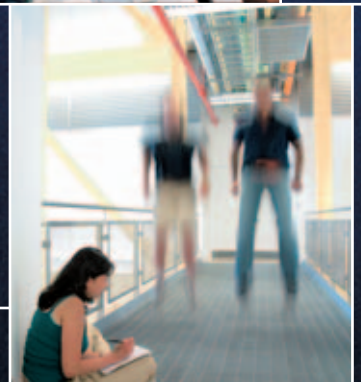




## WELCOME TO THE FUTURE THE JEONG H. KIM ENGINEERING BUILDING



**INSIDE**  
Bioengineering  
Advances Medical Care

Clark School  
as Top Choice



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*Engineering @ Maryland* is published twice a year for alumni and friends of the A. James Clark School of Engineering and the Glenn L. Martin Institute of Technology at the University of Maryland.

Letters to the editor and alumni notes are welcome. Please send them to *Engineering @ Maryland* Editor, 3230 Kim Engineering Building, University of Maryland, College Park, MD 20742-2831. Information can be sent by fax to 301.314.6868 or by e-mail to mcorley@eng.umd.edu

## Dear Alumni and Friends:

**PUT PEOPLE FROM DIFFERENT** engineering disciplines in close proximity to one another, and they'll create the powerful insights and innovations needed to take on today's most complex engineering challenges.

That simple but compelling idea is crucial to the future of the Clark School and of engineering itself. And it is built into the very foundation of the Clark School's new Jeong H. Kim Engineering Building.

People familiar with the Clark School might ask, "What's so new about the Kim Building? Isn't this cross-disciplinary approach also at work in the school's very successful institutes?"

The Institute for Systems Research (ISR), the Institute for Research in Electronics and Applied Physics (IREAP), and the Maryland Technology Enterprise Institute (MTECH) all bring together specialists from diverse fields, sometimes physically, sometimes virtually, *to pursue institute goals*. And that's where the difference lies: the institutes were established with goals in mind, whereas the Kim Building brings people together with no preconception of what might result.

At the Kim Building, we can't predict the interesting discussions that will take place when, for example, a bioengineering faculty member wanders down the hallway from the biomaterials lab, looks through the windows of the transportation systems lab, and asks a civil engineering student what she's working on. Will this result in a new bio-inspired method for re-routing traffic in a congested area? Or a new cardiac diagnostic device derived in part from transportation monitoring technologies?

While these fanciful engineering discoveries are highly unlikely, other interactions in the Kim Building will surely lead in interesting and productive directions—as they must if progress is to occur. Such interactions are the basis of what this issue's lead article describes as "hyphenated engineering" (in which "the emphasis is on connecting new and different ways of thinking.") I believe hyphenated engineering will be the source of major developments in telecommunications, energy, health care, the environment, national security, transportation, product innovation—all the major challenges and opportunities we face. After all, how can any one engineering discipline provide all the knowledge and tools needed to take on such challenges?

Of course, the Kim Building would not exist without funding from the state of Maryland and from private donors who recognized the value of the building and generously helped to make it a reality. Chief among these is Jeong H. Kim, Clark School alumnus, professor and benefactor. I know I speak for all *E@M* readers when I offer my deepest gratitude to Dr. Kim for both his financial support and his leadership. If the Kim Building lives up to his name, as I feel sure it will, we will achieve greatness there.

**Nariman Farvardin**, *Professor and Dean*

**"After all, how can any one engineering discipline provide all the knowledge and tools needed to take on such challenges?"**

## Clark School Leads Agency To Fund Firefighter Safety Research



Clark School researchers are developing new technologies to promote firefighter safety.

The Maryland Fire and Rescue Institute (MFRI), in conjunction with the Clark School's Department of Fire Protection Engineering and the College of Computer, Mathematical and Physical Sciences (CMPS), has been awarded a \$750,000 grant to develop new technologies to promote firefighter safety.

The grant, offered through the Assistance to Firefighters Grant Program of the U.S. Department of Homeland Security, will fund research in firefighter safety, including innovations to locate firefighters and monitor their health and safety during emergencies.

This marks the first time the U.S. Fire Administration has funded research and development of new technology, as opposed to the purchase or testing of existing technologies. The organization, now housed under the Department of Homeland Security, has previously provided millions of dollars to purchase standard equipment or test new equipment. "Through the efforts of the Clark School and MFRI, we made the case for the need to inject novel technology and the agency broadened the definition of research to include testing and development," says Marino di Marzo, chair of the Clark School's fire protection engineering department, which offers the country's only fully accredited under-

graduate program and one of only two graduate programs in the field. Those efforts included mobilizing the assistance of CMPS to form the Maryland Center for Firefighter Safety Research and Development.

"Traditionally, our discipline deals with building safety," explains di Marzo. "In the post-9/11 world, another avenue for research emerged—the safety of first responders. Through the Clark School and CMPS, we can transfer the technology to make the work of firefighters safer and more effective. MFRI, which trains some 30,000 firefighters each year and has earned a national and international reputation, provides the liaison between firefighters and researchers."

The grant will be used primarily to detect physiological problems experienced by firefighters during emergencies and to address individual performance and conditions in the controlled environment provided by MFRI. The grant is one of a number of multidisciplinary efforts on campus to address firefighter safety. Amr Baz, professor of mechanical engineering and director of the Small Smart Systems Center, is developing instrumentation to locate firefighters in the midst of a fire and Arthur Johnson, professor of biological resources engineering and director of the Human Performance Lab, is creating an algorithm to identify the stress point that could help determine a firefighter's propensity to experience physical problems on the job. ■

## Jacobs, Metcalfe Help Launch New Decade of Whiting-Turner Lectures

The Clark School's Whiting-Turner Business and Entrepreneurial Lecture Series has long been recognized for presenting the hard-won knowledge and insights of corporate leaders—information and inspiration attendees can put to use in their lives and careers. In the last decade, the lectures have reached a growing community of students, faculty and friends who leave each lecture energized, eagerly discussing what they have learned.

As the series enters its second decade, the Clark School is renewing its commitment to bring to campus speakers of the highest caliber and broadest experience, and to offer opportunities for interaction with them, such as recruitment events, research overviews, classroom visits



Ken Brody, B.S. '64, electrical engineering, co-founder of Taconic Capital Advisors, LLC and recent Whiting-Turner lecturer.

and receptions. The series begins a new era with two business headliners on board: Irwin Jacobs, former chief executive officer of Qualcomm and Robert Metcalfe, former chief executive officer of 3COM. Expanded promotional efforts and the national and international reputations of such speakers promise to attract even more of the region's top business, academic and government thinkers to the lectures, which will be webcast to reach the widest possible audience.

To learn more about the upcoming Whiting-Turner Lectures, visit the web site at [www.eng.umd.edu/whitingturner](http://www.eng.umd.edu/whitingturner) or email [mcorley@umd.edu](mailto:mcorley@umd.edu) to receive announcements. ■

## Clark School-Army Partnership Supports Auto Research

The Clark School and the U.S. Army Aberdeen Test Center have formalized a partnership to encourage and enhance study in automotive engineering and test technologies. The Maryland Center for Automotive Research and Testing (MCART), a collaborative research environment, will provide Clark School students and faculty with access to Aberdeen staff, data, programs and facilities; a virtual resource for automotive engineering; and the opportunity to participate in collaborative research in the automotive engineering field.

