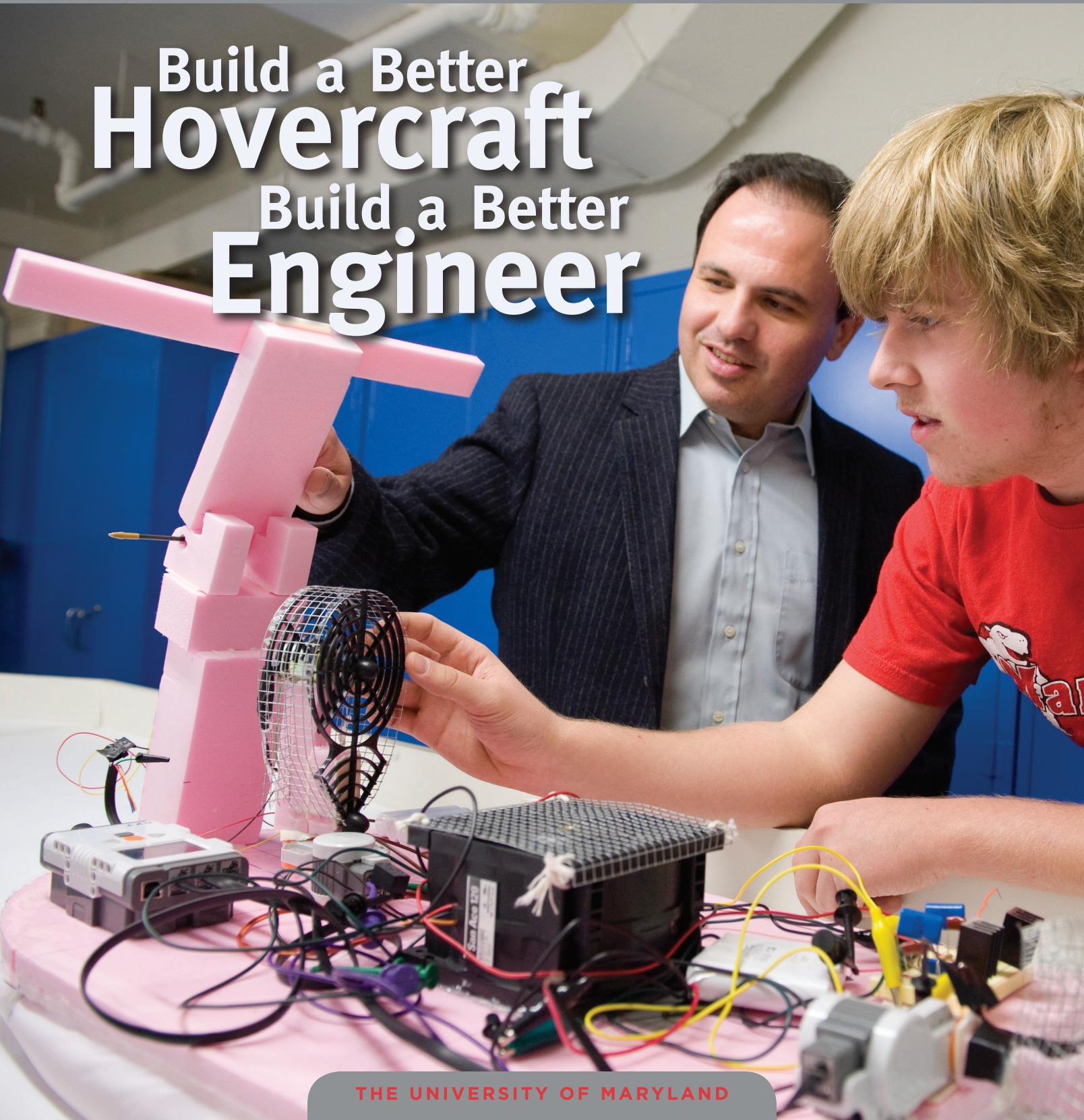


Build a Better Hovercraft

Build a Better Engineer





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Please note that *Engineering @ Maryland* refers to the A. James Clark School of Engineering by that name in all cases, including stories that describe alumni who graduated before the name was established, in 1994, to honor Mr. Clark's outstanding philanthropy.

COVER PHOTO BY MIKE MORGAN.
KEYSTONE PROFESSOR PETER KOFINAS
EXAMINES A HOVERCRAFT'S GATE ACTI-
VATION MECHANISM WITH A STUDENT.



Dear Friends of the Clark School,

In my first year as dean I have heard many Clark School alums say they obtained a great education here. I have also heard them say that it was sometimes an endurance test.

First, they had to wait until their junior or senior years to have real engineering experiences—actually designing and building something.

Second, they often had to wait until their later years to take classes from some of our best teachers.

Third, they had few opportunities early on to work together closely with their classmates and really get to know them well.

I can report today that things have changed.

As you will read in this issue (see cover story, p. 6), in the last few years we have revised our introductory course, and brought together some of our best teachers—Keystone professors—to ensure students experience the real hands-on excitement of engineering design, analysis and integration in their very first semester.

As a result of the Keystone Program, we are already seeing an improvement in our student retention and graduation rates, and, as witnessed by Jim Redifer, B.S. '58 and M.S. '71, and Ron Lowman, B.S. '67, we have established a new level of quality that will make many alums feel envious—and proud.

My thanks to Jim and Ron for coming to campus to see the new program firsthand. I encourage all alums to visit us, see how things have changed, and consider getting involved as mentors, guest lecturers and donors. I can tell you that working with the students is highly satisfying and a lot of fun!

For more information, please contact William Fourney, Keystone director, at four@umd.edu or Kevin Calabro, Keystone instructor, at kcalabro@umd.edu.

**We ensure students
experience the real
hands-on excitement
of engineering
design, analysis and
integration in their
very first semester.**

Sincerely,

Darryll Pines
Dean and Farvardin Chair of Engineering

Helping to Lead the National Discussion

Pines Advocates Before Congress for Early Engineering Education

"When you look into STEM programs," notes Clark School Dean and Farvardin Professor of Engineering Darryll Pines, "you typically find that the 'E' is missing." He is referring to Science, Technology, Engineering and Mathematics (STEM) programs for high school and middle school students, cited by many as crucial to the nation's competitiveness. And he wants to make sure that the 'E' gets the attention it deserves.

As dean of a leading academic engineering program located minutes from Capitol Hill, he is in an excellent position to do just that. This fall, Dean Pines testified about the inclusion of engineering concepts within K-12 education before the U.S. House of Representatives' Committee on Science and Technology, Subcommittee on Research and Science Education.

"By engaging students at the proper level at the proper time, schools can ensure that students are neither intimidated by the difficulties of engineering, nor deluded that engineering is essentially dreaming up ideas without the foundation of creating, analyzing, testing, and refining a solution using math and science," Pines noted.

University programs must do a better job, according to Pines, of educating high school and middle school teachers about the field of engineering, the academic capabilities their students must develop to enter the field, and the right level of engineering concepts that teachers can include in their lessons. He cited as examples the Clark School's summer offerings for STEM teachers, who have attended presentations from faculty, completed hands-on projects, and toured the school, all to enhance their understanding of technology and to gain new knowledge to take back into their classrooms.

With trained teachers, secondary schools can do a better job of preparing students for the challenges of a university engineering program. "The first step is to identify students who are proficient in mathematics and science, because without these strengths, it will not be possible for students to succeed in the field." Students must then be introduced to real-world opportunities to apply that profi-



Dean Darryll Pines testifies before Congress about the importance of early engineering education.

ciency, pacing the appropriate coursework and engineering-type classes throughout students' educational careers.

The committee learned of the Clark School's pioneering efforts to increase the number of students in the engineering pipeline, including summer programs that target students from elementary school to rising high school seniors; an *Introduction to Engineering Design* course that allows high school students to earn college credits and gain hands-on engineering experience; the Center for Minorities in Science and Engineering's ESTEEM program that brings students to campus in the summer and matches them with a research project and faculty mentor, with whom they continue to work during the school year; and the Maryland MESA (Mathematics, Engineering and Science Achievement) program, which places students from Prince George's County Public Schools in Saturday

Academies, summer programs, and in-service and after-school enrichment programs.

Pines also identified a number of future programs that could have a highly positive impact. These included a program of mandatory community service for Clark School students; an online STEM education system to bring the best STEM teachers into underserved areas; and the creation of living-learning programs on university campuses to enable talented high school upperclassmen to complete their university degrees early and gain early access to internship and employment opportunities with partnering corporations and government agencies.

Based on his testimony, this spring Dean Pines will participate in a panel on the K-12 Engineering Curriculum Initiative at the 2010 Engineering Deans Institute sponsored by the American Society for Engineering Education. ■

PHOTO COURTESY OF THE U.S. HOUSE SCIENCE & TECHNOLOGY COMMITTEE

Interdisciplinary Team Developing Revolutionary Model Interpretation Tools

Pancreatic cancer is the fourth leading cause of cancer death, killing about 32,000 Americans per year. While survival rates approach 40 percent if cancers are removed early, there is no reliable screening test, and the vast majority of cases are not diagnosed until it is too late.

