SPRING 2001 | Vol.1, No.1

METRICS

MECHANICAL ENGINEERING

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

INSIDE

First Annual ME Research Review Day a Great Success

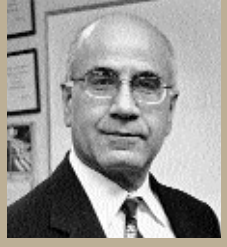
The Department of Mechanical Engineering presented its First Annual Research Review Day at the University of Maryland's Inn and Conference Center on November 3, 2000. Over 150 attendees from industry, government, and academia were presented with an overview of the research being conducted in the Department through talks, poster presentations, videos, and laboratory tours.

Right: Department Chair Dave Anand
Below: Clark School Dean Nariman Farvardin, President C.D. Mote, and Associate Dean Herbert Rabin

Attendees were welcomed by University President and Professor of Mechanical Engineering **C. Daniel Mote, Jr.** and Vice President for Research and Dean of the Graduate School **William Destler**, who spoke about research opportunities at the University of Maryland. Featured talks included:

- *Mechanical Engineering in the 21st Century*, **Davinder K. Anand**, Professor and Chair, Department of Mechanical Engineering
- *Mechanical Engineering's New Role in Electronic Product Development*, **Michael Pecht**, Director, CALCE Electronic Products, and Systems Center and Professor of Mechanical Engineering
- *MEMS, Microsystems and Nanotechnology*, **Donald DeVoe**, Director, Maryland MEMS Laboratory, and Assistant Professor of Mechanical Engineering
- *Virtual Vibration and Noise Control of Smart Structures*, **Amr Baz**, Director, Smart Materials and Structures Laboratory, and Professor of Mechanical Engineering
- *The Future of Building Technology: The Maryland BCHP Research and Demonstration Project*, **Reinhard Radermacher**, Director, Center for Energy and Environmental Engineering (CEEE), and Professor of Mechanical Engineering
- *New Directions in Quantitative Flow Visualization*, **James H. Duncan**, Director, Hydrodynamics Laboratory, and Professor of

continued on page 2



Message From the Chair

THE DEPARTMENT of Mechanical Engineering is changing at a rapid pace and it is important that we keep our alumni and friends well informed. We are therefore launching our first newsletter, ***METrics***. Our plans call for having this a biannual publication and include it in our Web presence, as well.

The inaugural issue introduces to you our newest faculty—these five young assistant professors have already become integral members of our research and teaching family, and we are delighted to have them aboard. We also highlight some of our more "senior" faculty's current research findings and accomplishments, as well as news from some of our various Centers and Laboratories. We also revisit our first-place win of *FutureTruck 2000* as we are preparing for this year's competition. Our cover story, however, features our most important event this Fall: the Mechanical Engineering Research Review Day. Nearly two hundred attendees were on-hand to hear the morning plenary sessions, have lunch, view the more than sixty posters showcased, and take afternoon tours of our many laboratory facilities.

We are sure that you will find ***METrics*** interesting and worthwhile reading. We would like to urge you to use the last page and keep the community informed of your activities. Best of all, call us or drop by and visit us. We look forward to hearing from you.

ME Research Review Day

continued from page 1

Mechanical Engineering

- *Impact of IT on the Future of Mechanical Engineering*, Donald R. Riley, Associate Vice President and Chief Information Officer, and Affiliate Professor of Mechanical Engineering

In addition, over 60 research posters were showcased and afternoon laboratory tours were scheduled.

For more information, please email Edward Magrab, Professor of Mechanical Engineering and Event Coordinator, at ebmagrab@eng.umd.edu.

Right: Robert Kavetsky (Gov't. Program Director, NAVSEA IH), Vice President William Destler, and Professor Michael Pecht
Below: The poster session

UM Serves as Host of Physical Society Annual Meeting

The American Physical Society's Division of Fluid Dynamics 53rd Annual Meeting was held at the Hyatt Regency on Capitol Hill Hotel in Washington, D.C. from November 19-21, 2000.

This meeting is the premier gathering of fluid dynamicists in the United States each year. This year 1100 scientists and engineers from numerous countries in North America, South America, Europe, and Asia attended. The meeting was hosted by the University of Maryland and was organized by a committee consisting primarily of faculty from the Mechanical Engineering Department:

James Wallace (Committee Chair); **Elias Balaras**; **Peter Bernard** (Invited Speaker Coordinator); Anil Deane, Institute for Physical Sciences and Technology; **James Duncan** (Gallery of Fluid Motion Coordinator); **Gregory Jackson**; **Kenneth Kiger** (Website & Publications Coordinator); Daniel Lathrop, Department of Physics; **Ugo Piomelli** (Technical Program Coordinator).

