SUMMER 2003 | Vol. 3, No. 2

METRICS

MECHANICAL ENGINEERING

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

INSIDE

Reliability Engineering Joins Department

On April 16, 2003, the Reliability Engineering Program was integrated into the Department of Mechanical Engineering.

The University's graduate program in reliability engineering began informally in the nuclear engineering program in 1984. In 1985 the Center for Reliability Engineering was formed, and in 1989 formal M.S. and Ph.D. degrees were granted in Reliability Engineering (RE). Since then, the program has grown substantially both in size of students and faculty, and today the program is a leader in reliability engineering education, having granted over 119 M.S. degrees, 21 M.E. degrees, and 34 Ph.D. degrees.

The focus of the RE program is the development and application of a system's approach methods and tools to understand why and how components, systems, and processes fail; to measure, track, and predict levels of reliability in various phases of a life cycle; to improve reliability by removing failure causes; and to provide input to decision makers. The focus of risk analysis is the development and application of methods and tools to determine potential undesirable consequences of systems and processes; to identify how such consequences happen; to assess the probability or frequency of consequences; and to provide input to decision makers on optimal strategies to reduce risk.

In integrating the RE program with the Department of Mechanical Engineering, both units will benefit from existing faculty strengths and opportunities. Faculty will be able to collaborate with greater ease, and laboratories and other physical facilities will be shared more efficiently.

The following seven faculty will be joining the Department of Mechanical Engineering:


Bernstein

Associate Prof. Joseph Bernstein received his Ph.D. from the Massachusetts Institute of Technology, and specializes in reliability of microelectronic devices. His research interests include electronic systems reliability in aerospace and military applications, electronic device physics of failure, including lifetime behavior of ultra thin gate dielectrics, and laser programmable analogy and digital arrays.


Cukier

Assistant Prof. Michel Cukier received his Ph.D. from the National Polytechnic Institute of Toulouse, France. His research interests include fault tolerance, intrusion tolerance, dependability and security evaluation, distributed systems, and software testing.


Modarres

Prof. Mohammed Modarres received his Ph.D. from the Massachusetts Institute of Technology. His teaching and research focuses on risk

continued on page 2

Faculty News
Jeong Kim is named Professor of Practice
page 4

Center Notes
CECD hosts first Research Review Day
page 10

Student News
Maryland Chapter of Pi Tau Sigma hosts National Convention on campus
page 12

Message From the Chair

AS WE ARE ALL AWARE, these are difficult times for public higher education in Maryland and elsewhere in the United States. Despite a concerted effort by the UMD and USM administrations, as well as our many friends throughout the State, the University has been asked to implement a very painful budget reduction, and the cuts have not spared this Department. As a consequence, the year ahead will see greater burdens placed on our infrastructure, staff, and faculty as we deal with larger undergraduate student enrollments and an ever more active research and scholarship program, with reduced state support.

Nevertheless, as you'll see in the pages of this Newsletter, the Department continues its move towards the highest echelons of the mechanical engineering community. At the start of the 2003-2004 academic year, the Department will be joined by two new faculty members: Dr. Bao Yang and Dr. Michael Zachariah. Dr. Yang's research deals with heat transfer and energy conversion in nanostructures, and his presence in the Department will provide a new direction for research in the Center for Environmental Energy Engineering and strengthen our growing efforts in nano science and technology. Dr. Zachariah comes to us from the University of Minnesota, where he directs the Army-funded, multi-university Center for NanoEnergetics Research, as well as the Reacting Flows and Nanoparticle Laboratory. He is internationally recognized as a leader in the nanoparticle community, and will spearhead the Clark School's efforts in nanomanufacturing. He will also hold a joint appointment at NIST, while serving as the Coordinator of the UMD/NIST research collaboration in nanometrology and nanomanufacturing. We look forward to their arrival.

The Department has also grown through the integration of the faculty associated with the Reliability Engineering Program. In April of this year, on the recommendation of the University Senate and following highly favorable votes by the Mechanical Engineering and the Materials Science and Nuclear Engineering faculties, President Mote approved the move of the administrative home of the graduate program in Reliability Engineering to the Department of Mechanical Engineering. The move will facilitate the growing interactions between the two faculties and provide opportunities for unencumbered collaboration and synergy. A Department Integration Task Force has been working over the past six months to develop a plan for integrating the Reliability Engineering faculty, courses, programs and research, as well as offices and facilities, into an expanded ME Department and will shortly submit its recommendations on implementation of the plan to the ME faculty.

The past few months have seen an extraordinary number of faculty awards, which are listed throughout this issue. I hope you will join me in personally congratulating all our colleagues on their many accomplishments.

Allow me to also use this opportunity to thank Patricia Congro Aquilina for her dedicated effort as our Publications and Web Coordinator. Patricia has been the force behind our many brochures, newsletters, annual reports and web pages, as well as the "newshound" for the words and images that fill each of these. Patricia will be leaving us in July, as she and her husband await the birth of their first child, and we all wish them well in their new role as parents.

One of my goals for the coming year is to reach out to our many alumni and begin to involve them more actively in the life of the Department. The back cover of this issue lists two upcoming fall events you'll want to put on your calendar: the Alumni Tailgate Party on October 11 and the Alumni Reception at the International ASME Congress in November. Keep tabs on our website (www.enme.umd.edu) for the latest details on each as well as on all the ongoing activities in the Department. If you can't join us in person, then try to join us virtually, via the Web, email (abc@eng.umd.edu), or phone (301-405-3173). Please let me know if you can participate in these activities, if you have ideas for any others, or if you would just like to keep in touch!

Reliability Engineering

continued from page 1

Mosleh

models and risk methodologies and reliability engineering, and he has worked closely with industry and government in these areas. His research interests include probabilistic risk assessment, functional modeling, intelligent systems in reliability and safety, and deterministic-probabilistic integrated modeling.

Prof. Ali Mosleh received his Ph.D. from the University of California at Los Angeles. He has made research contributions in Bayesian methods for data analysis, methodology for use of expert quantitative opinion, reliability growth modeling, probabilistic reliability physics, common cause failure analysis, modeling the impact of organizational factors on system reliability, dynamic accident simulation and dynamic probabilistic risk assessment, human reliability analysis, methodology for information systems security risk management, and space systems risk analysis.

Smidts

Associate Prof. Carol Smidts received her Ph.D. from the University Libre de Bruxelles. Her research focuses on probablilistic dynamics for complex systems, and human reliability and software reliability.

Prof. Emeritus Marvin Roush will also be joining the Department. A founding faculty member in RE, he received his Ph.D. from the University of Maryland.

In addition, Jeong Kim will also join the Department as Professor of Practice. He is profiled on page 4.

For more information on these and other ME faculty, visit www.enme.umd.edu/facstaff/faculty/.

facultyNEWS

New Fellows

ME Professor Emeritus **R.J. Sanford** and Professor **Balakumar Balachandran** were recently elected to the grade of Fellow of ASME International, a worldwide engineering society focused on technical, educational, and research issues in mechanical engineering.