To understand the course of pancreatic cancer and other diseases, physicians, scientists and engineers build complex disease models and test diagnostic and therapeutic approaches against them. Modeling is likewise used to understand and predict the performance of critical manmade systems, such as aerospace control systems. A major new National Science Foundation grant seeks to find ways to improve and understand such models and strengthen our ability to treat disease and build safer aircraft.

The multidisciplinary, five-year, \$10 million grant, "Next Generation Model Checking and Abstract Interpretation with a Focus on Embedded Control and Systems Biology," is led by Carnegie Mellon University and brings together researchers from the University of Maryland, City University of New York, New York University, SUNY Stony Brook, Cornell University and NASA's Jet Propulsion Laboratory.

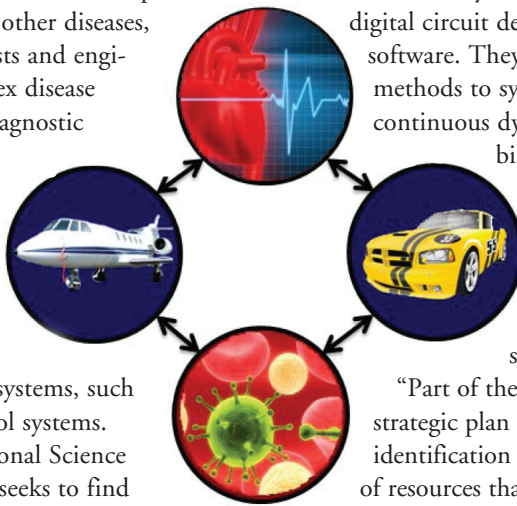
For the \$1.8 million Maryland portion of the grant, the Clark School's Steve Marcus, electrical and computer engineering (ECE) and Institute for Systems Research, is co-principal investigator; Rance Cleaveland, computer science and ISR, is principal investigator; and Tongtong Wu, epidemiology and biostatistics, is co-principal investigator. "One of the most rewarding aspects of this type of grant is the abil-

ity to work on projects with faculty from other disciplines," says Marcus. "Together we can achieve things that none of us could accomplish individually."

The consortium will build on the success of model-checking and abstract interpretation (MCAI), established methods for automatically verifying properties of digital circuit designs and embedded software. They will extend MCAI methods to systems with complex continuous dynamics and probabilistic behaviors—including pancreatic cancer, atrial fibrillation and automotive and aerospace control systems.

"Part of the Clark School's strategic plan is to encourage the identification and development of resources that we can effectively use to solve major societal issues," says Marcus. "One of the applications is to focus on biological problems, such as the early detection of disease." Working with physicians at the University of Pittsburgh Medical Center, team members will analyze data and study ways to use technology to predict the onset of pancreatic cancer.

By promoting collaboration across disciplines and across institutions, Marcus says the grant "opens up new research vistas" for faculty and students. This spring, five graduate students from ECE and computer science will work together to combine techniques from both disciplines. "Students have a unique opportunity to attend meetings and work jointly with many outstanding researchers," says Marcus. "They can begin to build their professional reputations." And when it comes to applying to graduate schools and for faculty positions, Marcus notes, "They will have unique portfolios." ■

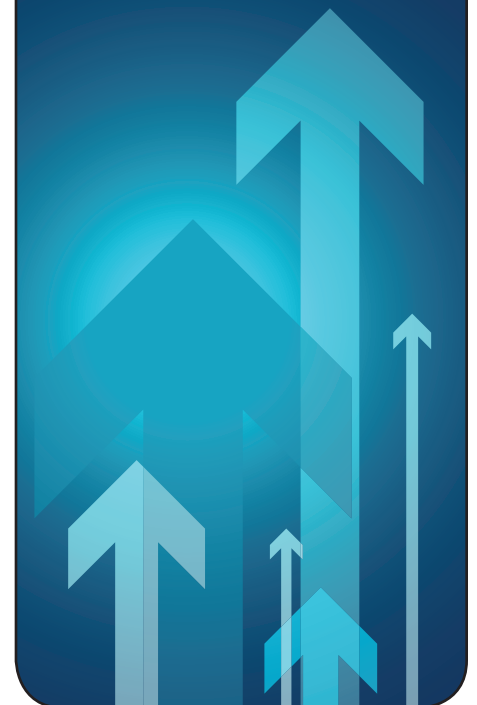


Clark School Research Dollars Soar

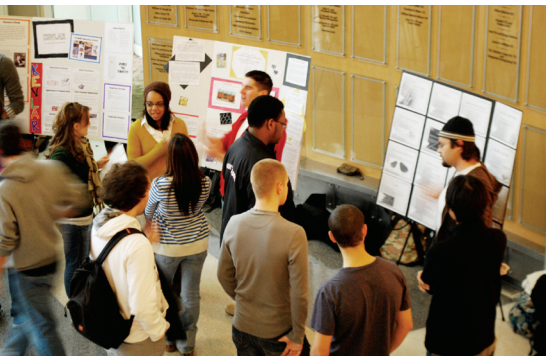
Leading a campus trend, the Clark School's research funding jumped from \$111 million to \$171 million over the past year.

"This spike in research funding earned by our professors demonstrates the Clark School's ability to address the critical research needs of major funding sources in energy, health-care, defense and homeland security, space exploration, transportation and other issues," says Clark School Dean Darryll Pines.

The University of Maryland, College Park, research funding total of \$518 million is the most ever for a Maryland public university and represents a \$117 million (nearly 30 percent) increase from the previous year's \$401 million. The Clark School's research funding is the largest portion of the university total. ■



Clark School Builds Tech Literacy Across Campus



Students explain their poster presentations for *The Materials of Civilization* course.

Clark School faculty members are sharing their expertise with undergraduates from majors throughout campus as part of a university program to expose non-science majors to the roles of science and technology in historical and contemporary issues, such as energy, the environment and medicine.

Robert M. Briber, chair of the Department of Materials Science and Engineering, recently taught *The Materials of Civilization* as part of the university's Marquee Courses in Science and Technology, a program to heighten understanding of how science, engineering, math and technology are instrumental in addressing the world's most challenging problems. Wes Lawson and Mel Gomez, electrical and computer engineering, also taught a Marquee course, *Engineering in Modern Medicine*.

"The students are great. Working with other faculty in the program really helps to bring science and technology to life and bring innovative teaching ideas to the classroom," says Briber, whose course has been accepted as a signature course in the university's revitalized general education program.

The course fulfills one of the Clark School's

strategic plan initiatives to increase the technological literacy of all students by encouraging Clark School faculty to develop and teach courses for non-engineering undergraduates. "Students need to know how technology works and its underlying structure if they are to make informed decisions," says Briber. "Our goal is to train leaders in business, government and academia. They need an understanding of the process of science and how it turns into technology."

His students gained an understanding of the basic science that controls material properties through hands-on demonstrations and guest speakers. For the final project, the 80-member class worked in teams to produce research posters on the materials behind such important technologies and products as Teflon, synthetic diamonds, fiber optics and batteries. ■

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Inspired by Maple Seeds, Students Devise Novel Aerial Surveillance Technology

With nature providing inspiration, Clark School students have created the world's smallest controllable single-winged rotorcraft.

The new vehicle, when dropped unpowered from a plane and then controlled remotely, can perform surveillance maneuvers for defense, fire monitoring and search-and-rescue purposes. Its design was inspired by the spiraling fall of maple tree seeds, known as samaras.

"Natural maple seeds usually trade off altitude for rotation as they fall to the ground," says Evan Ulrich, B.S. '05, Ph.D. '10, aerospace engineering, and one of the graduate students on the Clark School team. This altitude-rotation trade-off results in the power that the seeds need to travel, but the natural design does not provide enough power to allow an artificial device to hover.

The wing of the students' vehicle is designed to function in the same way as a natural samara and enables a stable autorotation during descent. The propulsive section of the vehicle is positioned like the tail rotor on a helicopter, but rather than prevent rotation as in the case of a helicopter, it gives the device the rotation capability it needs to hover.

Ulrich and other graduate students in the research group, led



Maple tree seeds and the spiraling pattern in which they glide to the ground served as inspiration for an innovative rotorcraft developed by Clark School students.

by Clark School Dean Darryll Pines, incorporated a new comma-shaped technology in the body that provides more stability and gives the device the power to hover. They have two patents pending on their innovative components. ■

Five Faculty Members Promoted to Full Professor

RAYMOND ADOMAITIS, chemical and biomolecular engineering and Institute for Systems Research (ISR), conducts research on systems modeling and simulation and semiconductor and thin film processing. Adomaitis currently teaches undergraduate courses on computer methods in chemical engineering and thermodynamics.

REZA GHODSSI, electrical and computer engineering and director of ISR, focuses his research on microfabrication technologies and applications for micro/nano devices, chemical and biological systems and small-scale energy conversion and harvesting. He teaches graduate-level courses on micro-electromechanical systems (MEMS).