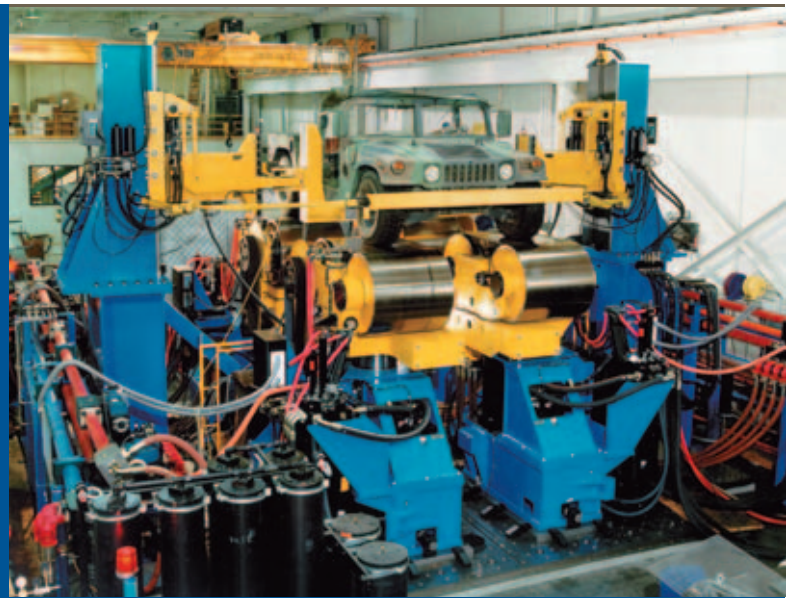
“The Aberdeen Test Center (ATC) will provide a unique opportunity for Clark School students to work on automotive research projects in a world-class research and development test facility. The center’s personnel, equipment and facilities are not usually accessible to engineering undergraduates,” says Gregory Schultz, mechanical engineering lecturer and manager of MCART.

The agreement between the U.S. Army and the Clark School recognizes the important role education plays in expanding the capabilities and resources of the Aberdeen Test Center

**The Roadway Simulator, the largest and most sophisticated of its kind in the world**

and its ability to collaborate effectively with business, industrial and educational institutions in Maryland and throughout the country. The collaboration will develop MCART as an internationally recognized center of excellence by leveraging the expertise of both the engineering school and the Aberdeen Test Center. “The new center will place Aberdeen in a wonderful position to help train the next generation of scientists and engineers and to benefit from the new perspectives Clark School faculty and staff bring to research. At the same time, our scientists are eager to share knowledge with Clark School staff,” adds Schultz.

Initially, the ATC and the Clark School will collaborate using the Roadway Simulator, a \$40 million, laboratory-based vehicle dynamics and powertrain performance test machine.



The machine is the largest and most sophisticated simulator of its kind in the world and the only one of its type in the United States.

Both graduate and undergraduate students are involved in collaborative research, including improving methods for testing vehicle handling and dynamics, particularly for heavy-duty trucks, and accelerated endurance testing of military ground vehicles, payloads and components. Faculty and students are also helping the ATC develop specifications and requirements for a new Vehicle Durability Simulator. The simulator will give MCART another automotive test capability—a method to test the durability of large military and commercial trucks. ■

3



**E. Stevens Beeland, left, assistant dean for external relations, and James F. McMenemy, assistant dean for communications**

## Raising Clark School Visibility

The Clark School has significantly improved its outreach capabilities with the appointments of E. Stevens Beeland as assistant dean for external relations and James F. McMenemy as assistant dean for communications.

Beeland brings more than 16 years of major gifts fundraising

experience from the University of Florida, where he most recently served as senior director of development for the College of Engineering. During his tenure at Florida, he was involved in two comprehensive capital campaigns that raised \$392 million and \$854 million, respectively.

For nearly 18 years, McMenemy ran the marketing and development communications company he founded, providing award-winning literature, web sites, video and advertising to the Wilmer Eye Institute (and numerous other departments of the Johns Hopkins School of Medicine), medical device and electronics companies, and the Clark School.

“Our development and communications teams will provide the support the school needs to improve its fundraising, recruitment and partnership efforts,” says Clark School Dean Nariman Farvardin. “We will rely heavily on the knowledge and experience of our development and communications staff as we share our message and forge new relationships with an ever-increasing number of constituents throughout the country and the world.” ■

## NSF Honors Ulukus, Fisher for Wireless Network, Replacement Tissue Research



This spring, two junior faculty were recognized for their research through the prestigious Early Career Award from the National Science Foundation (NSF). The Faculty Early Career Development (CAREER) Program offers the NSF's most prestigious awards in support of the early career-development activities of those teacher-scholars who are most likely to become the academic leaders of the 21st century. CAREER awardees are selected on the

basis of creative career development plans that most effectively integrate research and education within the mission of their organizations.

**SENNUR ULUKUS**, assistant professor of electrical and computer engineering and Institute for Systems Research (left in photo), has been honored for her work, "A Network Information Theoretic Approach to Wireless Ad Hoc and Sensor Networks." With a limited amount of bandwidth allocated to wireless networks by the Federal Communications Commission, Ulukus is eager to optimize wireless systems for as many users and as many devices at the highest connection rate possible. She hopes to develop a comprehensive information theoretic framework for determining the ultimate capacity limits of wireless networks and for developing efficient coding, transmission, reception and decoding schemes. "Wireless devices have an endless number of applications from laptops and cell phones, to future devices that will connect to refrigerators and tell us when we are running low on certain foods, to devices installed on our

bodies to monitor vital signs and send signals to our physicians," Ulukus offers. "My goal is to understand the ultimate capacity of the wireless communication network."

**JOHN FISHER**, assistant professor in chemical and biomolecular engineering and director of the Biomaterials Laboratory (right in photo), received an award for his work on "Enhancing Cell Signaling in Heterogeneous Cell Populations." Fisher will look at the fundamental phenomena surrounding cell function, particularly cell-to-cell communication when cells are grown within synthetic materials. "An understanding of cell signaling within synthetic environments is a critical step in the development of engineered tissues, test-bed tissues for pharmaceutical discovery and even model tissues demonstrating cancerous tumor development," Fisher indicates. "This award from NSF will allow our lab to develop basic strategies for growing replacement tissues, ultimately leading to our primary goal: treating ill or injured patients." (See related story, p. 11). ■

## New Faculty

**HELIM ARANDA-ESPINOZA** has joined the Department of Chemical and Biomolecular Engineering as an assistant professor. He will also serve as an adjunct faculty member in the school's bioengineering program. Aranda-Espinoza received his bachelor's degree in physics from the University of Zacatecas, Mexico and his Ph.D. in physics from the University of San Luis Potosi, Mexico. His research focuses on applying the theoretical and experimental machinery of physics and engineering to biological systems.

The Department of Materials Science and Engineering announces that **JOHN CUMINGS** has been named an assistant professor. He previously was a postdoctoral scholar in the physics department at Stanford University. He received his Ph.D. in physics (experimental condensed matter) from the University of California, Berkeley. He received his bachelor of arts from Boston University. Cumings's research interests are in nanoelectronics and nanodevices.

The Department of Aerospace Engineering welcomes **SEAN HUMBERT** as an assistant professor. He previously was a doctoral student in mechanical engineering at

the California Institute of Technology, where he received his master's degree in mechanical engineering. His dissertation was on "Bio-inspired Visual Navigation and Flight Control Systems." Additional research interests include autonomous robotics, MAV/AUV avionics design, dynamical systems and modeling of biological systems.

**NUNO MARTINS** has joined the Department of Electrical and Computer Engineering and the Institute for Systems Research as an assistant professor. Martins received his Ph.D. from the Massachusetts Institute of Technology. His primary research interest is in control, estimation and information theory.

**MIROSLOW SKIBNIEWSKI** has been named the A. James Clark Professor of Civil and Environmental Engineering. He previously was a professor of civil engineering, construction engineering and management at Purdue University. He received his M.Eng. degree from Warsaw University of Technology and his master's and doctoral degrees in mechanical engineering from Carnegie Mellon University. His current research interests include e-commerce technology applications to engineering project management for construction and construction automation.



**AVRAM BAR-COHEN**, chair and professor of mechanical engineering, has been named a Distinguished University Professor in recognition of his work in the thermal management of electronic systems.

**BAR-COHEN**

Distinguished university professors are selected from faculty who have been recognized nationally and internationally for the importance of their scholarly and/or creative achievements and who have demonstrated the breadth of interest characteristically encompassed by the traditional role of scholar, teacher and public servant.



**ANTHONY EPHREIMIDES**, professor of electrical and computer engineering (ECE) and Institute for Systems Research (ISR), and **SENNUR ULUKUS**, professor of ECE and ISR, are part of a Department of

**EPHREIMIDES**

Defense Multidisciplinary University Research Initiative (MURI) grant for their project entitled "DAWN: Dynamic Ad-hoc Wireless Networking." The lead institution for the grant, which provides \$5 million over the next five years, is the University of California, Santa Cruz.