Three ME Projects Receive DoD DURIP Award

The U.S. Department of Defense has announced the recipients of their Defense University Research Instrumentation Program (DURIP) Awards. Of the 242 awards to 99 academic institutions, six were awarded to the University of Maryland – three of which were headed by Mechanical Engineering faculty:

Virtual Platform for Design and Control of Structural Acoustics
Associate Professor **Balakumar Balachandran**, Principal Investigator

Deep Reactive Ion Etcher
Assistant Professor **Donald DeVoe**, Principal Investigator

Refractometer and Particle Image Velocimeter for Controlling the Structure of Spray
Professor **Ashwani K. Gupta**, Principal Investigator (Technical Program Coordinator).

The website link is: www.enme.umd.edu/orgs/dfd2000/.


DeVoe


Balachandran


Gupta

facultyNEWS

New Faculty

Elias Balaras
His research interests include computational fluid dynamics, biomedical fluid flows, fluid-solid interactions, turbulence and transition. He received his Ph.D. from the Swiss Federal Institute of Technology, Lausanne, Switzerland.

Dimitrios Hristu-Varsakelis
His research interests include control and dynamical systems, distributed systems, intelligent machines, formations of autonomous systems, and robotics. He received his Ph.D. in engineering sciences from Harvard.

Omar M. Ramahi
His research interests include electromagnetic compatibility and interference, high-speed electronic packaging, biomedical applications of electromagnetics, wave-material interaction, optimization and electromagnetic characterization of advanced materials. He received his Ph.D. in electrical and computer engineering from the University of Illinois at Urbana-Champaign.

Donald H. Robbins, Jr.
His research interests include computational mechanics of solids and structures, constitutive relations for composite and finite strain materials, development of finite element models and procedures for multiscale analysis of composite structural components. He received his Ph.D. in engineering mechanics from Virginia Tech.

Elisabeth Smela
Her research interests include the use of organic materials in microelectromechanical systems (MEMS), organic microfabricated light emitting diodes (LEDs), and fiber optic sensors. She received her Ph.D. in electrical engineering from the University of Pennsylvania.

Gupta Receives Awards

The Society of Manufacturing Engineers has selected Assistant Professor Satyandra K. Gupta to receive the 2001 Robert W. Galvin Outstanding Young Manufacturing Engineer Award. This award is conferred in recognition of Dr. Gupta's significant achievements and leadership in the field of manufacturing engineering as a young engineer. It ranks in stature with the SME International Honor Awards and the SME Award of Merit. Dr. Gupta was one of nine recipients selected to receive this award in 2001.

Dr. Gupta has also won a National Science Foundation Faculty Early Career Development (CAREER) Award for "Automated Design of Multi-Piece Molds–A Step towards Manufacturing of Geometrically Complex Heterogeneous Objects." The five-year award begins July 1, 2001.

In addition, Dr. Gupta has received a Young Investigator award from the Office of Naval Research. He will investigate ways to make casting and molding ceramic parts a more affordable fabrication process by combining machining and layered manufacturing to create complex parts of large size with very small features.

Buckley Awarded

Assistant Professor **Steven Buckley** has recently won two awards for his research: an Office of Naval Research Young Investigator Award and a National Science Foundation CAREER Award.

For his proposal entitled "Particle and Toxic Release Inventory Diagnostics for Navy Vehicles and Operations," Dr. Buckley received one of 26 ONR Young Investigator Awards. This award provides up to $100,000 per year for three years.

For his research "Investigation of Laser-Induced Breakdown Spectroscopy for Analysis of Airborne Particulate Matter" Dr. Buckley received a National Science Foundation Faculty Early Career Development (CAREER) Award. The five-year award began February 15.

Promotions Granted

The following Mechanical Engineering faculty have been granted tenure, effective in the 2001-2002 academic year: **Bongtae Han**, Associate Professor; **Peter Sandborn**, Associate Professor.

The following Mechanical Engineering faculty have been promoted from Assistant Professor to Associate Professor with tenure: **Jeffrey Herrmann**, **Ken Kiger**, **Jungho Kim**, **Linda Schmidt**, and **Greg Walsh**.

The Department offers their heartiest congratulations to all of these faculty for their well-deserved promotions.

Boiling in Microgravity

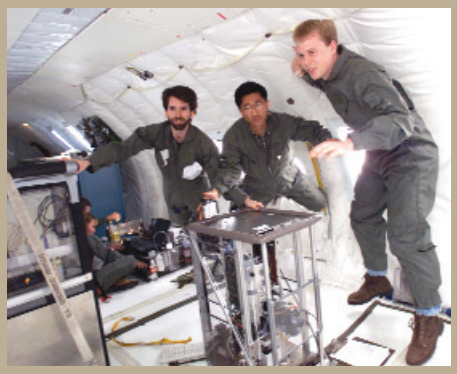
AN EXPERIMENT TO STUDY subcooled pool boiling of FC-72 by Assistant Professor **Jungho Kim** and students John Benton and Bob Kucner of the Phase Change Heat Transfer Laboratory has been upgraded to "flight definition" by NASA, meaning that it has a good chance to fly on the International Space Station. The experiment was recently upgraded from a ground-based to a flight experiment. The scheduled launch date is September 2004.