RAYMOND PHANEUF, materials science and engineering (MSE), conducts research in nanotechnology, surface physics, low electron microscopy, photoemission electron microscopy, scanned probe microscopes, nanostructure-enhanced light-matter interactions, and templating for directed self-assembly. Phaneuf teaches undergraduate courses in materials design and nanotechnology characterization.

The research interests of **PETER SANDBORN**, mechanical engineering and ISR, include electronic packaging and reliability; life-cycle cost analysis of electronic systems; technology obsolescence forecasting and management; supply chain management and parts selection and management for electronic systems; and design for the electronic systems environment. Last fall, Sandborn taught an undergraduate course on dynamics.

ICHIRO TAKEUCHI, MSE, pursues research in combinatorial synthesis and characterization of electronic and smart materials; fabrication and characterization of novel thin-film multilayer devices; and scanning probe microscopes. Takeuchi teaches undergraduate courses in microprocessing of materials and physics of solid materials.

Clark School Welcomes New Faculty Members



PINO MARTIN, who earned her Ph.D. in aerospace engineering from the University of Minnesota, has joined the Department of Aerospace Engineering as an associate professor and as director of the Cluster for Research on Complex Computations Laboratory. Martin was formerly an assistant professor and an affiliate faculty member for the Applied and Computational Mathematics program at Princeton University. A member of the American Physical Society and a senior member of the American Institute of Aeronautics and Astronautics, her research interests include computational fluid dynamics, numerical simulation of turbulent flows and numerical methods for compressible turbulence.



AMIR RIAZ received his Ph.D. from the University of California, Santa Barbara, and continued his research with a post-doctoral position at Stanford University. Riaz, who was a research assistant professor in the Department of Mechanical Engineering for the last year, will now serve as assistant professor of mechanical engineering in the thermo-fluid and energy services division. Riaz's research has focused on studies of carbon dioxide sequestration and oil and gas reservoir management. In addition to teaching, Riaz will be working on the development of a new graduate-level computational multi-physics course.



STANISLAV I. STOLIAROV, formerly a principal scientist at SRA International, Inc., where he conducted research in fire safety for the Federal Aviation Administration, has joined the Department of Fire Protection Engineering as an assistant professor. Stoliarov received his Ph.D. in chemistry from the Catholic University of America, and served as post-doctoral research associate in the Department of Chemical Engineering at the University of Massachusetts Amherst. His research interests include material flammability, pyrolysis mechanisms and fire growth modeling.

5

Wu, Moore Honored by Clark School

MIN WU, electrical and computer engineering (ECE), is the 2009 recipient of the E. Robert Kent Outstanding Teaching Award for Junior Faculty. Wu is recognized for bringing creativity to her coursework, using the latest technologies in teaching multimedia signal processing and data security. A leader in the Women in ECE Program, she has won the Institute of Electrical and Electronics Engineers Mac Van Valkenburg Early Career Teaching Award and the George Corcoran Award for outstanding contributions to engineering education and teaching.

TERESA MOORE, ECE executive director of operations, is the 2009 Staff Service Award honoree for her effectiveness in administering ECE teaching and research programs. In addition, she led efforts to raise funds for the medical expenses of a graduate student not covered by health insurance, and she spearheaded efforts leading to physical improvements of the A.V. Williams Building.

Bar-Cohen Receives Luikov Medal

AVI BAR-COHEN, Distinguished University Professor and chair of the Department of Mechanical Engineering, has been recognized as a seminal figure in thermal science and engineering by the International Center for Heat and Mass Transfer. The center has awarded Bar-Cohen the prestigious Luikov Medal, which recognizes "outstanding contributions to the science and art of heat and mass transfer" and contributions to the international community of heat transfer specialists. The medal will be presented to Bar-Cohen at the 14th International Heat Transfer Conference in Washington, D.C., in August. ■

Build a Better Hovercraft



Build a Better Engineer

Team Friendship is about to put its hand-built hovercraft to the test. The 11 Clark School freshmen have spent endless hours designing and constructing the vehicle, and crunch time is here. Faculty members and other teams gather to watch in the noisy basement test room in the J.M. Patterson Building.

Constructed from pink foam board, batteries, a Lego microprocessor, fans, sensors and an array of other readily available components—all purchased within a specified budget—the two-foot-long hovercraft must successfully complete tests in which, floating on a cushion of air, it propels itself forward, opens a gate, and navigates two turns. If Team Friendship succeeds here, it will fly its craft in the final competition before a cheering crowd in the rotunda of the Kim Engineering Building.

This is how freshmen learn at the Clark School today: taking on challenging, hands-on engineering projects, building camaraderie and interpersonal skills through teamwork, guided by some of the best teachers at the school. It is radically different from the experience of many Clark School alums, and it is paying big dividends in student satisfaction and retention and graduation rates.

Left: Keystone Professor Peter Sunderland, center, works with students to debug an error in their computer program.

A hovercraft team runs preliminary tests in preparation for the final competition.



A teaching fellow offers guidance to a student on assembly of the hovercraft.

PHOTO BY MIKE MORGAN



PHOTO BY MIKE MORGAN



PHOTO BY MIKE MORGAN

Above: Working as a team, students discuss the budget and components for their hovercraft.

Left: Students calibrate their vehicle's gate activation mechanism on the test track.

A Challenge that Builds Confidence and Commitment

Welcome to ENES 100, the Clark School's *Introduction to Engineering Design* course. Every freshman takes it—609 in the 2009-2010 academic year, in a class size averaging 40 students—and it is an experience they will all remember.

The semester-long class is taught by carefully selected Keystone professors and involves both formal lectures and presentations by outside experts on subjects such as product development, ethics, globalization and modern engineering trends. But most students think of it as “the hovercraft course” because working in teams to design, build and fly a hovercraft consumes their every waking hour in the second half of the semester.

At the test course, the Team Friendship hovercraft rises on a jet of fan-generated air, but something goes awry. The vehicle veers sharply to the left and crashes into a wall, coming to a dead stop.

“Maybe it’s a weight distribution problem.”

“Could be it’s a low battery ...”

“It’s the servo mechanism...I think we need to reprogram.”

“It’s a propulsion problem...”

“Our fans are not turning off fast enough. Maybe they’re overcorrecting...”

Disappointing? Yes. Disasterous? No. Students must deal with failure, learn from it, and find the confidence to try new solutions. Team Friendship is eager to determine what went wrong. The chance to work with classmates to build a functioning vehicle, they say, has engaged them more than any other assignment they have encountered on campus.

“Hands-on design experience can be highly motivating, and it can give students a reason to persist in engineering and make a deeper commitment to their classwork,” says Keystone faculty member Sheryl Ehrman, associate professor of chemical and biomolecular engineering and a strong advocate for ENES 100.

“Some bright underachievers don’t really connect with engineering until they have a chance to get in the lab and create something.”

Ehrman recalls a similar experience as an undergraduate in California. “It sometimes seemed in the first two years that my engineering school was trying to beat the creativity out of me and my classmates. Not until we got to our more advanced coursework and labs did we have the chance to experience the fun and the challenge of engineering,” she explains. This is a sentiment many engineers, including some Clark School alumni, might echo.

She draws on her own experience to make ENES 100 as challenging as possible for students. “We build challenges into the hovercraft assignment that students must overcome,” she says. “The fans, sensors and microprocessors have to work together. Most of the students have never confronted problems like this. It’s exciting for them.” Each year, the faculty members look for new ways—like the gate-opening requirement—to add interest and challenge. They have also created a hovercraft display in the J.M. Patterson Building to show different designs over the years and build students’ pride in their work.

Learning How Engineering Gets Done

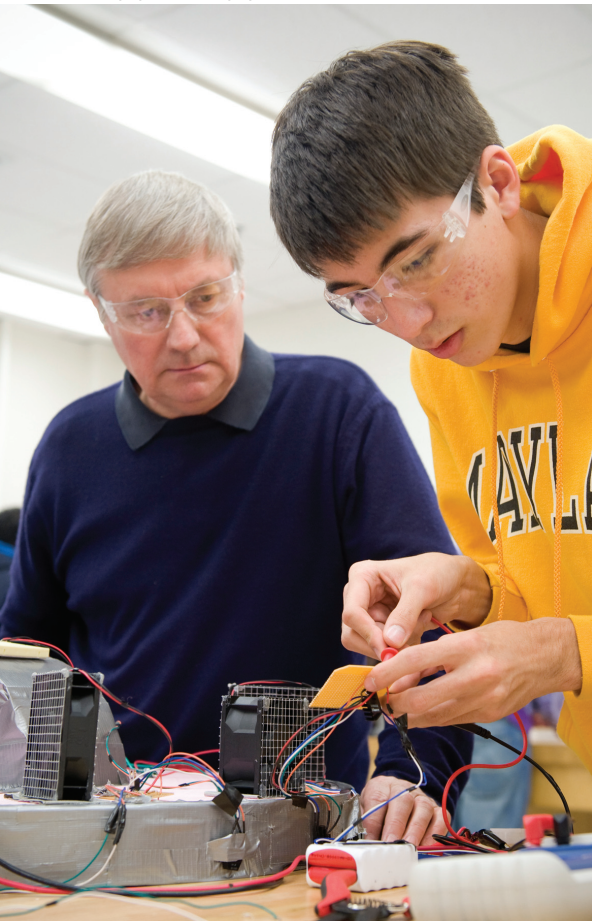
For Amy Cheng, B.S. ’13, a potential bioengineering major, ENES 100 has helped her view engineering as the sum of many contributions. “I have been excited to see how the design process works, how different subgroups undertake different tasks, and how all these efforts come together.”

