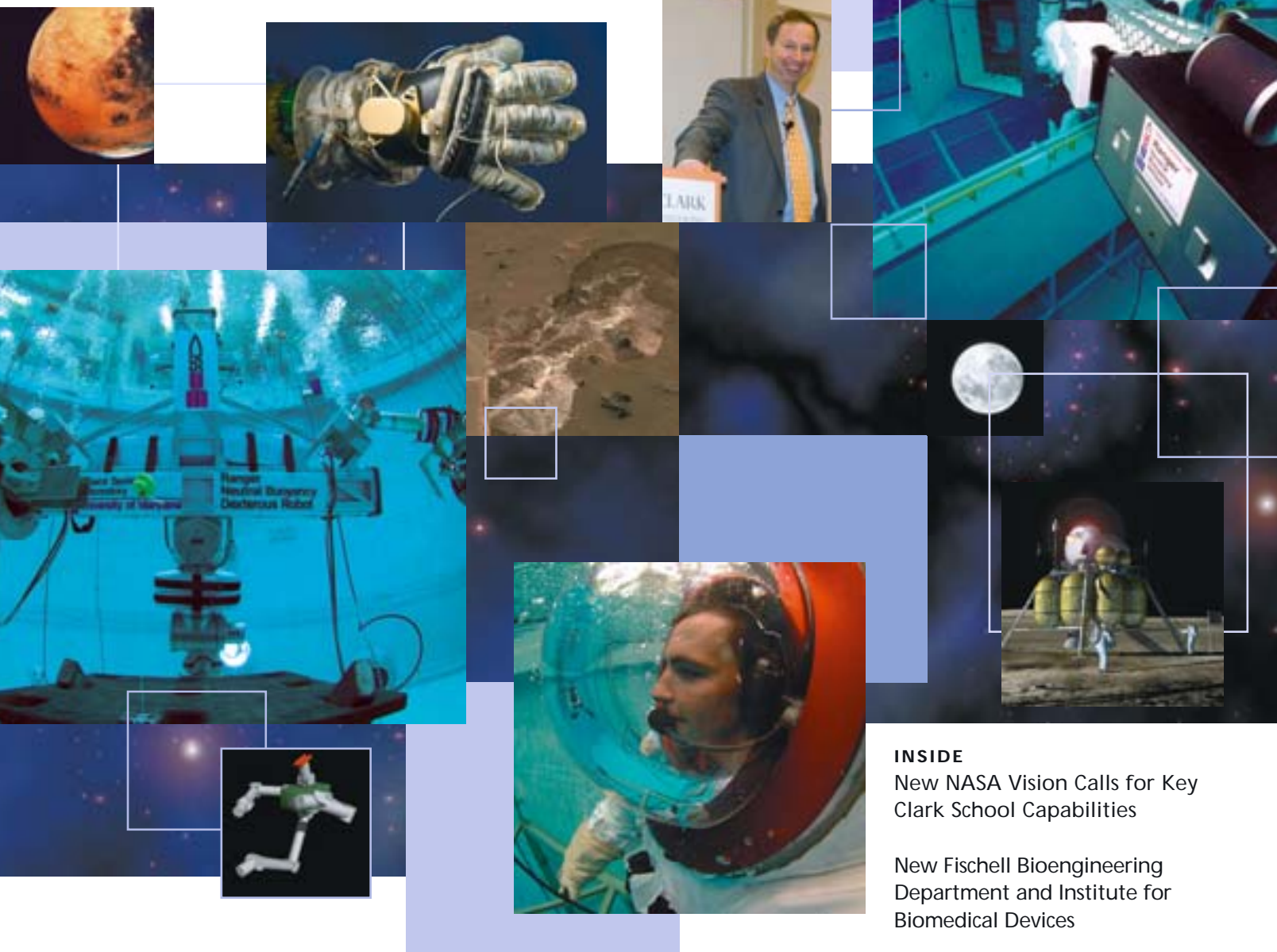


"A HUMAN PRESENCE ACROSS THE SOLAR SYSTEM"



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Dear Alumni and Friends:

THE CLARK SCHOOL'S PROXIMITY to Washington's many national laboratories and defense, aerospace, electronics, construction and biotech companies leads to valuable research partnerships for our faculty and employment opportunities for our students. There is another advantage in our location that has potentially even greater importance for the school in the long run: increased opportunities to participate in, and help to lead, the national dialogue on innovation and competitiveness.

In the last few months we have attracted campus visits by such national figures as alumnus, NASA administrator and newly elected National Academy of Engineering member Michael Griffin; entrepreneur, Ethernet inventor and Whiting-Turner lecturer Robert Metcalfe; and "Rising Above the Gathering Storm" report chairman, retired chairman and CEO of

Lockheed Martin, and White Symposium keynote speaker Norman Augustine. Each in his own way warned of challenges to our national competitiveness and the crucial role of engineering schools in advancing innovation. (Copies of Mr. Augustine's White Symposium lecture may be requested from mcorley@umd.edu.)

During the same period university president, mechanical engineering faculty member, Glenn L. Martin Professor and "Rising Above the Gathering Storm" committee member Dan Mote similarly addressed engineering deans from throughout the country in their annual Public Policy Forum (I had the honor of introducing him).

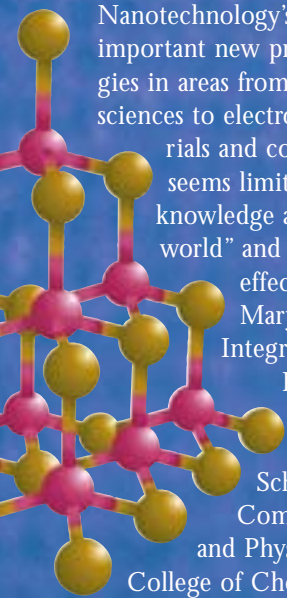
It is gratifying to see that the admonitions of the many advisory committees and individual voices are having a beneficial effect. President Bush and Congress appear to have taken seriously the many warnings and proposals and decided to fund a number of important educational and research initiatives. As of this writing, the National Science Foundation, Department of Energy and National Institute of Standards and Technology are slated to receive significant new funding. There is also a proposal to make permanent the research and experimentation tax credit for corporations and expand eligibility for that credit.

Whatever the ultimate outcome of all this intense participation by engineers, scientists and educators in the public policy arena, the effect on our students is, I believe, all to the good. They are seeing firsthand that engineers have a responsibility to look beyond their immediate professional and personal concerns and advocate for changes in national policy they know are important for the future well-being of the nation. They are enjoying multiple opportunities to meet and interact with excellent role models who will help to shape them as better engineers and citizens.

Our students...are seeing firsthand that engineers have a responsibility to...advocate for changes in national policy they know are important for the future well-being of the nation.

Nariman Farvardin, *Professor and Dean*

Maryland Nanotechnology Takes Safety Leadership Role



Nanotechnology's potential to create important new products and technologies in areas from medicine and the life sciences to electronics, structural materials and consumer products seems limitless. Yet we have little knowledge about the "nano world" and how to interact with it effectively and safely. The Maryland Center for Integrated Nano Science and Engineering (M-CINSE), the joint program of the Clark School, the College of Computer, Mathematical and Physical Sciences and the College of Chemical and Life Sciences, is leading key efforts to increase that knowledge.

Through its new \$1.5 million Center for Nanoparticle Risk, Impact and Assessment, M-CINSE is developing bio-microsystems to determine how nanoparticles in living cells may influence human health and the environment. Additional resources and potential collaborators include federal laboratories and the University of Maryland and Johns Hopkins medical schools. The new center is funded through the National Institute of Standards and Technology (NIST).

MARYLAND NANOTECH NUMBER ONE

The May/June 2005 issue of *Small Times* magazine ranked Maryland at the top of the nation's colleges and universities in nano research and education. The article cited the new Jeong H. Kim Engineering Building and the university's nearly 100 nano-related faculty, 120 published papers on nano and more than 400 grants for nano science research.

"Nanoparticles will appear nearly everywhere in nanotechnology, but we don't yet understand their potential impact on health and the environment. Since we don't know which nanoparticles are likely to be used in future technologies, we must invent ways to anticipate which aspects of nanoparticles are a concern," says Gary Rubloff, center director and professor of materials science and engineering and the Institute for Systems Research.

M-CINSE is also leading efforts to understand the application of nano materials in manufacturing. Under a new \$1.4 million National Science Foundation (NSF) program, M-CINSE works with NIST and three other universities to develop knowledge in nanoparticle manufacturing; another NSF grant, for \$1.2 million, supports research in nanostructured polymers for nanomanufacturing; and a \$1.2 million National Institutes of Health grant supports development of nanofluidic technology for protein analysis.

