Mechanical Engineering News

University of Delaware

Winter 2006

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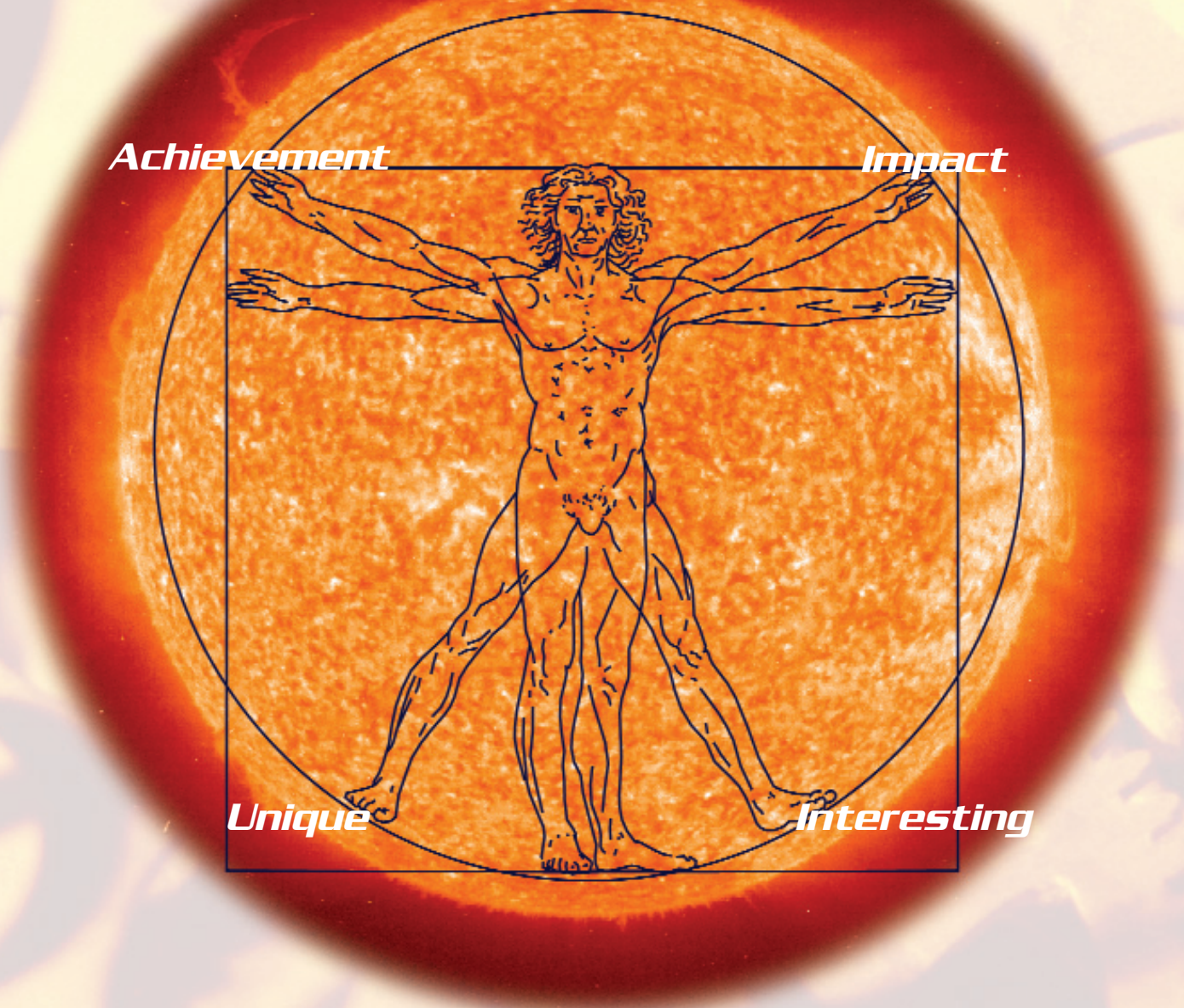
Alumni Career Celebration

Business/Technology/Careers Conference

Distinguished Career Selections



Sustainable Energy-Fuel Cell Research

Cheers from the Chair

Dr. Thomas S. Buchanan

We are mid-way through another great year for Mechanical Engineering at the University of Delaware. Allow me to share with you some of the news regarding our undergraduate program, our faculty, and our alumni.

Once again, our undergraduate enrollment in Mechanical Engineering has reached a new record. We recently went through the reaccreditation process for our undergraduate program with the American Board for Engineering and Technology (ABET). We are pleased with the outcome of the ABET visit and look forward to seeing them again in six years.

Along with the increase in students comes the addition of new faculty. We are in the process of hiring two new faculty members this year in the areas of nanoscience and clean energy. Last fall we added Liyun Wang to our roster. Dr. Wang received a PhD in Mechanical Engineering from City University of New York (CUNY) and did post-doctoral work in orthopaedics at Mount Sinai School of Medicine. Her area of expertise is fluid transport in bone. Her work is very important for understanding cancer formation and the development of arthritis. Dr. Wang has been very productive since arriving, writing two major grant proposals and giving birth to her first son! We are also very pleased that Dr. Xinyan Deng, whom we hired the previous year, received an NSF Career award for her work in microrobotics. Receiving this very prestigious award on one's first attempt is rather rare and we are very proud of her.

Our outreach to alumni has been expanding and we plan once again to host an Alumni Career Celebration day (April 28th). Last year's inaugural event was a tremendous success and we hope to repeat that again this year as alumni, current students and faculty meet together to hear of our alumni's accomplishments. Please join us if you can!

In a time when many ME programs are struggling, it is great to be a part of a program that is thriving. By rebuilding our ties to the past, strengthening our present faculty, and growing our future students, we believe we have good reasons to be excited about the future of Mechanical Engineering at UD!

Thomas S. Buchanan
Chair of Mechanical Engineering

IN THIS ISSUE

Editor's Notes

This issue of ME News features Research in our Department on Sustainable Energy with a focus on fuel cell research. Certainly this topic is receiving more public attention these days due to the recent State of the Union Address by President Bush.

The News also features a preview of the Mechanical Engineering Business & Career Conference to be held April 28, 2006 on Campus at Clayton Hall. One of the Seminars will be on "Sustainable Energy," and will be presented by Dr Ajay Prasad, Professor of Mechanical Engineering, at UD.

Many other interesting topics will be presented by your fellow alumni, so we hope you will "hold the date" and plan to attend. Finally, the News highlights the selection of this year's : "Distinguished Career Alumni." They will all be attending the conference (some presenting!), so come, and join us in congratulating them. I think you will agree that they have indeed made a difference in our world and provide great examples for our students to follow!

Nate Cloud '64, ME Alumni Relations Coordinator

In Memoriam, Irwin G. Greenfield

reprinted from UDaily

July 18, 2005--Irwin G. Greenfield, 75, of Kennett Square, Pa., died July 16.

A long-time member of the University of Delaware engineering faculty, Dr. Greenfield was Unidel Professor Emeritus of Engineering and had held several administrative posts at UD.

"Irv Greenfield led the University's College of Engineering at a crucial time in its growth, and many of his innovations stand today as hallmarks of the college's high reputation in the nation and the world," UD President David P. Roselle said. "The entire University community is indebted to him for his leadership, his scholarship and his friendship."

He was born in Philadelphia on Nov. 30, 1929, to the late William and Sara Greenfield, and he graduated from Overbrook High School.

He earned his bachelor's degree in metallurgy from Temple University and master's and doctoral degrees in metallurgical engineering from the University of Pennsylvania.

Dr. Greenfield was a metallurgist at the Naval Air Experimental Station and a senior research metallurgist at the Franklin Institute Laboratories for Research and Development in Philadelphia before joining the UD faculty in 1963, as an assistant professor, specializing in metals and crystallography. He was promoted to associate professor in 1965 and full professor in 1968.

Dr. Greenfield was named acting dean of the College of Engineering in 1973 and the next year became dean, a post he held for 10 years.

Under his leadership, the College of Engineering achieved several milestones. Three important nationally recognized research centers were established: the Materials Durability Center, the Center for Catalytic Science and Technology and the Center for Composite Materials. Spencer Laboratory and the Ocean Research Laboratory were built, and Evans Hall was renovated. Undergraduate enrollment in the college increased from 800 to 1,300 students, and graduate enrollment doubled, while research expenditures reached a new high. He also was active in encouraging the enrollment of women and minorities in engineering.