Sanford

Dr. Sanford received his B.M.E. and M.S.E. in Solid Mechanics from the George Washington University, and his Ph.D. in Solid Mechanics from the Catholic University of America. Before joining the faculty of the University of Maryland in 1982, he worked in the Marine Technology and Mechanics Divisions of the Naval Research Laboratory, beginning in 1962. Dr. Sanford served as a professor of mechanical engineering from 1982 to 1995, when he became Professor Emeritus.

Among his many honors, Dr. Sanford is the recipient of the NRL Research Publication Award, the Hetenyi Award and the Frocht Award of the Society of Experimental Stress Analysis, and the NRL Research Publication Award. He is also a Fellow of the Society for Experimental Stress Analysis, and is listed in *Who's Who in Engineering, American Men and Women of Science, Who's Who in the East*, and *Who's Who in Technology.*


Balachandran

Dr. Balachandran was promoted to Full Professor on July 1, 2003, having served as Associate Professor of Mechanical Engineering at the University of Maryland since August 1998. He received his M.S. in Aerospace Engineering and his Ph.D. in Engineering Mechanics from the Virginia Polytechnic Institute and State University (Virginia Tech). Prior to coming to the University of Maryland as an Assistant Professor in 1993, Dr. Balachandran worked as a Research Associate in the Department of Engineering Science and Mechanics at Virginia Tech from January 1991 to August 1993.

Dr. Balachandran's research interests include nonlinear dynamics, vibration and acoustics control, system identification, and signal analysis. He serves as a reviewer for the *ASME Journal of Vibration and Acoustics, Journal of Sound and Vibration, Journal of Vibration and Control, Nonlinear Dynamics, Smart Material and Structures, Shock and Vibration, ASME Journal of Applied Mechanics, International Journal of Nonlinear Mechanics, Journal of Intelligent Material Systems and Structures,* and *Chaos, Solitons, and Fractals*, and is on the editorial board of the *Journal of Vibration and Control*.

Elisabeth Smela Receives NSF CAREER Award


Smela

Assistant Professor Elisabeth Smela has won a National Science Foundation Faculty Early Career Development (CAREER) Award for her project titled, "Development of Advanced MEMS Actuator Technology for Microrobotics." The NSF CAREER program fosters the career development of outstanding junior faculty, combining the support of research and education of the highest quality and in the broadest sense.

The Faculty Early Career Development (CAREER) Program is a Foundation-wide activity that offers the National Science Foundation's most prestigious awards for new faculty members. The CAREER program recognizes and supports the early career-development activities of those teacher-scholars who are most likely to become the academic leaders of the 21st century. CAREER awardees are selected on the basis of creative, career-development plans that effectively integrate research and education within the context of the mission of their institution.

Professor Michael Ohadi Receives ASHRAE's Distinguished Service Award


Ohadi

Professor of Mechanical Engineering Michael Ohadi has been selected to receive ASHRAE's Distinguished Service Award on June 28, 2003 at the Society's 2003 Annual Meeting in Kansas City, Missouri.

The Distinguished Service Award is granted to individuals who have served ASHRAE with distinction on committees and have freely given their time and talent on behalf of the Society. In a letter announcing this award, ASHRAE Executive Vice President Frank M. Coda states, "It is the volunteer effort of people such as Dr. Ohadi that allows ASHRAE to contribute technological advances for the benefit of industry and the public."

Jeong Kim is Professor of Practice

Dr. Jeong H. Kim joined the Clark School of Engineering in January 2002 as Professor of Practice in Reliability Engineering with a joint appointment in the departments of Electrical and Computer Engineering and Materials and Nuclear Engineering. With the integration of the Reliability Engineering Program into the Department of Mechanical Engineering, Dr. Kim will become engaged in the life of mechanical engineering faculty and students, as well, conducting research, teaching classes and seminars, supervising student projects and thesis work, and interacting with students in various programs related to technology entrepreneurship.

The rank of Professor of Practice recognizes the impact of Dr. Kim's contributions and prominence in the practice of engineering. His technical expertise in communications, wireless technologies, and broadband optical systems and devices, coupled with his understanding of market trends and forces, makes him an excellent role model for our students.

Dr. Kim has had a distinguished career as an engineering entrepreneur. In 1992 he founded a successful telecommunications company, Yurie Systems, and pioneered the development of a revolutionary Asynchronous Transfer Mode Switch for wireless applications. The ATM switch became key in the modernization of telecommunications systems for today's digital market. Lucent Technologies acquired Yurie Systems in 1998, and Dr. Kim assumed a senior leadership position with Lucent. He has played a pivotal role in reshaping their optical communications division through a major restructuring of that division.

Dr. Kim's early career included work in computer design, satellite systems designs and data communications, as well as seven years as a Nuclear Submarine Officer in the U.S. Navy. He received his Ph.D. in Reliability Engineering from the University of Maryland in 1991, and holds a Master's Degree in Technical Management and Bachelor's degrees in Electrical Engineering and Computer Science from Johns Hopkins University. He is the recipient of numerous awards and honors including Ernst & Young's Emerging Entrepreneur of the Year Award, KPMG Peat Marwick LLP High Tech Entrepreneur Award, and the Maryland High Technology Council Entrepreneur of the Year Award.

Recognizing the current and future importance of these areas to the University of Maryland and the region's high technology economy, the state of Maryland has planned a new campus facility, the Jeong H. Kim Engineering and Applied Sciences Building. This 160,000 square foot building will significantly improve the college's physical infrastructure and enhance and accelerate research and education in both core subjects and emerging technologies. The building will house some of the most sophisticated engineering and research and educational laboratories in the nation; every aspect of the building will be used to educate tomorrow's engineers. A Virtual Groundbreaking of the building was held on May 14, 2003 at the University's Clarice Smith Performing Arts Center.

Faculty Promotions

The Department of Mechanical Engineering is pleased to announce the following faculty promotions, effective July 1, 2003:

Balachandran

Balakumar Balachandran
Promoted to Full Professor
Dr. Balachandran has been an Associate Professor of Mechanical Engineering at the University of Maryland since 1998, and held the position of Assistant Professor from 1993 to 1998. More on Dr. Balachandran can be found on the preceding page, or at www.enme.umd.edu/facstaff/faculty/associate/balachandran.html.

Jackson

Gregory Jackson
Promoted to Associate Professor with tenure
Dr. Jackson has been an Assistant Professor of Mechanical Engineering since 1997. He received his Ph.D. in mechanical engineering from Cornell University, focusing his research on liquid-fuel combustion and soot behavior in flames. Prior to joining the Maryland faculty, Dr. Jackson was a research and development engineer for Precision Combustion, Inc. in New Haven, Conn., from 1993-1997. Dr. Jackson is also the recipient of an NSF CAREER Award in 1999. His current research interests are in the area of catalytic reactors for ultra-low emissions combustion and hydrogen production, solid oxide fuel cells, and modeling of combustion and detonations.

For more information on Dr. Jackson, please visit www.enme.umd.edu/facstaff/faculty/assistant/jackson.html.