William Bentley, chair of the Clark School's new Fischell Department of

Bioengineering (see related story, p. 14) and Herbert Rabin Distinguished Professor of Engineering, emphasizes collaboration in nanotechnology, especially in "nano-bio." "M-CINSE and the Fischell department are actively pursuing partnerships with the University of Maryland schools of medicine, dentistry and pharmacy, Johns Hopkins, and national and international business and academic groups," he explains. "This is how we build the new discipline." Last fall, Bentley spoke about nano-bio at a meeting of the Greater Baltimore Committee, a regional business and government group; and M-CINSE hosted a conference of representatives of the Maryland Department of Business and Economic Development and officials and researchers from the Interuniversity MicroElectronics Center, Europe's leading independent research center in microelectronics and nanotechnology. ■

For more information on M-CINSE activities, see www.nanocenter.umd.edu

Hinman to Deliver Whiting-Turner Lecture on "New Age of Entertainment"



On April 7, 2006, Brian L. Hinman, B.S. '82 electrical engineering, member of the Clark School's Innovation Hall of Fame and founder of the school's renowned Hinman Campus Entrepreneurship Opportunities (CEOs) program, will return to the school to deliver the next Whiting-Turner lecture, "IP Video and the New Age of Entertainment." Students, faculty, staff and alumni are welcome. Hinman's successes as a business builder and leader are legendary. He is co-founder of Polycom, the world's leading teleconferencing company, and of 2Wire, the highly successful provider of broadband service platforms

for the DSL market, and was named the 2005 Ernst & Young California Entrepreneur of the Year in Communications and Networking.

Cell Phone-Based Traffic Monitoring and Other Studies Get Green Light

Clark School researchers are working closely with Maryland and Virginia transportation agencies to test and analyze technology that monitors traffic by tracking the “on” signals of vehicle-borne cell phones and mapping them against road grids.

The new systems can track several hundred thousand cell phones at once; the phones need only be turned on, not in use. By providing a constantly updated picture of traffic flow across thousands of miles of highways, cell phone tracking can help transportation agencies spot congestion and divert drivers through radio alerts or electronic road signs.

“The potential is incredible,” says Phil Tarnoff, director of the Clark School’s Center for Advanced Transportation Technology (CATT), who is leading the analysis. “It is going to alter the way we plan our trips and the way we drive. With a better traffic management system, we could reduce congestion by 50 percent and dramatically improve travel time, especially in the Baltimore-Washington corridor where there are four to five high-quality routes to which drivers can be diverted.”

Tarnoff recognizes there are privacy concerns, but says the technology protects the privacy of cell phone users by eliminating phone numbers as soon as the tracking data is received. Data from individual phones is not retained, and travel time is calculated by averaging information from large numbers of users.

Traffic problems in evacuations are a major concern of Hani Mahmassani, Charles Irish Sr. Chair in Civil and Environmental Engineering and director of the Maryland Transportation Initiative. His dynamic network modeling software (DYNASMART-P), supported by the Federal Highway Administration, is used by metropolitan areas in several states as well as overseas for planning evacuation scenarios. He says the success of an evacuation depends heavily on the preparation and decisions made by government officials and traffic managers.

The other key to a successful evacuation, he says, is to control the flow of traffic onto highways so that traffic does not clump up and come to a complete stop. Mahmassani says contraflow—claiming lanes that normally move toward the disaster center for travel away from it—is essential to a successful evacuation. “In a disaster, you have to use your capacity as quickly as you can and contraflow is the logical solution.” Hayssam Sbaiti, a Ph.D. student, is working with Mahmassani to develop a decision-support framework for optimal staging and network management in extreme situations.

Beyond our borders, Mahmassani and Elise Miller-Hooks, assistant professor of civil and environmental engineering, recently received a \$995,000 grant for a two-year European Commission Coordinated-Action study of the European rail freight industry. The Maryland Transportation Initiative is the only U.S. partner in the seven-member international consortium. The Clark School will work on intermodal network modeling and service optimization, developing innovative ways to overcome barriers to seamless intermodal service and creating collaborative decision-making frameworks for integrated system management. ■

For more information on the Center for Advanced Transportation Technology, visit www.cattlab.umd.edu. To learn more about the Maryland Transportation Initiative, visit www.mti.umd.edu.



A traffic detour computer simulation.



Regional traffic is constantly monitored at the Center for Advanced Transportation Technology.

Project Management “Better for Managerial Engineers than an MBA”

Clark School graduates have long been recognized for the outstanding technical skills they bring to the workplace. But as they move into management positions, engineers increasingly must manage people and projects, demonstrating knowledge and skills in all phases of the project management life cycle and creating a positive and productive work environment.

This spring, the Clark School is responding to the demands of the marketplace with three new project management education options: an online master's program, specialized certificates for engineers and non-engineers and an undergraduate minor.

“Our school's great reputation is built on engineering, and we put all our experience and knowledge to work aligning our project management courses with the career goals of engineers,” says John Cable, director of the school's project management program, who cites it as “a

better alternative for managerial engineers than a master of business administration degree.”

The new online master of engineering in project management provides a collaborative learning experience that enables engineers from around the world to share ideas and problems with faculty and students through the virtual classroom. The program gives students information they can immediately apply in the workplace, from cost accounting and finance to Web-based management.

The professional development certificate program in project management, with levels from beginning to advanced, is available to engineers and non-engineers. The program is offered through a collaboration between the Department of Civil and Environmental Engineering and the Project Management College in Haverton, Pa.

At the undergraduate level, the new minor

in project management ensures current students have both the technical background and management skills to succeed. “Our biggest concern is accommodating the growing number of interested students,” says Cable, who cites a recent tripling of enrollment in project management courses. “In the past, engineers would realize after a few years that they lacked project management abilities and return to school. Our minor produces engineers already prepared to manage. That's an enormous competitive edge for Clark School students.” ■

For more information on the project management courses offered through the Clark School, visit www.pm.umd.edu.

The Clark School's graduate project management degrees recently became the first accredited engineering school-based project management degrees in the nation.

4

Clark School and UM Policy Center Develop Navy Jet Supply Chain

Researchers from the Clark School's Institute for Research in Electronics and Applied Physics, the Department of Electrical and Computer Engineering and the Computer-Aided Life Cycle (CALCE) Electronic Products and Systems Center are partnering with the university's Center for Public Policy and Private Enterprise on a 12-month project to develop a prototype Web-based supply network for the U.S. Navy. The project involves maintenance of F/A-18 Navy fighter jets and will link together a series of advanced technologies—prognostics that can diagnose supply needs while equipment is still in combat, novel wireless communications to relay these needs to maintenance officers and automatic identification techniques to locate parts in the supply chain—all integrated through a secure Web portal.

“CALCE was recommended for this project by the U.S. Navy based on our experience in failure analysis and reliability modeling for the military and electronics companies,” says George E. Dieter Professor of

Mechanical Engineering Michael Pecht, who founded and directs CALCE. “We're developing tools and methods to provide early warnings of failure in Navy fighter jets so the military can make optimal maintenance decisions.” Pecht noted that the center's work could influence the future design of the jets.

“This is an unprecedented experiment, and it's critical for the military to move in this direction,” says Jacques Gansler, director of the Center for Public Policy and Private Enterprise and the university's vice president for research.

“The national agenda requires an integration of ideas to solve problems of national importance, such as energy, security and defense,” says Kenneth Gabriel, senior research scholar and program manager at the center and principal investigator on the project. “We have established a truly collaborative group and we are going to build an end-to-end system that starts in combat and seamlessly links up with the industrial world.” ■



Mechanical Engineering Chair and Professor **AVRAM BAR-COHEN** was appointed Distinguished University Professor in recognition of his research in the thermal management of microelectronic and nano systems, including thermal design, ebullient heat transfer and thermal phenomena in microelectronic, photonic and biological systems.

Professor **RAMA CHELLAPPA**, electrical and computer engineering, was appointed as a Minta Martin Professor at the Clark School. Minta Martin Professorships recognize the contributions of senior faculty who have distinguished themselves through their high impact and outstanding research contributions, excellent and innovative education efforts and influential leadership.

Electrical and Computer Engineering Professor **VIRGIL GLIGOR**, one of the country's pioneering figures in computer security, was presented the 2006 National Information Systems Security Award—generally considered the most prestigious in information security—by the National Security Agency and National Institute of Standards and Technology. Gligor is an expert in access control mechanisms, penetration analysis, denial-of-service protection, cryptographic protocols and applied cryptography.

LINDA GOODEN, a member of the Clark School Board of Visitors, was named Black Engineer of the Year. She was previously named Executive of the Year by the Tech Council of Maryland. Gooden is president of Lockheed Martin Information Technology, one of the fastest-growing business units of defense contractor Lockheed Martin.

Mechanical Engineering Professor **ALI MOSLEH**, director of the Reliability Engineering Program, has been awarded the Nicole Julie Kim Eminent Professorship in the Clark School. The appointment recognizes his sustained and influential scientific and scholarly work in reliability engineering.

University President **C.D. MOTE, JR.**, a Glenn L. Martin Institute Professor of Engineering in the Clark School, received the Founders Award from the National Academy of Engineering. The award was presented "for the creation of a comprehensive body of work on the dynamics of moving flexible structures and for leadership in academia." The award recog-

nizes outstanding professional, educational and personal achievement to benefit society.

Professor **GOTTLIEB S. OEHRLEIN**, materials science and engineering, was awarded the 2005 Prize in Plasma Science and Technology by the Plasma Science and Technology Division of the American Vacuum Society. He was recognized "for groundbreaking contributions in the development of knowledge bases for plasma surface interactions in materials processing."