With its product development orientation, ENES 100 is designed to introduce students to the kinds of on-the-job demands professional engineers must meet. The course incorporates seven product-development milestones, and teams must strictly adhere to deadlines and schedules.

Recognizing the importance of strong communication skills



PHOTO BY MIKE MORGAN



Top: Students, faculty and staff watch a team launch its hovercraft at the start of the competition track in the Kim Engineering Building. Around the track, other teams await their turns.

Bottom left: Keystone Professor Christopher Davis works with a student on the electrical components of the hovercraft.

Bottom right: Students make final adjustments to their vehicle at the beginning of the hovercraft competition track.

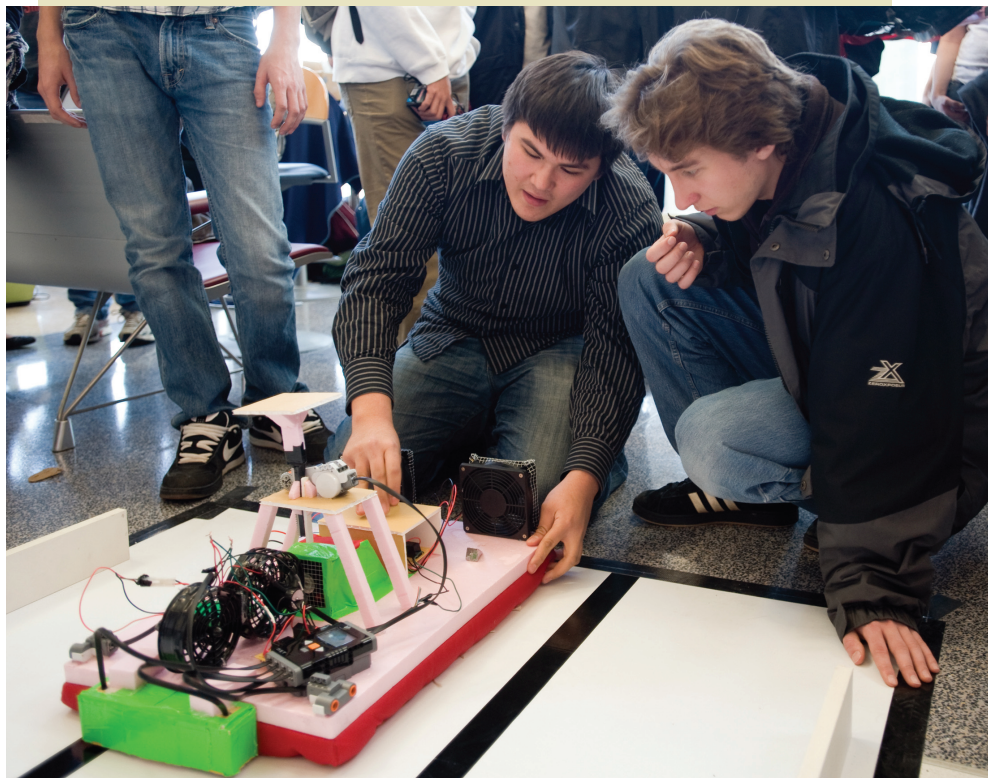


PHOTO BY AARON CLAMAGE

for engineers, the Clark School has incorporated formal written and oral team presentations into the course. Regardless of their success in the competition, the teams are again on equal footing as they make their first formal presentations as aspiring engineers. Dressed in business attire, the students detail their successes and failures before a faculty panel and provide a hefty packet that documents all of their efforts.

ENES 100 students develop real-world attitudes through their baptism under fire. “You have to let go of your perfectionism,” adds Jeff Sze, B.S. ’13, who is interested in the clean energy field. “I used to think solutions could be perfect. I see now that engineering in the real world is about approximations.”

Amanda Heyes, B.S. ’13, who is still deciding what area of engineering to pursue, raises another crucial point. “The course teaches time management,” she says. “You have to design the components simultaneously and you have to leave enough time to integrate them. All of the deadlines come up much faster than you expect.”

Get Involved

The Clark School of Engineering looks to its graduates and friends of the school to support of all its educational initiatives. By serving as mentors to current students, volunteering as guest speakers, attending special events, or financially supporting key programs, you will play a critical part in our success. To learn more about how you or your company can get involved in ENES 100, contact William Fourney at four@umd.edu

And a crisis can occur at any time. One day before the deadline to qualify for the competition, Heyes’s team encountered a problem. “Our battery caught fire when we were testing it. Our circuits were fried,” Heyes describes. The team spent most of the day struggling to integrate the new battery into the hovercraft’s propulsion system, and their efforts paid off. “Coming down to the wire, we got really good at teamwork, which helped us make it into the competition,” she reports. By the end of the fall semester, 32 of the 48 hovercraft teams managed to qualify for the final competition.

Building Clark School Engineers

The challenge—and the fun—of ENES 100 help to attract great students to the Clark School. When they take the class, students learn firsthand the level of commitment required to succeed in the undergraduate program.

“Students are here because they want to be. It’s amazing how dedicated they are,” notes Keystone Instructor Kevin Calabro,

Continued on p. 12

Alumni Hail Hands-on Approach

The hovercraft project simulates what it is like to be a professional engineer developing new products in an industrial setting. To add depth and breadth to that experience, the Clark School draws on the tremendous wealth of engineering and managerial experience of its own graduates and other professionals in the field, who serve as course guest speakers, volunteers and mentors. In fall 2009, two members of the Clark School Board of Visitors participated in the ENES 100 process. Retired energy executive Ronald W. Lowman, B.S. ’67, mechanical engineering, was impressed by and a bit envious of the hovercraft competition he attended in mid-December.

“I don’t think any other class at the university elicits this kind of enthusiasm,” says Lowman, who was

surrounded by a crowd of onlookers watching the hovercrafts levitate, bounce, lurch, glide, slide, crash and collapse throughout the competition. Amidst the cheering students, Lowman wishes the ENES 100 curriculum had been available during his undergraduate days. “When I was a student, the freshmen courses were dry and the first two years were basically an endurance test,” he recalls. “We didn’t get to the heart of engineering until we were juniors and seniors.”

This deficiency often drove students out of the engineering field, Lowman explains. “Until quite recently, good engineering students were lost because we were boring them to death. It is great to see these students having fun while working together and mastering the fundamentals necessary for their



Alumnus Ron Lowman takes a closer look at a hovercraft preparing for take-off.



Above: Hopeful students watch their hovercraft attempt to open the gate.

Right: Emotions are high as the hovercraft pushes a switch to open the track's gate, but has trouble passing underneath it.



PHOTO BY AARON CLAMAGE

future coursework.”

Retired executive James L. Redifer, B.S. '58, M.S. '71, electrical engineering, joined ENES 100 students for a series of formal classroom presentations, the final component of the course required for all hovercraft teams.

Redifer understands the need to increase student retention at the Clark School. He recalls that in the first years of his engineering program, for many students “it was an issue of survival. Today the Clark School is admitting students of the highest quality and is committed to their success.”

Redifer believes the Keystone approach to learning is valuable in other ways. “Hands-on, experiential learning helps students decide what kind of engineering they want to do: Is it microprocessing? Sensors and controls? Fluid dynamics? The Keystone approach exposes them to all of these



PHOTO BY MIKE MORGAN

areas early in their education.”

He notes that the infrastructure supporting ENES 100 is also a factor in the course's success. “The facilities that Clark School students have available to them are simply world-class. The Keystone program has been embraced so enthusiastically by the

Alumnus Jim Redifer participates in the formal team presentations.

Clark School. Even in these hard times, the budget has been there to enhance the learning process.” Redifer cites the recently renovated ENES 100 workshop and computer lab/classroom in J.M. Patterson Building as “really serving the teaching mission.”

Redifer believes the school's commitment to ENES 100 and its students will yield a strong return on many different levels. “The commitment that the Clark School makes to entering students will benefit them as individuals and as members of their larger communities. Engineers of Clark School caliber are a tremendous asset and will be highly appreciated as they begin to address intractable human needs here at home and globally.”



PHOTOS BY MIKE MORGAN



Above: Alumnus Jim Redifer provides feedback to members of a hovercraft team before their final presentation.

Left: In final presentations, teams offer details on the hovercraft design and construction process and describe lessons learned throughout the experience.



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who spends countless hours with the students during the vehicle design, construction and testing phases.