Professor A.K. Gupta to Receive Kirwan Prize


Gupta

Professor of Mechanical Engineering Ashwani K. Gupta has been selected to receive the 2003 Kirwan Faculty Research and Scholarship Prize. Established by University of Maryland Chancellor and former University of Maryland President William E. Kirwan and Patricia H. Kirwan, the Kirwan Faculty Research and Scholarship Prize recognizes a faculty member for a highly significant work of research, scholarship, or artistic creativity completed within the last three years. The prize can be awarded for a publication, an invention, a performance, or any other activity within the faculty member's academic discipline.

Dr. Gupta has become a leading authority worldwide on two areas in the field of thermodynamics: high temperature air combustion technology (HITAC) and swirl flows. His recent co-authored book, *High Temperature Air Combustion*, has received significant praise from the international technical community and is now in its second printing. His 1984 book, *Swirl Flows*, is considered the classic in this field. Dr. Gupta is the recipient of the ASME Westinghouse Gold Medal and the AIAA Energy Systems Award and Propellants and Combustion Award. He is a Fellow of both ASME and AIAA.

Professor Gupta's award will be conferred at the Fall 2003 Campus Convocation in October.

Professors Duncan, Schmidt Win Clark School Faculty Awards


Duncan

Professor James Duncan has been selected to receive the 2003 Poole and Kent Company Senior Faculty Teaching Award. This award consists of a wall plaque and a prize of $1,000. Dr. Duncan was selected for this award in recognition of his dedication to teaching in the classroom, his encouragement of students to master course topics, and the creativity he has shown in the development of new approaches to traditional courses. More about Dr. Duncan and his research can be found on page 6.


Schmidt

Associate Professor Linda Schmidt has been selected to receive the 2002 Engineering Faculty Service Award. This award consists of a wall plaque and a prize of $500. Dr. Schmidt was selected for this award in recognition of her outstanding service, dedication, and commitment to the A. James Clark School of Engineering. Dr. Schmidt also serves as the advisor to the University of Maryland chapter of Pi Tau Sigma. More about their recent national convention can be found on page 12.

These awards were presented at the Clark School's Commencement on Friday, May 23, 2003.

Professor David Holloway is NSF Outstanding Advisor of the Year


Holloway

At the FutureTruck 2003 Awards Ceremony held June 12 in Dearborn, Michigan, ME Professor David Holloway received the National Science Foundation Outstanding Faculty Advisor of the Year Award.

Dr. Holloway received this award for his outstanding work in incorporating the Advanced Vehicle Technology Competition (AVTC) activities into the classroom and for his significant impact on the engineering education of his students. This award carries a $20,000 fund to be used to enhance the integration of AVTC activities into the undergraduate curriculum for the benefit of the students.

Over the past three decades, Dr. Holloway has selflessly and quietly dedicated himself to improving the educational experience of students. He has made profound contributions to integrating automotive technology into the curriculum and engaged hundreds of students in real-world projects aimed at advancements in vehicle technology: lower fuel consumption, improved performance, better environmental characteristics, and enhanced functionality. He motivates his students and brings the best out of them.

In announcing this award to the University, Clark School of Engineering Dean Nariman Farvardin stated, "Please join me in congratulating Dr. Holloway for this outstanding national recognition and in thanking him for what he has done for the institution over the past 32 years."

Workshop on Power Device Packaging Reliability Held


McCluskey

On June 23, 2003, Associate Professor Patrick McCluskey hosted a multi-university Workshop on Power Device Packaging Reliability at the University of Maryland. The workshop, sponsored by the Office of Naval Research, reviewed the latest research work in the area of solder, substrate, and interconnect mechanics applied to power electronics. Dr. McCluskey and the ME Department were chosen to host the event because of their leading roles in the mechanical design of reliable power electronic systems. Topics discussed included testing for power cycling reliability, enhancing solder reliability through optimized package design, new solder materials and soldering processes, novel power package structures, cooling techniques, and the effect of thermal management on package reliability. Speakers included Dr. Fritz Kub of NRL, Dr. Cemal Basaran of SUNY-Buffalo, Dr. Vic Temple of Silicon Power Corporation, and Dr. McCluskey.

Duncan Discovers Effects of Surfactant in Ocean Waves

Duncan

University of Maryland Professor of Mechanical Engineering **James H. Duncan** and Post Doctoral Researcher Xinan Liu have made a discovery concerning the effects of surfactants on spilling breaking waves. They have determined in laboratory simulations that surfactants, like those found in the ocean, can cause the formation of small jets in these waves. These jets are likely to affect the transfer of heat, mass and energy across the air-sea interface. Their findings were published in the January 30, 2003 issue of the journal *Nature*.

Background

Wind conditions affect all bodies of water. In high wind conditions, the crests of the breaking waves turn white, signaling the entrainment of air bubbles and the ejection of water droplets. These breakers are known as white caps. At even higher wind conditions, plunging breakers are formed. In these breakers, a jet ejects forward from the crest of the wave and plunges into the wave face, entrapping large quantities of air and ejecting large numbers of water droplets into the atmosphere.

Plunging breakers at the shoreline are the subjects of numerous photographs, such as surfer photos. Under light to moderate winds in open water, weak breakers with short wavelength occur. These breakers do not entrain a significant amount of air because the surface motion does not have enough kinetic energy to overcome surface tension. These are called micro-scale breakers. Since there is no white cap they are difficult to see.

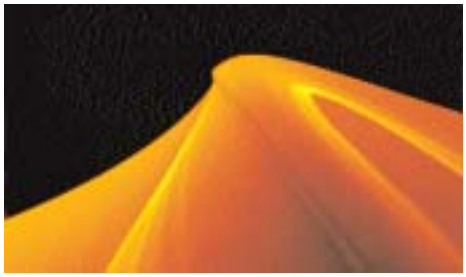
The research conducted by Duncan and Liu is important in understanding the natural effects of the oceans on the earth's climate. The rates of transfer of mass, heat, momentum, and energy between the ocean and the atmosphere are critical components in the control of our climate. For example, a large portion of the carbon dioxide discharged into the atmosphere ends up in the oceans. The turbulence, water droplets, and air bubbles created by wind-generated breaking waves dramatically increase these transfer rates.

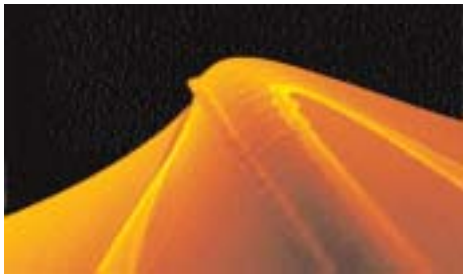
Surfactants are substances that reduce surface tension and create surface elasticity and viscosity. Soaps and detergents are examples of surfactants. Each surfactant molecule has a hydrophobic (water hating) end and a hydrophilic (water loving) end. They are attracted to the water-free surface where they form a layer that is a single molecule thick. In any natural body of water, surfactants are ubiquitous. Surfactants in the oceans are created as by-products of the respiration of organisms such as plankton, and are found in the highest concentrations in coastal regions.