Electrical and Computer Engineering Professor **EDWARD OTT** was awarded the Clark School Outstanding Faculty Research Award in recognition of his advancements in estimating the current state of the atmosphere and for his many contributions in developing the broad area of chaos and nonlinear dynamics.

ROSEMARY PARKER, director of the Clark School's Center for Minorities in Science and Engineering, is one of the recipients of the university's 2005 Women of Color Award. The award is presented by the President's Commission on Women's Issues to staff or faculty who have made exemplary contributions and a positive impact on minorities in the university community.

Several faculty have been named fellows of their respective professional associations: Associate Professor **CAROL ESPY-WILSON**, electrical and computer engineering (ECE)/Institute for Systems Research (ISR), fellow of the Acoustical Society of America; Professor **ADEL SHIRMOHAMMADI**, biological resources engineering, fellow of the American Society of Agricultural and Biological Engineering; Professor **ARMAND MAKOWSKI**, ECE/ISR, fellow of the Institute of Electrical and Electronics Engineers; Professor **WILLIAM D. DORLAND**, physics/Institute for Research in Electronics and Applied Physics (IREAP) and **DANIEL LATHROP**, IREAP acting director/physics, fellows of the American Physical Society; Associate Professor **JUNGHO KIM**, mechanical engineering (ME), fellow of the American Society of Mechanical Engineers; Associate Professor **BONGTAE HAN**, ME, fellow of the Society for Experimental Mechanics; and Professor **ALLEN PORTER DAVIS**, civil and environmental engineering, fellow of the American Society of Civil Engineers.

Wallace Wins Major Teaching Award

The Carnegie Foundation for the Advancement of Teaching and the Council for the Advancement and Support of Education have named James Wallace, professor of mechanical engineering, the



WALLACE

2005 Maryland Professor of the Year. A member of the College Park faculty for 30 years, Wallace was honored for his outstanding undergraduate teaching in

mechanical engineering and for leading the university's development of undergraduate initiatives dealing with the intersection of science, technology and society. Wallace worked with faculty in history, philosophy and the social sciences, along with faculty from engineering and the physical, computer and life sciences, to develop science, technology and society (STS) curricula. His efforts resulted in an STS undergraduate certificate program and provided the groundwork for the College Park Scholars STS program and the Clark School's Gemstone Program, which he directs. Wallace was named a Distinguished Scholar-Teacher by the university in 1987. ■

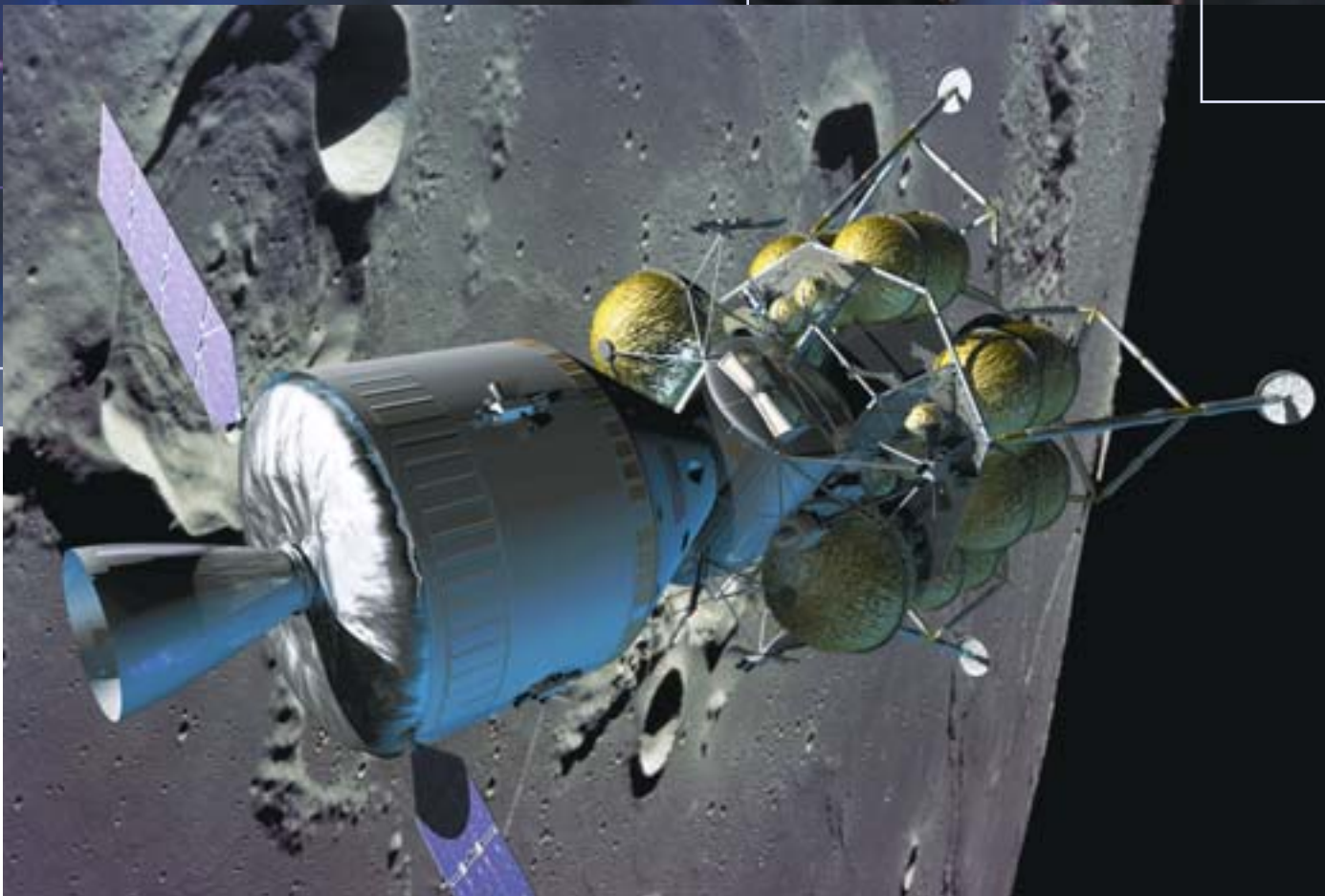
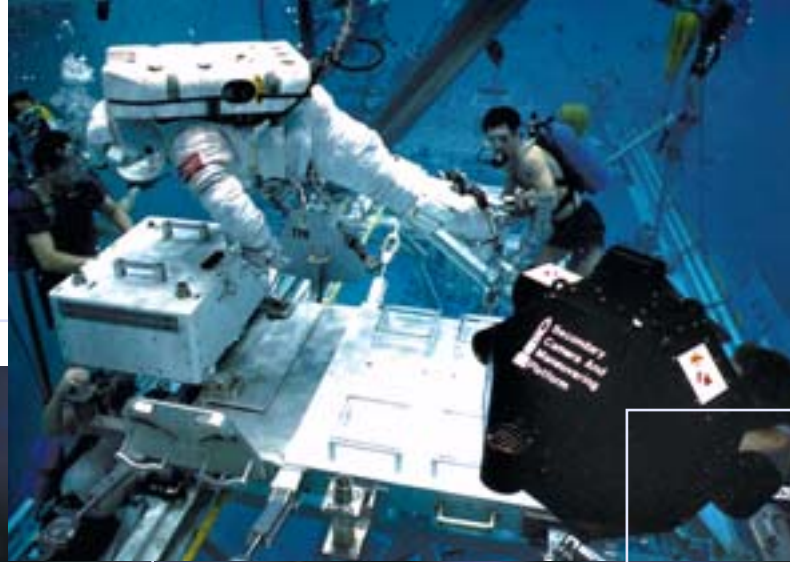
New Clark Chair

MIROSLAW SKIBNIEWSKI has been named the A. James Clark Chair in Construction Engineering and Management. An internationally recognized scholar and leader, Skibniewski was previously on the faculty at Purdue University. He is a former National Science Foundation Presidential Young Investigator and past editor of the journal, *Automation in Construction*. His research focuses on construction engineering and management, specifically construction project management, automation and robotics, e-commerce and tools.

"A HUMAN PRESENCE ACROSS THE SOLAR SYSTEM"

STORY BY JOHN STACK

NEW NASA VISION
CALLS FOR KEY CLARK
SCHOOL CAPABILITIES



Rendering by John Frassanito and Associates.

NASA'S NEW EXPLORATION ARCHITECTURE,

as presented at the Clark School on October 5, 2005, by NASA Administrator Michael Griffin, Ph.D. '77, aerospace engineering, is both practical and audacious. It calls for the gradual and cost-effective restructuring of the nation's space program to make the solar system a new home for human beings and ensure that America leads the way. (See related story, p. 12.)

The plan depends on two important capabilities for which the Clark School is highly regarded: the training of a large number of highly skilled engineers and the development of existing and new space technologies spanning the full range of engineering disciplines.