**DEBORAH GOODINGS**, professor of geotechnical engineering and co-director of the Master of Engineering and Public Policy program, is this year's recipient of the Clark School Faculty

**GOODINGS**

Service Award for her service and commitment to the school, particularly in her work with the school's Engineers Without Borders chapter.



**VICTOR GRANATSTEIN**, professor of electrical and computer engineering, was appointed Sackler Professor of Special Standing at Tel Aviv University. He recently received a Fulbright Senior

**GRANATSTEIN**

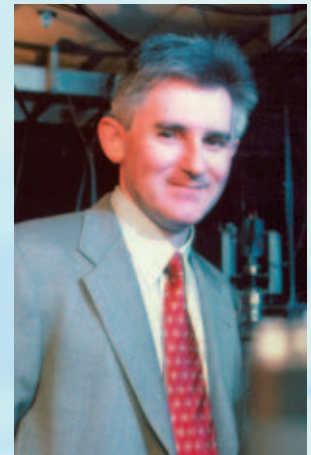
Specialist Award for education and research activities at Tel Aviv University and the Weizmann Institute for Science.

## O'Shea Is New ECE Chair

**PATRICK O'SHEA**, M.S. '82 and Ph.D. '86, physics, has been named the new chair of the electrical and computer engineering department (ECE). Most recently, O'Shea has served as director of the Institute for Research in Electronics and Applied Physics (IREAP) and professor of electrical and computer engineering. O'Shea is a fellow of the American Physical Society and the Institute of Electrical and Electronic Engineers.

Born in Cork, Ireland, O'Shea received his bachelor's degree in physics from University College Cork. Early in his career, he conducted research at the Los Alamos National Laboratory on the Beam Experiment Aboard Rocket Project and the APEX Free-Electron Laser Project. He continued his research at Duke University's Free-Electron Laser Laboratory. O'Shea's current research is in the area of charged beam technology and applications.

O'Shea succeeds Steve Marcus, who has served as department chair for the last five years. Under Marcus's tenure, the department increased faculty research funding and earned increasing recognition for academic excellence through faculty awards, national publications and the quality of ECE students. ■



**ARTHUR JOHNSON**, professor of biological resources engineering, was appointed secretary of the Biomedical Engineering Society (BMES) and was elected president of the International Society for

**JOHNSON**

Respiratory Protection. Additionally, Johnson was elected fellow in the BMES.



**K.J. RAY LIU**, electrical and computer engineering and Institute for Systems Research, has been honored with the Clark School's 2005 Poole and Kent Senior Faculty

**LIU**

Teaching Award for the impact he has made on education and curriculum in the college.



**HUBERT MONTAS**, associate professor of biological resources engineering, received the Northeast Agricultural and Biological Engineering Conference 2004 Young Engineer of the Year Award for outstanding contributions to the profession.

**MONTAS**



**SHIHAB SHAMMA**, professor of electrical and computer engineering, has been named a fellow of the Acoustical Society of America, "for contributions to computational modeling and cortical physiology of the mammalian auditory system." Recently, he received a five-year grant from the National Institutes of Health to study "Spectro-Temporal Plasticity in the Primary Auditory Cortex."

**SHAMMA**



**ELISABETH SMELA**, associate professor of mechanical engineering, was awarded the E. Robert Kent Outstanding Teaching Award for Junior Faculty for her commitment to education through teaching, course development, curriculum innovation and mentoring.

**SMELA**

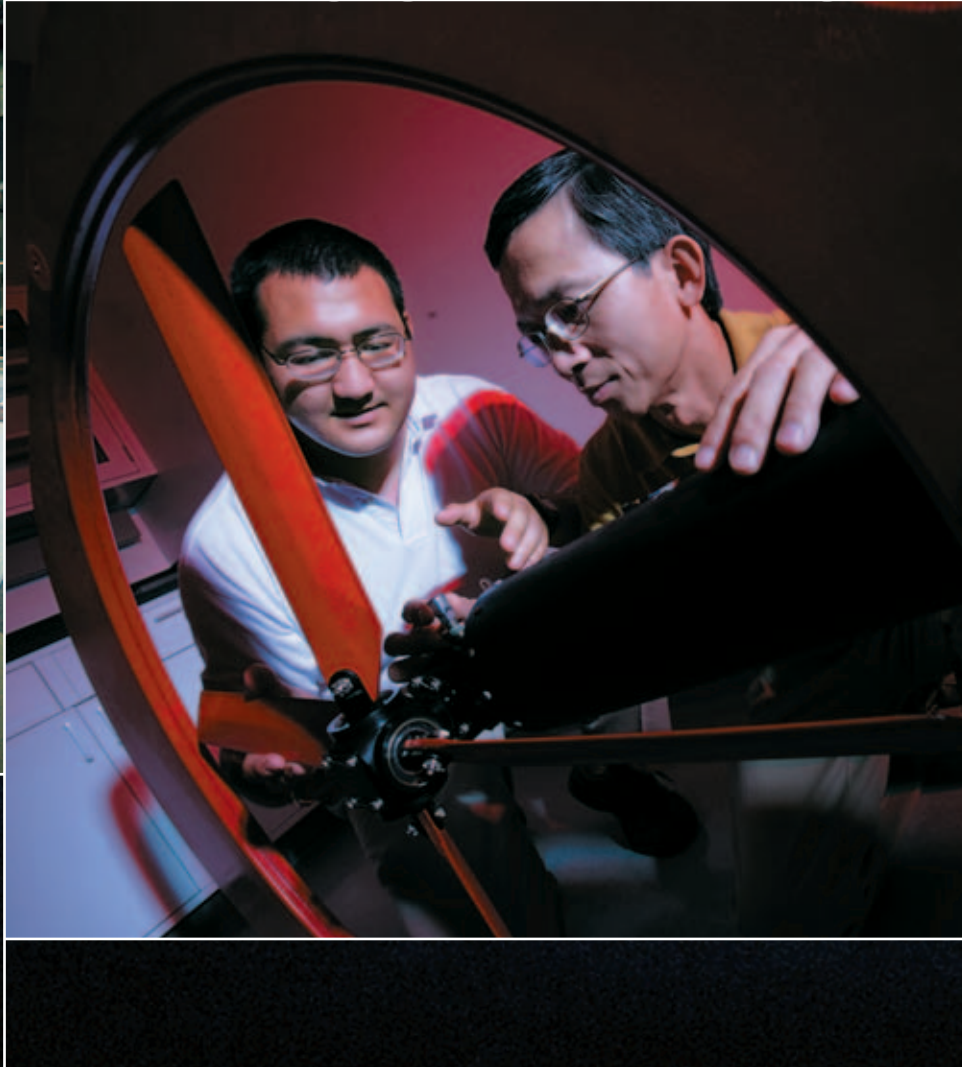


**FRED WHEATON**, professor and chair of biological resources engineering, was elected fellow in the American Society of Agricultural Engineers.

**WHEATON**

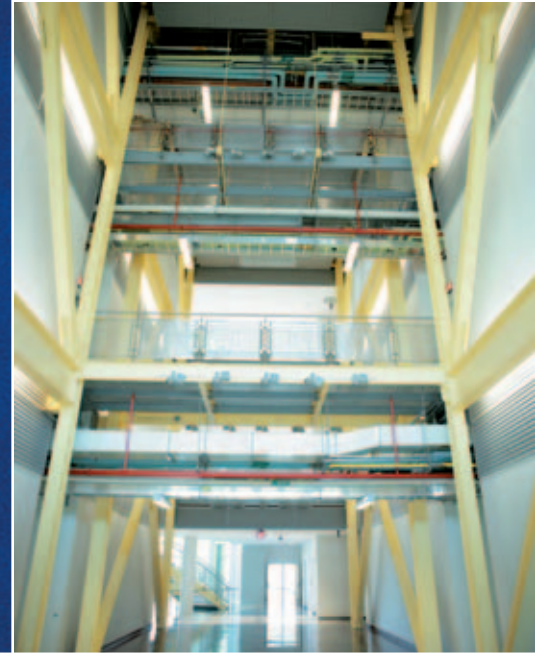


WELCOME TO



Clockwise from upper left: Jeong H. Kim; Keck Foundation laboratory; internal bridges in north atrium; exterior of the Kim Building; small smart systems laboratory; Kim Building rotunda.