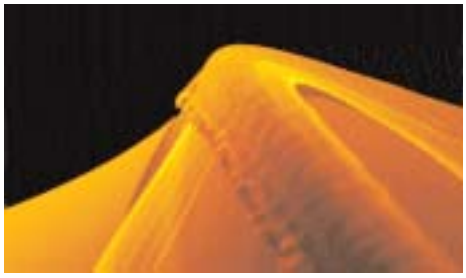
Research

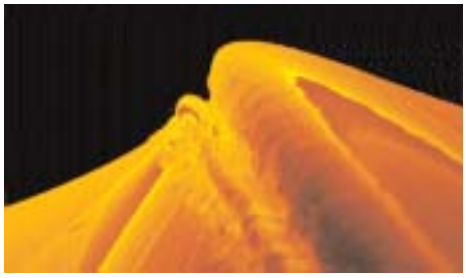
In their research, Duncan and Liu studied breaking waves in the Department of Mechanical Engineering's wave tank. The tank is 50 feet long, 4 feet wide and 3 feet deep. The waves were generated with a mechanical wave maker instead of with wind.

The behavior of the waves was measured photographically. The camera was set to take 300 pictures per second and was positioned to view the wave from the side. The wave was illuminated with a 1-mm-thick light sheet from a Nd:YAG laser. The light sheet was oriented parallel to the direction of motion of the wave.









The water was mixed with a fluorescent dye and an optical filter was placed in front of the camera. With this system, the light source for the pictures is the fluorescing dye. The entire photographic system was mounted on an instrument carriage that was set to move along the tank with the crest of the breaking wave. The combination of the high frame rate and the crest-fixed camera reference frame resulted in a movie of the breaking process that is dramatically slowed down in time, allowing for observations and measurements that are impossible with the human eye or a standard video camera.

For a given wave maker motion, Duncan and Liu observed the breaker in water with surfactant levels ranging from near zero (clean water) to high enough to reduce the surface tension to one-half its value in clean water. In the clean water case, breaking was initiated by the appearance a small bulge on the wave crest and a train of capillary waves growing on the front wave face. The crest became turbulent without overturning of the water free surface. For most surfactant conditions, the breaking behavior was qualitatively similar to the clean water case, though the capillary waves decreased and the wave's crest bulge diminished in size. In these cases, the surface motion during breaking seemed less energetic than in clean water. However, at the highest surfactant concentration, the wave changed dramatically. A tiny jet formed on the bulge near the toe. This jet was ejected into the air and fell to the water surface upstream of the toe. At impact the jet was about 10 mm long and 5 mm thick, and entrapped a small tube of air. The surface motion in this case was more energetic than in the case without surfactants. These experiments mark the first time a jet of this type had been observed. The very high temporal and spatial resolution of their measurement system offered the capability to discover this type of breaker. This phenomenon may be important since the entrained air is likely to increase air-water transfer rates.

For more information, please contact Dr. Duncan at duncan@eng.umd.edu.

The photographs in the paper were also used in a winning entry for the 2002 Gallery of Fluid Motion of the American Physical Society's Division of Fluid Dynamics. Photographs and drawings from winning entries of this poster and video entry are published in the journal Physics of Fluids and on the American Institute of Physics website. Dr. Duncan has also been a co-author of two other winning entries in past years (1994 and 2000) of the Gallery of Fluid Motion.

S.K. Gupta Receives NSF Grant for Undergraduate Research


Gupta

Associate Professor Satyandra K. Gupta is the Principal Investigator for a five-year, $688,702 research grant from the National Science Foundation for the Research Experience for Undergraduates (REU) program.

This award funds a five-year Research Experience for Undergraduates (REU) Site at the University of Maryland for fifteen students each summer for twelve weeks for research opportunities at the University's Institute for Systems Research, with which Dr. Gupta is also affiliated. Students at colleges, universities, and community colleges will be recruited nationwide through a process involving efforts to reach students who would otherwise not have access to a research experience. The program incorporates activities that will involve participants in the following research directions of the institute: global communications systems, sensor-actuator networks, next-generation product realization systems, societal infrastructure systems, and cross-disciplinary systems education. Through the program students will be able to (1) establish a basis for systems thinking by conducting research and thus understand systems engineering as a discipline; (2) acquire broader and deeper understanding of both the research process and the practice of engineering and how new knowledge is created and communicated; (3) develop multicultural understanding and team competence and become aware of the societal implications of research; and (5) successfully seek admission in a four-year program and/or graduate school.

Balachandran and Sandborn Win "Invention of the Year"

Mechanical Engineering Professors **Balakumar Balachandran** and **Peter Sandborn** were the winners of two of the three Office of Technology Commercialization (OTC) Invention of the Year Awards. These awards are granted in the Information Sciences, Physical Sciences, and Life Sciences.


Balachandran

Prof. Balakumar Balachandran was the winner of the Physical Science Invention of the Year. Vibration can adversely affect the performance of all kinds of complex structural and mechanical systems, including everything from aircraft and automobiles to household appliances to theaters. For example, in automobiles, aircraft and ships, vibration may cause fatigue damage, while in theaters it may be the source of a noisy environment. As a result, vibration sensors that can measure accelerations, velocities and acoustic pressure are in great demand for many industrial, defense and commercial applications.

Dr. Balachandran, a professor in the Department of Mechanical Engineering, and graduate student researchers Miao Yu and Moustafa Al-Bassyiouni have developed a new fiber optic sensor system for acoustic, pressure and acceleration measurements of vibration. Some of the advantages of this new system include its high sensitivity level; its ability to be miniaturized to the fiber optic diameter-level for micro-electromechanical systems, or MEMS, applications; and its remote sensing capabilities.

This patent-pending system can be developed into a fiber tip-based microphone, velocity sensor, accelerometer sensor and fiber optic acoustic intensity sensor. Its applications range from aerospace to architecture. Specific applications include acoustic emission measurements in computer hard disk drives; pressure measurements for ignition chambers of automobiles; integrated distributed pressure sensor arrays for smart wing structures; distributed acoustic pressure array panels for acoustic measurement in concert halls and conference rooms; health monitoring technologies; and background noise suppression systems in automotive telematics.

The inventors have received a Maryland Technology Development Corporation, or TEDCO, grant for $50,000 to further research and develop enhancements to the technology for commercialization. OTC is in the process of licensing this platform technology to a new, local University of Maryland start-up company.

Other ME faculty finalists in the physical science category were Associate Professor Don DeVoe, Professor Reinhard Radermacher, and Assistant Professor Elisabeth Smela.

Assoc. Prof. Peter Sandborn was the winner of the Information Science Invention of the Year. The life cycles of many electronic parts are often significantly shorter than the life cycles of the products in which they are used. A part becomes obsolete when it is no longer manufactured, either because demand has dropped to such low levels that it is not practical for manufacturers to continue making it, or because the materials or technologies necessary to produce it are no longer available. If system or product has a long life but is not a driving force in the market for its electronic parts, then there is a high likelihood of a lifecycle mismatch between the system or product and those electronic parts. These life-cycle mismatches can result in high maintenance costs for long-life systems.


