader energy industry in the United Arab Emirates and beyond. Today the Petroleum Institute has more than 800 students in five engineering majors, is sponsored by four of the five major oil companies in the world, and is committed to receive international accreditation (including ABET) at the first possible opportunity. Dr. Bin Yousef serves as the chairman of the board of trustees for the Petroleum Institute and takes a keen interest in seeing the Petroleum Institute reach its goal of being recognized as a global university of excellence in petroleum and energy related areas.

facultyNEWS

ME Welcomes New Faculty


Desai

Jaydev Desai joined the department in October as an Associate Professor of Mechanical Engineering. Dr. Desai served as the Director of the Program for Robotics, Intelligent Sensing, and Mechatronics (PRISM) Laboratory at Drexel University prior to joining the department. He holds an NSF CAREER Award for research on Minimally Invasive Surgery Using Haptics and Vision, and is among the most accomplished young academics in medical robotics in the United States. His research within the area of medical robotics is specifically targeted towards haptic interfaces for robot-assisted surgery, reality-based soft-tissue modeling for surgical simulation, model-based teleoperation in robot-assisted surgery, and force feedback interface for cellular surgery. At Maryland, Desai plans to develop the state-of-the-art medical robotics research facility in macro and micro scale surgery.


Li

Teng Li joined the department earlier this fall semester as an Assistant Professor of Mechanical Engineering. Li was formerly a post-doctoral Fellow at the Harvard University Division of Engineering and Applied Sciences, and completed his Ph.D. in 2005 at the same institution after earlier studies at Princeton University and Tsinghua University in China. His dissertation dealt with the "Deformability of Thin Films of Electronic Materials on Polymer Substrates," and his future interests include the micro/nano mechanics of flexible macroelectronics; MEMS and NEMS, and innovative nanoscale patterns of thin-film electronic materials with enhanced mechanical and electrical performance. He plans to initiate a multidisciplinary research program on flexible macroelectronics at University of Maryland, with broad collaboration with researchers in electrical, mechanical, biomedical engineering, chemistry and materials science.


Solares

Santiago Solares also joined the department earlier this fall as an Assistant Professor of Mechanical Engineering. He completed his Ph.D. in Chemical Engineering at the California Institute of Technology in late summer '06, where his research focused on applied computational nanotechnology. He had earlier obtained his B.S. and "Licensed Engineer" degrees in chemical engineering from the University del Valle in Guatemala City in 1993 and 1995. Upon completion of his studies, he worked for PepsiCo in Central America and in 1996 obtained an M.S. degree in Industrial Engineering from the University of Miami. He then relocated to Los Angeles with Mars Inc., where he held various technical and management positions in the R&D and Engineering departments before entering the Ph.D. program at Cal Tech. Solares plans to combine non-linear continuum and atomistic mechanics research in the development of enhanced recognition and nanopositioning systems.

Holloway and Roush Among Clark School Honorees

Mechanical Engineering Professors Emeritus **David Holloway** and **Marvin Roush** were honored among ten engineering faculty and staff at the Engineering Outstanding Commitment Award ceremony held on September 18 at the Glenn L. Martin Hall Plaza.


Holloway

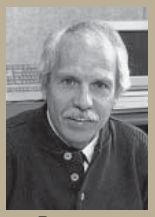
Professor of Mechanical Engineering **Bill Fourney** was the emcee congratulating Holloway and Roush for their contributions to the Clark School. Their names are now engraved on a fountain that is part of the Glenn L. Martin Hall Plaza. Dr. Mark A. Shayman, Associate Dean for Faculty Affairs in the A. James Clark School of Engineering, was also present to provide recognition.

Holloway was instrumental in establishing an excellent automotive engineering program for ME students, advising the solar-powered vehicle, hybrid vehicle and Terps racing vehicle student project teams. Roush was a seminal force in building the reliability engineering program for the Clark School of Engineering.


Roush


Dr. Mark A. Shayman, Associate Dean for Faculty Affairs in the A. James Clark School of Engineering congratulates Professor Emeritus of Mechanical Engineering David Holloway.

Fourney, Wallace Receive Prestigious Campus Awards


Fourney

William Fourney, Professor of Mechanical Engineering and Associate Dean and Chair of the Aerospace Engineering department, received the President's Medal from campus president C.D. Mote, Jr. at the Faculty and Staff Convocation ceremony on September 26 in the Memorial Chapel.

The award is the highest bestowed by the university and recognizes a member of the College Park community who has made extraordinary contributions to the social, intellectual and cultural life of the campus. Professor Emeritus and Glenn L. Martin Institute Professor of Engineering **George E. Dieter** was given this award in 2004.