When Dr. Greenfield stepped down as dean of the College of Engineering in 1984, then-President E.A. Trabant said, "The College of Engineering has continued its tradition of excellence under Dr. Greenfield's leadership during the past decade. The University as a whole has benefited from his guidance in enhancing the quality of the College of Engineering's faculty, students, research and facilities."

At that time, he was named Unidel Professor of Engineering and assistant to the president for engineering science, in recognition of his contributions. When he retired from the University in 1992, he was given the title dean emeritus.

In the 1980s, he received an Energy Conservation Award from the state of Delaware for "selflessly devoting time, talents, resources and good offices to the furtherance of energy independence."

Dr. Greenfield's research interests, supported by grants from the National Science Foundation, the National Aeronautics and Space Administration, the Air Force Office of Scientific Research and others, included processing of metal matrix composites, electron microscopy, surface properties, mechanical properties, Auger electron spectroscopy, erosion, wear and diffusion coatings.

The author or coauthor of more than 50 articles in professional journals, he made presentations at many technical meetings around the world.

He served as a visiting professor at Stanford and Oxford universities, the University of Cambridge and the Eindhoven Technical University in The Netherlands. He also served as a visiting scientist at the Du Pont Co.

Dr. Greenfield was a member of the American Institute of Mining, Metallurgical and Petroleum Engineers, the American Society for Engineering Education, the Electron Microscope Society of America, the American Society for Metals, Sigma Xi and the American Association for the Advancement of Science.

He is survived by his wife, Louise Truesdale Loening; sons Richard Greenfield, and his wife, Nancy, and Steven Greenfield and his wife, Emily; daughter Hermine Brindak and her husband, Paul; brother, Milton Greenfield and his wife, Micky; and seven grandchildren. He was preceded in death by his first wife, Barbara Shapiro Greenfield, and he established a scholarship fund in her memory.

Funeral services were held July 18 at Joseph Levine & Son Memorial Chapel in Philadelphia, and interment was at Montefiore Cemetery.

Contributions in Dr. Greenfield's memory may be made to Hillel at the University of Delaware, 47 West Delaware Ave., Newark, DE 19711 or to the Barbara Greenfield Scholarship Fund, in care of University of Delaware, Development Office, George Evans House, 5 West Main St., Newark, DE 19716.

ME Faculty Member and ME Alum Honored with Named Professorships

Of the four members of the University of Delaware College of Engineering faculty that were recently appointed to endowed professorships, two have ME connections: Suresh Advani and Jack Gillespie. Announced on September 9 by Provost Dan Rich, the appointments were effective September 1.

Advani, who has helped drive important advances in the science of composites manufacturing, has been named the George W. Laird Professor of Mechanical Engineering. Gillespie, who holds bachelor's, master's and doctoral degrees in ME from UD, was named Donald C. Phillips Professor of Civil and Environmental Engineering.

Associate director of UD's Center for Composite Materials, Advani studies polymer and composite processing and rheology and has developed a computer-based virtual simulation of the composites manufacturing process.

Since joining the UD faculty in 1987, Advani said he has seen great changes in composites manufacturing. "When I first started here, composites manufacturing was more an art than a science," he said. "People were skeptical about the use of science-based principles. Now, more and more people manufacturing composites are using simulations before making the composite."

Suresh Advani

Advani said his job involves both research and education, not only of UD graduate and undergraduate students but also of other researchers and industrial manufacturers. To that end, he teaches a course in composites manufacturing and holds technology transfer workshops to demonstrate the value of simulations.

Another area of research of interest to Advani is the potential use of carbon nanotubes in composite materials, and he has National Science Foundation funding to explore this field.

Carbon nanotubes are "very tiny particles, almost like soot, but very strong," Advani said, and he is considering how they behave in flow to see if he can improve fiber and resin components.

Two years ago, Advani took an interest in the development of fuel cells, which are of international importance as governments seek more efficient use of energy and fuels that are more environmentally friendly. "The biggest problem with fuel cells is cost," he said. "The materials are expensive, the manufacture is very difficult and time consuming, and the performance to date is not what it could be."

For clean energy to be affordable, researchers need to develop a basic understanding of what is happening in the fuel cell, Advani said, and only then can they make the modifications that will reduce costs.

The Laird professorship is named for UD alumnus George W. Laird, the son of noted benefactor William Winder "Chick" Laird Jr., who died in 1977 while still in his 30s. The funds for this endowment were provided through the George W. Laird Fund in Mechanical Engineering.

Advani earned a bachelor's degree in mechanical engineering from the Indian Institute of Technology in Bombay, India and a doctorate from the University of Illinois at Urbana-Champaign.

Gillespie holds a joint appointment with the Department of Materials Science and Engineering and is director of the Center for Composite Materials.

"Jack is one of a handful of visionary leaders of the composite materials community in the United States," said Dean Eric Kaler. "His research has opened up new areas of work, and his skill in leading the Center for Composite Materials to new heights has been phenomenal. His high research profile and dedicated leadership make him an ideal named professor."

Gillespie has been director of the Center for Composite Materials since 1996. Under his leadership, CCM is now home to four centers of excellence, two involving the Army Research Laboratory, one the Office of Naval Research, and another the Federal Aviation Administration, for commercial applications of composites in aircraft.

Much of that work is done in conjunction with more than 60 companies that are part of a consortium sponsoring research at the center, a number that has tripled over the last five years. "We are very proud of our centers of excellence and close partnerships with industry," Gillespie said.

Gillespie's own composites research is in the areas of processing science, mechanics, design, interphase science and experimental methods. He works closely with the UD Center for Innovative Bridge Engineering in the Department of Civil and Environmental Engineering, where he and his colleagues have pioneered the application of composite materials for bridge infrastructure applications.

Gillespie has served as a member of the prestigious and influential National Research Council Board on Manufacturing and Engineering Design and is chair of a recently completed study of the National Materials Advisory Board Committee on High-Performance Structural Fibers for Advanced Polymer-Matrix Composites.

He has also been editor of the Journal of Thermoplastic Composite

Jack Gillespie

Materials since 1993 and serves on numerous editorial boards.

Gillespie was a co-recipient of the U.S. Army's Paul A. Siple Memorial Award for his research on processing of multifunctional armor materials.

Tsu-Wei Chou, Pierre S. du Pont Chair of Engineering at UD, served as Gillespie's faculty sponsor. "I have been truly amazed at how Jack has successfully managed the Center during a period of tremendous vacillation in the composites industry itself and in patterns of funding for basic research in this field," Chou said. "Jack's vision, diligence and total dedication have had a profound and sustained impact on the education and research program in the college. I am very proud of his accomplishments and appreciate the contribution he has made to the university."

The Phillips professorship is named for Donald C. Phillips, a 1948 alumnus who established a trust that has resulted in UD receiving approximately $1.6 million to support the Department of Civil Engineering. A portion of that money is being used to endow the Donald C. Phillips Professorship in Civil Engineering.

Editor's Note: This article was adapted by Diane Kukich from an article by Neil Thomas that appeared in UDaily on September 9, 2005.

ME Undergoes ABET Review

In November 2005, the Department of Mechanical Engineering, along with the other five UD engineering programs that award undergraduate degrees, underwent a review by ABET (Accreditation Board for Engineering and Technology). ABET is a federation of 28 professional and technical societies representing the fields of applied science, computing, engineering, and technology. ABET currently accredits some 2,700 programs at over 550 colleges and universities nationwide.

The review process, which occurs every six years, involves years of preparation and submittal of a comprehensive Self-Study Report, culminating in a three-day site visit. During the visit, the ABET evaluators interview the department chair as well as departmental faculty, students, and staff. Final results will be shared with each program after the ABET Summer Meeting in 2006.

Prof. Karlsson wins Francis Alison Young Scholars Award

Adapted from a story by Martin Mbugua that appeared in the December 28, 2005, issue of UDaily

Anette M. Karlsson, assistant professor of mechanical engineering at UD, has been chosen as the winner of the prestigious Francis Alison Young Scholars Award for 2005. The annual award is given by the Francis Alison Society to one assistant professor at the University for outstanding scholarship, with research publications that enhance teaching.