Kim

Boiling as a heat transfer mechanism is of importance to space-based hardware due to the large amounts of heat that can be removed with little increase in temperature. Because boiling is strongly affected by buoyancy, the nature of boiling in microgravity environments is significantly altered. An understanding of the effect of this environment on boiling mechanisms is critical to the proper design of heat removal equipment for use in space-based applications. If boiling can be used reliably to transfer energy in space, this would lead to heat exchangers that are greatly reduced in size and weight, leading to lower payload launch costs (currently at $10,000 per pound).

Dr. Kim and members of the Lab have been performing experiments to determine boiling mechanisms in microgravity using a KC-135 airplane (popularly known as the "Vomit Comet") that provides microgravity environments for short (20-25s) periods of time. An experiment to study subcooled pool boiling of FC-72 was flown on the maiden flight of the Terrier-Improved Orion sounding rocket on December 17, 1999, which provided about 200 s of microgravity time. The rocket was launched from NASA's Wallops Flight Facility in Chincoteague, VA. It reached an altitude of 168 km, and landed about 70 km out into the Atlantic Ocean.

This work is sponsored by the NASA Microgravity Fluid Physics Program.



Benton, Kim, and Kucner aboard the KC-135

CALCE Seeks Lead Free Answers

THE ELECTRONICS INDUSTRY, believed to be responsible for approximately 2% of worldwide lead contamination (0.7 million metric tons per year), is under increasing pressure to eliminate the lead from their products. The primary sources of lead in electronics is solder, used to bond components to circuit cards. With new environmental legislation pending in Europe (Directive on Waste from Electrical and Electronic Equipment [WEEE], 76/769/EEC), and Japan already coming out with lead-free products, American companies are suddenly finding themselves lagging behind other industrial nations. A 1999 survey by the National Electronics Manufacturing Initiative (NEMI) indicates that only 22% percent of North American companies have a lead replacement plan and 58% do not.

A comprehensive study conducted in 1993-1997 by a U.S. consortium consisting of the National Center for Manufacturing Sciences (NCMS), CALCE, electronics manufacturers, government research labs, and educational institutions, identified several potential substitutes for lead solders, among them SnBi58 (58% by weight bismuth (a by-product of the lead-refining process), remainder tin), SnAg3.5Bi4.8 (3.5% silver, 4.8% bismuth, remainder tin) and SnAg3.5 (3.5% silver, remainder tin). NEMI has currently suggested that only the Sn/Ag alloys from the NCMS list are favored. The ternary Sn/Ag/Cu alloy is favored in reflow soldering operations and the binary Sn/Cu and Sn/Ag eutectic alloys in wave soldering processes.

The concern with eliminating lead solders has to be balanced against the durability and reliability of their replacements. Premature fatigue failures of solders lead to unreliable electronics, and the fatigue endurance of lead-free solders is not well understood yet. The fatigue failures in solders arise due to cyclic temperature changes caused by environment variations and by power on/off cycles. Solder fatigue is extremely difficult to quantify and predict because of the complex nonlinear time-dependent and temperature-dependent relationship between forces acting on the solder and the results deformations.

By quantifying thermomechanical fatigue behavior of the NCMS identified lead-free solders, researchers at CALCE Electronic Products and Systems Center have provided vital expertise. "Our goals are twofold," says Dr. **Abhijit Dasgupta**, CALCE Professor and Scientist. "One: to quantify the mechanical behavior and fatigue properties of the ternary Sn/Cu/Ag lead-free solder alloy; and Two: to identify compatible plating systems for printed wiring boards (PWBs) and components." The CALCE consortium members will use the findings of this study to design and fabricate electronic hardware using lead-free solders. These products will then undergo extensive qualification testing at CALCE to verify the in-service durability of these next generation "green" electronics.

For further information, contact Dr. Dasgupta at CALCE Electronic Products and Systems Center at 301.405.5323, or by email at dasgupta@eng.umd.edu.

Electromagnetic Radiation: A Growing Concern in Electronic Products Design

THE PAST DECADE has witnessed a significant increase in computer processor speed. In fact, present processor development is approaching the 2GHz mark, with fundamental harmonics reaching well beyond 10GHz. While these advances are highly welcomed, their silent negative consequences are that electromagnetic (EM) radiation increases with processor speed and, if unchecked, can interfere with the operation of nearby electronic devices and can pose a risk hazard to nearby biological organisms.