Many go on to participate in national and international competitions. Clark School students won first place among U.S. teams in the 2007 Department of Energy Solar Decathlon and are preparing to compete in the 2011 contest (see related story, p. 18). They have garnered top honors in numerous NASA competitions, placed first in the American Helicopter Society Student Design Competition nine out of 10 years, and have established a winning record in the national Biomedical Ethics Essay Contest. Others pursue engineering service activities, such as water and energy projects sponsored by Engineers Without Borders in impoverished communities around the world. And all students can build on their ENES 100 experience through advanced capstone design courses and professional internships at the many federal agencies and corporations in the Washington, D.C., area.

Proof in Numbers

Former Clark School Dean Nariman Farvardin established the current format of ENES 100, together with Keystone: the Academy of Distinguished Professors, in 2006. Keystone pro-

vides support for top professors to teach the most elementary engineering courses, ensuring that new students have an excellent academic experience early on, get an overview of the engineering profession, learn the importance of math and science to their success, and develop good habits in homework, exams and written assignments.

Such high-quality courses improve student retention and graduation rates. William Fourney, Clark School associate dean, professor of mechanical and aerospace engineering, and lead Keystone professor, attests to the success of ENES 100. By tracking and collating various data sets, Fourney has correlated rising retention rates at the Clark School with the school's educational innovations. His research demonstrates that since the inception of the first design-based freshman engineering courses in 1992, retention rates have increased by double digits and the percentage of students graduating in four years has risen dramatically. Following the introduction of ENES 100 in its current form, nearly 75 percent of students who entered the Clark School during the 2007-08 academic year remain enrolled two years later.

When ENES 100 debuted, Fourney and other faculty were more focused on improving the quality of the classroom experience than boosting retention rates. "We thought freshmen and sophomores should have access to the best teachers, those who earn the teaching prizes," he says. "There have been times when I looked at classes of freshmen and asked myself 'Will they ever be engineers?'" While Fourney admits it takes extra effort to get students over the freshmen hurdle, the results are worth it. "By the time they are seniors, they are performing at the highest levels," he adds.

Fourney recognizes that especially dedicated and passionate instructors are needed to teach freshmen and sophomores. For that reason, all Keystone faculty members, including the dozen who teach ENES 100, are rigorously selected by the Clark School.

The Keystone Professor: Key to Success

Peter Sunderland, Keystone faculty member and professor of fire protection engineering, is one of the talented teachers who make the course a success. Sunderland describes how the class addresses the academic talents of today's students while helping to ease their transition into the Clark School. "These students are 17- and 18-year-olds, right out of high school. On this big campus, they need a smaller group to relate to," explains Sunderland. "ENES 100, with just 40 people in a class, gives them a chance to get to know one another and their instructors."

ENES student Justin Huang, B.S. '13, who hopes to become a researcher, agrees. He confirms that working as part of a team in a small class helped him overcome feelings of isolation he experienced in the first weeks and months as a freshman. He also appreciates the chance to roll up his sleeves on a project. "I see all this tinkering and trial and error as the entry point to my future career as an engineer," Huang explains.

Sunderland believes working in teams "where there are lots of right answers," provides students with "a better idea of what the engineering profession is really about."

ENES faculty members and instructors also work as a team, following the same schedule, delivering the same six basic science lectures and assigning the same homework. The lectures, which

cover the scientific concepts students use to design and build the hovercraft, include such topics as fluid dynamics, electronics, microprocessors and sensors, and hovercraft dynamics and controls. A final lecture focuses on team dynamics.

The team approach has benefits for instructors as well, Sunderland says. "Usually when you teach, you don't have a chance to discuss the best ways to get certain material across to students," he says. "With ENES 100, the faculty and instructors meet every two weeks to brainstorm about best practices."

Team Friendship and the Final Competition

The hovercraft competition is underway in the rotunda of the Jeong H. Kim Engineering Building on a bright, sunny day; a bit too bright in fact. The abundance of sunshine confuses light sensors on many of the vehicles. Team Friendship's hovercraft hits the wall on its first trial. Bound by duct tape and sheer enthusiasm, the vehicle somehow makes it to the Final Four. Now, on its last run, the craft levitates, then proceeds awkwardly down the track toward the gate. Its robotic arm, using springs from a ball-point pen, rises and hits the switch to open the gate.

The hovercraft inches forward and navigates under the gate. "Oh my God! It worked," someone shouts, and the Kim Building rotunda fills with applause. ■

Undergraduate Teaching Fellows

13



PHOTO BY MIKE MORGAN

A teaching fellow works closely with a student to make last-minute adjustments on the final testing day for the hovercraft.

The ENES 100 faculty members are assisted by undergraduate teaching fellows who meet with students five hours a week, attend lectures with them, review lecture topics and supervise them in the workshop. The teaching fellows are interested in developing leadership skills and contributing to the greater good, and are close in age to the freshmen they help, making them approachable role models.

Jackelyn Lopez, B.S. '11, mechanical engineering, who is minoring in mathematics and Spanish, reports that her experience as a teaching fellow has led her to consider a teaching career. "It's important that people with the kind of education I have received at the Clark School teach the next generation of high school students. It's tragic that so many kids are turned off to the sciences and math."

Teaching fellow Dylan Rebois, B.S. '11, mechanical engineering, spent last January in Ethiopia on a project organized by Engineers Without Borders and casts his teaching experience in the context of global concerns. "You try to inspire the students to do their best as engineers and as global citizens," he says. Still, Rebois, who plans to pursue a Ph.D. in public policy and work on overseas development, concedes with a laugh, "The greatest challenge is figuring out how to convey basic information at 8 a.m. If students are not awake, they can't learn anything."



Charles E. Waggoner



Deborah Goodings

14

Waggoner's Gift Helps Focus Clark School on Sustainable Development Engineering

Inspired Donor Creates Goodings Professorship

As corporate planning manager for Belgian petroleum and petrochemical company Petrofina, Charles E. "Chuck" Waggoner, B.S. '54, chemical engineering, traveled throughout Europe and occasionally to Africa in the early 1960s. He will never forget his visits to the French Congo.

"It was difficult to comprehend people living in such terrible conditions," recalls Waggoner, now president of international petrochemical marketing company Esselen Associates and a member of the Clark School Board of Visitors. "Those visits were my first experiences with life in disadvantaged areas. At the time, engineers were not attuned to helping people in those areas improve their lives."

Today, Waggner is highly attuned to the challenges involved in helping communities develop and committed to finding sustainable solutions through engineering. What sparked his commitment was hearing a presentation by student members of the University of Maryland chapter of Engineers Without Borders, and the chapter's dynamic faculty leader, at a Clark School Board of Visitors meeting.

Motivated to Act

"At the board meeting lunch break, it's customary for students to join us and present their work," explains Waggner. "That day, students spoke about their travels to impoverished communities in Asia, Africa and South America. They described how they consulted with people in those communities about their energy, sanitation and water problems, and designed and built solutions those people could live with and maintain. Guiding the students—as engineers but also as concerned people—was Dr. Deborah Goodings. I was immediately impressed and I wanted to help."

Waggner began a series of discussions with Goodings, then a professor of civil engineering at the Clark School and co-director of its Master of Engineering and Public Policy program; she is now chair of civil engineering at George Mason University. Waggner learned more about Engineers Without Borders (EWB), the nonprofit organization that partners with developing communities on engineering projects, and about the growing movement called "sustainable development engineering," which emphasizes social, environmental and economic considerations in developing and implementing engineering products, processes and systems.

Waggner was quick to get involved. Already a donor to the Clark School—having established with his wife Joan the Charles E. and Joan M. Waggner Endowed Scholarship Fund in 1999—Waggner made a new gift to support the EWB chapter's operational fund. Then he made a second contribution to sponsor a regional conference in fall 2008 that brought to College Park all EWB university chapters in the mid-Atlantic region. The event,



Engineers Without Borders student volunteers install a drainage pipe in Thailand.

attended by hundreds of students and guests, included sessions on water purification, solar power, sustainability and collaborating with communities. (Waggner hopes that such conferences will become regular events at the Clark School, beginning as early as this fall.) Then, inspired by both Goodings's leadership and a desire to spur the Clark School's work in the broader field, he generously established the Deborah J. Goodings Professorship in International Sustainable Development Engineering. The professorship will provide program and research support for a professor in the Clark School's Department of Civil and Environmental Engineering. An international search to fill the position is now underway.

Focusing the Clark School on Sustainability

Chuck Waggner's Goodings Professorship is expected to have powerful and lasting effects. "The professorship will have the practical value of supporting a leading professor's work in this growing engineering discipline," explains Clark School Dean Darryll Pines. "But beyond that, the professorship will help to raise awareness of sustainable design across Clark School departments; inspire collaborations with academic, corporate and government partners who have similar objectives; draw graduate students who wish to pursue the topic; increase undergraduates' participation in international experiences such as Engineers Without Borders; and, over time, make the Clark School a leading contributor in this field. Chuck Waggner, through this gift, is making a powerful impact at his alma mater and in the field of engineering."