Wallace

In the same ceremony, Professor of Mechanical Engineering **James Wallace** received his Kirwan Undergraduate Education Award, one of two annual prizes established by former University of Maryland President William E. Kirwan and Patricia H. Kirwan. The Kirwan Undergraduate Education Award recognizes faculty or staff who have made exceptional contributions to the quality of undergraduate education at the university.

Wallace was recognized for his 30-year career of extraordinary dedication to undergraduate teaching and the leading role he played in launching three major University initiatives: the CORE Program, College Park Scholars, and Gemstone, which have enriched the lives of countless Maryland undergraduates and will continue to do so.

Last year Wallace was named the 2005 Maryland Professor of the Year by The Carnegie Foundation for the Advancement of Teaching and the Council for Advancement and Support of Education (CASE).

Summer School Students Discover Engineering

Associate Professor of Mechanical Engineering **Ken Kiger** delivered an overview of mechanical engineering to a group of 29 high school juniors and seniors in late July for the Discovering Engineering summer camp program. The students had the opportunity to explore different engineering disciplines, and participated in a variety of activities including laboratory work and demonstrations, lectures, discussions, computer instruction and a team design project.


Ken Kiger (right) leads the steam-powered boat races for Discovering Engineering summer camp students.

Kiger led an activity where students built a small steam-powered boat, which they raced down a waterway. The activity integrated some core principles of mechanical engineering, and connected those concepts with what they had already learned in high school.

Kiger was selected as a Keystone Professor in 2006. The Keystone program honors those faculty committed to fostering an outstanding undergraduate education.

Associate Professor **Linda Schmidt** and Senior Lecturer **Chandra Thamire** led similar demonstrations for the Exploring Engineering program in July. Exploring Engineering introduces high school girls to engineering concepts, and is sponsored by Women in Engineering. Schmidt's RISE students (more on page 9) also helped with the presentation.

Ashwani Gupta Receives A. James Clark School of Engineering Outstanding Research Award


A.K. Gupta

On September 13, 2006 Professor **Ashwani Gupta** received the University of Maryland College of Engineering Outstanding Research Award. This award was instituted by the Clark School to recognize exceptionally influential research accomplishments by its faculty. The award recognizes Professor Gupta's outstanding contributions to the field of combustion with singular success for energy savings and pollution reduction. In recent years Professor Gupta's work has gained much popularity in the international technical community for his work on the fundamental and applications of High Temperature Air Combustion (HiTAC), including environmentally benign green flame using hydrocarbon fuels and theflameless oxidation of fuels (colorless flame) with near uniform temperature in the entire burning zone. His co-authored book on "High Temperature Air Combustion: From Energy Conservation to Pollution Reduction" published by CRC press in 2003 is now in its 3rd printing. The HiTAC technology has been used in many countries worldwide with significant energy savings and pollution reduction from industrial furnaces. He is currently developing this technology for stationary gas turbine combustion application and also fuel reforming of solid wastes to clean hydrogen-rich syngas with support from the Office of Naval Research (ONR).

Professor Gupta also recently received the Sustained Service Award from the International Conference Incineration and Thermal Treatment Technologies (IT3) held in Savannah, GA in May 2006. In June Gupta also received Best Paper award from the American Institute of Aeronautics and Astronautics (AIAA) for his paper "Examination of Methane-Hydrogen Mixture Flame Using Isotope Shift/PLIF Spectroscopy" at the Intl. Energy Conversion and Engineering Conference in San Diego, California.

Azarm Begins Tenure as ASME Division Chair


Azarm

Professor **Shapour Azarm** has begun his tenure as Chair of the Design Engineering Division (DED) of the American Society of Engineers (ASME), serving through June 2007. DED is one of the largest divisions of ASME with over 36,000 members, 12 technical committees, and sponsors or co-sponsors six ASME transactions journals. Technical Editors or Associate Technical Editors for these journals have to be approved by the DED Executive Committee that Dr. Azarm chairs. DED also sponsors the International Design Engineering Technical Conferences (IDETC); a significant number of sessions in the International Mechanical Engineering Congress and Exposition (IMECE), and is a major contributor to the National Manufacturing Week Conference that is held annually in Chicago.

DED seeks to develop, promote, encourage, and support its members and technical committees in their quest for technical excellence and professional success in their respective field. DED also works to provide necessary processes and mechanisms to spawn new initiatives and identify emerging technologies through technical meetings, publications, and member interest activities.