Karlsson joined UD in 2002 as an assistant professor after receiving her doctorate in mechanical and space engineering from Rutgers University in 1999. A specialist in developing physics-based models to understand the response of structures or materials subject to mechanical loads, temperature changes, or age-limiting fatigue, Karlsson was picked from a pool of 14 nominations made by department chairs.

"I am very happy and honored to receive the Alison Young Scholars Award," Karlsson said. "When I was told I was the recipient this year, I could not quite believe it at first. There are many outstanding young faculty members here at the University of Delaware and being picked as the winner of this award is very humbling. To have my research contribution recognized with this award is quite thrilling."

Karlsson said she enjoys working on real-life, mostly interdisciplinary engineering problems that can only be solved through basic research that requires collaboration with a broad range of experts. She frequently works with scientists and researchers in the U.S., Europe and Asia, as well as with American-based companies.

"These collaborations give me a lot of motivation to pursue my research, and I am constantly learning," Karlsson said. "The collaborations also extend to my graduate students. For example, one of my graduate students, Jin Yan, spent three months at the German Aerospace Center in Cologne, Germany, this summer, developing a new test technique of high-temperature materials."

During the past year, Karlsson has received grants from four national funding agencies and corporations, valued at more than $1 million. Since 1999, she has published 19 articles in refereed journals, conference proceedings, and other peer-reviewed papers.

"I try to engage undergraduate students in my research as well," Karlsson said. "Right now, I have three undergraduate students working in my research lab, doing both experiments and numerical simulations."

In the laboratory, Karlsson focuses on theoretical and experimental work, developing models to understand the behavior of the material systems being considered, followed by experimental work that inspires and verifies the models.

"In the classroom, I commonly use state-of-the-art research as examples of the problems we are considering," Karlsson said. "That always gets the students' attention, and, hopefully, makes the subject matter more tangible and more inspiring."

Karlsson's work currently focuses on composite structures, polymer fuel cells, thermal barrier systems, and ultralight metal structures.

Faculty/Graduate Highlights

Suresh G. Advani was awarded a named professorship. Effective September 2005, he is the George W. Laird Professor of Mechanical Engineering, in recognition of his research, teaching and service (see story on page 4).

Rajagopal from Texas A&M University. From the University of Delaware, Professor Suresh Advani and Ms. Fuping Zhou, in collaboration by Dr. Eric Wetzel of ARL, contributed to the volume.

Michael H. Santare and **Ajay K. Prasad** were promoted to the rank of Full Professor.

Prasad recently accepted an invitation to join the Editorial Advisory Board of the journal *Experiments in Fluids* for a three-year term. He also gave an invited lecture, "Understanding Airflow in the Human Nasal Passage," at the Nasal Drug Delivery conference on July 25-27, 2005, in Washington, DC. He also gave an invited talk on fuel cell research at Motorola's Embedded Systems and Physical Sciences Division in Tempe, Arizona, in November 2005.

Mike Keefe received the 2005 Engineer of the Year award from the Delaware Engineering Society on February 24, 2005. Dr. Keefe was also asked to serve on the Solid Waste Management Technical Working Group, which is being assembled in response to Governor Minner's charge to the Department of Natural Resources and Environmental Control.

Suresh Advani was a keynote speaker at the 12th international Conference on Composite Materials (ICCE-12) at Tenerife, Canary Islands, Spain, in August 2005.

Thomas S. Buchanan was appointed Chairman of the National Institutes of Health Subcommittee on Function, Integration and Rehabilitation Sciences, July 2005.

Applied Materials, a maker of computer chip manufacturing machines, gave the Department an unrestricted gift of $25,000 to support **Len Schwartz's** coating flow research.

William B. Fagerstrom, supplemental faculty who teaches Manufacturing Processes courses in the department, was nominated by the Society of Manufacturing Engineers (SME) to be a candidate for International Director of SME. He was defeated by an incumbent Director.

Anette Karlsson received the Young Scholars Award of the Francis Alison Society in September 2005. The most prestigious award at the University of Delaware for Assistant Professors, the award is conferred by the Francis Alison Society, which consists of senior professors who have received the Francis Alison Faculty Award of the University. See story on page five.

Tsu-Wei Chou delivered plenary/keynote lectures at the ECCOMAS Thematic Conference on Smart Structure and Materials in Lisbon, Portugal, in July and at the Fifth Canadian International Composites Conference in Vancouver, Canada, in August. He was an invited speaker at the China Nano 2005 Conference in Beijing, China, in June.

Also, the Cambridge University Press in England has just issued the paperback version of Chou's book *Microstructural Design of Fiber Composites*, which was first published in 1992 in the Cambridge Solid State Science Series.

In addition, Dr. Chou was recently named a Fellow of the American Institute of Aeronautics and Astronautics (AIAA). He will be recognized at ceremonies to be held in Washington, D.C. in April 2006. With the AIAA award, Chou has attained the grade of fellow in five professional organizations.

Lian-Ping Wang was awarded a Faculty Fellowship from the National Center for Atmospheric Research (NCAR) through its Advanced Study Program. The Fellowship enabled Wang to work with NCAR scientists in Boulder, Colorado, during the summer of 2005. The award also allowed his two graduate students, Dr. Orlando Ayala and Ms. Yan Xue to spend up to a month at NCAR.

A special issue (Vol. 10, No. 3) of the *International Journal of Applied Mechanics and Engineering* is dedicated to **Andras Z. Szeri** on the occasion of his 70th birthday. The guest editor is Professor K. R.

Kausik Sarkar gave four invited talks on his group's research on contrast microbubbles for ultrasound imaging and drug delivery during 2005: at the University of Pennsylvania (April), the University of Illinois at Urbana Champaign (July), the National Institute of Standards and Technology (August), and the University of Minnesota (October).

Sunil Agrawal served as the Conference Chair for the ASME Mechanisms and Robotics Conference, 2005, as a part of the ASME IDETC at Long Beach in September. In this conference, 120 technical papers were presented in 28 sessions, with two keynote speeches.

Dr. Agrawal served as the Guest Technical Editor for a special issue on "Robotics and Control" in the *Journal of Dynamic Systems Measurement and Control, Transactions of the ASME*. This special issue will be published in March 2006.

Dr. Agrawal served as the Guest Technical Editor for a special issue on "Biomimetics and Novel Aspects in Robotics" in the journal *IEEE/ASME Transactions on Mechatronics*. This special issue will be published in March 2006.

Dr. Agrawal served as the Chair of the Robotics Technical Panel within ASME Dynamic Systems and Control Division for 2005. He organized 10 technical sessions in the ASME IMECE meeting in Orlando in the area of robotics.

Dr. Agrawal was an ASME Distinguished Lecturer for the years 2004-2005. During this time, he was invited to give a lecture at University of Washington, Seattle, Virginia Polytechnic University, SUNY at Buffalo, Technical University, Munich, Technical University, Ilmenau, University of California, Los Angeles, and University of Delaware.

Graduate Students

So-ryeok Oh was awarded a University of Delaware Competitive Graduate Fellowship for 2005-2006. He is advised by Dr. Sunil Agrawal.

Wenzhong Tang was awarded a University Dissertation Fellows Award for 2005-2006. He is advised by Dr. Suresh Advani.

ME Researchers Team up to Lead Fuel Cell Effort

Lian-Ping Wang

Ajay K. Prasad

Michael Santare

Anette Karlsson

Suresh Advani

High gas prices, fears about reliance on foreign oil supplies, and environmental concerns have all helped to drive the search for alternative energy sources and forms such as the fuel cell. A research group in the University of Delaware Department of Mechanical Engineering is addressing some of the many issues that need to be resolved before the tremendous potential of this technology can be realized.

Fuel-cell team members include George W. Laird Professor Suresh Advani, Professors Mike Santare and Ajay Prasad, Associate Professor Lian-Ping Wang, and Assistant Professor Anette Karlsson.

Prasad first developed an interest in alternative energy technologies and power sources as an undergraduate and chose thermal sciences as his research focus in graduate school. However, during the Reagan years, the trend toward alternative technologies was down, along with the oil prices, so he focused instead on fundamental studies in fluid mechanics in the early part of his career at UD.

But the surging price of oil today has given him the opportunity to rekindle his interest in alternate energy sources, including fuel cells. "Fuel cells are two to three times more efficient than traditional internal combustion engines in extracting useful work from fuel, and, equally important, they produce zero emissions," he says.