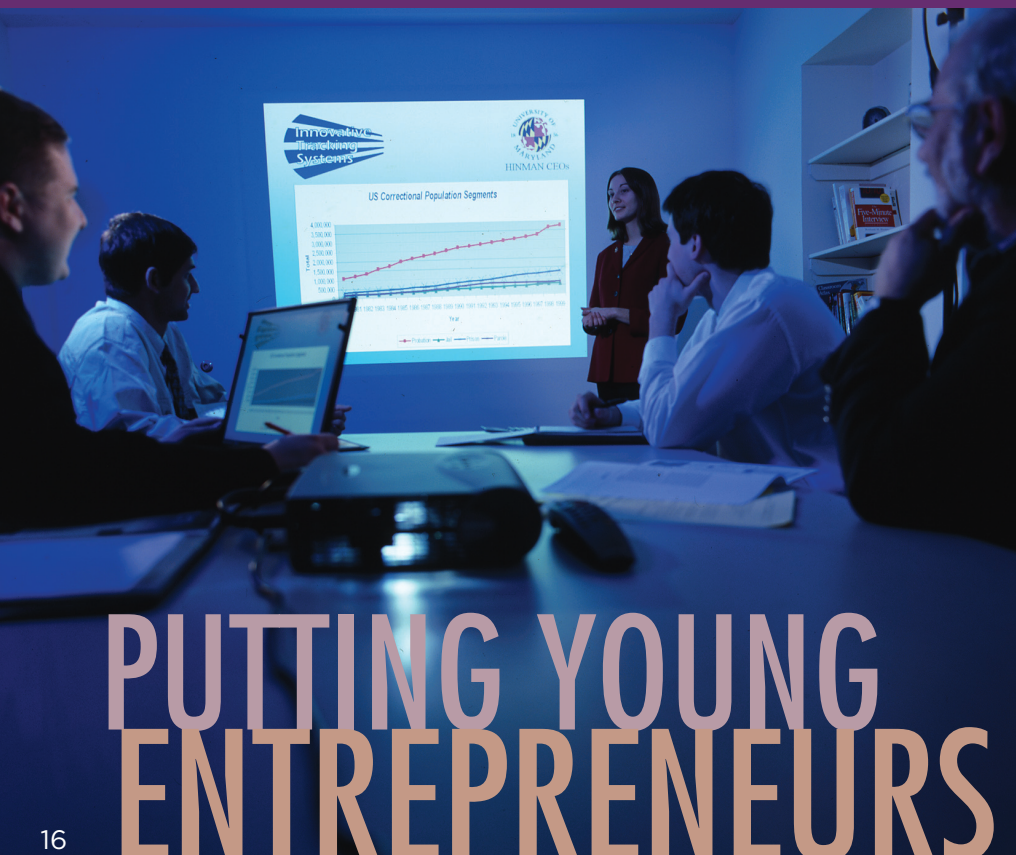
There is even preliminary planning for a Clark School Global Sustainability Engineering Center. "As we develop ideas for implementing the Clark School's new strategic plan, we are considering the creation of a center that would develop knowledge and approaches engineers could use to improve sustainability in their designs, across disciplines and applications, here and around the world," states Pines. "We expect that this topic will only increase in importance over time, and we want to bring our expertise to bear on it in a concerted manner."

Clark School Department of Civil and Environmental Engineering Chair Ali Haghani is excited about the new focus on sustainability engineering. "As the availability of research funding in this area grows and students continue to demonstrate the desire to have a positive impact, the Clark School will be positioned to contribute to advancements in the field," says Haghani. "With the addition of the Goodings Professorship, we can dedicate greater resources and expand opportunities for students to pursue their interests in sustainability engineering."

"We tend to underestimate what young people can do these days," says Waggner. "Deborah Goodings has demonstrated that we can inspire students with strong leadership and meaningful projects. It's my hope that the first Goodings Professor will help provide that leadership going forward."

To learn how you can support sustainable development engineering or another area of engineering at the Clark School, please contact Leslie Borak, assistant dean for external relations, at lborak@umd.edu or 301-405-0317.

PHOTO BY JOHN T. CONSOLI



PUTTING YOUNG ENTREPRENEURS ON THE FAST TRACK

New Program Trains Freshmen and Sophomores

With many high school students entering college with business plans in hand, the time has come for the Clark School to offer entering students a new entrepreneurship education opportunity. Could you serve as a mentor?

Starting this fall, academically talented freshmen and sophomores with entrepreneurial aspirations can live together and learn how to start their own companies as soon as they begin their university careers. The Entrepreneurship and Innovation Program, part of the university's new Honors College, was launched by the Maryland Technology Enterprise Institute (Mtech) to give students a primer in entrepreneurship through experiential courses, seminars, workshops, competitions and volunteer opportunities.

"Entering students are now getting earlier and earlier exposure to what happens in entrepreneurial ventures," says James V. Green, interim director of the program and long-term director of the Hinman CEOs program, the Clark School's nationally recognized living-learning entrepreneurship program for juniors and seniors. "This is a robust program that will engage students from the moment they set foot on campus."

Green believes the program may have special appeal for incoming Clark School students. "Engineering students are quick to recognize opportunities and act on them," relates Green. "They know how to think strategically and how to present ideas effectively, which is why they are good candidates for learning in a dynamic, entrepreneurial environment."

Across the university, Green has witnessed a rapid rise in interest in entrepreneurship. "Just five years ago, about 200 students enrolled each year in our graduate and undergraduate entrepreneurship courses," Green describes. "Now enrollment has risen to 600 students, and we have started a summer entrepreneurship program for high school students."

Some 150 students will participate in the Entrepreneurship and Innovation Program, with the first class of 75 freshmen set to enter the program this fall. All students will live in LaPlata Hall on campus, and staff offices will be centrally located so students can easily visit staff members to discuss their latest ideas or to tackle tough legal, financial or ethical questions. "This is another avenue to attract stu-



dents interested in entrepreneurship and to bring the best students to Maryland,” relates Green.

The Honors College offers students challenging courses across university majors, ensuring small classes taught by exceptional faculty members. The Entrepreneurship and Innovation Program includes four courses: *Foundations of Entrepreneurship and Innovation*, a one-credit seminar focusing on building the entrepreneurial mindset and basic entrepreneurship principles and terminology; *Contemporary Issues in Entrepreneurship and Innovation*, including interactive lectures, workshops, and case studies on topics such as energy, life sciences, healthcare and technology; *International Entrepreneurship and Innovation*, providing a global perspective through lectures and guest speakers with international experience; and *Social Entrepreneurship Practicum*, a course for developing innovative for-profit products or service concepts with social benefits.

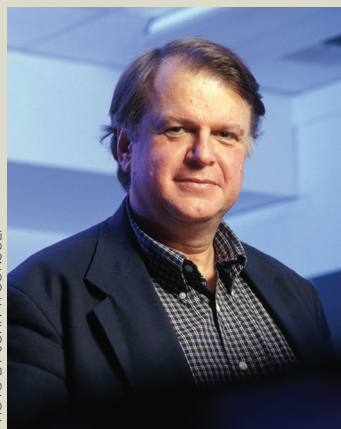
In addition to working in collaboration with faculty members and mentors who have successfully launched new ventures, students also can compete in the university’s \$75K Business Plan Competition, apply for a share of the \$250,000 Mtech Impact Seed Fund and volunteer in program-managed activities.

To learn how you could serve as a mentor for the new program, please call James Green at 301-314-1450. ■

Baras, Dowling Named 2009 Innovators of the Year

Professor **John Baras**, electrical and computer engineering and Institute for Systems Research, and **Matthew Dowling**, Fischell Fellow in Biomedical Engineering, have been named 2009 Innovators of the Year by the *Maryland Daily Record*. Baras was recognized for a key exchange system that reduces the potential for security breaches, and Dowling was honored for the blood-clotting “nano-Velcro” technology produced by Remedium Technologies, his startup company.

Strengthening Network Security



John Baras

Baras and his team have developed a key exchange system that holds great interest for national defense, banking, healthcare and e-commerce organizations and other industries in which secrecy is critical. The new technology allows for message encryption and its reversal while eliminating the potential for a third-party security breach by avoiding the need to communicate keys—pieces of information that determine the output of algorithms.

The system provides for the highest level of security with only modest communication, computation and memory requirements, and makes it nearly impossible for adversaries to determine the current key or to gain advantages in determining past or future keys. The innovative system can be used with any portable electronic devices, such as personal digital assistants, phones, computers or sensors.

Baras’s innovation was created in collaboration with **Paul Yu**, B.S. ‘03, computer engineering, Ph.D. ‘08, electrical engineering, Baras’s doctoral student at the time and now a researcher at the Army Research Laboratory, and **Brian Sadler** of the Army Research Laboratory. In addition, Baras and Yu are the first recipients of the Jimmy Lin Award for Innovation and Invention from the Department of Electrical and Computer Engineering for related work.