"Dr. Griffin's vision presents the Clark School with exceptional leadership opportunities," notes Clark School Dean Nariman Farvardin. "From robotics to human factors, fire safety to reliability engineering, we are already working to produce the new technologies, and new engineers, his vision demands."

THE NATION'S PREMIER SPACE ROBOTICS TEAM

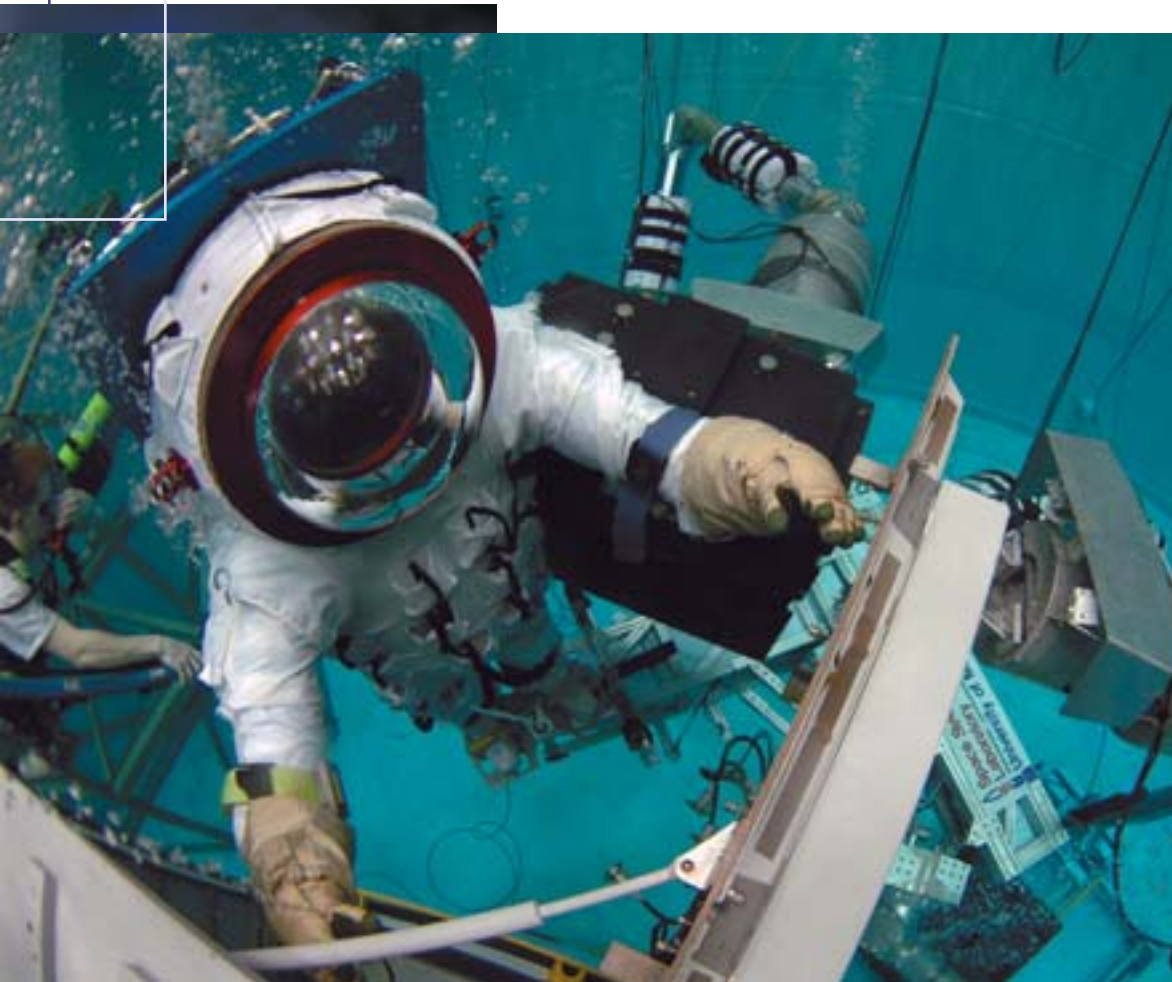
In the advanced facilities of the Clark School's Space Systems Laboratory (SSL), robots are doing amazing things. Designed, built and controlled by students and faculty, they are maneuvering within the Space Hardware Assembly Lab in the Jeong H. Kim

Engineering Building and working underwater in the simulated space conditions of the nearby Neutral Buoyancy Research Facility (NBRF), grasping tools and small objects and interacting with researchers. In the years ahead, future generations of these same robots will work alongside astronauts as they travel to and explore the landscape of the moon and Mars.

"All current experience indicates that teams of humans and robots, working cooperatively in an integrated work site, are the most capable and productive way to conduct space operations," notes Dave Akin, associate professor of aerospace engineering and SSL director. His group includes four full-time researchers and more than 40 graduate and undergraduate students. "Our work aims to make astronauts more productive, both inside the spacecraft and outside during extravehicular activity (EVA) excursions."

Akin and his lab have a long history of space robotics leadership. As the principal investigator of the Experimental Assembly of Structures in EVA (EASE) program, Akin directed the first EVA structural assembly experiment in space in 1985. In 1989, the SSL conducted the first set of robotic and human/robot team repair experiments on the Hubble Space Telescope hardware.

The SSL has built eight robots since 1983, most recently the Ranger series, which were funded by NASA as part of its Space Telerobotics Program. They were designed to repair satellites,



Left, an artist's concept of the Crew Exploration Vehicle and Lunar Surface Access Module in orbit around the moon. Center, the SCAMP (Supplemental Camera and Mobility Platform) monitors Astronaut Tom Jones during training for a space-walk. Right, Space Systems Laboratory researchers use the MARS (Maryland Advanced Research/Simulation) suit MX-2 and Ranger Dexterous Robot to investigate cooperative human/robot servicing of the Hubble Space Telescope.

prepare work sites and act as servicing systems for the Hubble Telescope and the International Space Station. Building on the SSL's more than 20 years of experience with the Hubble Telescope, the Ranger could be the first robot to perform dexterous work in space. It is designed to "do anything a human in a space suit can do," including satellite maintenance, refueling and orbit adjustment, relates Akin.

Based on its demonstrated expertise, the SSL was selected late last year to lead a new Institute for Dexterous Space Robotics, funded by Congress for \$3.5 million. Through the institute, the Clark School teams with Carnegie Mellon University and Stanford University, creating and leading a consortium to address NASA's current and future needs for cutting-edge robotics.

According to Akin, SSL research is "pushing advanced robotics technology to the next level," particularly in the area of spacecraft automation. Akin cites the development of the Supplemental Camera and Maneuvering Platform (SCAMP), a neutral buoyancy robot designed as a flying camera to give ground controllers and astronauts better views of EVA excursions and to inspect work sites in orbit. Originally manually controlled from a remote station, SCAMP vehicles are being altered to automatically perform complex inspection tasks, including following astronauts during spacewalks to monitor their activities.

ACHIEVING HUMAN-ROBOT SYMBIOSIS

8 The SSL is also a leader in human factors research, which includes space suit and glove design. The Maryland Advanced Research/Simulation (MARS) suit is a simplified neutral buoyancy spacesuit for use in EVA research, producing useful data on EVA operations without the multi-million dollar price tags of NASA space suits. The Power Glove is a prototype motorized spacesuit glove to reduce hand fatigue while providing the wearer with a greater range of motion.

"The ultimate goal of human-robot cooperation in space is symbiosis—directly providing robotic capabilities to the human in the space suit. Power Glove is a first step in this direction. The human commands the motion, but the glove itself provides the grasp force," explains Akin.

The Clark School is one of the few engineering programs

doing significant work in both space systems robotics and human factors. "Too often in the past, humans and robots have been treated like adversaries when considering how to perform a new mission. If the current NASA vision is to succeed, it will need a combination of humans and robots working together and the Clark School is one of the few places where the next generation of space engineers can receive training in both fields," says Akin.

As other nations become increasingly competitive in space endeavors, he notes, aerospace engineering is one field in which the U.S. remains dominant. "The key to maintaining the U.S. lead in space is to continue to innovate and incorporate advanced technology. There is no better place to accomplish that innovation than the university environment. Given our experience and unique facilities, the Clark School should be pre-eminent in producing future space technologies and professionals."

FROM NEUTRAL BUOYANCY TO ARCTIC SEAS

Given the SSL's expertise in developing waterproof robotic arms in the NBRE, the lab was the logical choice to help the Woods Hole Oceanographic Institute (WHOI) prepare to venture under Arctic ice. In the summer of 2007, WHOI will go beneath the ice cap to obtain biological samples from deep volcanic vents using autonomous underwater vehicles. The SSL will play a pivotal role, developing a robotic sampling system for the WHOI undersea vehicle. Autonomous operation is required for deep-sea vehicles and their manipulators when shifting ice or

Photos by Mike Morgan



ALUMNI ASTRONAUTS: A PROUD TRADITION

Maryland alumni have made enormous contributions—and sacrifices—for America's space exploration program. Judith Resnik, Ph.D. '77, electrical engineering, was one of the astronauts who perished in the explosion of the Challenger spacecraft. William (Willie) McCool, M.S. '85, computer science, was among those astronauts who died aboard the Space Shuttle Columbia. Paul Richards, M.S. '91, mechanical engineering, spent 13 days in space on the 2001 Discovery mission to the International Space Station. Richard "Ricky" Arnold II, M.S. '92, marine estuarine environmental science, was selected as a member of the 2004 class of astronaut recruits.