Sandborn

Peter Sandborn, an associate professor in the Department of Mechanical Engineering, and Pameet Singh, a graduate student researcher, have developed a new methodology for determining the optimum design refresh (redesign) schedule and strategy for long-life electronic systems based on future production projections, maintenance requirements, and parts obsolescence forecasts. The methodology, called Mitigation of Obsolescence Cost Analysis, or MOCA, is the first of its type for parts-obsolescence-driven refresh scheduling and optimization.

Based on a detailed cost analysis model, MOCA determines the optimum design refresh plan during the field support life of the product. The plan consists of the number of design refresh activities and their respective calendar dates and content in order to minimize the life-cycle sustainment costs of the product. The methodology supports user-determined, short- and long-term obsolescence mitigation approaches on a per-part basis and variable look-ahead times associated with design refreshes. MOCA also presents a mix of obsolescence mitigation approaches ranging from lifetime buys to electronic parts substitutions.

The methodology has been demonstrated on Honeywell International's Full Authority Digital Electronic Controller, which is a long-life, low-volume, safety-critical component used in engines for regional jets.

Associate Professor Satyandra K. Gupta was another ME faculty finalist in this category.

The Office of Technology Commercialization at the University of Maryland was established in 1986 to facilitate the transfer of information, life and physical science inventions developed at the University to business and industry. In the past 16 years, OTC has recorded more than 1115 technologies, secured more than 180 patents and licensed more than 600 technologies, generating more than $20.8 million in technology transfer income. In addition, more than 30 high-tech start-up companies have been formed based on technologies developed at the University.

departmentNEWS

Department Hosts Space Shuttle Technology Forum

photo courtesy of NASA

On February 6, 2003, following the tragic loss of the Columbia and its crew, the Department of Mechanical Engineering held a Space Shuttle Technology Forum. At this Forum, Clark School faculty and research staff shared first-hand experience and knowledge of these technologies and the trade-offs and risks inherent in the development of spacecraft.

Following a series of brief presentations, the Forum was opened for questions and comments from the audience. These presentations included:

Welcome and Introduction, Avram Bar-Cohen, Professor and Chair, Department of Mechanical Engineering

Risk Assessment at NASA, Ali Mosleh, Professor of Reliability Engineering and Mechanical Engineering

Shuttle Insulation Tiles—Key Properties and Potential Failure Mechanisms, Isabel Lloyd, Associate Professor of Materials Engineering

Materials at High Temperature and Shock Compression, Aris Christou, Professor of Materials Engineering

Human Productivity in Space, Brian Roberts, Faculty Research Associate, Aerospace Engineering

Shuttle Robot Arm Electronics, Diganta Das, Faculty Research Associate, Mechanical Engineering & CALCE

High Temperature Electronics, Patrick McCluskey, Associate Professor of Mechanical Engineering & CALCE

Electronic Parts Life Extension for Military and Avionics Qualification, Joseph Bernstein, Associate Professor of Reliability Engineering and Mechanical Engineering

Space Shuttle Tile Design, Otto Wilson, Assistant Professor of Materials Engineering

Ethical Issues in Shuttle Design, Vincent Brannigan, Professor of Fire Protection Engineering

Questions/Answers/Comments, Full Panel

This Forum was broadcast as a live webcast. To watch the archived webcast, go to www.enme.umd.edu/shuttle/webcast.html.

Maryland's Engineering Program Rises to No. 16

The U.S. News & World Report's recent rating of America's Best Graduate Schools ranks the A. James Clark School of Engineering No. 16. Tenth among public institutions, the Clark School remains the top ranked engineering graduate program in the Mid-Atlantic region, which includes Delaware, Maryland, the District of Columbia, and Virginia. The Clark School of Engineering's graduate program was ranked 19th last year.

"We are once again honored to be recognized as a leader in engineering education and research and ranked among the nation's best engineering programs," states Nariman Farvardin, dean of the Clark School. "The success of the Clark School can be attributed to our excellent teaching and research faculty, the high caliber of our students, and a commitment to conduct work that benefits future generations."

The ratings are a result of surveys based on the following categories: quality assessment, student selectivity based on quantitative and analytical GRE measures, faculty resources as determined by faculty to student ratios, as well as specialty ranking that are based solely on nominations by educators at peer schools.

In Brief

Robert Anders, Engineering Technician, retired on May 2, 2003, following 35 years of service to the University. Bob began his tenure at the University in the Physics Department, and moved to Mechanical Engineering several years later.

Elyse Beaulieu-Lucey, Academic Coordinator for the Graduate Program, received her M.A. in English this spring. Her thesis title was "Recovering Trauma: War in J.R.R. Tolkien's 'The Silmarillion,' 'The Hobbit,' and 'The Lord of the Rings.'"

Assistant Professor Steven Buckley and his wife, Alice Detwiler, welcomed their third child, Jennifer Detwiler Buckley, on February 13, 2003.

Diane L. Mallon, Payroll and Benefits Coordinator, was honored by Personnel Services at a ceremony on April 15, 2003, in the Grand Ballroom of the Stamp Student Union for her 20 years of service to the University.

CECD Hosts First Research Review Day

by Allie Buzzell

On May 21, 2003, the Center for Energetic Concepts Development (CECD) held its First Research Review Day. Technologists from Naval Surface Warfare Center, Indian Head Division (NSWC-IH) gathered with their academic colleagues from the Mechanical Engineering Department at the University of Maryland and with invited guests to be briefed on a remarkable list of energetics research accomplishments and ongoing investigations. The half-day meeting and luncheon, hosted by CECD Director Davinder K. Anand, was held at the Inn and Conference Center at the University of Maryland.

"In our five years of working together, the CECD has become a world-class research center with an impressive list of accomplishments," said Dr. Anand in welcoming remarks. "A feeling of excitement and collaboration is flourishing among the teams investigating a variety of energetics research and design problems — teams of faculty, graduate students, and Indian Head scientists and engineers." Through both research and educational collaborations, the original intent of the CECD's founders is being realized, said Dr. Anand.

From the perspective of America's national security, CECD is "critical to sustaining energetics capabilities for the Navy and for the nation," stated NSWC-IH Executive Director Steve Mitchell. "We have also used this partnership to refresh our work force and engage the talents of the University in solving near-term energetics problems." Looking ahead, "we would like to expand the CECD partnership beyond Indian Head to also embrace China Lake, Dahlgren, and other federal laboratories involved in energetics R&D," Mitchell added.

Research Review Day Attendees

Economic development is another benefit of the CECD that is perhaps overlooked. According to Kumar P. Barve, the Majority Leader in the Maryland House of Delegates, "an intimate relationship exists between economic development, science, and technology." Barve credits the University of Maryland with standing in the forefront of economic development in the state, which boasts the highest number per capita of engineers and scientists in America.

"Economic development doesn't just happen. You need a highly educated work force," said Barve.

After opening remarks, several University of Maryland Mechanical Engineering professors who are directing CECD-allied research projects took the podium to discuss the high points of their work. In addition, the lobby of the conference center was lined with poster presentations on many other ongoing investigations featuring collaborations between Maryland faculty and graduate students and NSWC-IH employees.