Moreover, the drive towards low-cost electronic packaging using non-metallic fixtures is creating unintended internal and external spurious radiation that can significantly alter the timing of electronic circuitry, leading to device incompatibility and hard-to-detect operation failures.

Increased internal and external electromagnetic pollution has made the efficient and optimal containment or shielding of EM radiation a major factor in the overall design of electronic packages. In fact, the Federal Communication Commission (FCC) and the European Community (EC) have reacted aggressively by imposing strict regulations on the amount of radiation allowed from each class of devices.

The significance of EM radiation in the package design process has led to the emergence of a separate discipline within engineering studies, referred to as electromagnetic interference (EMI) and electromagnetic compatibility (EMC).

The "old way" of applying design rules, then fixing the EMI/EMC problems after the product is built, is not acceptable in today's highly competitive development environment, when designs must pass regulatory requirements the first time through the design cycle.

Recently, this research effort has been expanded with the addition of Dr. **Omar Ramahi**. Dr. Ramahi joined the Mechanical Engineering department as a faculty member in August of 2000. Prior to joining us, he had worked at Compaq Computer Corporation for seven years, where he was part of the Alpha Servers Development Group.

Dr. Ramahi is currently constructing an advanced EMI/EMC characterization, testing, and measurements laboratory with the capability of investigating and testing novel designs that produce lower levels of radiation. He is also establishing a computational electromagnetic laboratory that will help identify effective designs. These capabilities will help establish appropriate design methods and testing procedures for EMI/EMC, and the results obtained will be used to characterize and quantify shielding reliability.

For more information on EMI/EMC research conducted at CALCE and current research projects in this area, contact Dr. Omar Ramahi directly at oramahi@calce.umd.edu or call 301.405.5261.

Three-year NSF CRCD Grant Awarded to ME Faculty

Mechanical Engineering Assistant Professors **Greg Walsh** (PI) and **Dimitrios Hristu-Varsakelis**, along with Electrical and Computer Engineering Professor William Levine and Human Development Assistant Professor Roger Azevedo have been awarded a three-year National Science Foundation Combined Research and Curriculum Development (CRCD) grant for their proposal titled "A Curriculum in Networked and Distributed Systems." The project is funded at about $500K, which includes $100K in matching funds from the A. James Clark School of Engineering.

The goal of this project is to develop an innovative senior/masters-level curriculum designed to: (a) bring important new technologies in wireless and networked distributed systems into the classroom, (b) make use of novel teaching and evaluation methods to enhance faculty productivity in laboratory and project courses, and (c) improve the educational value of student experiences in laboratory and project courses. The laboratory facilities which will be part of this work will also play a role in enabling multi-disciplinary research in networks, communications, and control.

CEEE Annual Meeting 2000

CEEE Director Reinhard Radermacher

THE CENTER FOR ENVIRONMENTAL Energy Engineering (CEEE) Annual Meeting, held September 13 and 14, 2000, at the University of Maryland Inn and Conference Center, represented a tremendous opportunity for CEEE sponsors to get an update on the status of the projects, to provide a valuable feedback, and to discuss and plan future developments.

CEEE also offered a technology transfer workshop for all the people involved in BCHP (Buildings: Cooling, Heating and Power). Presentations focused on the potential of BCHP and discussed the background, introduced individual technologies, presented case studies and showed as examples the system that is currently in operation on the College Park campus. A tour of the University of Maryland facility was included. Companies involved in this field came from all over the country and were impressed by the great potential of the BCHP concept and of the CEEE particular project. Among the companies represented were: Arthur D. Little, Kathabar, International Fuel Cells, Curtis, LG, Hill Phoenix, Sebesta Blomberg, Columbia Energy Group, Broad, Honeywell, Trigen, Chesapeake Utilities, Daikin, Fresh Air Solutions, and Healthy Buildings.

For further information, please visit the CEEE web site at www.enme.umd.edu/ceee or contact them by e-mail at sratti@wam.umd.edu.

The BCHP team: Sean Nollan, Aris Marantan, Predrag Popovic, Jonathan Murray, Eric Griff, Ron Worley, Werner Wongsosaputro

Touring the Chesapeake Building

Front view of the microturbine installed at the Chesapeake Building

CECD Offers New Graduate Program

The Center for Energetic Concepts Development (CECD) has created a new graduate degree specialization in Energetics. This program of study, leading to the Master of Science and Doctor of Philosophy, is offered through the Department of Mechanical Engineering at the University of Maryland. In addition, the Master of Engineering, a professional degree, is offered through the Clark School of Engineering.