To prepare for his work as Division Chair, Azarm attended an ASME sponsored Leadership Training Conference in March. During his tenure, Azarm hopes "to be forward looking and embrace change while simultaneously keeping in sight the things the Division has historically done well."

Radermacher Elevated to ASHRAE Fellow


Radermacher

Professor of Mechanical Engineering **Reinhard Radermacher** was recently elevated to the grade of Fellow of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) for his contributions to the organization and innovations in the sciences of heating, refrigeration, & air conditioning. Radermacher joins ME faculty Michael Ohadi and Arthur Bergles with this distinction.

ASHRAE is a global leader and a primary provider of opportunity for professional growth in the arts and sciences of heating, ventilating, air conditioning and refrigerating.

In April, Radermacher was a guest lecturer at the International Academic Conference of Research in Air Conditioning & Refrigeration at the Shanghai Jiao Tong University (SJTU). The Institute of Refrigeration & Cryogenics department of SJTU also celebrated their 50th anniversary in a ceremony where Radermacher received an honorary guest professorship award.

S.K. Gupta Chairs ASME DFM Committee


S.K. Gupta

Associate Professor **Satyandra K. Gupta** (who holds a joint appointment in the Institute for Systems Research) began his tenure as the Chair of the Design for Manufacturing Committee of the Design Engineering Division (DED) of the American Society of Engineers (ASME) technical committee roster on July 1, 2005.

This fall Gupta and his Ph.D. student Tao Peng received the Best Paper Award at the 2006 ASME Computers and Information in Engineering Conference in Philadelphia, Sept. 10-13. "A Computational Framework for Point Cloud Construction Using Digital Projection Patterns" was judged the best of the 94 papers presented at the conference. Gupta also became Associate Editor of the ASME *Journal of Computing & Information Science in Engineering* in January.

In addition, Gupta was recently designated as a "Trailblazer" by Science Spectrum magazine. The publication annually honors 70 "outstanding Hispanic, Asian American, Native American and Black professionals in the science arena whose leadership and innovative thinking on the job and in the community extend throughout and beyond their industry."

Herrmann Named Associate Editor of ASME Journal


Herrmann

Associate Professor **Jeffrey Herrmann** (who also holds a joint appointment in the Institute for Systems Research) was recently named as one of seven new Associate Editors for the American Society of Mechanical Engineers (ASME) *Journal of Mechanical Design*.

The quarterly journal publishes technical papers concerned with the conception, development and design of machines and mechanical systems. Specific areas of concern include: robotic system design; computer coordinated mechanism; expert systems in design; computer-aided engineering; design optimization; mechanism design; kinematics and dynamics of mechanisms; cam design; gear design; continuously variable transmission; power transmission design; design of machine elements; design theory and methodology; design technology; stress in design;and reliability in design.

This summer Herrmann was also interviewed for the WTOP Radio Series on Engineering for his flu clinic systems planning software. "It could be a real problem if they haven't carefully thought about the capacity and congestion that can occur in such clinics," says Herrmann in the interview.

To listen to this broadcast, visit:
http://www.nae.edu/nae/pubundcom.nsf
and follow the left sidebar link 'WTOP Radio Series'.

faculty in the NEWS

Keeping Cool in a Warming World

An August article featured in *Discovery News* quotes Professor Reinhard Radermacher, Director of the Center for Environmental Energy Engineering, about the future perils of keeping cool in a warming world. With current technology, heating a home is more efficient than cooling, explained Radermacher. While heating a home is usually performed locally with fossil fuels, energy used to cool a home comes from centralized power sources, where a lot of energy is lost en route to the home. Solving this energy efficiency problem means employing everything from new cooling technologies to reconsidering the way buildings are designed and, ultimately, how much cooling we really need. "We really have to drastically rethink how we make ourselves comfortable in a warm climate," said Radermacher. "It's really a paradigm shift." Unfortunately, said Radermacher, it's not a shift that's even close to happening. Right now most of federally-backed research into cooling technology is going into making the same old coolers just 10 to 20 percent more efficient, he said. What we really need, Radermacher said, are technologies that use just 10 to 20 percent of the energy of current chillers. Such alternatives do exist. They include integrated heater/chillers that are powered by waste heat from smaller, site-specific electrical generation stations like those sometimes found on college campuses and other large institutions. There are also geothermal heat pumps that use the moderating temperature of the ground to cool. A similar article authored by Radermacher was featured in the September issue of *Appliance Magazine*.

Counterfeit Electronics Source of Faulty Laptops?