# THE FUTURE



## *THE NEW KIM BUILDING DEFINES THE CLARK SCHOOL'S PATH FORWARD*

**F**ROM ITS BRIGHT, AIRY ROTUNDA TO ITS STATE-OF-THE-ART LABORATORIES TO ITS MEETING SPACES LARGE AND SMALL, THE NEW JEONG H. KIM ENGINEERING BUILDING IS A STUNNING TESTAMENT TO THE CLARK SCHOOL'S FORESIGHT AND FORWARD MOMENTUM.

"WHEN YOU VISIT THE KIM BUILDING," EXPLAINS DEAN NARIMAN FARVARDIN, "YOU VISIT THE FUTURE OF THE CLARK SCHOOL—CROSS-DISCIPLINARY, ADAPTABLE TO CHANGE AND GROWTH, OPEN TO THE WORLD."

"THE BUILDING IS A TANGIBLE SYMBOL OF THE CLARK SCHOOL'S GROWTH," ADDS PROFESSOR OF THE PRACTICE JEONG H. KIM, PH.D. '91, RELIABILITY ENGINEERING, WHO HAS GENEROUSLY SUPPORTED CONSTRUCTION OF THE BUILDING AND FOR WHOM IT IS NAMED. "IT IS A VISUAL CUE FOR OUR RAPID PROGRESS."



Students measure strain on a Kim Building internal bridge.

## The Kim Building as Learning Tool

The Kim Building not only houses engineering labs—it is an engineering lab.

According to William Fourney, professor and chair of aerospace engineering, associate dean for faculty and graduate affairs and director of facilities for the Clark School, the Kim Building can teach students about civil and environmental engineering, control systems and construction. The interior design features exposed columns and beams, an open elevator shaft, windows with a variety of glazings, two types of bridges and visible color-coded pipes and heating and air ducts. Students can take measurements, perform tests, control heating and cooling and experience firsthand the concepts they learn about in textbooks. For more information, visit [www.eng.umd.edu/research/kim\\_building.html](http://www.eng.umd.edu/research/kim_building.html).

## CROSS-DISCIPLINARY COLLABORATION “BUILT IN”

To exploit new opportunities and solve increasingly complex challenges—in telecommunications, energy, the environment, national defense, medicine, transportation, new product design and business development—engineering’s traditional specialties must come together in new and powerful ways.

But those traditional specialties tend to remain apart. While the Clark School has been a leader in creating boundary-breaking institutes and centers, some with their own physical spaces, some “virtual,” these have remained exceptions.

The 160,000-square foot Kim Building changes all that. “Cross-disciplinary collaboration is built in” to its design, according to Farvardin. The new building features shared and discrete state-of-the-art laboratories with modifiable utility and data service, formal and informal discussion areas, advanced presentation and communications systems and even structural and environmental components that teach construction and control concepts.

“For faculty and students, the Kim Building will be an inspiring environment,” Farvardin continues. “You’re more likely to meet new people, hear new ideas, share new perspectives on difficult problems.”

## “HYPHENATED ENGINEERING”

Such interaction is vital for the Clark School’s Bioengineering Graduate Program (see related story, p. 11). Says William Bentley, program director and Herbert Rabin Distinguished Professor of Engineering, “Our group works on novel methods for improving medical care at the molecular level. This is another example of ‘hyphenated engineering’—nano-, bio-, micro-, and so on—where the emphasis is on connecting new and different ways of thinking.”

He adds, “Research space where people from many backgrounds can co-exist and actively collaborate is rare. I was fortunate to be part of such a space in the Center for Biosystems Research and we have established this on a much grander scale in the Kim Building. All around us are exceptional thinkers and resources to draw on—a Keck nano lab, a large, advanced clean room for microelectronics fabrication, a nano imaging lab, Gary Rubloff’s Maryland Center for Integrated Nano Science and Engineering, Peter Kofinas’s functional macromolecular lab. This is the perfect place to conduct our work.”

Bioengineering is only one instance of this approach. All of the building’s tenants, from the full array of engineering specialties, have similar opportunities for valuable interactions that will lead to innovations and advances. “In engineering, we talk about approaches to problem-solving that require constant communication across disciplines,” sums up Jeong Kim. “Housing many of our key areas so closely together in an inspiring, modern facility will spark creative new ideas and solutions.” ■



Hallways behind labs permit rapid change of utility and data service.

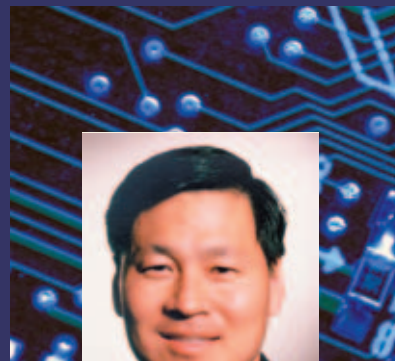


## Kim to Lead Bell Labs

Jeong H. Kim, the Clark School alumnus, faculty member and benefactor for whom the Kim Building is named, has been appointed president of the Bell Labs unit of Lucent Technologies.

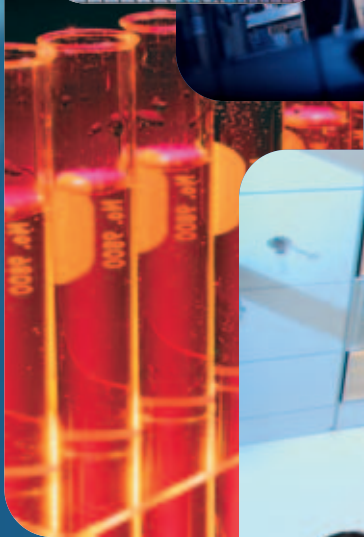
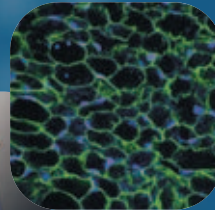
“The research produced at Bell Labs has shaped many of the technological advances of our lifetime,” says Kim, the labs’ 11th president and the only one recruited from outside the organization. “Bell Labs is trying to achieve a synergy very similar to what the Kim Building will help the Clark School achieve: an environment in which innovation occurs

easily across all disciplines,” relates Kim. “This lab is known worldwide for innovation, but we must generate the ideas and processes that allow us to commercialize or harvest these innovations faster and more efficiently.” Kim will continue in his Clark School post and will remain involved in the school’s progress.



JEONG H. KIM

In addition, the U.S. Pan Asian American Chamber of Commerce has named Kim as one of the top 10 most influential Asian Americans in business. The chamber, the leading Asian American business organization, works to foster business relationships between businesses, the U.S. government and the minority community.



# BIOENGINEERING

## ADVANCES MEDICAL CARE THROUGH POWERFUL ALLIANCES

Story by Nancy Grund

### In the new cross-disciplinary Kim Engineering Building, the Clark School's boundary-breaking Bioengineering Graduate Program is right at home.

In John Fisher's Biomaterials Lab—part of the Bioengineering Graduate Program's new home in the Jeong H. Kim Engineering Building—large and small miracles are in progress.

Fisher, an assistant professor of chemical and biomolecular engineering at the Clark School (see related story, p. 4), together with his team of Clark School graduate and undergraduate students, is creating biodegradable polymers to treat abdominal hernias that often occur in patients following certain types of surgery. That's the large miracle. The small miracle is that Fisher is conducting his research in conjunction with J. Scott Roth, M.D., head of surgical endoscopy in the Department of Surgery at the University of Maryland Medical System. Such interaction across schools and campuses is vital to success in achieving medical advances at the molecular level, but has long remained more the exception

Top, Angela Fu, bioengineering graduate assistant; center, William E. Bentley, Bioengineering Graduate Program director and Herbert Rabin Distinguished Professor of Engineering and Gary Rubloff, director of the Maryland Center for Integrated Nano Science and Engineering and professor, materials science and engineering, study new biomaterials; below center, Rojan Fernandes, bioengineering graduate student; and bottom from left, Adam Hsieh, assistant professor in mechanical engineering and director of the Orthopaedic Mechanobiology Lab works with graduate assistant Anshu Rastogi and lab research technician David Ryan. Related images, center right, cytoskeleton and nuclei of cells in the intervertebral disc and center left, stained intervertebral disc section.

than the norm. The Bioengineering Graduate Program, and indeed the Clark School and its cross-disciplinary Kim Building, provide a model for changing this situation.