The CECD is an alliance between the University of Maryland and the Naval Sea Systems Command, Indian Head, Surface Warfare Center Division (NAVSEA IH). It was established to address research and development in energetics manufacturing and a full spectrum education program, from graduate education to technician training. The technician training component is under the purview of The College of Southern Maryland. Further, the Center is involved in establishing partnerships with industry and other organizations to further the goals of their enterprise.

For more information on the graduate program or CECD in general, contact Dr. D.K. Anand, CECD Director and Professor of Mechanical Engineering, at 301.405.5294 or by email at dkanand@eng.umd.edu.

In Brief

UM Teams Up with RPI

The Hydrodynamics Laboratory, currently in the final year of their three-year grant from the National Science Foundation, is working on the effect of surfactants on spilling breaking water waves. This joint project between UM ME Professor James Duncan and Professor Jerry Korenowski of the Department of Chemistry at Rensselaer Polytechnic Institute is ground-breaking research in breaking wave dynamics. Professor Korenowski has brought his laser and extensive optical equipment for measuring instantaneous surfactant concentrations on a water surface to the University of Maryland laboratory. While the UM ME lab is measuring the behavior of the waves, Professor Korenowski and his students are measuring the surfactant concentrations on the wave profiles as they break.

Research Featured

The research of Professor Michael Ohadi and the Advanced Heat Exchangers/EHD Laboratory has been featured on the cover of the November/December 2000 issue of the *Journal of Heat Transfer Engineering*. This internationally recognized journal in the field of heat transfer has been in publication nearly three decades.

CEEE Wins Award

The Center for Environmental Energy Engineering (CEEE) has received the 2000 "Educational Institution of the Year Award" from Oak Ridge National Laboratory for research in support of ORNL and its mission.

The award was given for their work in the Chesapeake Building. The goal of this research effort is to develop technologies that offer buildings a wide range of utilities while reducing energy consumption by more than 30% and global warming gas emissions by more than 45%. The effort is succeeding very well, as demonstrated by publications that are forthcoming and the award.

Terps are Tops in *FutureTruck* Competition

This article first appeared in the July 18, 2000 issue of Outlook, *the University's faculty & staff weekly newspaper.*

Teams of engineering students from around the country have sent a clear message to U.S. automakers: It is possible to build sport-utility vehicles with much better fuel economy than the highway hippos now so popular.

At the two-week *FutureTruck* competition held under the blazing June sun at the General Motors Desert Proving Ground in Mesa, Ariz., University of Maryland students took a stock Chevy Suburban and figured out how to combine an electric motor with an ethanol-fueled smaller engine. The design netted the Maryland students top honors overall and in the off-road category.

FutureTruck 2000 was sponsored by General Motors and the U.S. Department of Energy. In past years, the competition has focused on car fuel economy, but this year the 15 teams took on the task of re-inventing the sport utility vehicle. The sponsors provided each team with a new Suburban and $10,000 seed money.

"The first year of this competition has been a real 'everybody wins' situation," says Mark Maher, director of powertrain systems for General Motors Truck Group. "The student team members are leaving here with incredible experience in advanced automotive technologies, GM has developed great recruiting opportunities for the best talent, and the rest of the country will eventually benefit from the types of cleaner, more efficient technologies we're seeing experimented with here."

The task—maintain all the SUV's ability to carry cargo and pull heavy loads such as trailers, while reducing fuel consumption and greenhouse gas emissions—coincided with soaring gasoline prices, the summer driving season, and increasing concern about global warming.

Led by student project managers Kevin Denton and Blaine Woehr, and advised by Mechanical Engineering professor David Holloway, the 36 members of the University's team first

Dr. David Holloway and members of the *FutureTruck* team with their winning entry at the GM Desert Proving Ground

exchanged the Suburban's stock V-8 engine for a smaller, more efficient V-6.

The V-6 was then converted to run on clean-burning ethanol fuel. The electric motor was added to make up for the power difference between the V-6 and the original V-8 engine. A sophisticated system of computer controls automatically switches on the battery-powered electric motor when the vehicle needs more power, such as during hard acceleration or towing. The result is a cleaner, more efficient vehicle that retains all the "muscle" of a gasoline-powered engine.

The students began their participation in the *FutureTruck* challenge in the fall of 1999, when they enrolled in a special six-credit class over two semesters. During the first semester, team members attended lectures on basic vehicle design and hybrid vehicle theory. In the spring, the team did the actual hands-on work to convert the Suburban into what their written presentation described as "*Proteus*: The Truck You Wish You Had."

The *FutureTruck* teams competed in more than a dozen events. They were evaluated on safety, performance, towing ability, greenhouse gas emissions, fuel economy and consumer acceptability. Project sponsors say every entry demonstrated innovative approaches to the fuel economy and greenhouse gas emissions even while 100-degree temperatures caused problems for many of the vehicles.