Rendering by John Frassanito and Associates.

Left, Ella M. Atkins and Dave Akin lead the Clark School's space robotics efforts. Center, the Power Glove is a prototype motorized spacesuit glove to reduce hand fatigue and increase range of motion. Right, up to four astronauts could land on the moon in NASA's planned new lander.

other hazards prohibit the reliable high-speed communication link required for tele-operated control.

The Arctic mission begins this summer when a team of SSL faculty and students travels to WHOI in Massachusetts to interface the robotic manipulator to the Woods Hole vehicle. From there, the WHOI-developed autonomous undersea vehicle, with the SSL robotic sampling system attached, will be loaded onto a U.S. Coast Guard icebreaker for sea trials in ice packs off Point Barrow, Alaska. Findings will be incorporated into the final system, which will descend the following summer through a hole in the Arctic cap to never-before-seen hydrothermal vents five kilometers down at the bottom of the Arctic Ocean.

According to Assistant Professor of Aerospace Engineering and SSL researcher Ella M. Atkins, "The Arctic mission holds many of the same challenges that space missions do, and demonstrates the abilities of autonomous robots to calculate and provide valuable data before and during a mission, work in dangerous situations and reduce the risk to humans. As we establish a base on the moon and begin to explore Mars and other planets, the need for intelligent, dexterous and autonomous robotic systems will become more critical than ever."

LANDING THE SHUTTLE, LAUNCHING ITS REPLACEMENT

At the Clark School's Space Vehicle Technology Institute (SVTI), the next generation of space vehicles is taking shape. Explains SVTI director Ken Yu, associate professor of aerospace engineering, "Instead of a spaceplane like the shuttle, it will be a Crew Exploration Vehicle or CEV, a reusable capsule similar to the one used in the Apollo and Gemini missions. Adapting this earlier approach will allow NASA to cut costs and meet a 2012 launch deadline."

Three times larger than earlier capsules, the CEV will carry four

astronauts to the moon and back, orbit the moon autonomously, and allow the entire crew to descend to the surface. It will support up to six crew members on future missions to Mars and deliver crew and supplies to the International Space Station.

The SVTI, funded by NASA and the Department of Defense, consists of more than 30 graduate students from the Clark School, the University of Michigan, the Johns Hopkins University Applied Physics Laboratory, the University of Washington and North Carolina A&T. It began as one of NASA's seven University Research Engineering and Technology Institutes (URETI), engaged in developing new, reusable launch vehicles to replace the space shuttle. When NASA announced plans to return to the moon last year, the Maryland-led team was redirected to support that mission.

To ensure the CEV can stand up to the rigors of re-entry into the Earth's atmosphere, the SVTI is concentrating on four main issues: thrust chamber assembly; re-entry aerodynamics; systems analysis; and vehicle thermo structure. Much of the work occurs in the Clark School's Center for Hypersonic Education and Research, which is dedicated to the study of high-speed flight more than five times the speed of sound. The research laboratory hosts a range of studies including the basic physics of high-speed flights, such as when the CEV enters the atmosphere, and systems design issues, such as the best shapes for re-entry heat shields and emergency return trajectories from the moon.

"If you are going to make repeated trips to the moon and Mars, you need an incredibly reliable system," says Mark Lewis, professor of aerospace engineering and chief scientist of the U.S. Air Force. He notes the world-class capabilities of the school's reliability engineering program (see next section, p. 10). "The Clark School is clearly a leader in robotics, future propulsion technologies, future vehicle concepts, and in greater combustion efficiency and safety in our current liquid-fueled rockets."

In fact, in both the school's Advanced Propulsion Research Lab and Combustion Lab, Yu and colleagues are applying a revolutionary new physics-based combustion control technology not only to achieve more powerful and efficient propulsion but to minimize risk for longer distance space exploration. "Even the tiniest fraction of uncontrolled combustion energy can cause a tremendous amount of unwanted stress," explains Yu. "Traditional control methods have relied on empirical data with costly trial and error testing. We are working to obtain state-of-the-art diagnostics data from various model rocket injectors. With well-characterized databases and a better understanding of complex combustion problems, we'll improve prediction and modeling capabilities for future NASA missions."

THE WORLD'S LEADING RELIABILITY ENGINEERING PROGRAM

The tragedies of the Challenger and Columbia missions have made a commitment to safety an absolute imperative at NASA and the Clark School (see related story, p. 8). Few people feel this commitment more than Ali Mosleh, professor of mechanical engineering and director of the Clark School's Center for Risk and Reliability. For years, Mosleh has advocated that NASA perform risk assessment with the same disciplined scientific approach adopted by the nuclear power industry. NASA listened and chose the Clark School over 20 competing organizations to create the software and methodology for its risk assessment and analysis program.



Today, NASA and the school hold a joint patent on quantitative risk assessment system software. "In fact," adds Mosleh, "the software has been commercialized and used by other industries." His team, including graduate students, is now in the process of creating the Simulation-Based Probabilistic Risk Assessment program, which makes the software more accessible to engineers and scientists, especially those engaged in spacecraft design.

"There's no question that many people in the profession regard Maryland as the world's leading reliability engineering

AEROSPACE ALUMNI CONNECTIONS

Calibrating the Deep Impact Mission

Working with the Jet Propulsion Laboratory in Pasadena, Calif., Calina Seybold, B.S., '90, aerospace engineering, is part of the Deep Impact mission, a \$312 million NASA project to provide the first-ever complete profile of substances that comets may have brought to Earth 4.5 million years ago. Seybold has worked on the Deep Impact team since the project was proposed in 1998. Her job, throughout the entire process, was instrument calibration.

Distinguished University Professor Michael A'Hearn, College of Computer, Mathematical and Physical Sciences, is principal investigator for the project, which recently won the Space Frontier Foundation's Vision to Reality award for "turning the vision of true space exploration and the gathering of scientific knowledge into reality."

For more information, see
www.deepimpact.umd.edu.

Finding Commercial Partners for NASA

As NASA turns to private industry to provide cost-effective access to low-Earth orbit and the International Space Station, Alan J. Lindenmoyer, M.S. '86, aerospace engineering, will be leading the effort. Lindenmoyer is project manager for the Commercial Crew/Cargo Project Office. "We are in the process of soliciting proposals from private industry for space transportation capabili-

ties," says Lindenmoyer. "If private industry can prove it can produce vehicles that are reliable and cost effective, we will have a new market ready to resupply the space station," he explains. Lindenmoyer joined NASA's Goddard Space Flight Center in 1982 and has worked in the International Space Station Program since 1990. He anticipates private industry will increasingly partner with universities to make research platforms affordable and accessible.

Ethernet inventor and 3Com founder Robert Metcalfe agrees. Addressing a Clark School audience last fall as a speaker in the Whiting-Turner Business and Entrepreneurial Lecture Series, Metcalfe stressed how entrepreneurs need to rely on government to conduct research and advocated more government spending on university research. "The most effective method of technology transfer is people and these people come from our universities," says Metcalfe.





Left, Ranger free-flying repair robot and SCAMP camera platform perform Space Shuttle servicing tasks. Center, Dave Akin prepares for submersion in the Neutral Buoyancy Research Facility (NBRF), the only testing facility of its kind on a university campus. Right, Space Systems Laboratory graduate student Jeff Braden tests MARS suit MX-2 in the NBRF.



program,” Mosleh adds. “One indication is that NASA has an exclusive relationship with us to train their workforce in the areas of risk and reliability.”

IMPROVING SPACE FIRE SAFETY MEASURES

Peter Sunderland, assistant professor of fire protection engineering, has been involved with NASA research on microgravity combustion and fire safety since 1991. Prior to joining the Clark School last year, he held a postdoctoral appointment at NASA Glenn Research Center in Cleveland and supported a study of soot formation in flames that was conducted on three space shuttle flights. Currently, he is working on three NASA projects: developing advanced diagnostics for combustion experiments, investigating ways to control soot formation and extinction in flames and evaluating fire safety in spacecraft oxygen storage.

“Enriched oxygen systems, which are integral to all manned spacecraft, were responsible for the nearly catastrophic fire on the Mir space station in 1997,” explains Sunderland. “Our study looks at the unusual fire hazards of these systems and considers ways to mitigate them.”

As a member of the Space Vehicle Technology Institute, André Marshall, assistant professor in fire protection engineering with an affiliate appointment in aerospace engineering, studies film cooling for rocket thrust chambers and motor nozzles. His work supports the development of new technologies for cooling thrust chamber assemblies.


“The viability and advancement of this technology depends on understanding the complex heat transfer and mixing processes that occur near walls. Understanding these processes will also enable the development of a wide range of new propulsion technologies, such as micro-rocket arrays for distributed propulsion,” says Marshall.