To understand the significance of the work the group is doing, Advani explains the basics of the Proton Exchange Membrane, or PEM, fuel cell, which is the type most suited to power vehicles such as cars and buses.

"The PEM fuel cell works as a reverse electrolysis process," he says. "Hydrogen and oxygen flow into the cell from opposite sides, with a catalyst causing the hydrogen to break into protons and electrons. The PEM membrane allows only the protons to pass through, while the electrons travel along an external circuit, generating energy through an electrical current. After the protons pass through the membrane, they join the oxygen molecules and form water."

"All components of the fuel cell including the membrane, the catalyst layers, the gas diffusion layers, and the bipolar plates are critical to the efficient operation of the fuel cell," he continues. "The proper selection of materials and flow field design can impact the amount of energy that can be generated while minimizing cost. Water management becomes very critical—because water is a by-product of the reaction, operating conditions must be maintained to limit flooding."

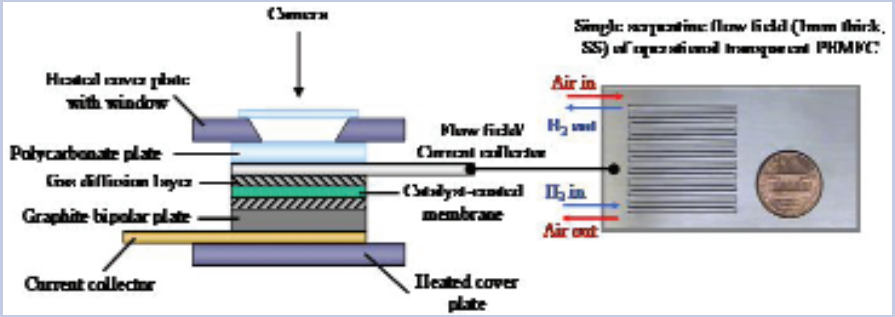
The researchers are currently working at the single cell level, measuring power output under various conditions, including humidity, temperature, and reactant gas stoichiometries. "We're interested in not only increasing the current density but also improving reliability," Advani points out.

Scaling issues will also need to be

Don't wait till "cell" freezes over![1] "Water management in Fuel Cells" Ajay Prasad and Suresh Advani

The by-product of a hydrogen fuel cell reaction is pure water, giving fuel cells the deserved tag of "zero emissions." Under ideal operating conditions water emerges from the fuel cell in vapor form, but, under conditions of high current draw, so much water vapor is produced that it can condense to a liquid and cause flooding within the cell. Liquid water prevents reactant gas access by drowning the catalyst sites which shuts down the reaction. In cold climates, there is the added danger of freezing of water within the cell which can seriously damage expensive components. For this reason, DOE has highlighted freeze-resistant stacks as a key research area. One way to prevent flooding is to run the cell at higher temperature and/or lower relative humidity. However, current PEM fuel cell materials do not function well under hot and dry conditions. For example, the proton exchange membrane must remain well hydrated to ensure protonic conductivity. This places conflicting requirements on the amount of water within a cell, a problem dubbed "water-management." Fuel cells are made of opaque materials that prevent optical access for flooding prediction and control. Therefore, we are using a unique transparent operating fuel cell for this purpose. Under our supervision, Ph.D. student Dusan Spernjak is varying the properties of component materials, cell design, and operating conditions to visually characterize flooding and develop water management techniques that will help prevent it.

[1] *Thanks to Dick Orth (UDME 1960) for the title.*



Transparent operational; PEM fuel cell with 10 cm² active area for water visualization

addressed. The cells are assembled into stacks for practical applications, as each individual cell generates less than one volt of electricity. "Our next step will be to develop a test stand that will enable us to examine the performance of the stack under various conditions, including temperature and the presence of contaminants.

While many groups across the country are working on fuel cell technology, Advani says that the UD group offers a couple of important strengths: "We have some unique test methods and a unique flow visualization technique that allows us to visualize a transparent cell," he says.

The research team has developed an experimental facility to test the mechanical behavior of the membrane materials under high temperature and humidity. "Durability has been identified as a major barrier to commercialization of fuel cells," says Santare, who along with Karlsson, is investigating this issue.

"This unique test facility is enabling us to generate valuable data on the mechanical behavior of these materials in an environment very similar to those encountered in operating the fuel cell," Karlsson points out.

Prasad and Advani, in collaboration with Prof. Ardeshir Faghri from the Department of Civil and Environmental Engineering, are currently leading a new project funded by the Federal Transit Administration to research, build, and demonstrate a fuel-cell-powered transit vehicle in Delaware. A consortium comprising the Electric Power Research Institute (EPRI), Ballard Power Systems, and the Delaware Transit Corporation has been formed for the project.

"Our goal is to be positioned at the forefront of research, development, and implementation of the state of the art in hydrogen-based fuel-cell transit buses," says Faghri. "The vehicles developed under this program will be fully tested in real-life situations, and the results will be presented to transit agencies throughout the United States and other interested countries."

While the application to buses has already begun, fuel-cell cars are not expected to reach the mass market until 2010. Advani explains that it is easier to apply the technology to buses because of refueling issues.

"Buses tend to be refueled at centralized stations," he says, "but for individual cars, there will need to be hydrogen fueling stations spread throughout the nation just as we now have gas stations."

Other issues include production and storage of hydrogen. "Ironically," says Prasad, "hydrogen today is most easily produced by steam reforming methane, so our dependence on fossil fuels will not be eliminated anytime soon. However, fuel cells, operating at higher efficiencies than conventional internal combustion engines, can extend the existing supply of fossil fuels. At the same time, fuel cells can assure an improvement in air quality at the point of use, and even a reduction in greenhouse gas emissions if carbon sequestering were feasible. In the ideal scenario, hydrogen would be produced in a wholly renewable manner."

Materials costs for fuel cells are currently very high for not only the membrane but also the catalyst, which is platinum. A group of researchers from the Department of Chemical Engineering is investigating alternative catalysts to replace expensive platinum.

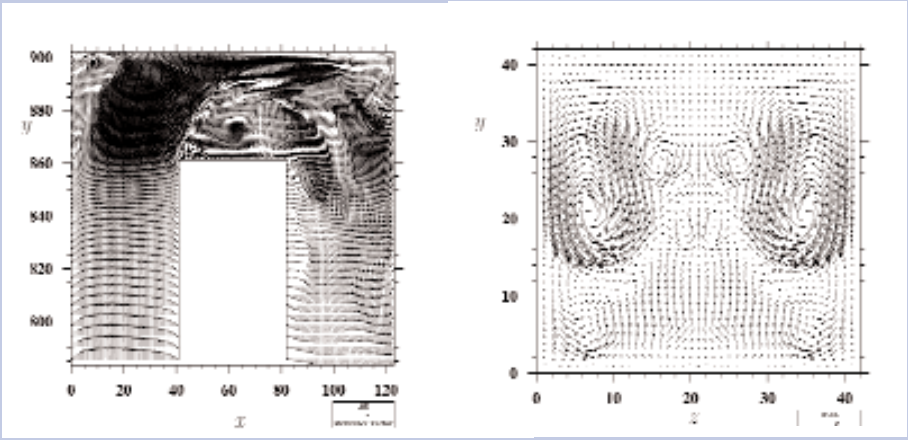
Finally, it is critical that the results of research on fuel cells be incorporat-

Ph.D. student, Dusan Spernjak, assembling the experimental transparent fuel cell.

Flow Modeling for PEM Fuel Cells

Lian-Ping Wang

Computational models of increasing complexity are currently being developed to better understand issues related to the performance of PEM fuel cells, such as pressure loss and thermal effects in the flow channels, species transport through porous gas diffusion layers, and water management on the cathode side. Most computational methods currently being put forward are based upon macroscopic conservation equations. We are developing a quantitative modeling tool using the lattice Boltzmann (LB) approach. The LB approach is a kinetic approach offering flexibility and reliability in treating complex multiphase flows encountered in fuel cells. We have successfully developed single-phase flow models through the flow channel and the porous gas diffusion layer. Our goal is to extend these models to multiphase flow and eventually develop a predictive tool for fluid and species transport in fuel cells.