Students from the winning Proteus team were able to reduce greenhouse gas emissions by 28 percent while still maintaining much of the Suburban's overall performance. The truck designed by the Univ. of California, Davis, had the best fuel economy at 18.7 miles per gallon, a 13 percent increase over the average Suburban.

Other competitors came from Concordia Univ., Cornell Univ., George Washington Univ., Georgia Tech, Michigan Technological Univ., Ohio State, Penn State, Texas Tech, Univ. of Idaho, Univ. of Tennessee, Univ. of Wisconsin-Madison, and Virginia Tech.

"We are gratified that we won such a challenging competition and finished ahead of the other extremely talented *FutureTruck* teams," says Holloway. "However, our focus is now on next year's competition. We've already started the process of bringing on new team members and beginning the hard work necessary to successfully compete again next year."

Three Teams from Clark School Win Department of Defense MURI Awards

Three teams from the A. James Clark School of Engineering have been selected for this year's Department of Defense Multidisciplinary University Research Initiative (MURI) Awards. MURI is a highly competitive program designed to address large multidisciplinary topic areas representing exceptional opportunities for future DoD applications and technology options. The average award will be $1 million per year over a three-year period; two additional years of funding will be possible as options bringing the total award to five years.

In announcing these awards, Dean Nariman Farvardin stated "please join me in congratulating the faculty who work so tirelessly to move the college into higher levels of excellence and national visibility."

The three projects are as follows, with Mechanical Engineering faculty highlighted:

Project: *Microwave Effects and Chaos in 21st Century Analog and Digital Electronics*
Faculty: Victor Granatstein (PI), Ed Ott, Tom Antonsen, Patrick O'Shea, Yuval Carmel, John Rodgers, John Melngailis, Neil Goldsman, Bruce Jacob, Agis Iliadis, Omar Ramahi, Steve Anlage (physics)

In this project, the University of Maryland is prime and there is participation from Boise State University. The project is aimed at investigating the threats and opportunities associated with the introduction of microwave pulse energy into modern and future electronics.

Project: *Multiferroic Materials for Smart Structures and Devices*
Faculty: Manfred Wuttig (PI), Amr Baz, Inder Chopra, J. Cullen, Abhijit Dasgupta, R. James, P. Kofinas, D. Pines, R. Ramesh, A. Roytburd, L. Salamanca-Riba, T. Shields, I. Takeuchi, D. Viehland, N. Wereley, R. Wu

In this project, the University of Maryland is prime and there is participation from Univ. of Minnesota, Univ. of Rhode Island, and Cal State at Northridge. The project is aimed at identifying and enhancing the design and performance characterization of new classes of hybrid smart materials and developing enhancements to the use of such materials in macro-structures capable of both actuation and sensing.

Project: *Communicating Networked Control Systems*
Faculty: Krishnaprasad (PI), John Baras, Prakash Narayan, Greg Walsh, Dimitrios Hristu-Varsakelis

In this project, Boston University is prime and there is participation from the University of Maryland, Harvard, and University of Illinois (Urbana). This project aims at developing mathematical foundations to support the integration of control and communications technologies.

studentNEWS

UM Chapter of ASHRAE Ranked #1; Darabi Recognized

The University of Maryland's Student Chapter of The American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) was awarded the 1999 Region III Richard W. Nanes Memorial Award. Winners are recommended by the ASHRAE Student Activities Committee which recognizes superior service, chapter activities, and membership. Awarded once per year, recognition is in the form of a plaque and lapel pin. ME Professor **Michael Ohadi** is the advisor to the student organization.

Also recognized was then Chapter President Dr. **Jeff Darabi**. A University of Maryland Ph.D. graduate and Assistant Research Scientist, Dr. Darabi was awarded the Homer Addams award in recognition of his work entitled, "Analytical and Experimental Study of Thin Falling Film Evaporation - Application to Industrial Chillers."


Darabi

The Homer Addams award recognizes one graduate student who has been engaged in an ASHRAE research project and is awarded once per year. The winner is recommended by the ASHRAE Research Administration Committee and recognition is in the form of a $1,500 honorarium, plaque, and lapel pin.

Elisabeth Goldwasser Awarded

The Semiconductor Research Corporation Education Alliance has awarded Mechanical Engineering student Elisabeth Goldwasser an Undergraduate Research Assistantship, worth $6,000. The Undergraduate Research Assistants (URA) program seeks to attract academically qualified students early and build their interest in and enthusiasm for disciplines of interest to the semiconductor industry by providing a valid research experience. Fifty assistantships will be awarded for the summer of 2001.

Sponsored by Professor **Yogendra Joshi**, Ms. Goldwasser is a sophomore ME student. This summer will be her first time working in such a laboratory. After she graduates she would like to attend graduate school, however will most likely work first to gain experience as a professional engineer. Uncertain of her specific career goals at this point, she open to exploring all of the different areas of the mechanical engineering field.