Bob Kavetsky, Director of Science and Technology Revitalization in the Office of Naval Research (ONR) and a co-founder of CECD, noted that CECD leaders are building a world-class enterprise that recognizes an important change in science and technology: that the United States is not as clearly dominant as it was 30 years ago. Federal laboratories gain an important advantage when they collaborate with universities such as Maryland, which have stayed closely connected to international developments in science and technology.

Kavetsky noted that Dr. Chester F. Clark, who recently assumed responsibility for managing NSWC-IH's involvement in CECD, is committed to carrying on the tradition of cooperative teaming established during the first five years. For ONR's part, said Kavetsky, "We are moving ahead to implement the CECD model across all our Navy laboratories."

Allie Buzzell is a writer and editor with Adeptus Associates, Middletown, Maryland.

Left to right: CECD Director Dave Anand with Maryland House Majority Leader Kumar Barve; ME Assistant Professor Hugh Bruck during his talk; David Rizzardo and ME Associate Professor Jeffrey Herrmann with their research poster; NSWC-IH Executive Director Steve Mitchell with Capt. Marc Siedband




photos by Thai Nguyen

Assistant Secretary for Energy David Garman Visits CEEE

By Matthew Cowie
Research Assistant, CEEE

Matthew Cowie (third from right) explains the Integrated Equipment Test Center to (left to right) Dr. Tom Rosfjord and Tony Prophet of UTC Power, Reinhard Radermacher, and David Garman and Patricia Hoffman of the Department of Energy

On May 9, 2003, Assistant Secretary for Energy David Garman visited the Center for Environmental Energy Engineering (CEEE) to tour the Chesapeake Building, home to the Integrated Energy System Research Center. Two independent Combined Cooling, Heating and Power (CHP) systems installed in and around the high-profile administrative building are used to demonstrate and experiment on electrical generators and waste heat activated cooling equipment.

David Garman directs the Office of Energy Efficiency and Renewable Energy, which funds research into distributed energy resources (DER). DER improves the efficiency and reliability of the electric grid by placing smaller, cleaner electrical generators closer to the point of end use, thereby reducing transmission losses and making the waste heat remaining in the exhaust gases available for heat activated cooling, heating, or dehumidification equipment. The Chesapeake Building is a unique facility visited by hundreds of engineering professionals, educators, and legislators from around the U.S. and the world every year.

On the roof of the Chesapeake Building (left to right): Patricia Hoffman, Reinhard Radermacher, David Garman, Patti Garland of ONRL, Matthew Cowie, Tony Prophet, and Tom Rosfjord

Also in attendance at the tour were Patricia Hoffman, director of the DER program within the Department of Energy, Patti Garland, the project's director from Oak Ridge National Laboratories, representatives from the DER/CHP industry, as well as Mechanical Engineering Professor Reinhard Radermacher, Director of the CEEE. The tour was hosted by the staff and students of the CEEE and concluded with a visit to the campus 27MW Trigen CHP Plant that is currently in the last stages of commissioning on campus. By replacing the old, existing energy infrastructure with the new CHP plant, the University of Maryland stands to save approximately $6 million per year. The University also anticipates reduction in emissions of nitrogen oxide by 196,000 tons and carbon dioxide emissions by 3.5 million tons over 20 years, making it an excellent example of the benefits that can be realized from this technology.

(left to right) Matthew Cowie, David Garman, Tony Prophet, Patricia Hoffman, and Tom Rosfjord

University, CEEE Recognized by EPA, NWF

The University of Maryland, College Park, is being recognized by the U.S. Environmental Protection Agency and the National Wildlife Federation for environmental achievements, including a new cogeneration system that will reduce the University's energy consumption by more than 30 percent. This system is the Center for Environmental Energy Engineering (CEEE) Integrated Energy Systems Test Center, designed as a research facility that explores the intricacies of integrating advanced power generating equipment, such as microturbines and fuel cells, with waste heat activated technologies such as absorption chillers and desiccant systems. It is housed at the Chesapeake Building, which currently has two CHP systems installed, and is a fully instrumented platform for conducting research on advanced energy efficient and environmentally friendly building technology.

For more information, visit the CEEE website at www.enme.umd.edu/ceee.

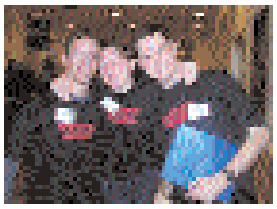
studentNEWS

Maryland's Tau Mu Chapter Hosts 82nd National Pi Tau Sigma Convention

The University of Maryland's Tau Mu Chapter hosted the 82nd National Pi Tau Sigma Convention on the weekend of February 21-23, 2003. The convention welcomed over 200 attendees representing over 65 colleges and universities from across the United States. The Title Sponsor was Schlumberger; local sponsors included the Department of Mechanical Engineering, Black & Decker, the University's Center for Energetic Concepts Development, and Northrop Grumman.

The convention kicked off with lab tours to the Glenn L. Martin Wind Tunnel, The Neutral Buoyancy Tank, the Permanent Interconnects and Accelerated Testing Lab (Prof. Abhijit Dasgupta, Director), the Laboratory for Optomechanics and Multilayer Systems (Prof. Bongtae Han, Director), Failure Analysis and Materials Characterization Lab (Dr. Craig Hillman, Director), and the Multiphase Transport Lab (Prof. Ken Kiger, Director). During the convention's plenary sessions, revisions to the Pi Tau Sigma Constitution were made and motions were passed, including The New Chapter Petition to welcome the University of Puerto Rico into Pi Tau Sigma, as well as a motion that "Maryland Rocks." The convention also showcased sponsor and graduate school exhibits.

One of the convention highlights was the talk by Dr. Eric Donzier entitled "Pioneering Technical Solutions for Oil Exploration and Production." Dr. Donzier, is the research director of the Sensor Physics department Schlumberger Doll Research in Ridgefield, Conn. He is responsible for developing new measurement systems for better management of oil and gas reserves. He summed up the opportunities in his research area by stating it was a "playground for engineers."



Maryland students Steven O'Hara, Catherine Buxton, and Raleigh Stewart

Fall 2002 electees Will Becker, Scott Bryant, Catherine Buxton, Josh Dinaburg, Ira Golden, James Govern, Jason Mindlin, and Zach Sandkuhler were also initiated as new members of Maryland's Tau Mu. The guest speaker for the Saturday luncheon was Department of Mechanical Engineering Chairman Avram Bar-Cohen, and special guests at the Saturday evening banquet included A. James Clark School of Engineering Dean Nariman Farvardin and Pi Tau Sigma alumni.

Contributing to the success of the 2003 National Convention was the Pi Tau Sigma Chapter Advisor, Associate Professor Linda Schmidt (who was also named the 2002 Outstanding Advisor for a Student Organization by the Office of Campus Programs). The National Convention Chairs, Patrick Schmahl, Rosa Shim, and Raleigh Stewart, and the members and electees of the Tau Mu chapter worked with Dr. Schmidt prior to and during the convention to make the event a huge success.

Mechanical Engineering Student Awards Announced

The Department of Mechanical Engineering is pleased to announce the winners of the Spring 2003 Student Awards.