#### Location. Location. Location.

According to the U.S. Department of Commerce, Maryland ranks third among all states in its number of biotechnology firms and biotech-related employees. Ask anyone involved in economic development here—biotechnology is expected to be a big part of the state's future.

Despite such expectations, it remains a challenge to bring together people who want to achieve similar objectives: physicians who seek new ways to care for patients, engineers ready to create new medical technologies and entrepreneurs eager to build companies that bring those technologies to market.

The Clark School's Bioengineering Graduate Program is perfectly positioned to meet this challenge. William E. Bentley, program director and Herbert Rabin Distinguished Professor of Engineering, explains, "Our program focuses on cellular and molecular systems, major emphases in all areas of medicine today. Our efforts include the development of new diagnostic tools, disease identification techniques, therapies to treat injuries and illness, and methods to deliver therapies to targeted tissues—all at the molecular level."

"To achieve these goals we need to bring together specialists from a wide range of engineering, life sciences, medical, business and other disciplines," says Bentley. "And we are finding that we can, thanks to our new facilities, the cross-disciplinary outlook they promote and the array of resources

and relationships the Clark School has assembled.”

“Biotechnology requires pulling minds together from many areas to solve all-encompassing problems,” echoes Rohan Fernandes, a graduate student in Bentley’s lab. Fernandes uses magnetic nanoparticles to manipulate cells. One of the first students to enter the bioengineering program, he chose the Clark School because of its “established ties to area biotech companies and nearby medical centers.”

## Engineering Better Health: New Approaches

Creating wound-healing polymers is just one of the projects underway in Fisher’s Biomaterials Lab. With researchers John F. Caccamese Jr., D.M.D., M.D., Domenick P. Coletti, D.D.S., M.D., and John J. Sauk, D.D.S., at the University of Maryland Dental School, Fisher studies ways to recreate orbital bone that houses and protects the eye. Fractures of the orbit account for some 15 percent of all facial fractures. Currently, these injuries are treated by implanting inert metals or plastics. Fisher’s team is working on a degradable biomaterial that allows regeneration of the orbit floor, leaving the injured patient with bone tissue, rather than an artificial implant, after treatment.

Adam Hsieh, an assistant professor in mechanical engineering who heads the bioengineering program’s Orthopaedic Mechanobiology Lab, also in the Kim Building, studies how tissue structure and function are guided by mechanical stress through cell deformation and response. Excessive levels of mechanical loading on the spine can accelerate degeneration of aging intervertebral discs and eventually lead to debilitating back pain. “Our ultimate goal is to develop models predictive of spinal motions that are either beneficial or detrimental to disc health,” says Hsieh. He works with Miao Yu, Ph.D. in mechanical engineering, to develop ways to monitor disc pressures in small animals using fiber optic sensors. Hsieh’s adjunct appointment in orthopaedics at the University of Maryland

School of Medicine has facilitated both the development of animal surgical procedures in collaboration with Daniel Gelb, M.D., and Steven Ludwig, M.D., and the pursuit of the mechanisms involved in disc degeneration with molecular biologists Thorsten Kirsch, Ph.D., and Joseph Stains, Ph.D. “Tensional stress causes tissues to become more like ligaments while compressive stress induces more of a cartilage phenotype,” Hsieh explains. “The quantitative nature of both mechanics and biology will allow us to generate relationships that could advance the development of new therapies and preventive measures.”

Down two floors from Hsieh, Peter Kofinas, associate professor of chemical and biomolecular engineering, is developing molecularly imprinted polymers (MIPs) that can be used as virus filters or virus sensors in medical applications. “Our work could lead to the development of a virus-imprinted MIP that could assist in the identification, classification and removal of viruses,” explains Kofinas. “The removal of viruses could potentially impact a wide range of diseases” with applications in gene therapy, human and animal health, crop protection and biologics production.

Helim Aranda-Espinoza, assistant professor in the department of chemical and biomolecular engineering (see related story, p. 4), also studies the mechanical properties of cells, but he uses techniques such as atomic force and force traction microscopy. “Cholesterol plays a key role in hardening of the arteries (atherosclerosis),” he says, “yet the mechanical properties of arteries during this process remain controversial. Atomic force microscopy will explore the effects of cell cholesterol content on the mechanical properties of cells involved in the process.”

Instabilities in blood flow patterns are the special interest of Elias Balaras, assistant professor in mechanical engineering, who uses computational fluid and structural dynamics to examine related medical problems. He compares simulated blood flow patterns through implanted prosthetic heart valves against flow

## The Face of Bioengineering

As in other bioengineering programs nationwide, the number of women students in the Clark School program equals or surpasses that of men. “Bioengineering is a helping field and traditionally women have been drawn to fields that can better the human condition,” says Julie Holbrook, academic coordinator for the program.

She also says the program, which has already enrolled 25 students, most Ph.D.-bound, in its first three years, draws more U.S. citizens than other engineering disciplines. “U.S. high school and college students gain greater exposure to the field and are keenly aware of new pharmaceuticals and new medical devices entering the market every day.”

More than 50 faculty members participate in the program, from the College Park campus, the university’s medical, dental and pharmacy schools in Baltimore and the University of Maryland Biotechnology Institute.





through natural valves to better understand the clinically observed complications and improve present heart valve designs. Working with researchers at the University of Miami, Balaras is studying the blood flow in compliant models of intracranial aneurysms. These models, generated using medical images from specific patients, help pinpoint the biomechanical forces and eruption potential of such aneurysms—information that can assist physicians in selecting the appropriate treatment.

Avis Cohen, professor of biology and of the neuroscience and cognitive science program, member of the Institute for Systems Research and of the Clark School's neuromorphic engineering group, partners with an engineer and neurosurgeon at Johns Hopkins University and physiologists at the University of California, Los Angeles, to develop a neural prosthetic device for spinal cord injury patients. "The device, a silicon chip, will ultimately control and guide the spinal cord below the injury site so the paraplegic patient could walk," explains Cohen. As a test-bed for the biomedical device, the Clark School researcher currently uses software but will eventually use analog VLSI (Very Large Scale Integration) chips to control the spinal cord of a lamprey, the most primitive of vertebrates.

Targeted drug delivery is a key focus in bioengineering. In collaborations with scientists at the University of Maryland School of Pharmacy and the Greenebaum Cancer Center, bioengineering faculty are creating polymeric carriers for the targeted delivery of drugs, genes and imaging agents. "Cancer patients too often suffer adverse effects following chemotherapy or radiation," offers Hamid Ghandehari, director of the pharmacy school's Center for Nanomedicine and Cellular Delivery and an adjunct in the Bioengineering Graduate Program.

Undergraduate and graduate students work on applications of polymer science in bionanotechnology in the lab of Peter Kofinas, associate professor of chemical and bioengineering. Lower left, a typical DNA microarray chip. Lower right, a microscopy image of a deformed cell.

"Bioengineering approaches to target therapeutic or diagnostic agents to tumors can improve the well-being and quality of life for these patients." The bioengineering program and the pharmacy school will sponsor the Third International Symposium on Nanomedicine and Drug Delivery this fall.

### Advanced Applications in Radiology

Reuben Mezrich, M.D., Ph.D., the John M. Dennis Professor and radiology chair at the University of Maryland School of Medicine, is looking to bioengineering to help "move the operating room into the imaging lab." Mezrich is turning to engineers and scientists to refine the robotics behind image-guided therapy to improve real-time visualization and allow for better analysis of and interaction with data images.

He cites breast cancer as one disease for which improved imaging could bring screening to new patients. "Magnetic resonance imaging has great potential as a screen for breast cancer in much younger women. You eliminate the radiation risk associated with mammography and gain sensitivity to changes in the soft tissue present in younger women," Mezrich says. He hopes to develop technologies to advance this approach and use spectroscopy to detect subtle tissue changes, such as benign or cancerous fiber abnormalities.