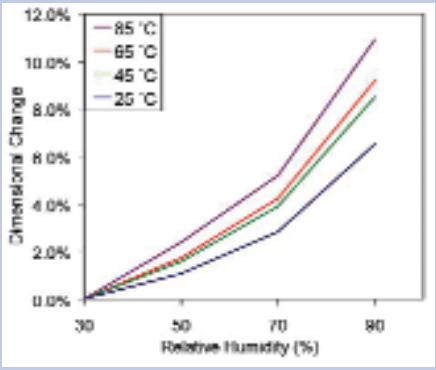


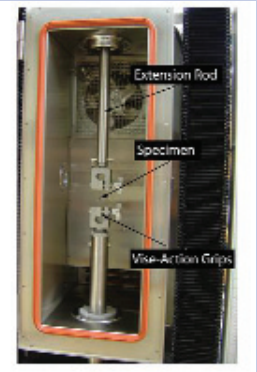
Snapshots of the velocity field through two planar sections in a 3D serpentine flow channel at flow Reynolds number of 1059.

Durability of fuel cells

Michael Santare and Anette Karlsson

During the operation of a fuel cell, the fuel cell membrane absorbs water and swells, thus causing a volume change of the membrane. Since the membrane is confined in the fuel cell assembly, the swelling can lead to large mechanical stresses during operation. Thus, it is critical to measure the volume change as a function of temperature and humidity. We have developed a unique capability to measure the mechanical properties – including the volume change – of the fuel cell membrane, as a function of temperature and humidity. The equipment is a combination of an environmental chamber and a strength-test machine. The results obtained from the experiments are used in finite element simulations where the mechanical stresses are determined. This will eventually lead to a lifetime prediction of the polymer fuel cell assembly. This graph shows how the dimensions change as a function of temperature and humidity for a polymer fuel cell membrane (Material: Nafion).





Experimental System

ed into the modern mechanical engineering curriculum. Prasad is currently teaching a new 400/600-level course, "Introduction to Fuel Cells."

"Clean energy from sources such as fuel cells, is a 'hot' topic in engineering today," says ME Chair Tom Buchanan. "There is a lot of demand for expertise in this field from industry, funding organizations, and students. Although relatively new, Dr. Prasad's course has become one of our most popular technical electives with both traditional and continuing education students."

Prasad points out that, while the emphasis has been on the use of fuel cells for transportation applications, the technology has other potential applications. For example, it is envisioned as a replacement for the lithium-ion batteries currently used in laptop computers and cell phones, with greatly increased times between "charges." In addition to their work on PEM fuel cells, Prasad and Advani are conducting research on direct methanol fuel cells (DMFC) for portable electronic devices like laptops.

"Regardless of the application," says Advani, "developing a fundamental understanding of this technology is essential if we're going to improve the process and the materials."

Alum Does Research on High Performance Hybrids

Not your grandfather's dragster

Most faculty members can only dream about getting paid to do research that involves going from zero to 50 in three seconds in a red sports car. But Jim Burns (95PhD) is actually doing it. An Assistant Professor in the Department of Mechanical Engineering at San Diego State University, Burns is also Director of the Facility for Applied Manufacturing Enterprise (FAME) at SDSU.

Burns was featured in the September 25th issue of the *New York Times Magazine* in an article on high-performance hybrids. He and his team—with their own money and support from the California Energy Commission and a handful of philanthropic donors—have built a one-of-a-kind prototype called the Enigma in their campus lab. They are currently designing the next generation, which will have a top speed of 217 MPH while still getting upwards of 40 MPG.

In the article, reporter Clive Thompson refers to the Enigma as "a seeming paradox: a car potent enough to please muscle-car buffs yet eco-friendly enough to thrill environmentalists."

Burns refers to it as "lean muscle" and argues that is "the future of hybrids." Thompson quotes Burns as saying, "We've got to produce a car that gets a 14-year-old boy excited…. We got to have the smoking! The squealing! The tires popping off!"

Whether or not "high-performance" and "hybrid" will ever become synonymous in the auto industry, Burns is certainly enjoying his work. "We built her really low, so she totally hugs the ground," Burns said to the reporter as he gave him a test ride, with the finish videotaped by Burns's students.

"Watch this," he said as they coasted to a stop at a large intersection near Highway 8. He proceeded to perform "two 360-degree doughnuts, complete with white smoke pouring off the shrieking back wheels."

Burns's research thrust is on manufacturing, which he refers to as "the interdisciplinary intersection where engineering mechanics, material science and measurement and control theory meet."

As a doctoral candidate in mechanical engineering at the University of Delaware, Burns was advised by Dr. R. Byron Pipes. His doctoral research, carried out at the Center for Composite Materials, focused on aligned long-fiber array reinforcements for composite structures.

Editor's Note: Visit Burns's web site at http://www.l3research.com/.

Undergraduate Highlights

Undergraduate Design; From 'Rube Goldberg' Machines to Industry Prototypes

The senior design capstone course has become an integral part of the mechanical engineering curriculum at universities throughout the United States. UD-ME is no exception, but the experience here is not limited to the senior year.

"Design is an important component of our curriculum and permeates many of our courses," says ME Chair Tom Buchanan. Freshmen have design projects in the introductory course, sophomores have them in courses like Solid Mechanics, and juniors have substantial design projects in many courses."

"Of course," he continues, "the pinnacle is the senior design course, which has the greatest visibility. But that is just the tip of an iceberg, a summit arising from a foundation that has been growing for years but is largely unseen."

Under the guidance of Prof. Dick Wilkins, the freshman class (in MEEG101, Introduction to Mechanical Engineering) was organized into 34 teams of approximately four students each to create a "Rube Goldberg" machine for turning a page in a MEEG101 textbook.

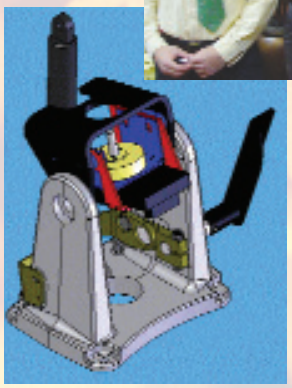
Wilkins explains that the task in such exercises is irrelevant—the idea is for the students to use physics principles to create a number of mechanical steps on the way to completion of the final task. Last year, the students created mousetrap catapult-type devices to shoot small pieces of candy into a coffee cup.

Two of 35 Freshman teams show off their Rube's

"We try to do something different every year," Wilkins says. "Our main goals are for the students to demonstrate the design process and to have fun doing it." An important element of the project is presentation of the final devices in front of an audience.

While the project is not actually a contest, four teams were reimbursed for the cost of their contraptions, which were then kept by the department for use in future recruiting activities.

Sophomore design is a recent addition to the curriculum. "We found that by the time students reached their junior year and were taking machine design, they had forgotten a lot of what they had learned as freshmen." To keep the principles fresh in their minds, Prof. Jim Glancey incorporated a design project into his Computer-Aided Design class last spring.



In Prof. Jill Higginson's Machine Design class (MEEG301) this year, members of the junior class were challenged with creating, analyzing, and demonstrating a means for transporting a backpack from its stowed location on the back of a wheelchair to a place where it is easily accessible to the user.

"The project was intended to expose the students to a real-world experience," says Higginson, "where they are responsible for all stages of the design process—including concept creation, synthesis, analysis, and prototyping—all of which involved effective teamwork and communication. The student teams developed a wide array of successful approaches to the problem, and I was impressed by the professional nature of their presentations and the breadth of engineering skills they used."

The project was sponsored by Volunteers for Medical Engineering, Inc. (VME). A non-profit organization of volunteer engineers and medical professionals, VME works to improve the lives of individuals with disabilities through the use of innovative engineering. John Staehlin, founder and president of the Baltimore-based group, supplied the class with the problem and helped to evaluate the projects.

The Case-New Holland Team and a CAD picture of their prototype steering system for advanced agricultural equipment

Senior design differs from the earlier experience, where the entire class focuses on the same problem. For the seniors, each of several small teams of students addresses a different problem, creating a product for various industrial "customers." The projects are generally aimed at saving money, speeding up production, or improving existing products.

Dick Wilkins, Mike Keefe, Jim Glancy, and Nate Cloud are faculty advisers to the 14 senior design teams of 4 to 5 students each, who presented the projects to their clients at the University's Clayton Hall on Friday, December 12. "The projects enable us to assess whether our graduating seniors have learned design and engineering practice, realistic industrial management structure, and professionalism," says Wilkins.