Rupani Selected

Ankur Rupani has been selected as Distinguished Teaching Assistant for 2000-2001. Currently pursuing a M.S. in mechanical engineering, Mr. Rupani has taught ENES 221—Dynamics for four semesters under Drs. **Steven Buckley** and **Peter Sandborn**.

A native of India, he is interested in improving the education system there, incorporating the positive aspects of the systems of India with those of the U.S.

UM Students to Compete in Solar Decathlon

A cross-disciplinary team from the University of Maryland, led by Assistant Professors **Jungho Kim** and **Omar Ramahi**, was chosen to be one of twenty to compete in the 2002 Solar Decathlon. This two-year planning, design, and building project culminates with a one-week contest on the National Mall in Washington, D.C. in the fall of 2002.

Competitors will be required to provide all the energy for an entire household, including a home-based business and the transportation needs of the household and business. During the week of the event, only the solar energy available within the perimeter of each house may be used to generate the power needed to compete in the Solar Decathlon contests.

The Solar Decathlon will consist of ten contests designed to test inventive thinking and leadership skills as students develop creative architectural and scientific solutions to the challenge of designing and constructing the most effective solar-powered home. Tomorrow's scientists, engineers, architects, and entrepreneurs will gain hands-on experience in research and development of energy-efficient products and solar energy technologies.

Excerpts taken from the Solar Decathlon webpage, www.eren.doe.gov/solar_decathlon/.

Undergraduate Awards Announced

The following Mechanical Engineering undergraduate students were recognized for their superior academic achievements, service, and dedication to the Clark School of Engineering and the Department of Mechanical Engineering for the 2000-2001 academic year. These awards were presented in a ceremony on April 17, 2001:

Dinah Berman Memorial Award: **Anita Currano**
Presented to engineering students who have combined academic excellence with demonstrated leadership or service to the College as freshmen or sophomores.

Kim A. Borsavage and Pamela J. Stone Student Award for Outstanding Service: **William Samuel Sellers III**
Presented for outstanding service and dedication to the college.

American Society of Mechanical Engineers (ASME) Senior Award: **Robert James Kucner**
Present to the senior member who has contributed the most to the student chapter.

Pi Tau Sigma Outstanding Service Award: **Melissa Elaine Fleck**
Presented to a student for outstanding service and contributions to the chapter.

Pi Tau Sigma Memorial Award: **William Samuel Sellers III**
Presented to the senior in Mechanical Engineering who has made the most outstanding contributions to the University.

Pi Tau Sigma Outstanding Sophomore Award: **Matthew Philip Para**
Presented to the most outstanding sophomore in Mechanical Engineering on the basis of scholastic average.

Department of Mechanical Engineering's Academic Achievement Award: **Aaron Joseph Johnson**
Presented to the junior in Mechanical Engineering who has attained the highest overall academic average.

Department of Mechanical Engineering Chairman's Award: **Melissa Elaine Fleck, Sara Theresa Hewitt, and Brent Mager**
Presented for excellence in academics, outstanding service to the department or leadership in the department.

directory

Davinder K. Anand
Professor and Chair
301.405.5294
dkanand@eng.umd.edu

Marino di Marzo
Director of Graduate Studies
301.405.5257
marino@eng.umd.edu

Sami Ainane
Director of Undergraduate Program
301.405.5310
ainane@glue.umd.edu

Margaret Brumfield
Director of Financial Services
301.405.6580
margaret@eng.umd.edu

Patricia Congro Aquilina
Publications and Web Page Coordinator
301-405-4111
pcongro@eng.umd.edu

Louise Benas
Coordinator
301.405.1230
benas@eng.umd.edu

Thelma Miller
Executive Administrative Aide
301.405.5297
tcm@eng.umd.edu

alumniNOTES

We would like to congratulate our recent graduates for being recognized and offered positions with the following companies:

John R. Berger, Ph.D. '90, is Associate Professor in the Division of Engineering, Colorado School of Mines.

Parker Chapman, B.S. '70, is Chairman and Chief Executive Officer of The Poole & Kent Organization, a Baltimore-based provider of mechanical service to waste/water treatment utilities, government agencies, transportation authorities, and commercial and institutional clients in variety of industries. A market leader, P&K specializes in the construction of new waste/water treatment plants, as well as renovation, modernization and expansion of existing facilities.

Pradeep Lall, Ph.D.'93, Senior Staff Engineer at the Corporate Manufacturing Research Center of Motorola, Schaumburg, IL has recently been named the Jane Robertson Memorial Award Scholar for 2001 by the Kellogg Graduate School of Management for his record of academic excellence.