Raj Shekhar, M.D., assistant professor of diagnostic radiology

University of Maryland School of Medicine collaborators Reuben Mezrich, M.D., Ph.D., right, the John M. Dennis Professor of Radiology and department of radiology chair, and Raj Shenkar, M.D., assistant professor of diagnostic radiology



at the University of Maryland School of Medicine and a Bioengineering Graduate Program adjunct, is teaching a medical imaging and image processing course to bioengineering and electrical and computer engineering students. He also works with students on two current projects: the creation of smart imaging technology that will enable future surgeons to work without directly seeing the operative field, greatly enhancing accuracy and enabling long-distance surgery on the battlefield and elsewhere; and the development of software and hardware for a new compact beamformer for volumetric ultrasound imaging.

## The Nano-Bio Partnership

The ability to construct, examine and control biological components and systems at the nanoscale holds great promise for bioengineering. At Maryland, the partnership could hardly be closer: bioengineering research groups collaborate with nanotechnology experts on a daily basis. The new Maryland Center for Integrated Nano Science and Engineering (M-CINSE, [www.nanocenter.umd.edu](http://www.nanocenter.umd.edu)), a joint program of the Clark School, the College of Chemical and Life Sciences and the School of Computer, Mathematical and Physical Sciences, not only supports the Maryland nano community, but champions the nano-bio partnership. "Our faculty and students see nano-bio as perhaps the most exciting piece of the nano landscape, a chance to genuinely improve how people live as well as to broaden our minds by learning from our bioengineering colleagues," says Gary Rubloff, the center's founding director, professor of materials science and engineering and former director of the Institute for Systems Research. The nano fabrication (FabLab) and characterization (NispLab) facilities in the new Kim Building profoundly enhance the center's nano-bio capabilities.

Currently, M-CINSE researchers are working with the University of Maryland pharmacy school to exploit several approaches to construct and biofunctionalize nanoparticles for targeted drug delivery. They also collaborated with the University of Maryland Biotechnology Institute (UMBI) to develop biosurface platforms within microfluidic systems that can be programmed to carry out biomolecular processes for

drug discovery. Additional research focuses on using the selectivity of biology to remotely assemble nanoelectronic devices into systems or to recognize specific chemical and biochemical agents.

## Taking Bioengineering Advances to Market

To be of use, biotech innovations must become actual prod-

ucts and go through commercialization and testing. The Clark School's Bioengineering Graduate Program plays a vital role in this process, supported by the Clark School's Maryland Technology Enterprise Institute (MTECH). One of MTECH's units, the Maryland Industrial Partnerships (MIPS) program, links bioengineering faculty with Maryland companies to develop technology-based products. Says Martha J. Connolly, MIPS director and an adjunct professor in the bioengineering program, "Tech companies are eager to work with faculty who have a foot in both worlds—engineering and the life sciences. We help make the right match between faculty and companies." Other MTECH programs help faculty members and students start their own companies and find venture backing.

Another university group that fosters biotech research, education and commercialization is the Center for Advanced Research in Biotechnology (CARB), a cooperative venture of UMBI, the National Institute of Standards and Technology and Montgomery County, Md. The Clark School recently formalized a partnership with UMBI to design and implement educational and research programs in nano-biotechnology and molecular bioprocessing. Says Greg Silsbee, CARB chief operations officer, "With the new Kim Building and our new facilities, students can access the most sophisticated equipment and instrumentation and work next to world-renowned experts in the field." CARB will provide critically needed state-of-the-art facilities for structural biology, proteomics, plant and insect transformation and bioprocessing. The cooperative endeavor will accelerate the commercial development of inventions and other intellectual property.

At the Clark School, all of the pieces are in place to move bioengineering discoveries from the laboratory to the market. The collaborations and transdisciplinary efforts of Clark School researchers and their colleagues are certain to yield significant contributions to healthcare that will enhance the quality of all of our lives. ■

*Nancy Grund is the editor of E@M.*





## Tapping Into Success

### Innovative Biosensors, Inc. Draws on MTECH Support

By any standard, 2005 has been an excellent year for Innovative Biosensors, Inc. (IBI). The young developer of rapid, ultra-sensitive pathogen-detection technologies—think of food processing companies guarding against *E.coli* 0157:47—won the 2005 Maryland Incubator Company of the Year Award for Best Life Science Company and the 2005 Technology Leadership Award from Frost & Sullivan, the global growth consulting firm. IBI also raised \$3.5 million in venture capital to support its continued progress.

IBI achieved those successes, remarkable for a company only two years old, through skillful development of advanced technologies for important applications, and through the support of the Clark School's Maryland Technology Enterprise Institute (MTECH). Specifically, MTECH's Technology Advancement Program (TAP), a leading incubator and accelerator for early-stage ventures, helped guide and shape the growing company.

Says IBI founder and chief executive officer Joe Hernandez, "This latest award validates our accomplishments as a growing developer and manufacturer of rapid pathogen tests, and highlights the importance of incubators to entrepreneurship. The TAP program has been integral to our success."

#### Leveraging White Blood Cells

IBI's technology allows for rapid detection of analytes by engineered biosensors. As Hernandez says, "We genetically engineer

nature's detection system, white blood cells, to detect a specific pathogen and to glow when it finds the appropriate target. We are, in essence, leveraging millions of years of genetic refinement to detect pathogens with revolutionary sensitivity and speed." IBI plans to commercialize tests that rapidly identify important pathogens in food safety applications and human clinical diagnostics.

Key to IBI technology development is access to MTECH's modern bioprocessing laboratory, dedicated to the development and scale-up of biotech products and processes. "Maryland's Bioprocess Scale-up Facility has helped us manufacture our product efficiently and cost effectively," says Hollie Kephart, IBI's marketing manager.

#### In Good Company

Kephart describes how IBI has benefited significantly from TAP's state-of-the-art facilities and extensive mentoring. She adds that the program also provides an introduction to funding sources and access to vast university resources.

The success of IBI is yet another promising chapter for the TAP program. In the last 19 years, TAP has helped create more than 1,725 jobs and TAP companies have raised \$310 million in private investments. Furthermore, TAP has contributed to the introduction and growth of some 50 diverse companies, including biotech industry leaders such as Martek Biosciences Corporation, Digene Corporation, Chesapeake PERL Inc. and Novascreen Biosciences Corporation. ■

## Advising Congress on Tech Commercialization

The United States government wants to accelerate the use of new technologies in the fight against bio-terrorism, so it asked an expert for advice. Scott Magids, director of the Technology Advancement Program (TAP) offered through the Clark School's Maryland Technology Enterprise Institute (MTECH), recently testified before Congress about MTECH's efforts to accelerate technology commercialization.

"Congress has become interested in the topic of technology commercialization—especially in the areas of bioterrorism and public safety," Magids commented about his testimony before the U.S. Senate Committee on Health, Education, Labor, and Pensions. "Technology innovation in these areas is not making it to the public arena fast enough because of the gap that exists between an individual technology creator and a viable company capable of bringing usable products to the marketplace."

Magids attributed this gap to a lack of readily available professional management talent for technology creators, inadequate seed funding and insufficient motivation for inventors to pursue commercialization. To remove such obstacles, Magids said, the Clark School's MTECH unit has developed a proven five-part method to accelerate technology commercialization: education; hands-on support and funding access; internal and external communications; operating initiatives; and entrepreneurship culture-building.

Magids pointed to the university's continuing success in developing high-potential start-ups from infancy to sustainable commercial enterprises and how other institutions now model their own programs after MTECH. ■

# The Clark School AS TOP CHOICE

## Clark Scholarships Attract More of the Best and Brightest

16 by John Stack

The Clark School Class of 2009 is more diverse and academically accomplished than any in recent history, thanks in large part to the availability of more undergraduate scholarships through the new A. James Clark Scholarship Endowment. (See p. 17 for stories about two outstanding Clark Scholarship recipients, Paul Freeman and Heather Bradshaw.)

This fall's incoming freshman class includes more women, African American and Hispanic students, and its SAT scores are markedly increased compared to those of last year's class. In another indicator of class quality, some 42 freshmen are joining Inventis, the Clark School's highly selective program that pairs talented students with distinguished faculty mentors.