The clients, officials with Air Products, Dade Behring, Berry Plastics, W. L. Gore, CNH, and others, were there to watch students demonstrate the devices their companies had requested.

Student projects start with meetings with clients to determine their needs. Then, the teams identify the best practices for the desired function, generate design concepts, and work with clients to select the best concept.

An essential feature of the course is transforming the design into hardware. The work involves building and testing prototypes, improving designs, and satisfying the customer. "In many cases, the devices have actually been manufactured and used by the clients," Wilkins says.

This year's projects included an automatic sheet stacker for Alcore, a knit hat automation system for Artex Knitting Mills, and a steering angle sensor for Case-New Holland. The complete list of projects and descriptions can be found at http://www.me.udel.edu/meeg401/05/project-descriptions.pdf

Top Student Finds Time to Stay Active

Janelle Konchar

Many students view their senior year as a time for winding down, but for Janelle Konchar it's more an occasion for gearing up. Although she has been active since she arrived here as a freshman four years ago, Konchar is busier than ever—trying to cram in every experience possible before she graduates.

The top student in the ME class of 2006, Konchar has managed to maintain high academic standards while also contributing substantially to the Department, the College, the University, and the larger community. While serving as a leader of her senior design team, she still managed to fit in trips to the meetings of three national organizations: to Rutgers University for the National Student Leadership Conference, to Salt Lake City for Tau Beta Pi, and to Anaheim, California, for the Society of Women Engineers.

"These national meetings are a wonderful way to meet people and learn how things are done at other schools," Konchar says. "It's amazing to find out how much we have in common with students in other engineering departments throughout the country."

Originally from York, Pennsylvania, where she attended a mid-sized high school, Konchar chose engineering for the usual reasons—because she liked math and science and she enjoyed problem solving. But she chose UD as a way to hedge her bet: "Delaware was big enough that I knew I could switch majors if I wanted to," she says, "but it wasn't so big that I would get lost. I also wanted a place where I could make a difference and have an impact."

As it turned out, both UD and ME turned out to be good choices for Konchar, and she wasted no time getting involved. During her first three years here, she was an active participant in the Resident Student Association (RSA). "It's perfect experience for the real world," she says, "because the student body is the customer, and the role of the representatives is to listen to their needs and facilitate change."

Konchar was faced with a tough decision her senior year—she decided to move off-campus, which meant that she could no longer participate in the RSA. "But I decided that it was a perfect opportunity to apply the leadership skills and experience I had gained elsewhere to engineering organizations on campus," she says. She is currently President of UD's Tau Beta Pi chapter and has worked to revitalize the chapter through recruitment of new members. With participation up, efforts are now focused on instituting programs and activities that will benefit the College.

Although she will be graduating in June, Konchar plans to stay connected to UD-ME. As a senior, she was asked to join the team planning the department's next Alumni Career Celebration. "This event is a great opportunity for students to learn about how alumni successfully make the transition into the workplace," she says. "I want to see more students take advantage of that opportunity next time."

"Too many students come here thinking that a college education is just about the curriculum," she continues, "but there is so much more to it than that, so many opportunities for us to become involved in campus life and learn outside the classroom."

When she's not busy studying or working, Konchar treasures the downtime that she spends with her friends—cooking dinner and just relaxing.

It's tough to envision, however, where she finds the time to relax. In addition to everything else she is involved in, Konchar has conducted undergraduate research with Prof. Jim Glancey. Her project focuses on characterizing the sound emissions of chisels designed using high-performance engineering polymers. This work resulted in the submission of a journal article and led to a summer internship in the power tools industry. Konchar is continuing to participate in undergraduate research by completing a senior thesis to model pneumatic impact tool performance.

Job hunting is now added into the mix for this busy senior. Although Konchar would eventually like to earn an advanced degree, she is not ready to specialize, and she wants to first spend some time learning what it's like to be an entry-level engineer.

"I think I'd ultimately like to combine engineering with another field," she says, "but I'm not sure yet what that would be, maybe public policy—I have a wide variety of interests. Maybe someday I'll pursue an MBA or an advanced degree outside of engineering and then use my broad technical knowledge combined with practical leadership experience to work in the public, government, or non-profit sector and influence public policy."

"The mission of Tau Beta Pi is to foster a liberal spirit in engineering," Konchar concludes. "I think I've embodied that as a student, and I'd like to continue it in the workplace."

Pie an Engineer

A group of faculty and students from ME participated in "Pie an Engineer," which was held on September 16, 2005, to raise money for victims of Hurricane Katrina. The event was part of the "Giving on the Green" fund-raising effort, organized by UD's Office of Campus Life and several other campus offices. Residential complexes, student organizations, and sororities and fraternities were invited to develop creative ways to convince supporters to donate. The MEs raised more than $200, due to the good natured participation of people like Prof. Mike Santare, who was willing to have pies thrown in his face by donors.

Mechanical Engineering Departmental Calendar

Feb. 19-26	National Engineers Week
Feb. 20	Last day free add/drop for Spring 2006
Feb. 20	Deadline for completion of incomplete work for 05F & 06W for undergraduates
Feb. 21	Order of the Engineer Ring Ceremony
Feb. 22	Senior Design Appreciation Night 6:00 Clayton Hall
Feb. 24	SWE sponsored "Explore Research" Lunch
Mar. 17	Deadline for completion of incomplete work for 05F & 06W for graduate students
Mar. 22	Dr. Advani Inaugural Lecture and Reception
Mar. 24	Jerzey L. Nowinski Lecture
Mar. 27-31	Spring Recess
Apr. 3	Registration for Summer 06 begins
Apr. 8	Delaware Decision Days
Apr. 10	Deadline for sumbission of PhD dissertations for May 06 conferral
Apr. 13	Registration for Fall Semester 2006
	ASME Distinguished Lecturer
Apr. 17	Last day to change registration or withdraw without academic penalty
Apr. 17	Deadline for submission of master's thesis for May 06 conferral
Apr. 22	Delaware Decision Days
Apr. 28	Alumni Career Celebration
May 5	Honors Day - modified class schedule
May 15	Deadline for submission of advanced degree applic. for Aug. 06 degree conferral
May 17	Last day of Spring 2006 classes
May 18	Reading Day
May 19	Final exams begin for 06S
May 26	Final exams end for 06S
May 27	Commencement
May 29	Memorial Day - University offices closed
June 5	First summer session begins
June 8	Last day of late registration for summer 06
July 4	Independence Day - offices closed

Celebrating Alumni Careers

Second Annual Alumni Career Celebration To Be Held April 28

The Mechanical Engineering Department of the University of Delaware is pleased to announce that it will be sponsoring its Mechanical Engineering Business & Career Conference on April 28, 2006. This event is the second annual event of its kind celebrating the careers of ME alumni and providing a forum for networking among alumni, faculty and students.

"One of the things we discovered from the presentations by last year's distinguished alumni was that there were many things they didn't learn in school—primarily the business aspects of being an engineer," says Jim Hutchison (BME79), President of JAED Engineering and event planning leader. "So we decided to make the next alumni career celebration more of a learning event."

The 2006 conference (see program on page 17) will comprise two tracks: one focusing on business and technology and the other on careers.

"Participation by students was disappointing last year," says Prof. Mike Santare, who is also on the planning committee. "To attract more students this time, we included undergraduates Khenya Still and Janelle Kochar on the committee. We also polled students to determine their interests. The career track at the conference is geared directly toward current undergraduates and their needs and interests."

"Our overall goal is still to celebrate the accomplishments of our alumni," says alumni relations coordinator Nate Cloud. "But we hope that the new format will also enable us to attract a broader audience and allow others to benefit from the wisdom of the most-accomplished of our alumni."

In addition to the dual-track conference, the event will include networking/poster sessions, recognition of the 2006 distinguished alumni, dinner, and a keynote speaker from NASA.

For more information about the Mechanical Engineering Business & Career Conference: see the program (page 16); contact Nate Cloud (cloud@me.udel.edu); or go to http://www.me.udel.edu/alumni/.

Views from Last Year's Career Celebration

Second Class of Distinguished Career Alums Selected

Five distinguished alumni will be honored at the Mechanical Engineering Business & Career Conference, to be held on April 28, 2006. **Allen Flenner, Terri Kelly, William Mavity, Carl W. Hall,** and **Kaushal Kurapati.**

Alumni are selected for recognition based on several criteria, including achievement, impact, uniqueness, and interest. "Our alumni have a tremendous range of career experiences not only in the fields of engineering, but also in business, academia, government, the arts and sciences, and public service," says Department Chair Tom Buchanan. "We discovered last year that our alumni and Distinguished Career Recipients were outstanding in many ways."