Treating Non-compressible Injuries



Matthew Dowling

Led by Dowling, Remedium Technologies is developing a high-pressure foam that can be sprayed into an injured body cavity, where it adheres to tissue and rapidly stops bleeding as it expands. “Our new product is similar to a can of shaving cream—you spray it into the wound, it becomes an expandable foam, fills the space, and stops the bleeding without any pressure,” says Dowling. “It doesn’t require any special training to use so it can be distributed to soldiers, paramedics or civilians for emergency or mass-casualty situations.”

The Remedium team includes **Peter Thomas**, Ph.D. candidate in bioengineering, and **Srinivasa Raghavan**, an associate professor in chemical and biomolecular engineering. Remedium Technologies was selected from 100 entries worldwide to win first prize and \$10,000 in the Most Promising Security Idea category of the Global Security Challenge 2009. Currently, no comparable products are available on the market to treat non-compressible injuries. ■



LEAFHouse, the university's second-place 2007 Solar Decathlon entry.

PHOTO BY AL SANTOS

Anticipation Builds for 2011 Solar Decathlon

18 200 Students Await Final Approval to Compete

Last fall, when Clark School Dean Darryll Pines and School of Architecture, Preservation and Planning Dean Garth Rockcastle invited students to the first planning meeting for the university's entry into the U.S. Department of Energy's 2011 Solar Decathlon, the Kim Engineering Building lecture hall was swamped. Some 200 students ultimately asked to participate in the competition, an enormous undertaking that Dean Pines describes as "one of the most challenging and satisfying projects for students, alumni and citizen volunteers to join."

In January, the university learned that it had passed the first hurdle in the competition. An initial proposal, submitted by faculty members from both schools, was accepted by the DOE. The next step in the process for the Maryland team is submission of a conceptual design, including a scale model, this spring.

Students are now awaiting the outcome of that design evaluation. The final 20 teams, from universities across the U.S. and around

the world, will be announced in April.

Keith Herold, associate professor of bioengineering and the Clark School faculty advisor for the 2011 effort, attests, "Students are energized by this competition and going head to head against other colleges and universities worldwide in devising solutions for our nation's energy problems."

Herold, who researched energy systems and the efficient use of energy as a former faculty member in mechanical engineering, has witnessed increased national and university attention to the Solar Decathlon since he helped construct the university's first entry in 2002. "The projects are increasingly sophisticated in their design, and the level of faculty commitment to the project continues to grow," explains Herold, who is optimistic that the university could construct another winning house. "From the onset, Clark School students bring a passion and energy to this project matched only by the high level of their engineering capabilities."

Considering the invaluable practical

experience students gain from the Solar Decathlon experience as well as the inordinate amount of time they invest in the effort, the Clark School faculty is considering creating an engineering minor and/or certificate program to address sustainable building design. Such coursework would enable engineering student members of the Solar Decathlon team to earn credit for their volunteer work and include information on their transcripts reflecting their Solar Decathlon commitment.

Opportunities to Participate

As the DOE's request for proposals states, the Solar Decathlon "is designed to increase education about zero-energy home design, and to accelerate zero-energy home R&D. The competition fosters collaborations among students in the disciplines of architecture, engineering, business engineering, business and marketing, and communications at the outset of their careers to achieve the goal of developing and demonstrating solar and energy efficiency technologies in

marketable residential applications.”

In practical terms, that means the 20 teams must build a fully functional, 800 square-foot, solar-powered house that produces more energy than it uses. Students, alumni and other volunteers may participate. The university’s entry in the 2007 International Solar Decathlon, LEAFHouse, placed first among U.S. teams and second only to Technical University of Darmstadt, Germany. LEAFHouse also won the BP Solar People’s Choice Award as the favorite entry of thousands of visitors to the competition site on the National Mall in Washington, D.C.

John V. Cartagirone, owner of American Power & Light, Renewables, a company based in Bowie, Md., that designs and installs electrical systems, has volunteered in all of the university’s Solar Decathlon efforts. “It is important to share information with the public about the advantages of renewable energy,” he explains. In the last six years, “more and more people are asking about ways to achieve energy efficiency in their own homes.”

Cartagirone cites a number of benefits for Solar Decathlon volunteers. His own passion for achieving energy independence developed largely through his work with the decathlon teams, and his technology capabilities in that area expanded as well. “My experience with the student team really advanced my use of technology,” he explains. “Thanks to students, I can now handle more project management and design functions electronically.”

Students and alumni can participate at many levels of the two-year project, including building design and construction, plumbing, carpentry, project management, communications and web design. Individual and organizational donors can provide financial support or reduced-price materials and mentoring or consulting services. Donors have the opportunity to participate in a variety of recognition events and communications, depending on their capacity to give. If you are an individual or organization interested in making a contribution to the university’s Solar Decathlon team, contact Keith Herold at 301-405-5268 or kherold@umd.edu. ■

Clark Named Washingtonian of the Year



Clark School alumnus and benefactor A. James Clark, B.S. '50, civil engineering, has been named a Washingtonian of the Year by *Washingtonian* magazine. The honor recognizes those in the Washington, D.C., area who “give their time and talents to make this a better place for all of us,” according to the magazine’s website.

“Mr. Clark’s impact is broad and profound,” said Clark School Dean Darryll Pines. “Because of his vision and generosity, there is a premier academic engineering program in Washington, D.C., where vital scholarships fund the education of hundreds of young men

and women. Everyone at this school acknowledges a debt of gratitude to A. James Clark.”

Clark has given major gifts to name the school of engineering and to establish a scholarship endowment for engineering students. He is the chairman and CEO of Clark Enterprises, Inc., which includes The Clark Construction Group. The company is responsible for building structures such as Washington, D.C.’s Verizon Center, FedEx Field in Landover, Md., and Oriole Park at Camden Yards in downtown Baltimore. ■

Bradshaw Urges Graduates to Be Brave and Persistent

For Heather Bradshaw, B.S. '09, mechanical engineering, and winner of a Presidential Scholarship, Clark Scholarship and Goldwater Scholarship, a positive attitude helped her through her most challenging days as a Clark School engineering student. So when a major snowstorm cancelled the Clark School’s December commencement for the first time in history, Bradshaw was undaunted, even though she was the scheduled student commencement speaker at the Clark School ceremony.



Heather Bradshaw wears a simulated spacesuit at the Mars Desert Research Station in Hanksville, Utah.

Her speaking opportunity may have been postponed, but Bradshaw, who will attend spring commencement, knows her message for students is a timeless one: “Be brave and be persistent.”

Bradshaw understands how persistence pays off. In applying for a cooperative learning experience at the NASA Goddard Space Flight Center, the odds were not in her favor. There was exactly one opening available for a mechanical engineering co-op. She consistently e-mailed the hiring representative, who eventually forwarded her information to the manager to whom the position reported, and he finally agreed to an interview. Bradshaw’s enthusiasm won her the job, and the process taught her a valuable lesson. “If opportunity doesn’t knock, build a door,” she says.

In addition to interning at NASA and the Clark School’s Space Systems Laboratory, Bradshaw was a member of the school’s chapter of Engineers Without Borders (see related story, p. 14) and played a leading part in many national student competitions throughout her college career. A member of the National Space Society, Tau Beta Pi, Omicron Delta Kappa, the American Society of Mechanical Engineers and the American Institute for Aeronautics and Astronautics, she also volunteered with children in Langley Park, Md., served as a Clark School ambassador, played intramural soccer, and performed with vocal performance and ballroom dancing groups.

As students begin their adventures as engineering professionals, Bradshaw encourages them to meet the challenges of the work world head on. Recalling her own experience at NASA, Bradshaw relates how her skills developed to match the increasing responsibility she was given, to the point when she found herself testing a \$1 million piece of equipment. “It was a defining moment when I realized, ‘Oh my gosh, I’m in charge,’” she relates. ■

Alumni News

NIKHIL KORATKAR, M.S. '98 and Ph.D. '00, aerospace engineering, was awarded the 2009 Young Investigator Award from the Electrochemical Society, Division of Fullerenes, Carbon Nanotubes and Nanostructures.

CAN KORMAN, B.S. '85, M.S. '87, and Ph.D. '90, electrical engineering (EE), has been appointed the associate dean for research and graduate studies at George Washington University's School of Engineering and Applied Science.



ROBERT "BOB" STOLL, B.S. '79, chemical engineering, has been nominated as the U.S. Patent and Trademark Office's new commissioner for patents.

J. CHARLES TOBIN, Ph.D. '09, EE, has received the prestigious Peoples Fellowship from the U.S. Department of Energy's Fermi National Accelerator Laboratory.

For a complete listing of alumni accomplishments, see Significant Accomplishments at www.eng.umd.edu/aboutus/accomplish/0110-alumni.html.

NSF CAREER Award Winners

Electrical engineering graduates **MOUNYA ELHILALI**, M.S. '03 and Ph.D. '04; **SEAN ANDERSSON**, Ph.D. '03; and **FUMIN ZHANG**, Ph.D. '04, are all recent recipients of five-year National Science Foundation Faculty Early CAREER Development Awards. Elhilali's \$550,000 award will support her research on developing an architecture for sound processing based on cognitive and adaptive processes. Anderson's \$430,000 award will help him establish a rigorous theoretical and experimental foundation for tracking single nanometer-scale particles and for tracking multiple particles simultaneously. Zhang will use his \$400,000 grant to establish a theoretical foundation for battery-supported, cyber-physical symptoms.