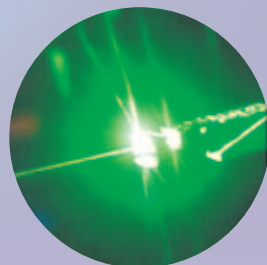
This snapshot of the Class of 2009 is but the latest evidence of how the Clark Endowment is helping the school more successfully recruit the nation's best and brightest engineering undergraduates. In the words of Dean Nariman Farvardin, "a

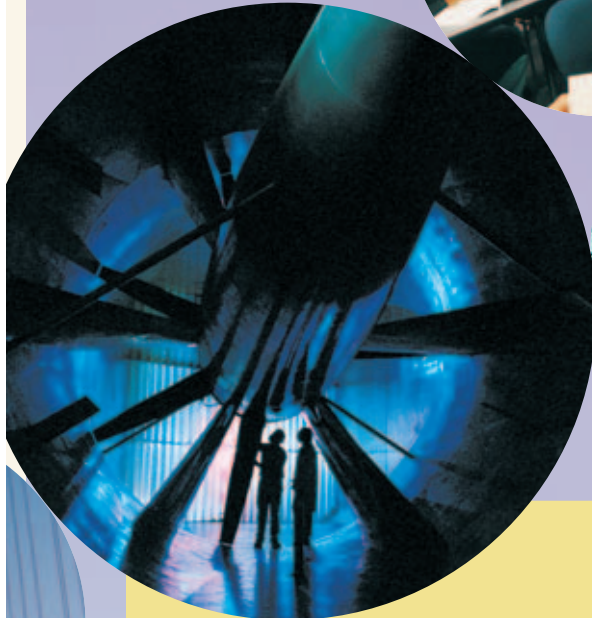
revolution was launched" earlier this year when A. James Clark, '50, chairman and chief executive officer of Clark Enterprises, Inc. and the man for whom the Clark School is named, committed \$30 million to undergraduate scholarships based on merit, need and diversity. It is the single largest gift in the school's history.

The endowment dramatically improves the Clark School's competitive position. Meredith DeMoss, coordinator of undergraduate recruitment and special programs, explains, "We're one of the country's leading engineering programs, and many of the best students want to come here. In the past, our more limited ability

to offer them scholarships made it difficult to compete with other top schools. Now, with the Clark scholarships, we have removed the financial barriers and made it much easier for students to choose us."

DeMoss attests that prospective students see the Clark School as an environment where they can be challenged and thrive. "They like the opportunities, programs, facilities and faculty," she notes. "Now the A. James Clark Scholarship Endowment can relieve them from worrying about finances. Free to compare us to other schools without financial considerations, more and more often they are selecting the Clark School."





## Researcher-in-the-Making Chooses Clark School

Receiving a four-year Benjamin T. Rome Scholarship through the A. James Clark Scholarship Endowment was a leading factor in Paul Freeman's decision to choose the Clark School over such prestigious institutions as the Massachusetts Institute of Technology, Purdue University and the University of Illinois. Freeman, an incoming freshman from Eagan, Minn., and valedictorian of his high school class, will pursue a degree in aerospace engineering.

"I began searching for schools online last year. The Clark School has many unique research opportunities: it offers a five-year program in which I could obtain a master's degree, and I like the location so close to Washington," notes Freeman, whose visit to campus last summer solidified the Clark School as his top choice. "The financial support made my decision even easier," says Freeman, who considered his selection for the award a surprise despite his strong academic record.



Freeman spent his last year of high school attending morning classes at the University of Minnesota's Institute of Technology honors program, where he did research on an unmanned aerial vehicle, and completing extracurricular activities at his high school in the afternoon. A National Merit Scholar and Eagle Scout, Freeman was a member of the track, math, speech and debate teams for all four years of high school. He has participated since middle school in the University of Minnesota Talented Youth Mathematics Program.

"I've always loved airplanes and rockets and I know I want to pursue aerospace engineering," Freeman says. "I could do anything in this field and be interested and happy about it."



## Support, Kim Building Make the Difference

For Heather Bradshaw, a Presidential Scholarship and Clark Scholarship recipient, the decision to come to Maryland involved several visits to College Park, attendance at a wide range of classes and lengthy discussions with faculty and students. "The financial package was a major factor in my decision, but there was a multitude of other reasons that compelled me to choose Maryland, one of which was the Kim Building. I was impressed to learn that it is one of the most sophisticated engineering facilities on any university campus," she states.

Bradshaw, who will major in mechanical engineering, adds that the potential for hands-on experiences, such as those offered by the QUEST and RISE programs, internships and student design teams, also influenced her decision. "Engineers push the frontiers of human knowledge and ability—they create the future. Even though I loved Virginia Tech and Penn State, I decided the Clark School was the best place to achieve my dreams."

*John Stack is a Baltimore-based writer who has written extensively for the American Society of Engineers, headquartered in Reston, Va. In addition, his work has appeared in The Baltimore Sun, The Richmond Times-Dispatch, Baltimore magazine and other publications.*

## Michael Griffin Leads NASA



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Vice President Dick Cheney formally swears in NASA Administrator Michael Griffin as his wife, Rebecca Griffin, holds the Bible. Griffin, who assumed the new post in April, is the agency's 11th administrator.

Michael D. Griffin, Ph.D. '77, aerospace engineering, has been confirmed to lead the National Aeronautics and Space Administration. Griffin has served as Space Department Head at the Johns Hopkins University Applied Physics Laboratory. Previously, he was president and chief operating officer of In-Q-Tel, Inc. He also served in several positions with Orbital Sciences Corporation and as chief executive officer of Magellan Systems, Inc.

Griffin is a member of the aerospace engineering department's Academy of Distinguished Alumni. Earlier in his career, Griffin served as chief engineer at NASA and as deputy for technology at the Strategic Defense Initiative Organization.

Before his doctoral work at the Clark School, he received a bachelor's degree in physics from Johns Hopkins University and a master's degree in aerospace science from Catholic University of America. He holds graduate degrees in electrical and computer engineering, applied physics, business administration and civil engineering. ■

## England Nominated as Deputy Secretary of Defense

Gordon England, B.S. '61, electrical engineering, has been nominated by President George W. Bush to serve as deputy secretary of defense. The nomination of England, who currently serves as Secretary of the Navy, is pending U.S. Senate approval.

England served as executive vice president of General Dynamics Corporation from 1997 until 2001. Previously, he was executive vice president of the Combat Systems Group of

Turkey's Minister of National Defense Vecdi Gonul (left) is escorted into the Pentagon by Acting Deputy Secretary of Defense Gordon England (right).

General Dynamics, president of General Dynamics Fort Worth Aircraft Company (later Lockheed), president of General Dynamics Land Systems Company and principal of a mergers and acquisitions consulting company. ■





## New Prominence for the Innovation Hall of Fame

The spacious and highly traveled three-story atrium just off the rotunda in the Kim Building is the new home of the Clark School's Innovation Hall of Fame. Here visitors learn about the Clark School alumni, faculty and associates who invented pulse Doppler radar, the standard form of the universal product code and some 20 other major engineering innovations. The new space offers plenty of room for future winners.

"These are innovations of real magnitude," says William Fourney, professor and chair of aerospace engineering, associate dean for faculty and graduate affairs and director of facilities for the Clark School. "It is amazing to consider what our local talent has produced."

Together with William Grubb, the school's associate director of facilities, Fourney oversaw the

relocation of the Hall of Fame from its less public setting in Glenn L. Martin Hall. The new placement in the Kim Building not only gives Hall of Fame members the level of recognition envisioned by founder Stanford Berman, B.S. '50, mechanical engineering, it also more powerfully honors Berman's concept and the support provided for the hall by the Engineering Alumni Chapter.

This year's inductees are Draper Prize winners Edward A. Miller, B.S. '50, mechanical engineering, and James W. Plummer, M.S. '53, electrical engineering. They worked on the top-secret Corona Project, which pioneered satellite surveillance during the Cold War. The induction will be held as part of the September 19 Kim Building dedication. For more information, visit [www.eng.umd.edu/ioh/](http://www.eng.umd.edu/ioh/).

## Students Compete with Mini Baja, Formula Vehicles

Some 50 students from the Clark School chapter of the Society of Automotive Engineers (SAE) designed, built, tested, promoted and raced vehicles in two types of SAE-sponsored competitions this spring. The students represented a variety of disciplines, including mechanical, aerospace and electrical and computer engineering.

The Mini Baja 100 competition is for off-road recreational vehicles and the 2005 Formula SAE® is for formula-style vehicles. The Clark School teams built their machines as part of a special projects class and received academic credit for their efforts.