The following highlights the careers of this year's distinguished alumni.

Alan Flenner (1986) is an attorney with High, Swartz, Roberts & Seidel in Norristown, Pennsylvania, and a Commander in the Navy Reserve Civil Engineer Corps. He is currently assigned as the Commanding Officer of Naval Mobile Construction Battalion 21 in Lakehurst, New Jersey. Born and raised in Wilmington, Delaware, his post-graduate education includes a Master of Science degree in Civil Engineering from the University of Illinois, a Juris Doctor degree from Penn State University, and a Command and Staff diploma from the U.S. Naval War College.

Flenner enlisted in the Navy as an Officer Candidate through the Navy Civil Engineer Corps Collegiate Program in July 1985 before entering his senior year at Delaware. Among his early assignments, Flenner was the project officer for the largest single Navy construction effort of the Persian Gulf War, a 15,000-person tent camp and equipment marshalling yard.

Upon completion of graduate school at the University of Illinois in January 1993, Flenner was assigned as the Environmental Officer at the Navy Ships Parts Control Center in Mechanicsburg, Pennsylvania. In October 1995, he became the Director of the Safety, Health, and Environment Division of the Naval Inventory Control Point (NAVICP) in Mechanicsburg and Philadelphia.

Flenner left active duty to attend law school in November 1996 and immediately affiliated with the Navy Reserve. He was promoted to his current Navy rank in August 2002.

Flenner focuses his law practice on matters associated with the built environment and concentrates in the areas of municipal, environmental, and land use law. He also serves as Counsel to the Seabee Memorial Scholarship Association.

In July 2004, Flenner was recalled to active duty with the First Marine Expeditionary Force Engineer Group in support of Operation Iraqi Freedom. Among other duties, Flenner served as the Officer in Charge of Reconstruction in Fallujah. He was responsible for working with local Iraqi engineers to restore essential city services and reconstruct critical infrastructure heavily damaged by the November 2004 battle to remove insurgents from the city.

Flenner is a Registered Professional Engineer in Delaware and Pennsylvania, a Licensed Attorney in Pennsylvania, and a Registered Environmental Manager with the National Registry of Environmental Professionals. He earned Penn State's top academic awards in both environmental and land use law. He has published and spoken on riparian and stormwater management regulation. His military awards include the Bronze Star Medal, Meritorious Service Medal, Navy Commendation Medal (five awards), and numerous campaign and service awards.

Flenner lives with his wife Robin, son Jacob, and daughter Jenna near Harrisburg.

Alan was responsible for working with local Iraqi engineers to restore essential city services and reconstruct critical infrastructure heavily damaged by the November 2004 battle to remove insurgents from the city.

William Mavity (1972) joined Paracor Medical, Inc. as President, Chief Executive Officer, and Director in March 2003. Paracor Medical is focused on developing device-based treatments for patients suffering from heart failure.

Mavity spent first the first 21 years of his career with a large conglomerate (3M Company) and the next 12 years with a number of smaller companies. He has acted as CEO, and led the sale, of two public medical technology companies. His responsibilities at 3M included heading its cardiovascular subsidiary, Sarns/3M Health Care, and serving as the head of European Health Care manufacturing.

Mavity has been involved in raising private capital from leading venture capital firms on a number of occasions and in funding-raising (secondary offering) in public markets. He has also led the acquisition of companies and businesses, as well as helping to found two small medical technology companies.

He is currently involved in trying to develop a means to treat heart failure, affecting five million Americans, many with no longer-term alternative. He recently hosted UD President David Roselle at Paracor's headquarters in Sunnyvale, California, and gave him an overview of the company's efforts.

In addition to his role as a Director of Paracor Medical, Mavity currently serves as Chairman of Biosurface Engineering Technologies and as a Director of Aspire Medical, a private entity focused on treating sleep apnea. He has previously served on the Boards of Cohesion Technologies, Inc., InnerDyne, Inc., Cardeon, Inc., AMed Sytems, Inc., Fidus Medical Technologies, NeuColl, Inc. and the Michigan Technology Council. Mr. Mavity also serves on the Advisory Council for the UD College of Engineering.

Bill is currently involved in trying to develop a means to treat heart failure, affecting five million Americans, many with no longer-term alternative.

Terri Kelly (1983) is President and Chief Executive Officer of W. L. Gore & Associates, Inc. Ms. Kelly was appointed in April 2005, after 22 years with the company in positions of increasing responsibility.

Before assuming her current role, Kelly spent more than four years as a member of the leadership team that worked with the President and Chief Executive Officer. She assisted in enterprise-wide decision making, including strategic direction and vision, investment planning, portfolio management, acquisitions and divestitures, resource planning and key enterprise initiatives. Kelly began her career at Gore as a Process Engineer. She gained experience in military fabrics as a Product Specialist for the Extended Cold Weather Clothing System from 1985 to 1989 and as Business Leader with overall profit and loss responsibility for the Military Fabrics Unit from 1989 to 1998. Kelly assumed co-leadership of Fabrics, Gore's largest division, in 1998 and was responsible for the GORE-TEX® and WINDSTOPPER® brands as well as military, fire and safety services, law enforcement, workwear and medical protective fabrics.

Terri is President and Chief Executive Officer of W. L. Gore & Associates, Inc. She was appointed in April 2005, after 22 years with the company.

Kelly comes from a family of mechanical engineers including her father and two of her three sisters. Kelly and her husband, John, have four children—Bryan (14), Maddie (10), and twin girls Nicole and Alexis (5). In her spare time, Kelly enjoys running, skiing, cooking, and going to the beach.

Carl W. Hall (1950) earned his bachelor's degree in agricultural engineering (five year) at Ohio State University in 1948, his M.M.E. at the University of Delaware in 1950, and his doctorate in agricultural engineering at Michigan State University in 1952, where he served as department chariman. He taught at those institutions and then at Washington State University until 1982, leaving as dean emeritus of engineering and professor emeritus of mechanical engineering. He devoted his career to teaching, research and administration in engineering. He served in the U.S. Army infantry with combat in ETO (three campaigns).

Hall was elected to the National Academy of Engineering in 1989 for his fundamental research in agricultural product processing and food engineering. He retired in 1990 as Deputy Assistant Director of the National Science Foundation's Directorate for Engineering. He is credited with developing and obtaining funding for NSF's Engineering Research Center (ERC) program. He's been a leader in incorporating biology in engineering education.

Hall has held consulting and professional assignments to industry, foundations, universities, the National Research Council, and the United Nations. He has served as president of the American Society of Agricultural and Biological Engineers (ASABE) and as director of the ASABE and the National Society of Professional Engineers, and he has been active at the national level in ABET and the American Society for Engineering Education.

Hall is a fellow of AAAS, ASAE, ABET, AIMBE, ASME and CIGR. He is an author or editor of 30 books and has won numerous national and international awards.

Carl was elected to the National Academy of Engineering in 1989 for his fundamental research in agricultural product processing and food engineering.

Kaushal Kurapati (1995) is currently Senior Product Manager at Ask Jeeves, Inc. He manages several products coming out of the Teoma search engine, and oversees many relevance initiatives. Most recently he was responsible for the products Zoom (concept-based navigational tool) and Web Answers (answering questions by mining unstructured web pages).

Kurapati has over eight years of industry experience in the areas of web search, personalization, machine learning, and information visualization. He worked at large multinational corporations such as IBM and Philips Electronics for several years before joining Ask Jeeves. While working in IBM's Software Group, Kurapati developed technology and a product positioning strategy for IBM's flagship product WebSphere portal. He led a global research team in developing personalized TV program guides for PVRs (Tivo-like devices) while at Philips research labs.

At Philips research labs Kaushal led a global research team in developing personalized TV program guides for PVRs (Tivo-like devices)

Kurapati holds six U.S. patents and has authored several technical papers and presented them at major international conferences. In addition to his BME from Delaware, Kurapati earned an MS degree in computer science and an MBA from the NYU Stern School of Business.