CRUCIAL AUTONOMOUS HYBRID COMMUNICATIONS

Intelligent communications among humans and space systems and devices are a vital part of the new Exploration Architecture. Clark School experts are building new communication capabilities through the development of high-performance, integrated wireless networks.

John S. Baras, Lockheed Martin Chair in Systems Engineering, professor of electrical and computer engineering and founding director of the school’s Institute for Systems Research, stresses that smart vehicles, sensors, robots or astronauts using intelligent tools in outer space must send essential information to NASA over satellite networks as well as collaborate to perform vital functions in space. For example, Baras explains, in the initial exploration of the moon and Mars, wirelessly connected, surface-based sensors will form an autonomous network among themselves, the orbiting CEV and, eventually, orbiting satellites. “This wireless sensor network will establish a detailed picture of the physical terrain and prepare for future explorations that will bring mobile multifunctional robots and humans to the moon and Mars,” explains Baras. He notes that several sensors will be mobile and their capabilities will range from recording images to sensing vibrations or chemical substances.

Baras is a member of the steering committee of the NASA Space Communication Architecture Working Group and current director of the Maryland Hybrid Networks Center (HyNet), one of 11 Research Partnership Centers sponsored by NASA. Building on the Clark School’s expertise in terrestrial wireless networks, satellite networks and hybrid networks for commercial and military operations, HyNet is creating the autonomously operated system of ground and space-based communications networks the Exploration Architecture demands. “In the future, it will be possible for an in-space

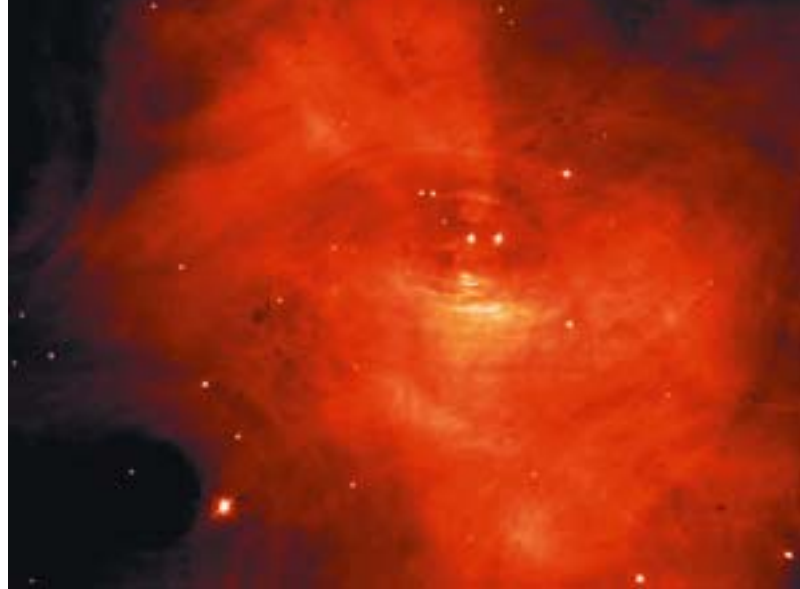


human or robotic spacecraft, a rover or a ground-based user to gain access to the network from nearly anywhere on or around the Earth, the moon or Mars,” says Baras.

“Our primary focus is to develop hybrid networks that link satellite and wireless systems with cellular, cable, Internet and telephone networks,” adds Armand Makowski, professor of electrical and computer engineering and a HyNet co-founder. “Sophisticated sensors, attached to satellites, man-made stations and other nodes, will create the information and communication network critical to long-distance space travel.” In fact, some predict one trillion sensors in space by 2015, dwarfing the number of cellular phones on Earth. “My work includes creating complex algorithms to direct these sensors,” says Makowski.

PULSARS: THE NEXT GENERATION OF NAVIGATION SYSTEMS

Making sure that space systems are where they ought to be depends on reliable, accurate navigational systems, an area where Suneel Sheikh, Ph.D. '05, aerospace engineering, and Darryll Pines, professor of aerospace engineering, continue to make headlines. Two years ago they were honored by the university's



Office of Technology Commercialization for the invention of a new system using pulsed X-ray radiation from distant celestial bodies (pulsars) to establish a spacecraft's time, position, velocity and attitude without the expense of creating navigation satellites and maintaining them with complex ground operations, as in human-developed systems such as GPS.

“Navigation signals from GPS and similar systems primarily work for orbits of spacecraft within those satellite constellation orbits,” says Sheikh. “Pulsars are nature's ‘celestial lighthouses’—navigation beacons that, much like our lighthouses on Earth,

A WARM HOMECOMING FOR NASA ADMINISTRATOR

Michael Griffin, Ph.D. '77, aerospace engineering and the 11th administrator of the National Aeronautics and Space Administration (NASA), was welcomed home last October by Clark School faculty, staff and students. The Clark School graduate unveiled NASA's Exploration Architecture and its vision of “a human presence across the solar system,” including a return to the moon no later than 2020.

“If the U.S. is to continue its role of global pre-eminence, we must continue our pre-eminence in space,” Griffin said. “I believe there will come a day when more humans will live away from the Earth than on the Earth. Space will no longer be a destination visited briefly and tentatively. Space is an arena where human beings will live, work and thrive.”

In the next five years, as NASA “flies out the old system while creating the new system,” the agency will utilize existing technologies and minimize dollars spent for new development. However, as NASA

prepares to field a new system in 2012, universities will play a critical role in research and development. Technologies to be developed include crew and cargo launch vehicles, crew exploration vehicles and Mars ascent and descent propellant systems. Griffin cited NASA's robotic space science program, a \$5.5 billion venture, as “one of the nation's crown jewels.”

At the same time, Griffin expressed concern that “there are never enough brains” to do the work, particularly as fewer and fewer U.S. students pursue careers in engineering. Questions such as why lunar dust causes astronauts to lose their fingernails, why wrist rings on space suits wear out in three days, and how can a power station be created on the south pole of the moon, are among the thousands that need answers. “We must do things that make students want to study biology or engineering and to be involved in an enterprise like NASA,” he shared.

“Space exploration is humanity's frontier.



When one looks back on history, one can only conclude that those nations that explore the frontier are the leaders of their time,” says Griffin, who is committed to keeping the U.S. in that leadership position.

Left, Pulsars are nature's "celestial lighthouses."

provide a powerful, periodic signal that can be utilized throughout our entire solar system and beyond."

Sheikh speculates that in the future all human-developed navigations systems such as GPS will be combined within single receiver units with such high reliability and integrity that aircraft, and even trucks, buses and automobiles, could be automatically operated without pilots or drivers. "As these systems improve, we will see commonplace navigation accuracies measured in millimeters and centimeters instead of meters or kilometers," he says.

EDUCATING AND INSPIRING FUTURE ENGINEERS

Throughout the Clark School's departments and institutes, faculty and graduate and undergraduate students are answering NASA's call to enhance existing space technologies and develop new ones through research. At the same time, the school is training the engineers NASA must hire today and over the coming decades to realize its mission.

"The aerospace engineering department is conducting research with virtually all of the NASA centers. So, many of our students are already working on the really tough problems facing NASA in the near and distant future," offers William Fournery, department chair and associate dean. "More than one-third of our undergraduates work in research labs alongside faculty and all of our full-time graduate students are supported on research projects." The department is ranked among the top 10 graduate programs nationwide by *U.S. News & World Report*.

Thomas Stengle, B.S. '76, aerospace engineering, and head of the Flight Dynamics Analysis Branch of Goddard Space Flight Center, has worked on satellite operations support with the department. "Their fresh ideas and new techniques and technologies for navigating and controlling spacecraft complement our traditional technologies," he notes. "The Clark School has made a greater effort, particularly in the last 10 years, to understand the needs of agencies like NASA and develop ideas that can be directly applied to current projects." Stengle cites the high number of Clark School graduates and current graduate students in his branch, and adds that Clark School students have enhanced a special spacecraft simulator built at Goddard for use as a classroom demonstration tool.

"The enormous and exciting challenges of planned lunar and martian missions will require a host of skilled engineers from aerospace engineering and indeed every Clark School department," comments Dean Farvardin. "America's space program has long been a key force in inspiring young people all over the world to enter engineering. We expect that the new Exploration Architecture will only strengthen this important motivation, and are committed to doing our part to further this plan." ■

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.



The Clark School's winning team for the American Helicopter Society's 2006 Student Design Competition.

AEROSPACE STUDENTS FLY HIGH OUTSIDE THE CLASSROOM

Aerospace engineering students are translating their work in Clark School labs into prize-winning entries in national competitions. Graduate students from the school's Alfred Gessow Rotorcraft Center flew off with an eighth-straight victory in the American Helicopter Society's 22nd Annual Student Design Competition. Their assignment: create an aircraft that can take off vertically while carrying a fully-loaded, 20-ton combat vehicle. Atlas, the center's ship-based military helicopter designed to support logistics for an Army Future Combat System light armored vehicle, was the winner.