Maryland Mini Baja captured first place in the hill climb event at the Mini Baja 100 in Green Valley, Ariz. The Terps' vehicle reached 95.5 feet on the 98-foot climb. Many of the 140 participating

vehicles did not climb 20 feet, and no vehicles completely crested the hill, reports Gregory Schultz, lecturer in mechanical engineering and faculty advisor to the Clark School teams. Maryland also placed third in the acceleration event and 14th in the maneuverability category.

In addition, the Mini Baja team competed at the SAE Mini Baja Midwest competition in Troy, Ohio, placing fifth in the acceleration event, eighth in the hill climb and just below the top 10 for speed.

At the 2005 Formula SAE® competition, held at the Pontiac Silverdome in Pontiac, Mich., the Maryland formula car logged the fastest lap time of the day before experiencing a failed fuel pump.

"Students received quite an education this year about hard work and engineering," says Schultz. "They have learned first-



Students on the Clark School's Mini Baja team.

hand what it takes to be a winner as far as working under time and cost constraints and the work ethic required." Just as important, Schultz notes, the students learned to work in a team environment and to apply classroom theory to an actual competition.

## Sweet Honored for Undergraduate Research Efforts

Debbie Sweet has always had a passion for science and mathematics, but she was unsure of the exact direction her education would take when she entered the Clark School. The summer of her freshman year, Sweet participated in a Research Experience for Undergraduates (REU) internship in the Department of Chemical and Biomolecular Engineering that gave her experience in the laboratory and sparked an interest in research.

Throughout her sophomore and junior years, Sweet, a chemical engineering major, continued her research pursuits, working closely with teacher and mentor Mohamad Al-Sheikhly, professor of materials science and engineering. Her work with Al-Sheikhly has focused on using various experimental techniques to study the surface of biochips and could contribute to the body of knowledge concerning DNA probe technology and other topics.

Her research efforts were rewarded this spring when she received a Barry M. Goldwater Scholarship. The Goldwater Scholarship is the

premiere undergraduate award granted to mathematics, natural sciences and engineering students interested in research careers. The program aims to ensure a steady supply of qualified scholars and researchers for the nation. Students are evaluated on academic merit, research experience and career objectives. "The research experiences I pursued at the Clark School are the major reasons I could even consider applying for the Goldwater Scholarship," says Sweet. "The financial assistance is important and the national recognition will help me as I apply to graduate programs."

A National Merit Scholarship winner, recipient of numerous university scholarships and officer in the school's chapter of Tau Beta Pi, the engineering honor society, Sweet worked this summer at the National Institute of Standards and Technology on a database that assists in research on drugs that fight AIDS. She intends to pursue a Ph.D. in chemical or bioengineering and ultimately to pursue a career in research. ■



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## Parker is UM's First Churchill Scholarship Winner

Andrew Parker, B.S. '05, double-degree student in civil engineering and physics, has been awarded a Churchill Scholarship to study at the University of Cambridge. Parker is the first University of Maryland student to win a Churchill Scholarship and one of only 24 scholarship winners in the United States in the last two years.

Parker was actively involved in research in both engineering and physics. He studied the use of fly ash in geotechnical applications under the direction of Ahmet Aydilek, assistant professor of civil engineering, and performed research in an experimental nuclear physics group under the leadership of Elizabeth Beise, professor of physics.

The highly competitive scholarships offer American students of exceptional ability the opportunity to pursue graduate studies in engineering, mathematics and the sciences at Cambridge, where Parker will pursue a master of philosophy degree in engineering for sustainable development. Parker's interest in international development, piqued by his experiences with the Clark School chapter of Engineers Without Borders, led him to select the program. Parker plans to pursue a doctoral degree in the U.S. and to enter the international development field either working in public policy nationally or working as an engineer abroad. ■



## Alumni Notes

**MATTHEW DELISA**, M.S. '99 and Ph.D. '00, chemical engineering, and now an engineering faculty member at Cornell University, has received a National Science Foundation (NSF) Early CAREER Award, NSF's most prestigious award for young faculty members. DeLisa will receive a five-year, \$500,000 grant to develop techniques to analyze and engineer a model complex protein machine.

**KOUSHIK KAR**, M.S. '99 and Ph.D. '02, electrical and computer engineering, and now a faculty member at Rensselaer Polytechnic Institute, received a National Science Foundation (NSF) Early CAREER Award. Kar's research concentrates on computer and communication networking in relation to routing and traffic engineering, congestion control and resources allocation, ad-hoc and sensor networks and multicasting.

**DAN EASTON**, B.S. '76, civil engineering, has been promoted to deputy commissioner of the Alaska Department of Environmental Conservation. He formerly was director of the department's water division and has spent 25 years in the field of environmental engineering.

**AARON FALK**, B.S. '92, electrical engineering, and M.S. '94, systems engineering, is the new chair of the Internet Research Task Force, a confederation of researchers in academia and industry who coordinate research, foster collaboration and exchange information on Internet research. Falk is a computer scientist at the University of Southern California's Information Sciences Institute, where his work focuses on the new XCP Internet protocol to ease Internet congestion.

**PRADEEP SHARMA**, M.S. and Ph.D. '00, mechanical engineering, has been selected as an Office of Naval Research Young Investigator for his work in nanomechanics. Sharma is currently an assistant professor of mechanical engineering at the University of Houston.

ENGINEERING THE FUTURE

# Forward Thinking

**A**t one point in his college career, James Douglas (Doug) Hartlove, B.S. '67, chemical engineering, lived on little more than pocket change. Hartlove paid for his education by working each summer as a cemetery groundskeeper and stretching his funds as far as they would go during the school year.

He has never forgotten the perseverance required to earn a degree. He and his wife, Carol, recognized the need for more American-born engineers and decided some 20 years ago to include the university in their wills. "When I see students today, I still remember my struggles. I would like to give something back to the university so that needy American students have the same chance at life that we had," shares Hartlove. When updating their will in 2001, they formalized those intentions by establishing a bequest to fund a four-year scholarship in chemical engineering.

"I want to help someone who has the ability and the need and may be having difficulties financially," says Hartlove. "This scholarship could allow them to focus on coursework and remain in good academic standing. It could carry them all the way through their engineering degree."

Hartlove has long considered his engineering education as "the bedrock for my happiness in the world from that point on." His decision to attend Maryland was made in a matter of minutes following a meeting with his parents and a high school guidance counselor. "The counselor told my parents, 'The boy is good in math and science.' When they asked where I should attend school he advised that 'Students who graduate from Maryland get good jobs,'" Hartlove recalls. That was all his parents needed to hear. He applied to Maryland the next day and was admitted by the beginning of his senior year in high school.



Hartlove spent the majority of his career in the engineering construction business—he is licensed as both a professional engineer and professional planner. Since his retirement the Hartloves enjoy golfing, thoroughbred horse racing, trips to the beach and Terp basketball.

Each year, the Hartloves stop for a visit at the Clark School. "We enjoy walking through the engineering school, remembering Doug's professors and experiences, sharing funny stories about teachers and students," says Carol.

Hartlove says his success has rested on two pillars: his degree in chemical engineering and his love for America. "A job in engineering in this country can position you for all that you wish to accomplish." ■

TO LEARN MORE ABOUT MAKING A PLANNED GIFT OR FUNDING A SCHOLARSHIP, PLEASE CALL OR WRITE:

Radka Z. Nebesky, assistant director of development, Clark School of Engineering, University of Maryland, College Park, Maryland 20742 ■ 301.405.8072 ■ radka@umd.edu



## Do You Remember?

This academic year, the University of Maryland celebrates its 150th anniversary. In honor of the occasion, we will feature archival photographs of scenes related to engineering in the next several issues of *E@M*. Jog your memory and share with us your knowledge about the scene above. If you can tell us the decade and information about the scene, you may be eligible for a special anniversary gift. Send your answer to [mcorley@umd.edu](mailto:mcorley@umd.edu). Happy Anniversary, University of Maryland!



### Share Your Mementos

If you have saved interesting items from your days in the engineering school, we would like to see them. Take them out of the attic, dust off the cobwebs and make your mementos

part of the Clark School timeline planned for the new Jeong H. Kim Engineering Building. For more information on the timeline, contact [mcorley@umd.edu](mailto:mcorley@umd.edu).



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