Research on counterfeit electronics by Professor Mike Pecht and Sanjay Tiku, featured in the May 2006 issue of *IEEE Spectrum,* was cited in an August article of the *Electronic Engineering Times*. The Times article addressed the aftermath of faulty lithium-ion laptop battery recall that month, which may be attributed to poor-quality counterfeit parts. Pecht said the complex layers of outsourcing of the supply chain make it next to impossible to point fingers in product recalls. "There is such a concern with reducing the overall price in consumer goods these days [that] companies have turned to levels of outsourcing where accountability is very tough," said Pecht. Power subsystems also can fall victim to counterfeit chips or passive components. "Any component is a potential target," he said.

CALCE Engineers Test "Smart" Parking Meters

Center for Advanced Life Cycle Engineering (CALCE) researchers Dr. Mike Azarian and Professor and CALCE Director Mike Pecht were featured in a July article of the *Maryland Community Newspapers Online* (*www.gazette.net*) about "smart" parking meters. These meters detect when a car arrives and leaves a metered parking space. Azarian and Pecht were recruited by the meter's inventor to test the engineering of the device using CALCE's testing equipment, and recommended new coating materials for the device's circuit boards. In one Maryland trial, these IntelliPark meters showed researchers that only 40 percent of drivers actually paid for parking.

Biotech Start-Up Featured in *The Washington Post*

Calibrant Biosystems Inc., an emerging biotechnology company founded by Associate Professor Don DeVoe and Associate Professor Cheng S. Lee of the Department of Chemistry and Biochemistry, was profiled as a feature start-up company in the Business section of *The Washington Post*. Their best-known product is a technology that analyzes isolated cells from human tissue samples for protein biomarkers, which can indicate the presence of a particular disease. The technology is unique in its ability to examine very small tissue samples, said DeVoe. "We can work with around 10,000 isolated cells from tumor tissue removed in a biopsy, and we've developed techniques that allow us to remove proteins from this limited amount of tissue." Calibrant's technology can identify proteins that can be used as drug targets, evaluate the toxicity of a compound at very early stages and stratify patient populations during clinical trials.

Female-Named Chat Users Get More Malicious Messages

Research results produced by Assistant Professor Michel Cukier was a featured article on *ABC*, *BusinessWeek*, *USAToday,* and *FoxNews* websites, *The Today Show* on NBC, and various local radio and television stations. Cukier's study found that chatroom participants with female usernames received 25 times more threatening and/or sexually explicit private messages than those with male or ambiguous usernames. Female usernames, on average, received 163 malicious private messages a day in the study. Cukier works in the Center for Risk and Reliability and is an affiliate of the university's Institute for Systems Research. The research was assisted by sophomore computer engineering student Robert Meyer. Their results were published in the proceedings of the Institute of Electronics and Electrical Engineers International (IEEE) Conference on Dependable Systems and Networks (DSN '06) in June.

CALCE-Hanyang University Cooperation Established

In June a cooperative relationship between The Center for Advanced Life Cycle Engineering (CALCE) and Hanyang University in Korea was officially sanctioned by the Korean Government. The relationship seeks to strengthen both institutions, and will help Korea in analyzing product durability, defect rates and overall customer satisfaction. This agreement complements a previous cooperative agreement with Maryland and Hanyang University that has existed since 2004.

The relationship began in February when Dr. **Michael Pecht** delivered a keynote presentation on 'Virtual Qualification' at the International Reliability Conference in Seoul, hosted by the Hanyang Institute of Technology (HIT). A televised ceremony honoring Hanyang-CALCE relations followed, which was front page news in the Korean Herald business section.

Reliability plays a major role in organizations that seek to produce quality products and to reduce production time. To promote reliability means preventing problems from occurring by implementing organized strategies beforehand, rather than waiting for them to arrive and then resolving them accordingly.

CALCE is an interdisciplinary research and educational center sponsored by over 50 commercial corporate and government organizations from all sectors of the electronics systems industry. The CALCE team has developed physics-of-failure techniques which enable design-for-reliability, accurate reliability predictions, efficient accelerated test methods and prognostics. For more information about CALCE, please visit their homepage at *www.calce.umd.edu* .

CECD Awarded Office of Naval Research Funds for R&D

The Center for Energetic Concepts Development, directed by Professor Emeritus **Davinder K. Anand,** was recently awarded $2.62M by the Office of Naval Research to support workforce development initiatives and research and development work in two specialized areas: energetic devices and risk assessment for large-scale chemical releases in harbors. "This work with the Navy, together with the establishment of our Energetics Technology Center (ETC), will help CECD fulfill its vision of becoming a National Center of Excellence in Energetics," says Anand.