Last fall, graduate students Mike Naylor, B.S. '04, M.S. '06, aerospace engineering, and Nick Scott, B.S. '03, electrical engineering, M.S. '06, aerospace engineering, won first place at the Infotech@Aerospace video competition for the "Most Innovative Other Vehicle or System." Infotech@Aerospace is a technology forum sponsored by the American Institute of Aeronautics and Astronautics. The video details the latest efforts of the school's Space Systems Lab to conduct autonomous sampling with a robotic manipulator by merging NASA-supported robotics technologies with advanced autonomous under-sea vehicles (see related story, p. 8).

For the last six years, Clark School students have participated in the NASA Revolutionary Aerospace Systems Concepts—Academic Linkage (RASC-AL) competition. The school was recognized with top honors three years ago for its design of a Space Construction and Orbital Utility Transport (SCOUT). The 2004 team won RASC-AL with MORPH-LAB, a design for modular habitat units that can travel from place to place on the moon and set up a base for human exploration.



IMPROVING LIFE FOR MILLIONS OF PEOPLE

FISCHELL GIFT ESTABLISHES BIOENGINEERING DEPARTMENT
AND INSTITUTE FOR BIOMEDICAL DEVICES



Above, the Fischells share their medical inventions with invited guests and the media at the gift announcement ceremonies. Center, the Fischell family includes, from left, David, Robert, Scott and Tim. Right, Robert Fischell's granddaughter, Erin Fischell.

"The best engineering has the power to improve life for millions of people. Bioengineering and biomedical devices are the most direct means to achieve this goal."

Robert E. Fischell



Robert E. Fischell, M.S. '53, physics, and honorary doctor of science '96, believes there is no better use of science and engineering knowledge than to improve lives. For the better part of his career, Fischell has successfully done just that, with the invention of a host of life-saving medical devices, including lifetime pacemaker batteries and implantable insulin pumps. With his recent \$30 million gift to the Clark School, Fischell is sharing his vision with future generations and enlarging opportunities for engineering students to innovate and create their own devices for the betterment of all humankind.

"I want undergraduate and graduate students to have the vision to search for answers to scientific questions and the courage to pursue their ideas," says Fischell, who holds more than 200 patents and is the father of modern coronary artery stents.

His gift, one of the three largest ever received by the university, establishes the Fischell Department of Bioengineering and the Robert E. Fischell Institute for Biomedical Devices at the Clark School. His sons David, Tim and Scott committed another \$1 million to support the new department.

At a ceremony in mid-December, Fischell attributed much of his success to the brilliance and collaboration of his three sons, who participated in the ceremony along with their own families. Among those who spoke was granddaughter Erin, who plans to pursue studies in biomedical engineering. The family's latest inventions could warn of impending heart attacks and treat epileptic seizures and migraine headaches.

Fischell's vision for the department is ambitious. "My goal is that when you go to a doctor's visit with a loved one five years from now, they can say that because of what was conceived at this university they can help you."

Making the World a Better Place

Helping others and making the world a better place are constant themes for the Fischell family. "Joy in life comes from what you accomplish and what you have done to help humankind," professes Fischell, who serves on the University of Maryland Foundation's Board of Trustees and the Clark School's Board of Visitors. He has frequently shared his expertise with Clark School students and previously established the Fischell

Fellowship in Bioengineering.

The establishment of the new department and institute is the latest step in the Clark School's progress as one of the nation's premier engineering schools. "The Fischell gifts allow us to offer new research and educational capabilities in health care, one of engineering's major growth areas," says Clark School Dean Nariman Farvardin. "We can now apply our well-established, cross-disciplinary methods and facilities to create a first-rate biomedical engineering department—one that will benefit from ideas and insights from all of our engineering disciplines, as well as all of the university's other schools and institutes."

The new department, chaired by William Bentley, Herbert Rabin Distinguished Professor in Engineering, will offer a new undergraduate program as well as the existing graduate bioengineering program. Undergraduate admissions will begin this fall. Plans are underway to build an addition to house the new department in the Jeong H. Kim Engineering Building, which already contains several bioengineering laboratories. ■

From Brainstorm to Market

Venture Accelerator Boosts Early-Stage
Faculty and Student Companies

Several years ago the founders of Applied Media Analysis began creating computer vision software for mobile devices based on the innovative research of David Doermann, M.S. '89 and Ph.D. '93, computer science, and associate research scientist in the College of Computer, Mathematical and Physical Sciences; Huiping Li, Ph.D. '00, electrical engineering; and Ramani Duraiswami, an assistant professor of computer science. Their work was supported largely by federal Small Business Innovation Research Grants. To move their products to market, the researchers began looking for expertise to help them develop a business plan and recruit a management team.

Anik Singal, B.S. '05, finance, and an alumnus of the Hinman CEOs program, began developing the idea for his company, Affiliate Classroom, during his sophomore year at Maryland. By graduation, he had established a profitable online training program to prepare "affiliate marketers," or independent online sales representatives, to help companies sell. He soon realized that to grow his company he needed a strategic plan, a marketing strategy and venture capital.

16 Venture Accelerator Director Scott Laughlin, left, works closely with clients, including Affiliate Classroom founder Anik Singal.



Enter Venture Accelerator (VA), the latest Clark School entrepreneurship program offered under the auspices of the Maryland Technology Enterprise Institute (MTECH). "The Venture Accelerator program is truly home-grown. We work exclusively with faculty and students who have started their own companies based on innovative intellectual property developed at College Park. We help them take those companies to the next step," says VA Director Scott Laughlin. "The Clark School is one of the only engineering schools in the country to offer such a program."

Through hands-on mentoring and consultation, including venture funding acquisition, marketing and sales plan development, market validation and staffing, VA stands ready to help transform selected faculty and student companies into more viable business entities.

Laughlin and staff draw upon a range of personal and university relationships to make valuable customer, investor and strategic partner introductions. "Social capital is one of the VA program's most important assets," says Laughlin, a former partner in a \$600 million venture capital firm. "It is all about the people we bring to bear on the problems of early-stage companies."

VA has helped Applied Media Analysis match its computer vision software to three distinct markets: bar code readers on mobile phones to make positive patient identifications for the healthcare market; business card readers that provide optical character recognition for the corporate market; and capabilities to photograph and translate full-page documents for the government market.

The biggest challenge for the company: selecting an executive team. "At our company, we are all researchers. We need to recruit the right kind of business leader and determine the right timing to make that move," says Doermann, who is working with Laughlin to make those decisions.

For a one-time fee, Affiliate Classroom participants access step-by-step affiliate marketing training through the company's Web site and online newsletter. They learn the best affiliate

companies to partner with, ways to draw traffic to their Web sites and methods to increase sales.

"We have about 2,000 monthly subscribers and more than 30,000 individuals who receive our free newsletter and free blog," says Singal, who is looking to VA for mentorship and coaching, help in identifying new markets and business introduc-

tions. Laughlin is busy connecting Singal with companies that utilize affiliate marketers, providing the entrepreneur a business-to-business marketing approach he had not previously considered.

Both businesses anticipate moving into MTECH's Technology Advancement Program (TAP), an incubator for technology-based start-up companies, in the months to come. "Our goal is not to guarantee success; rather, it is to minimize failure. We are here to help faculty and students overcome the fear of getting started and the other real challenges all companies face in their first 12 to 18 months," says Laughlin. "We want to make each company look, act and perform as a well-run company."

Laughlin emphasizes the program's synergy with MTECH's other programs, which include the Hinman CEOs, the Maryland Industrial Partnerships Program (MIPS) and the university's Office of Technology and Commercialization (OTC). "If OTC sees a company with a great technology and a good pos-

sibility for successful commercialization, they can refer them to us. On the flip side, we can point faculty and students in their direction for those ventures that have the potential for protectable and licensable intellectual property," he says.

Promoting technology-based entrepreneurship is a key goal for Venture Accelerator. "We want to be sure that the students we teach have entrepreneurial opportunities and that technical faculty campuswide can commercialize not only by licensing but by creating companies," adds Laughlin. ■

For more information, visit www.appliedmediaanalysis.com, www.affiliateclassroom.com and www.va.umd.edu.



Applied Media Analysis is preparing to market its computer vision software for mobile devices.



CLARK SCHOOL CELEBRATES CROSS-DISCIPLINARY KIM BUILDING AND DONORS' GENEROSITY



With state, university and corporate leaders on hand, the Clark School celebrated the new cross-disciplinary Jeong H. Kim Engineering Building last fall. The dedication ceremony included speeches by Maryland Governor Robert Ehrlich; Michael Busch, speaker of the Maryland House of Delegates; William "Brit" Kirwan, chancellor of the University System of Maryland; University President C.D. Mote, Jr.; and Clark School Dean Nariman Farvardin. Jeong H. Kim, Ph.D. '91, reliability engineering, professor of practice and head of Bell Labs, was lauded for his visionary naming gift.

Other individual and corporate donors to the Kim Building were recognized for their commitments, and tours of the building's numerous research labs—from bioengineering to space robotics to intelligent transportation systems to the FabLab clean room facility—were conducted throughout the day. ■



Top, Maryland Governor Robert Ehrlich addresses the audience. Above left, Jeong H. Kim, Ph.D. '91, reliability engineering, for whom the building is named, enjoys the moment with Governor Ehrlich and Clark School Dean Nariman Farvardin. Bottom left, Professor Emeritus Hung C. "Jimmy" Lin, Professor of Mechanical Engineering Reinhard Radermacher and Lloyd Robeson, Ph.D. '67, chemical engineering, were among those receiving Innovation Hall of Fame medallions from University President C.D. Mote, Jr.