American Society of Mechanical Engineers Senior Award
Presented to the senior member who has contributed most to the student chapter
Jason Michael LeBlanc

Pi Tau Sigma Outstanding Service Award
Presented to a student for outstanding service and contributions to the chapter
Raleigh Daniel Stewart

Pi Tau Sigma Memorial Award
Presented to the senior in mechanical engineering who has made the most outstanding contributions to the University
Robyn Louise Hladish

Pi Tau Sigma Outstanding Sophomore Award
Presented to the most outstanding sophomore in mechanical engineering on the basis of scholastic average
Thomas Buchanan Baummer

Department of Mechanical Engineering Academic Achievement Award
Presented to the junior in mechanical engineering who has attained the highest overall academic average
Aaron Joseph Johnson

Department of Mechanical Engineering Chair's Award
Presented for excellence in academics, outstanding service to the Department, or leadership in the Department
Anita Maria Currano

Summer Employment Program Award
Presented by the Engineering Co-Op and Career Services Office and the Maryland Technology Enterprise Institute to an intern who has demonstrated exceptional work performance, outstanding professionalism for a successful engineering career, and dedicated service to the Co-Op Office
William Edward Cartee

A. James Clark School of Engineering Leadership Award
Presented to a graduating senior for outstanding leadership in the College
Alexander Ramsay Yasbek

ME Teams Win First, Third Place in Business Plan Competition

by Eric Schurr
Maryland Technology Enterprise Institute

Two new technology-based companies founded by Mechanical Engineering students, faculty, and recent alumni at the University of Maryland walked away with a share of $50,000 in prize money at the University's Third Annual Business Plan Competition on May 9, 2003.

"Winning this competition will help us realize our entrepreneurial dream," said mechanical engineering student Alok Priyadarshi, a member of first-place company Terplicators Inc. "Being recognized by such a distinguished panel of judges validates our business plan and gives us confidence to move forward. Our credibility will also be higher as we seek additional funding."

Terplicators, which netted $20,000 by winning the competition, is developing next-generation mold design software solutions. The company's software modules take Computer Aided Design (CAD) or scanned data and produce accurate mold designs within minutes. Companies such as Black & Decker could speed their products to market by producing molds for complex plastic parts in minutes rather than days.

More than a third of the 30 potential customers contacted by Terplicators have already expressed interest in their product, including Black & Decker, Direct Dimensions, Space Limited, and NAVSEA. Graduate student Rohit Kumar and Associate Professor Satyandra Gupta, both from the Department of Mechanical Engineering, are also members of the Terplicators team.

Third-place-winner Castle Duncan Inc. won $7,500. The company has already developed a prototype of its ultra-safe all-terrain vehicle, which is designed to cut down on ATV-related injuries and deaths with a custom roll-cage and four-point safety harness. Castle Duncan's team includes undergraduate student Adam Herbert and alumnus Richard Duncan, both from the Department of Mechanical Engineering.

The competition was judged by Jonathan Aberman, partner at Fenwick & West LLP; Rob Cerbone, associate at Telecommunications Development Fund; Wayne Lee, partner, at Reed Smith LLP; John May, managing partner at New Vantage Group; and Erik Org, senior associate at Techno Venture Management.

ME graduate students Rohit Kumar and Alok Priadarshi of Terplicators Inc.

Sponsors of the competition included Mohr, Davidow Ventures, Fenwick & West, Techno Venture Management, Telecommunications Development Fund, and Reed Smith LLP.

The Hinman CEOs Program, a living-learning entrepreneurship program at the University, managed the competition. The Hinman program is a joint initiative of the University's A. James Clark School of Engineering and Robert H. Smith School of Business.

Sophomore Michael Armani Receives ASME Scholarship

At a reception following the A. James Clark School of Engineering Commencement Exercises on May 23, 2003, ME sophomore Michael Armani was presented with an ASME Fuels and Combustion Technologies (FACT) Division & Power Division Student Scholarship. Criteria for selection included the academic merit of the student, the number of energy and FACT/Power related courses taken by the student, the student's achievement, leadership, participation, and interest, the university's course offerings and research activities available to undergraduates, and one recommendation letter from the student advisor. The scholarship was founded to encourage and promote involvement and of participation of young engineers in the Society and its technical divisions.

Mr. Armani has gained a great deal of hands-on experience in mechanical engineering by conducting research and working on many projects. To date, he has made significant advances towards fully understanding combustion regimes in a Kerosene Spray Flame, which is a powerful facility that enables researchers to reduce pollutants. Furthermore, he has been working towards creating a non-invasive particle control system by means of a computational fluid dynamics model. He also has been working on optimizing a two-stroke engine mounted to a mountain bike. In addition, he hopes to participate in the Darpa Grand Challenge, an automated robotics competition with a 200 mile path. Academically, Michael is interested in inspiring his fellow students to pursue undergraduate research positions; to do so, he has been leading a section of the Honors 200 research colloquium at the University of Maryland. Michael's future plans include studying biomechanical engineering in graduate school and becoming a professor in the field.

studentPROJECTS

ME Students Win First Place at Submarine Races

A team of undergraduate ME students, led by faculty advisor Dr. Marjorie Ann Erickson Kirk, took first place for speed in the one-man, propeller-driven, category and second place overall at the Seventh International Submarine Races (ISR), held June 23-27, 2003 at the Carderock Division of the Naval Surface Warfare Center in Bethesda Maryland. The University of Maryland Human Powered Submarine (HPS) was sponsored by the Mechanical Engineering Department and the Clark School of Engineering. Their winning one-person submarine, *RSR Fourier*, took second place overall for speed behind a two-person-propulsed submarine from the University of Quebec. Overall, 19 boats competed in the this year's Races, including boats sponsored by high schools, universities, and private sponsors from across the United States, Mexico, and Canada. This was the second competition for the University of Maryland team.

The International Submarine Races are held every other year for the purpose of promoting education and research regarding underwater vehicles and involve competitions in speed, design, and the most effective use of composites. They are sponsored by the Foundation for Underwater Research and Education, the U.S. Navy, and private corporate sponsors. The University of Maryland started their Human Powered Submarine program in the Fall of 1998 to provide a two-semester course in which students could apply the skills and theory learned in other mechanical engineering classes in a course designed to include comprehensive research and design, manufacture, and testing of a complex project in a team environment, culminating with a competition.

Human Powered Sub Team Members Standing: Topaz Obler, Team Leader Bill Elliott, Nima Ashkeboussi, Patrick Schmahl, Joel Jorgenson, Faculty Advisor Marjorie Erickson Kirk, Pilot Alan Stevens; Kneeling: Vance Petrella, Beccie Vincent

Students participating in this years HPS class spent the Fall 2002 semester researching submarine system theory and designing a one-person, propeller-driven boat that includes a hull (free-flooded, requiring pilot to be on S.C.U.B.A.), human-powered propulsion system, control system, and safety system. Students worked in teams to develop ideas, research theory, and finally develop a full design that was numerically confirmed to meet performance requirements. This design was then presented and defended before a group of peers, faculty, and outside expert reviewers for approval and comment.

The actual submarine was constructed during the winter and spring semesters of 2003 with teams using much of their out-of-class time to hone the design. Testing was conducted on campus at the Space Systems Laboratory, Neutral Buoyancy Facility of the Aerospace Engineering Department.