KARYN S. BERGMANN, et al., ,
Plaintiff Class Representatives,
Plaintiff Class Members,

v.

UNIVERSITY SYSTEM OF MARYLAND,
et al.
Defendants.

IN THE
CIRCUIT COURT
OF MARYLAND FOR
BALTIMORE CITY
Civil Case No. 24-C-02-005740

AN IMPORTANT NOTICE FROM THE CIRCUIT COURT OF MARYLAND FOR BALTIMORE CITY ABOUT A CLASS ACTION INVOLVING A TUITION REFUND THAT YOU MAY BE ELIGIBLE TO RECEIVE

A class action has been certified by the Circuit Court of Maryland for Baltimore City and steps have been taken by the parties to notify all class members of their rights and involvement in the case. The class action seeks partial tuition refunds for students charged out-of-state tuition after applying for in-state tuition at any one of the following University System of Maryland ("USM") schools: (1) University of Maryland, Baltimore; (2) University of Maryland, Baltimore County; (3) University of Maryland, College Park; (4) University of Maryland, Eastern Shore; (5) University of Maryland, University College; (6) Bowie State University; (7) Coppin State University; (8) Frostburg State University; (9) Salisbury State University; (10) Towson University; and (11) University of Baltimore. Students who qualify as members of the class include those who: (1) petitioned any USM school for re-classification from out-of-state status to in-state status for any semester from the Spring 2001 to the present, and (2) were denied in-state tuition status based upon a failure to overcome the "financial dependence" or "residence at application" presumptions of the relevant USM policies, but otherwise met the requirements of the policy and the school's procedures for obtaining in-state tuition status, including exhaustion of the institution's administrative process. Class members are entitled to have the original decision to charge out-of-state tuition reconsidered by the institution, based upon revised standards for determining how these presumptions should apply (Those standards may be found at www.usmd.edu/regents/bylaws/SectionVIII/VIII270). Depending upon the results of that review, you may be eligible for a refund in the amount of the difference between the out-of-state tuition that you paid and the in-state tuition rate applicable at that time.

If you believe you are a member of the class but have not received a personal notice and wish to be part of the class, you should immediately contact the class plaintiffs' attorney Anthony M. Conti at CONTI FENN & LAWRENCE LLC, 36 South Charles Street, Suite 2501, Baltimore, Maryland 21201, to learn more about your possible rights in this matter, as you may be entitled to a tuition refund.

To learn more about your possible rights and to make a request to be considered as a member of the class, please contact Anthony M. Conti, CONTI FENN & LAWRENCE LLC, by calling (410) 837-6999 or by e-mailing info@lawcfl.com. All e-mails should include the following information: full name, day and evening telephone number(s), current mailing address, name of constituent institution attended, and the years applied for and denied in-state tuition.

Judge M. Brooke Murdock

Earning a High Yield on His Investments

Brian Hinman's Entrepreneurship Gifts Gain Value at the Clark School

When Brian Hinman, B.S. '82, electrical engineering, recently donated \$1 million to the Clark School's Hinman CEOs (Campus Entrepreneurship Opportunities) program, he was not only adding a new international component to the renowned program that bears his name, he was acting as a savvy investor—one who expects a high return from a responsive and successful organization.

He did not always hold such expectations. When Hinman graduated, he could find no mentorship or support anywhere on campus for his strong entrepreneurial ambitions.

"At the time, there was not a culture of entrepreneurship on campus," recalls Hinman. Even then, he recognized that "entrepreneurship is not a solo sport, it is about teamwork and finding a world-class group of similarly motivated people."

Hinman left Maryland to pursue his master's degree at the Massachusetts Institute of Technology, where just two years later, at age 22, he partnered with his thesis and graduate advisor to start his first venture: PictureTel-Corp., a leading video-conferencing company. In 1991, Hinman relocated to Silicon Valley where he co-founded Polycom, Inc., the world's leading manufacturer of audio, video and data conferencing solutions. Then, in 1998, Hinman co-founded 2Wire, Inc., innovators of home networking products to distribute broadband content throughout the home.

Hinman never forgot the void that existed at the Clark School when he wanted to learn how to start companies and find crucial support. As an early member of the Clark School's Board of Visitors, he began a dialogue with former Clark School Dean William Destler about "how a successful entrepreneurship program at Maryland could fundamentally change the nature of the student experience and make the campus and the region a center of entrepreneurship."

The result of those conversations: A \$2.5 million gift and subsequent support to fund the nation's first living-learning entrepreneurship program. Hinman CEOs is a groundbreaking initiative that brings together entrepreneurially minded students from all disciplines in a unique community. The program is celebrating its 11th year with hundreds of graduates, some of whom have made their own gifts to the Clark School.

"The most exciting part of the program is the connections between students," says Hinman, who remains in touch with many Hinman CEO graduates. "I take a lot of pride in our students. They are among the brightest, most energetic, articulate



Brian and Tabetha Hinman on a recent trip to Morocco.

and well-balanced students in the country."

Always a visionary, Hinman's career continues to develop. A member of the Clark School's Innovation Hall of Fame, he holds 12 U.S. patents and was honored with Ernst and Young's Entrepreneur of the Year Award in 2005. He has been recognized by the University of Maryland with the Major F. Riddick, Jr. Entrepreneurship Award and a Distinguished Alumnus Award. Most recently, Hinman entered the emerging field of clean energy, joining venture capital firm Oak Investment Partners. Hinman now sits on the board of half a dozen clean technology firms, and his work has made him acutely aware of the need to give students a more global perspective.

Hinman's latest gift addresses that need. It realigns the Hinman CEOs to help students grasp entrepreneurship opportunities in developing countries, particularly India and China. This realignment will include adding a course in international entrepreneurship and formalized exchange programs with universities in developing countries for Hinman students to study abroad and for foreign students to join the Hinman program. The gift will also be used to bring experts in international development to campus to address Hinman CEO students.

"We need to provide an educational environment that exposes students to the changing world economy," notes Hinman. "We need to give students access through study abroad or other programs to international markets."

The high yield on his investments in the Hinman CEOs is not lost on Hinman. "I could have funded a new building, but I did something more creative and the outcome has been extraordinarily positive. When I look at the magnitude of my gifts relative to the outcomes, I realize how much leverage there has been." ■

TO LEARN MORE ABOUT MAKING A GIFT TO THE CLARK SCHOOL, PLEASE CALL OR WRITE:

Leslie Borak, assistant dean for external relations, Clark School of Engineering, University of Maryland, College Park, Maryland 20742-2831 ■ 301.405.0317 ■ lborak@umd.edu



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Learn, Commit, Explore and Network

Take an Active Role with the Clark School

Dean Darryll Pines and Director of Alumni Relations Josey Simpson invite you to take advantage of some of the outstanding events the Clark School sponsors throughout the year (see a spring 2010 sampling below). For a full calendar listing, visit www.eng.umd.edu/events. We look forward to seeing you soon!

Whiting-Turner Business and Entrepreneurial Lecture **Thursday, April 8, 5 p.m.**

1110 Jeong H. Kim Engineering Building

Pradeep Kaul, president of Hughes Systique Corporation, part of the Hughes group of companies and a leading communications consulting and software company, is the featured speaker. For more information, contact Missy Corley at 301-405-6501 or mcorley@umd.edu.

Order of the Engineer Ceremony **Friday, April 9, 7 – 9 p.m.**

University of Maryland Golf Course Clubhouse

As a graduate of the Clark School, you can become a member of the Order of the Engineer. Join this annual ceremony and affirm your commitment to ethical responsibility in the profession by publicly accepting an engineering "Oath of Obligation." This year's event is sponsored by Lockheed Martin. For more information, contact Josey Simpson, director of alumni relations, at 301-405-2150 or josey@umd.edu.



Fourth Annual Fischell Festival **Thursday, April 29, 10 a.m. – 6 p.m.** **Jeong H. Kim Engineering Building**

Engineers are devising new technologies to expand and enhance the capabilities of health care providers and to improve the lives of individuals around the world. Join us for a full day of activities, including faculty presentations, student poster sessions and a career fair. Learn what the future holds in bioengineering and biomedical devices and discover the latest collaborations between Clark School faculty and students and the medical profession. For more information, see www.fischellfestival.umd.edu.

Baltimore Alumni Networking Event **Thursday, May 13, 6 – 8 p.m.** **Engineers Club, Downtown Baltimore**

Enjoy a wonderful evening of networking with alumni and friends, and learn the latest news about the Clark School from Dean Darryll Pines. For more information, contact Josey Simpson, director of alumni relations, at 301-405-2150 or josey@umd.edu.



Maryland Day: Explore Our World **Saturday, April 24, 10 a.m. – 4 p.m.**

www.marylandday.umd.edu