For more information about CECD, please visit their homepage at *www.cecd.umd.edu* .

CHP Application Center Announces New Director


Orlando

Dr. **Joseph A. Orlando** P.E. has agreed to serve as the new director of the Midatlantic CHP Application Center Director. Dr. Orlando has consulted to private, public and international clients on all aspects of CHP including market analyses, feasibility analyses, central plant assessments, engineering reviews and contract negotiations. He has negotiated turnkey design/build contracts, power, steam and fuel supply agreements and O&M agreements. Additionally, he has testified before state regulatory bodies on a variety of CHP and competitive power projects. His practice specialized in institutional facilities where he was responsible for developing overall energy master plans and campus energy management. Dr. Orlando has served as Chairman of the ASHRAE Technical Committee on cogeneration and has been responsible for revising the ASHRAE Handbook chapters on prime movers and on cogeneration. He is a registered engineer and the author of numerous articles on Combined Heat and Power including the ASHRAE Cogeneration Design Guide.

The Mid-Atlantic CHP Applications Center is charged with promoting the appropriate application of CHP in Maryland, Virginia, Pennsylvania, New Jersey, Delaware, West Virginia and the District of Columbia. Activities include outreach to potential CHP owners, developers and engineering firms, preliminary screening analyses of potential applications and, information dissemination including case studies of operating CHP project.

The Center for Environmental Energy Engineering at the University of Maryland conducts energy efficiency research and is committed to education and outreach activities. In addition to the MAAC and core research in the areas of thermal energy characterization of computational and telecommunications equipment, it consists of consortia focusing on Advanced Heat Exchangers, Integrated Energy Systems, Alternative Refrigerants and Integrated System Optimization.

More detailed information about the Applications Center can be found at *www.chpcenterma.org* .

studentNEWS

Ph.D. student **Arvind Ananthanarayanan** (pictured at right) was awarded a travel grant from Arizona State to present his research "Development of In-Mold Assembly Methods for Producing Mesoscale Articulated Joints" at the National Science Foundation's Division of Design and Manufacturing Innovation (DMI) Grantees Conference this July in St. Louis. Ananthanarayanan was among 87 students selected from over 300 students who applied for the grant. Arvind is advised by Associate Professor S.K. Gupta.

Ananthanarayanan (right) receives his award from Dr. Noe Vargas Hernandez, a Research Scientist in the Design Automation Lab at Arizona State University.

M.S. student **Daniel Chenet** was selected to participate in the Bridge to the Doctorate Program. The program will provide Chenet with an annual stipend, tuition and health insurance supplement, mentoring from advanced graduate students, links to research and internship opportunities, and opportunities to participate in national and professional conferences. Daniel's research focus is thermal, fluid, and energy sciences, and he is avised by Associate Professor Jungho Kim.

Ph.D. student **Arindam Goswami** won the 14th Motorola-IEEE CPMT Society Graduate Student Fellowship for Research on Electronic Packaging for his paper titled "Ultra-Fine Leak Detection of Hermetic Wafer Level Packages." Goswami's paper was selected as the best of 22 submissions. His thesis advisor is Professor Bongtae Han. The award was presented at the 56th Electronic Components and Technology Conference (ECTC), held May 30 - June 2, 2006 in San Diego, California. The Fellowship award is intended to promote graduate-level study and research on electronic packaging, and is given annually to a student enrolled full-time in a graduate curriculum leading to a Ph.D. and whose major field of interest is in electronic packaging.

Reliability Engineering Ph.D. student **William McGill** recently won the 2006 Society of Risk Analysis Student Merit Award from the Economics and Benefits Specialty Group of the Society for Risk Analysis. The award will be presented at the 2006 Society for Risk Analysis Annual Meeting in December 2006 at the Renaissance Harborplace Hotel in Baltimore, Maryland. McGill works at the Center for Technology and Systems Management.

McGill and son Keith.

Research conducted by Ph.D. student **Prahalad Parthangal** was highlighted on nanotechweb.org, the website for Nanotechnology, a prominent interdisciplinary nanotechnology science journal. A brief abstract for Parthangal's research on self-assembled nanoparticles over nanowire arrays which inspire novel nano-sensors can be viewed at: http://nanotechweb.org/articles/journal/5/7/2/1 . Parthangal is advised by Professor Michael Zachariah.