Honda Engineer Spends Year with FutureTruck

There was a lot more from Honda than the Insight engine involved in the makeup of this year's FutureTruck — there was also a young engineer from Honda working alongside the team of Mechanical Engineering undergraduates on the stock 2002 Ford Explorer.

Takeo "Tax" Yokoyama is a motorcycle engineer at Honda Research and Development in Japan. He has been at the University of Maryland since July 2002 as part of the ISR-Honda Visiting Scientist Program, administered by the Institute for Systems Research. The program provides early career engineers from Honda with a 14-month immersion in English language and American culture. and matches the engineers with University faculty for research based on their mutual interests. Tax has been working with Professor David Holloway and the FutureTruck team during his time here.

Tax Yokoyama aboard the *Excite*

Tax chose the FutureTruck program not necessarily because he wanted to work on a vehicle project, but because he wanted to interact with as many American students as possible. While his background is in performance motorcycles, the FutureTruck was very different. Tax says that while the technology behind the FutureTruck is not very advanced — they were using existing hybrid-electric and ethanol engine technology — the combination of these technologies and the problem-solving that went on in making it work for an SUV was appealing to him.

Tax was also interested in working with Dr. Holloway. In initial interviews for placement with various departments and faculty on campus, Tax was very attracted to Dr. Holloway's personality and hands-off advising style. "He didn't emphasize winning," Tax says. "Education is his primary mission; he lets the students learn through doing." He knew he made the right decision at the FutureTruck competition this past June in Michigan. While talking with some of the other teams there, Tax became more and more impressed with his Maryland colleagues. "The Maryland students seemed much more mature than the others. Other teams were required to do the FutureTruck project, and their advisors forced them to go in the right directions. Maryland students chose to participate in FutureTruck. Dr. Holloway let his students make decisions on their own, so that they could learn for themselves."

With his year at Maryland coming to a close at the end of July, Tax will have fond memories of his stay and the friends he made. He proudly wears a Terps baseball cap, autographed by the entire FutureTruck team, and says that this year was a very good and fresh experience for him. Tax was born and grew up in Tokyo, and this was his first time out of Japan. While he looks forward to his return home, he knows already that he will miss his life in the U.S. "I feel half and half; while I miss my Japanese life, I know that I will miss my American life, too."

alumni PROFILES

ME Students Roll Out FutureTruck

On Tuesday, May 13, 2003, the University of Maryland FutureTruck team rolled out their 2003 entry, *Excite*, an ethanol-fueled hybrid electric SUV, for the University community and members of the press. This vehicle is their entry in June's national FutureTruck competition. In the past three FutureTruck competitions, Maryland students have finished in the top three twice, taking first in 2000 and third in 2001.

FutureTruck 2003 challenges teams of students from 15 top North American universities to re-engineer a conventional Ford Explorer into a lower emissions vehicle with at least 25% higher fuel economy, without sacrificing performance, utility, safety, or affordability. The Terp student engineers, advised ME Professor David Holloway, transformed their stock gasoline powered Explorer into the lighter, cleaner, and more efficient Maryland *Excite*. This hybrid vehicle is powered by two motors: a rebuilt 3.0 liter V6 that is specifically designed to burn a mixture of ethanol and gasoline, and an electric motor from a Honda Insight.

For more information on the FutureTruck Competition, go to http://futurecar.umd.edu/.

Members of the FutureTruck Team

Inaugural Charles and Helen White Symposium

On May 14, 2003, the Clark School of Engineering inaugurated the Charles and Helen White Symposium with Keynote Speaker Arno Penzias. Dr. Penzias is best known for his work in radio astronomy for which he received a Nobel Prize in 1978. He and Bell Laboratories colleague Robert Wilson received this prestigious award for their discovery of cosmic microwave background radiation, which gave unprecedented support to the "Big Bang" theory of the universe's creation.

The late Charles M. White was graduated from the University of Maryland with a degree in Mechanical Engineering in 1913 and married Helen Bradley five years later. White's career in mechanical engineering progressed rapidly. In 1930 he joined Republic Steel Corporation as assistant vice president of operations. He was elected chairman and CEO in 1956, after serving eleven years as president, and is credited for many improvements in steel manufacturing. White received numerous awards and served both as a civic leader and as a trustee to many organizations. He received an Honorary Doctorate in Engineering from the University of Maryland in 1960.

For more information on the Symposium, please visit www.engr.umd.edu/kim/symposium.htm.

Robert L. Gunter, Jr., B.S.M.E. '83, is senior vice president for Aircraft Carrier Programs at Northrop Grumman Newport News. Appointed to this position in 2001, he has responsibility for aircraft carrier new construction, aircraft carrier overhaul, carrier engineering and design, and planning and production control.

Following his graduation from the University of Maryland in 1983, Mr. Gunter began his career with Newport News, working in the Machinery Design Department, and has held progressively responsible management positions in Ship Repair, Engineering, and Construction. Prior to this assignment he was vice president of engineering, where his responsibilities included aircraft carrier and submarine engineering, research and development, and testing. He received a master's degree in engineering from Virginia Tech.

Mr. Gunter is a member of the Naval Submarine League and Naval Surface Association. He currently serves on the Engineering Advisory Council for Hampton University and the Technical Committee for the American Bureau of Shipping, and is a member of the board of directors of AMSEC LLC and the Virginia Air and Space Center. He was the past chairman of the Hampton Roads American Society of Mechanical Engineers and the Society of Naval Architects and Marine Engineers.

Northrop Grumman Newport News, headquartered in Newport News, Virginia, is the nation's sole designer, builder, and refueler of nuclear-powered aircraft carriers, and one of only two companies capable of designing and building nuclear-powered submarines. Newport News also provides after-market services for a wide array of naval and commercial vessels, and has the capability to design, build, and maintain every class of ship in the U.S. Navy's fleet. The company employs about 18,000 people.

Mr. Gunter also oversaw the construction of the Navy's newest aircraft carrier, the USS Ronald Reagan, which was christened on March 4, 2001. The USS Ronald Reagan is America's most technologically advanced super carrier, representing the apex of Nimitz Class design advancements. It is scheduled to be commissioned on July 12, 2003.

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.

Phone: 301.405.2410
Fax: 301.314.9477

Visit our Web site at
www.enme.umd.edu

Department Chair:
Dr. Avram Bar-Cohen
Editor:
Patricia Congro Aquilina

upcomingEVENTS

Maryland Football Engineering Alumni Tailgate Party
Saturday, October 11, 2003
Time: TBD

It's the Terps vs. Duke — a favorite ACC clash! Watch your mail for more information, or check out www.enme.umd.edu for the latest updates.

2003 ASME International Mechanical Engineering Congress and RD&D Expo
November 15-21, 2003
Washington, DC

For more information, visit www.asmeconferences.org/congress03/.

A. JAMES CLARK
SCHOOL OF ENGINEERING

Department of Mechanical Engineering
University of Maryland
College Park, MD 20742-3035

Nonprofit Org.
U.S. Postage
PAID
Permit No. 10
College Park, MD