Although Kurapati has deviated from pure mechanical engineering in his career, he believes that the analytical abilities he developed during his education at UD have been of value in his various jobs. He credits his office mate at UD, Jim Newill, with piquing his interest in programming languages and helping him gain confidence with computers in general, as well as his advisor, Dr. Ajay Prasad, who let him follow his interests in computer sciences and encouraged him to pursue his goals.

University of Delaware
Department of Mechanical Engineering
Business & Career Conference

April 28, 2006

12:30 **Registration**

1:00 **Welcome and Conference Introduction**
Dr. Tom Buchanan, Chair Department of Mechanical Engineering
University of Delaware

1:30 **Seminars Begin**
Participants may choose to stay in a single track or cross between tracks

	Track A – Business/Technology	Track B – Career Planning
1:30	**Strategic Planning** Mapping Business Success Bill Mavity '72 President & CEO, Paracor Medical	**Engineering Your Future** Starting/Improving Your Career Leda Favor Human Resources Director, Dade Behring, Inc.
2:30	**Networking**	
	Track A – Business/Technology	**Track B – Career Planning**
3:00	**Financial Planning** Tools for Business Management Jodie Morgan '85 President, SPI Foods	**Diverse Roadmaps to Success** Panel Discussion Recent UDME Graduates
4:00	**Networking**	
	Track A – Business/Technology	**Track B – Career Planning**
4:30	**Sustainable Energy** Research at UD Dr. Ajay Prasad Professor, Mechanical Engineering, University of Delaware	**Navigating Your Career Path** Stepping Up to Leadership Terri Kelly '83 CEO, W.L. Gore & Associates

5:30 **Social Hour / Reunion**

6:30 **Dinner**

7:30 **Distinguished Career Alumni Presentations**

8:00 **Keynote Speaker** – "Returning to Flight" – NASA Langley's Contribution to the Space Shuttle Program Following the Columbia Accident – Dr. Jerry Kegelman '78 – Associate Director, Aerodynamics, NASA Langley Research Center

Engineering Scholarships with Sports Connection take shape

Engineering Alumnus Honorary Captain at Blue Hens Football Opener

Reprinted with permission from The College of Engineering Electronic Newsletter, ENGAGE – News & Events: http://www.engr.udel.edu/newsletter/index.html - October 2005 Edition

Jim Laser ('69ME) served as Honorary Captain of the Blue Hens opening game of the 2005 season against Lehigh on September 10th. A tackle on Delaware's 1965-67 teams, Laser is no stranger to the football field, but he admits that his history as a player had little to do with the invitation to serve as captain for a night.

"I'd like to think I was offered the job based on the outstanding leadership I displayed during my playing years in the 1960s," he jokes, "but I think the opportunity was actually offered because I endowed a scholarship." According to Kathleen Houghton, the Director of Development for Athletics, "The honorary captain program was started in 1995 as a way to honor those alumni who have stayed connected with and supportive of Delaware football. One other engineering alum has served as honorary captain. The late Irvin S. Taylor ('30EG) served as captain of the Fightin' Blue Hens in 1929 and was an honorary captain in 1996."

Two years ago, Laser, who is now retired after spending 28 years with Merck, decided to endow a scholarship for an engineer-athlete, with a first preference for a football player. Nate Cloud ('64ME) is in the process of doing something similar for basketball players majoring in engineering, and Laser saw it as a good way to give back to the school that had given him an education. "I had such a good experience at UD—playing football and earning a degree in mechanical engineering administration—that it seemed like the right thing to do," he says.

When K.C. Keeler joined the Hens as head coach in 2002, Laser's connections to UD football were strengthened: The two had come to Delaware from the same hometown, Emmaus, Pennsylvania. Although they had never met growing up—Laser admits that he has a few years on Keeler—they have gotten to know each other over the past three years.

"For me, that was a fun part of serving as honorary captain—the Keeler connection," Laser says. "I was happy to get involved with the opening game in that way." Laser is also pleased that the scholarship in his name was awarded for the first time this year. "It's not fully funded yet, but we were able to give an award." The first recipient is civil engineering major Kyle Campbell, a junior from Kennesaw, Georgia, who began his football career at Delaware as a walk-on in 2002.

Despite his brief return to the football field, Laser's primary current interests lie in working to stay fit, volunteering, traveling, and enjoying his new status as a grandfather.

Sports/Engineering Scholarship Named Before The Jan 14th UD Men's Basketball game.

100 Years of Delaware Basketball Celebrated This Season

The following is a transcript of the announcement:

A few years ago, a small group of University of Delaware alumni, members of the early 60's basketball teams, the majority of whom were engineering majors, started a scholarship project with a goal of raising a minimum of $25,000, the amount required to start an endowed scholarship to be awarded in perpetuity.

Along the way they received some contributions from friends who heard about the project and from their former coach, Irv Wisniewski. The group decided that in honor of the 100th anniversary of men's basketball at the University of Delaware, they would formally name the scholarship the Coach Irv Wisniewski Sports/Engineering Scholarship. We are happy to announce tonight that the ***scholarship fund has now reached a total of over $28,000!***

Another ME alum is an Honorary Team Captain - this time it's "round ball".

Alumni Support

Mechanical Engineering Alumni Donors to the University of Delaware in Fiscal Year 2005 (listed by class date in each gift category); and Other Friends contributing to the Mechanical Engineering Department

$50,000 - $55,000

Mr. David R. Helwig ..... '73
Mr. David A. Parvis ..... '43

$20,000

Mr. James R. Laser ..... '69

$10,000 - $15,000

Dr. Andras Z. Szeri
Mr. William G. Mavity ..... '72

$5,000 - $10,000

Dr. Donald R. McCoy ..... '75
Mr. James S. Dick ..... '69

$2,000 - $4,000

Dr. Tsu-Wei Chou
Mr. Robert H. C. Irwin ..... '51
Mr. Chandler S. Eason, Jr. ..... '59
Dr. Durand R. Kinloch III ..... '61
Mr. Francis J. Suppe ..... '63
Mr. Nathan Cloud ..... '64
Mr. Allen C. Liddicoat ..... '71
Joseph A. Walkowski, Jr., Esq. ..... '71
Mr. John S. Thackrah, Jr. ..... '79

$1,000 - $1,500

Mr. Ferris O. Lee
Mr. Lewis L. Reign, Jr. ..... '48
Mr. David C. Trimble ..... '50
Mr. C. Jackson Levis ..... '50
Mr. W. Murray Campbell ..... '50
Mr. Frederick H. Kohloss ..... '51
Mr. Price K. Snyder ..... '51
Mr. J. Ridgeway Jones ..... '52
Mr. W. Richard Clendaniel ..... '53
Dr. Jules J. Schwartz ..... '53
Mr. E. Douglas Huggard ..... '55
Mr. Wayne E. McCabe ..... '57
Mr. George G. Tatnall ..... '57
Mr. William T. Morris ..... '61
Mr. William B. Wagamon III ..... '62
Mr. John W. Owen ..... '65
Mr. John L. Haverstick, Jr. ..... '69
Mr. Michael D. Yon ..... '76
Mr. W. David Cockey ..... '76
Mr. Daniel S. Hudson ..... '82
Mr. Jon P. Martin ..... '84
Mr. J. M Scarborough ..... '96

$200 - $800

Dr. Christian F. Davis
Mr. Joseph Stuart III ..... '36
Mr. John F. Eliason, II ..... '42
Mr. A. Gordon Brewer ..... '46
Mr. John R. Dick, Jr. ..... '48
Mr. James R. Reagan ..... '49
Mr. John M. Pursell ..... '49
Mr. Benjamin E. Herring ..... '50
Mr. Lawrence H. Gillespie, Jr. ..... '50
Mr. James P. McFadden ..... '50
Mr. Fred G. Harvey ..... '50
Mr. Thomas A. Wood, Jr. ..... '51
Mr. Donald T. Hoffecker ..... '51
Mr. Paul F. Berry, Jr. ..... '51
Mr. Victor P. Beiriger, Jr. ..... '51
Mr. Ralph E. Gesell ..... '52
Mr. Thomas A. McKenna ..... '52
Mr. Donald B. Kiddoo ..... '52
Mr. Edward A. Milligan ..... '52
Mr. Samuel H. Macrum, Jr. ..... '52
Dr. Barry S. Seidel ..... '53
Mr. Richard E. Fisher ..... '53
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