Clark School Grads Honored by University



Left, University President C.D. Mote, Jr. presents Jeong H. Kim, Ph.D. '91, with the President's Distinguished Alumnus Award. Below, Phil Wiser is honored with the Clark School Distinguished Alumnus Award by Eun Yang, B.S. '95, anchor for Washington's NEWS4Today Weekends.



Jeong H. Kim, Ph.D. '91, reliability engineering, professor of practice and the man for whom the Kim Engineering Building is named, and Phil Wiser, B.S. '90, electrical engineering, were honored at the university's Sixth Annual Awards Gala in December at the Samuel Riggs IV Alumni Center.

Kim received the President's Distinguished Alumnus Award, which goes to an alumna or alumnus who has achieved national recognition for excellence in her or his profession or field. Past Clark School winners of this award include Gordon England, '61, deputy secretary of defense, and A. James Clark, '50, for whom the Clark School is named.

Kim recently was appointed head of the Bell Labs unit of Lucent Technologies. In addition, the U.S. Pan Asian Chamber of Commerce named Kim as one of the top 10 most influential Asian Americans in business. Kim described his enormous pride in the accomplishments of the university and cited the advice and wisdom of his former professor Ali Mosleh, who directs the Clark School's renowned reliability engineering program. Kim recalls how he questioned the reputation of the relatively new program when he began his doctoral studies. "Today, the reliability engineering program is number one, not just in this country, but in the world," shared Kim.

Wiser, vice president and chief technology officer of Sony Corporation of America, received the Clark School Distinguished Alumnus Award, which recognizes the professional achievements and demonstrated success of a Clark School graduate and his or her contributions to and impact on the field of engineering. Wiser told attendees at the ceremony, "I know all too well how desperately a motivated young person needs a break... that one shot to show what they can really do. College Park gave me that shot." He added, "I hope that the school recognizes the value of access for students in need and maintains that as a priority. By creating an opportunity to join this community of excellence, the college invests in a growing group of the strongest and often most loyal Terps." ■

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Williams Named Young Engineer of the Year

Dwight Williams, Ph.D. '05, nuclear engineering, has received the Young Engineer of the Year Award from the National Society of Professional Engineers. Williams is chief engineer and principal nuclear physicist with the U.S. Department of Defense. He oversees all nuclear, biological, chemical and electrical engineering

technology applications within the department's Technical Assessments Division.

"The Clark School gave me an opportunity to pursue a degree full force. It helped me move to the next phase of my life and fulfill my career goals," he states. Now, he is spending a good deal of his time mentor-

ing junior colleagues. "I am trying to use my life experiences to help others overcome obstacles in their lives. The Clark School has been particularly productive in assisting students in traditionally under-represented groups. It is important that minority groups no longer feel isolated in the engineering field." ■



Above, kitchen dining area. Inset, exterior of house.

Maryland Solar Decathlon House Is Crowd Favorite

20

The University of Maryland student Solar Decathlon house won the People's Choice Award as the favorite design of the thousands of visitors to the Department of Energy's 2005 competition on the National Mall last fall. The Maryland team of engineering, architecture and liberal arts majors launched their project in 2003 and was the only team from the Washington-

Baltimore area among the 18 competitors. The Maryland team finished eighth in the overall competition, based on such criteria as power efficiency, livability and design. The team donated the finished home to Red Wiggler Community Farm, a non-profit organization in Clarksville, Md., that employs adults with developmental disabilities. ■

Student Wins Hollings Scholarship

Jennifer Thompson, B.S. '06, mechanical engineering and a student in the school's Gemstone program, has won the prestigious Ernest F. Hollings Scholarship, which promotes increased undergraduate training in oceanic and atmospheric science and education. Only 100 students nationwide receive the prestigious scholarship and Maryland is one of the universities with the largest number of awardees, four in 2005. Scholarship winners receive \$8,000 during their junior and senior years and are given a summer internship at the National Oceanic and Atmospheric Administration. ■



Alumni Notes

JOHN CHINO, M.S. '73, mechanical engineering, was named deputy of Northrop Grumman Corporation's Electronic Systems sector and vice president and general manager of enterprise excellence. A 34-year veteran of the company, Chino has executive responsibility for the sector's engineering, manufacturing, procurement and materials management, flight test and capital resources functions. He also serves on the Clark School's Board of Visitors.

EDWARD A. MILLER, B.S. '50, mechanical engineering, was inducted as a Pioneer of Space Reconnaissance at the National Reconnaissance Office (NRO) in Chantilly, Va. Last year, Miller was inducted into the Clark School's Innovation Hall of Fame with fellow alumnus James W. Plummer, M.S. '53, electrical engineering. Both Miller and Plummer are recent recipients of the Draper Prize from the National Academy of Engineering for their work on the Corona Project.

Alumnus, benefactor and educational innovator **BRIAN HINMAN**, B.S. '82, electrical engineering, was named California Entrepreneur of the Year in Communications and Networking by Ernst & Young.

W. JEFF HOLTZINGER, B.S. '87, civil engineering, has been elected mayor of Frederick, Md. In his first run for elected office, Holtzinger pulled off an upset victory against a former four-term mayor. A former city engineer for Frederick, he is also a lawyer.

HAMID JAFARKHANI, M.S. '94 and Ph.D. '97, electrical engineering, was selected as a fellow of the Institute of Electrical and Electronics Engineers. He is on the faculty of the University of California, Irvine.

HAITAO ZHENG, M.S. '98 and Ph.D. '99, electrical engineering, has been named one of the top 35 innovators under the age of 35 by the Massachusetts Institute of Technology's *Technology Review* magazine. Zheng was cited for her work on cognitive radios, which dynamically detect unused radio frequencies and help alleviate competition in the radio spectrum. Zheng is an assistant professor of computer science at the University of California, Santa Barbara.

ENGINEERING THE FUTURE

Forward Thinking

Engineering Education is Key to Life's Success

John Chester Barto, B.S. '29, electrical engineering, was born in Cordova, Md., in 1908, the youngest of four children and the only boy. Raised on his family's farm, which continues as a successful agriculture venture today, Barto's ability in math and science led him to pursue a degree in engineering at the University of Maryland.

Following graduation, engineering and research positions with Westinghouse Electric Corporation and Union Switch and Signal Company took him to Pittsburgh, Pa. In 1933, he married his high school sweetheart, Mary Eugenia Morgan, and they made Pittsburgh their home until 1942, when the couple returned to Maryland's Eastern Shore.

Recognizing the uncertainty of the railroad industry, Barto established under his own name the authorized dealership for Westinghouse, RCA and Philco appliances in Easton, Md. Barto marketed his business on the novel idea of "we service what we sell" and this innovative service orientation drew customers from around the state. In 1954, he and his partner created a local sensation when they obtained one of the first commercially available color televisions.

A respected businessman and financial investor, Barto joined the board of directors of the Talbot Bank in Easton and served in that post until his death some 30 years later. He was an active member of the community and belonged to the Rotary, the Elks, the Talbot County Farm Bureau and the administrative board of St. Mark's Church in Easton.

Barto brought an enormous amount of energy and enthusiasm to everything he loved—his wife and two children and his work. He believed work was as natural as play, the key being to love your work. An avid sports fan, he coached the Easton Little League and Senior League baseball teams, sup-



Above, the Barto Room in the Kim Building.

Inset, John Chester Barto, '29.

ported all Easton High School sports teams and followed all Terrapin teams with great pride.

A constant supporter of higher education, Barto felt that his coursework and training at Maryland were central to his business and financial success. He spoke warmly about the caring atmosphere and the beauty of the College Park campus. When Barto died in 1983, a memorial scholarship was established in his name at the Clark School. This fall, in further recognition of Barto's affection for the school, the John Chester and Eugenia Morgan Barto Room was dedicated at the opening of the new Jeong H. Kim Engineering Building. Bright and airy and filled with comfortable chairs and couches, the Barto Room is already a popular gathering spot for students to meet, study and relax.

"Our father was delighted that he received a superior education at his own state university. As an engineer, he knew that small events compound to produce major results," say daughter Mary B. Barto and son John M. Barto. "We know that the room named for our parents will be the site where many students share ideas and dreams that will reach far beyond the walls of the dynamic new Kim Building." ■

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?

As the campus continues to celebrate its 150th anniversary, we will feature vintage Clark School photos on this page of *E@M*. Can you identify what is going on in the photo above and the decade in which the photo was taken? Send your answer to mcorley@umd.edu and you may be eligible for a special anniversary gift.



Congratulations to Harry Wellens, B.S. '67, civil engineering, of Monrovia, Md., who correctly identified the 1950s electrical engineering lab in which students were testing motors in the photo featured on the back of the last issue. Wellens won two tickets to a Terps basketball game for his entry.



A. JAMES CLARK
SCHOOL OF ENGINEERING

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