Reliability Engineering Ph.D. candidate **Mohammad Pour-gol-mohamad** won the American Society of Mechanical Engineers (ASME) Nuclear Engineering Division (NED) student paper competition. His awarded paper, entitled "Modified Phenomena Identification and Ranking Table (PIRT) for Uncertainty Analysis" was presented at the ICONE 14 – International Conference on Nuclear Engineering this July in Miami, along with a second paper, "Treatment of Uncertainties: Output Updating in Complex Thermal-Hydraulics (TH) Computational Codes". Pour-gol-mohamad is co-advised by Professors Ali Mosleh and Mohammad Modarres.

M.S. student **Emil Rahim** was invited by the National Science Foundation (NSF) to the Fourth International Conference on Nanochannels, Microchannels, and Minichannels to present his research and discuss "The Future of Nanoscale and Microscale Research from My Perspective" this June in Limerick, Ireland. The meeting was held at the Stokes Research Institute in Limerick. Rahim is advised by Chair and Distinguished University Professor Avram Bar-Cohen.

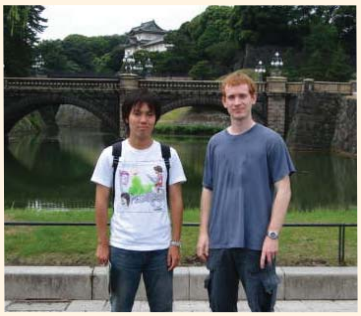
ME Undergraduate student **Mai Phuong Le** was one of three Clark School students to win the Gates Millennium Scholarship. The Gates Millennium Scholars (GMS), funded by a grant from the Bill & Melinda Gates Foundation, was established in 1999 to provide outstanding low income African American, American Indian/Alaska Natives, Asian Pacific Islander American, and Hispanic American students with an opportunity to complete an undergraduate college education in any discipline area of interest.

Mechanical Engineering Ph.D. student **Peng Wang** recently won the International Microelectronics and Packaging Society (IMAPS) Student Award at IMAPS - Thermal Management 2006 for his paper entitled "Impact of Thermal Contact Resistance on Hotspot Cooling using Enhanced Thermoelectric Coolers". Peng works at the Laboratory for Thermal Packaging of Electronic Systems and conducts thermal design, modeling and testing of hot spot cooling on silicon chip using novel thermoelectric techniques. Peng is advised by Prof. Avram Bar-Cohen and co-advised by Assistant Prof. Bao Yang.

ME Students Enrich Learning with Summer Experience

Senior undergrad student and Terps Racing vehicle engineer Mike Cook worked as an engineering staff member for Dale Earnhardt, Inc. in Mooresville, North Carolina. Cook used MatLAB software performing basic programming, user interface and computations for vehicle simulation exercises. He also assisted in testing vehicle aerodynamics in wind tunnel environments. The Earnhardt racing team includes drivers Dale Earnhardt Jr., Martin Truex Jr. and Paul Menard.

Through a joint NSF/ Japanese Society for the Promotion of Science (JSPS) program, Ph.D. student Andrew Dick worked on a project concerning an operation mode for atomic force microscopy at the University of Tsukuba and at one of the National Institute of Advanced Industrial Science and Technology (AIST) facilities in Tsukuba, Japan. Andrew worked with a professor and two graduate students from the university, two research scientists from AIST, and his advisor Professor Bala Balachandran and co-advisor and University President Dr. C. Dan Mote, Jr. via e-mail. His team will try to obtain an international patent based on the positive results obtained over the summer.



Masatoshi Numatsu, a graduate student at the University of Tsukuba, and Andrew Dick at the Meganebashi Bridge in the Imperial Palace East Garden in Tokyo, Japan.

Bryan Hise, senior undergrad student and member of the Terps Racing team, interned as a data analyst for the Dreyer & Reinbold Racing team. On his first week of work he helped the team in the Indy 500 competition as engineering staff. He also performed shock and vibrations engineering tasks and helped design prototype pieces for the racing vehicles. Dreyer & Reinbold Racing includes drivers Al Unser, Jr., Buddy Lazier, Ryan Briscoe, and Sarah Fisher.

Hise

Senior undergrad student Tim Oberc participated in The Institute for Systems Research's (ISR) Research Experiences for Undergraduates Program (REU) this summer working with Associate Professor of Mechanical Engineering Satyandra Gupta. Oberc was tasked to redesign and construct a new cost-effective virtual reality interaction device, a wand as they called it, to improve user comfort and convenience in addition to the professionalism of the device design. The project involved design work using ProEngineer software, circuit design and fabrication, as well as the physical assembly of all parts to create the final product. The REU program supports active research participation by undergraduate students in areas of research funded by the National Science Foundation.