Richard Link, Ph.D. '93, is Assistant Professor of Mechanical Engineering at the US Naval Academy.

Salim Shaikh, Ph.D. '95, is President and Founder of Technology Promotion International, Ltd., which focuses on CAD, IT, and analysis of energy systems.

Sheguang Zhang, Ph.D. '92, SAIC, Annapolis, MD

Charles Milligan, M.S. '97, Ph.D. '91, Naval Surface Warfare Center, Carderock, MD

Peter Haswell, M.S. '98, JDS Uniphase, Senior Development Engineer, CT

James Cho, M.S. '00, Hughes Network Systems, MD

Zhenya Huang, M.S. '00 Motorola, TX

Rajesh Natarajan, M.S. '00, Comcast, MD

Srinivasan Parthasarathy, M.S. '00, Advanced Micro Devices, CA

Bharatwaj Ramakrishnan, M.S. '00, Advanced Micro Devices, CA

Rajiv Subrahmanyam, M.S. '00, Netapps, AZ

Juscelino Okura, Ph.D. '00, Nokia Mobile Phones, TX

Jagadeesh Radhakrishnan, M.S. '01, Intel, CA

Scott Sealing, Ph.D. '00, General Electric, Reliability Engineer

Pradeep Sharma, Ph.D. '00, General Electric, Reliability Engineer

Jingsong Xie, Ph.D. '00, Microsoft

Join the Terp Network

Clark School alumni can share their knowledge and expertise and help guide current students toward successful careers by volunteering for the Terp Network.

Terp Network features contact information for alumni, parents, staff, and friends who are interested in providing career advice and serving as role models for current Maryland students. Students search the Terp Network to identify a volunteer, and then contact these volunteers directly for information and advice. The commitment to the Terp Network depends entirely upon the amount of time a volunteer decides to give the mentoring program.

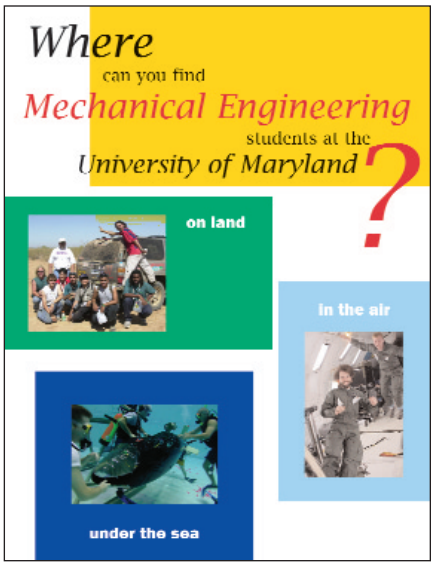
To join the Terp Network, go to www.careercenter.umd.edu and click on the Terp Network icon, and then complete the online volunteer form. For more information, or to request a form, contact the Career Center at 301.314.7225.

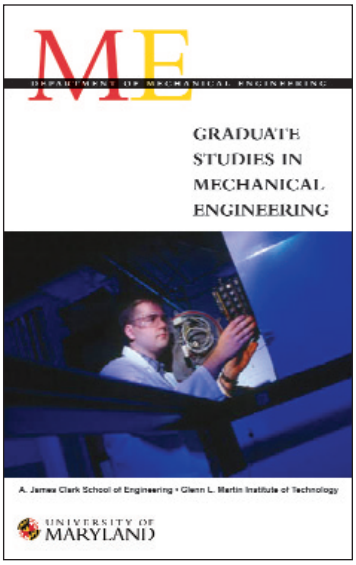
alumni OUTREACH

Do you know someone who would make a great future University of Maryland Mechanical Engineering Alum? Have you been considering returning to Maryland to pursue your masters or doctorate?

Our latest undergraduate or graduate brochures are hot off the presses, and we would be glad to send either—or both—to you!

To request application materials, or for more information, give us a call:
Undergraduate: 301.405.5310
Graduate: 301.405.4216
or log on to www.enme.umd.edu





WE'D LIKE TO HEAR FROM YOU!

Please fill out the form below to have your news printed in the next issue of *MEtrics*. Send to: *MEtrics* Editor, Department of Mechanical Engineering, 2181 Glenn L. Martin Hall, A. James Clark School of Engineering, University of Maryland, College Park, MD 20742-3035 or fax it to 301.314.9477. E-mail to pcongro@eng.umd.edu.

NAME

DEGREE AND MAJOR YEAR OF GRADUATION

HOME ADDRESS

HOME CITY, STATE AND ZIP CODE

HOME PHONE WORK PHONE

WORK TITLE

COMPANY

WORK ADDRESS

WORK CITY, STATE AND ZIP CODE

FAX (AREA CODE)

E-MAIL ADDRESS

News for Alumni Notes:

MEtrics is published twice per 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

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