ME Graduate Leads RISE Summer Research Project

This summer a group of multi-disciplinary women from across the nation joined as a research team for 10 weeks at the University of Maryland's Mechanical Engineering Department. The National Science Foundation (NSF) funded the Research in Science and Engineering (RISE), a program that creates unique and enriching experiences in the engineering field. Directed by Dr. Paige Smith, RISE brings female students in or interested in engineering together to research, study, and network. Associate Professor Linda Schmidt was the faculty member for the RISE Mechanical Engineering Group whose project was titled "Capturing Design Rationale." Ms. Dan Feng, a Maryland ME graduate student, also participated as a role model and graduate student mentor. Ms. Ashley Grenier, B.S. '06 and Current M.S. student, managed the team. The RISE scholars all came from different universities and have different fields of study. Ms. Khine Lwin is a Biological Resources Engineering undergraduate Maryland. Ms. Valerie Owolo is a Psychology undergraduate at Texas Woman's University. Ms. Grace Shih is an Optical Engineering undergraduate at the University of Arizona.

Ms. Grenier and the three Mechanical Engineering RISE scholars conducted intensive research on design rationale and the implementation of a design notebook requirement in the Capstone Design Course (ENME472) taught by Schmidt during an 8-week summer format. Topics researched included cognition, sketching, and notebook usage. The RISE scholars and Ms. Grenier observed ENME 472 team meetings and analyzed their design notebook entries the 472 students were keeping. With the data from the ENME 472 class literature and previous works others have done, the RISE team was able to further their knowledge in design rationale. Ms. Owolo, who is not an engineering student, was an important part of the team due to her psychology background and brought insight and knowledge to the research and analysis of the project. This research experience introduced Ms. Owolo to Maryland alumni doing design research at Stanford University, a position Ms. Owolo is now pursuing. The RISE research propelled Ms. Grenier's M.S. thesis work and inspired the other team members to pursue graduate school positions.

Ms. Grenier was invited to present her RISE research project findings as a poster at the Sigma Xi National Conference to be held in Detroit in November, 2006.

RISE Participants, from left to right: Grace Shih, Ashley Grenier, Khine Lwin, and Valerie Owolo.

alumniNEWS

Matt Graham (B.S. '94) spent three months converting a 1990 Nissan 240SX powertrain from gasoline to electric, making it the quickest full-bodied, street-legal electric car on the East Coast. It accelerates from zero to 60 in 4.2 seconds and runs the quarter mile in 13.3 seconds at over 100 mph. But he also drives it to work and to the grocery store, and charges it every night on a 240-volt outlet. While his electric bill went up to $25 per month, his gasoline bill (formerly $50/month) dropped to nothing.

Mark P. Huston (B.S. '85), a member of the Clark School's Board of Visitors, has been named chief operating officer for Constellation Energy's retail energy subsidiary, Constellation NewEnergy.

Huston

Roy McCauley (B.S. '92) is the Miller Lite Dodge Racing Crew Chief of the No. 2 Lite Dodge driven by Kurt Busch. McCauley grew up in Davidsonville, Maryland. McCauley joined Penske Racing South in 2002 as chief engineer. He made his crew chief debut in 2004 overseeing Penske's driver development program. In 2005, McCauley oversaw a nine-race NASCAR Busch Series schedule in which the team, with driver Ryan Newman, emerged with six victories.

Roy McCauley (B.S. '92 - at right) is the Miller Lite Racing Crew Chief of the No. 2 Lite Dodge driven by Kurt Busch (left). *Photo by Steve Rose.*

Andrew Nix (B.S. '95), joined West Virginia University's Engineering College as a research assistant professor in their department of Mechanical and Aerospace Engineering. Nix earned his master's and doctoral degrees in mechanical engineering from Virginia Polytechnic Institute. His research interests include gas turbine engine heat transfer and film cooling; the effects of unsteady flows on turbine engine heat transfer and aerodynamics; high-frequency heat transfer and velocity measurements; alternative fuels, engines and emissions; and propulsion and power.

Nix

Ryan Schoonmaker (B.S. '04) received a M.S. degree in mechanical engineering from Tufts University. He has accepted a project engineer position with Helbling Precision Engineering, an engineering services company that specializes in medical device product development.

Neil R. Schulman (B.S. '64) joined the Republic Property Trust as Vice President of Construction Services, effective August 28, 2006. Mr. Schulman will be responsible for all construction related activities at the Company's Virginia properties. Mr. Schulman also attended the Graduate School of Business Administration at Tulane University, and holds a Master of Science degree in Management Engineering from Long Island University.

Michael Stanbro (B.S. '05) has turned his senior design project into a life's mission--converting cars to run on used vegetable oil. His work was recently featured in *The Annapolis Capital*.

Kai-tak Wan (B.S. '93) earned a nano & biomechanics of materials Early CAREER Award from the National Science Foundation to assist his work on interfacing and integrating life-sciences and solid mechanics.

Staff News


Galpoththawela

Donations from department staff member **D.B. Galpoththawela** gave one-hundred needy children in Sri Lanka savings accounts of 1000 rupees each. The deserving children were selected from villages and temples in Medasiyapatha of the Kandy District, Sri Lanka. Galpoththawela was present on Sinhala New Year (April 13) to present the donations to the chief incumbents (priests) of the temples from the areas in need.

New ME Babies

Faculty Research Assistant in the Center for Advanced Life Cycle Engineering (CALCE) **Vidyu Challa** and husband Gopal Mandava welcomed Navya to their family, a girl born on July 27. Navya Mandava weighed in at a healthy 8 lbs. and 11 oz and 21" long.

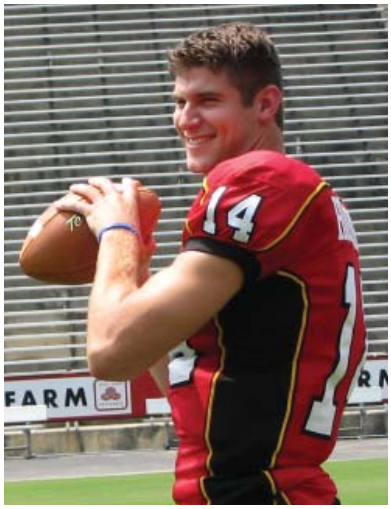
In Memoriam

Alumni **James Patrick Rahilly** passed away on July 10th at the age of 78, survived by his wife Dorritt, daughters Kathleen and Kim, and son James Jr. Rahilly earned his MS from the department and applied his prodigious engineering talents to the defense industry, contributing to think tanks and public companies for 45 years. For 20 years he held high-level positions with Naval Research and Development in Point Loma where he developed the first ship-to-ship satellite communications in 1995. His groundbreaking work elevated at-sea communications from archaic Morse code to the sophisticated technology now used by the U.S. Navy.

GO TERPS!

ME Student Returns as Incumbent Terps Quarterback

Senior **Sam Hollenbach** returns as the incumbent quarterback for the Terrapins football team for the 2006 season while balancing mechanical engineering undergraduate coursework. This fall he enrolled in ENME 361: Vibration, Control and Optimization, in pursuit of an automotive design emphasis to his mechanical engineering degree. Sam gets tutoring help from a Ph.D. student for his courses and maintains a 3.93 GPA.


Mechanical engineering undergrad student Sam Hollenbach prepares for the '06 season.
Photo: Jim Barrett

How does he do it?

"I try to break down the test questions into what I feel comfortable with and what I need work on, and just do a lot of practice problems," states Hollenbach. "It's not uncommon for me to spend 7 or 8 hours of the day being up for a test studying."

To catch the Terps at Maryland or near your town, the remainder of the fall football schedule is as follows:

10/21: NC State (Homecoming)
10/28: Florida State (College Park)
11/04: Clemson (Clemson, SC)
11/11: Miami (College Park)
11/18: Boston College (Chestnut Hill, MA)
11/25: Wake Forest (College Park)

upcomingEVENTS

Leaders in Mechanical Engineering Lecture Series

Oct. 27 - Shapour Azarm, "Multi-Objective Design Optimization and Selection with Variability." For more information on this series, visit: *http://www.enme.umd.edu/department/seminars/mechanical.html*

Transforming Energy Lecture Series

Nov. 10 - John A. Turner, "Hydrogen from Sunlight and Water."
Dec. 1 - Patricia Dehmer, "Nanotechnology and Nanoscience for Advancing Energy." For more information on this series, visit: *http://www.eng.umd.edu/energylectures/*

2007 Research Review Day

March 19, 2007
Samuel Riggs IV Alumni Center
For more information, visit
http://www.enme.umd.edu/research/day.html

Metrics is published twice a year for alumni and friends of the Department of Mechanical Engineering at the A. James Clark School of Engineering.

Your alumni news and comments are welcome. Please send them to: Editor, Department of Mechanical Engineering, 2181 Glenn L. Martin Hall, College Park, MD, 20742-3035.

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