FALL 2006

BU College of Engineering MAGAZINE

THE MAGAZINE OF THE BOSTON UNIVERSITY COLLEGE OF ENGINEERING

Innovations

ENGINEERING FACULTY ARE BRINGING THEIR RESEARCH TO PRACTICAL USE

Class Dismissed • Racing Toward a Green Earth

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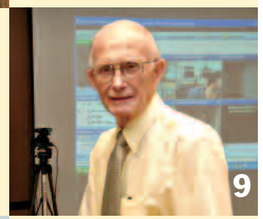

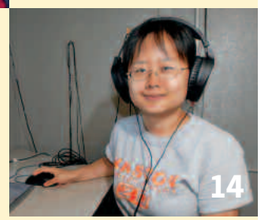

BU College of Engineering
BOSTON UNIVERSITY

MAGAZINE FALL 2006

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COVER: A stack of the fuel cells MFG researchers Uday Pal and Srikanth Gopalan are developing with BTU International.

Greetings

By Kenneth R. Lutchen, Dean

When I arrived at the Boston University College of Engineering as an assistant professor in 1984, we were a small college primarily devoted to undergraduate teaching. Today, we remain committed to our undergraduates and have grown to become a leader in engineering research and graduate studies. As chairman of the Biomedical Engineering Department, I have been privileged to be part of this transformation and proud to have played a leadership role in the College's growth.

This past summer, President Bob Brown and Provost David Campbell honored me with the University's trust and confidence when they appointed me dean of the College of Engineering. Both men are themselves former engineering deans—Bob at MIT and David as my predecessor here. They share my view that the evolution of the College of Engineering is not complete; that we are well positioned to enter a new era of excellence in education and research. David, previous deans and Solomon Eisenberg—who served as dean *ad interim* last year—have built a strong foundation.

We are ready to build on our strengths in several key areas. We offer seven degree programs at the bachelor's, master's and doctoral levels. Our undergraduate curriculum is geared to produce not only great engineers but well-rounded individuals suited to success in the national and global societies. Our research efforts are led by more than 100 faculty members who attract $30 million in external funding annually and have driven our graduate programs into the upper echelons nationally. We have recently completed the Life Science and Engineering Building, the Ingalls Engineering Resource Center and other high-quality physical facilities needed to support our research and educational programs as we reach for new heights.

Our research expertise spans the most forward and important areas of engineering. Our College has leading faculty in the areas of micro and nano systems (MEMS and NEMS), advanced materials science and engineering, sensors, imaging, acoustics, information and sensor network systems, photonics, biomedical engineering, computational modeling and bioinformatics. There are many fascinating areas where two or more of these disciplines intersect. Our faculty have put together some of the most exciting undergraduate and graduate courses and experiences one can imagine. These faculty members bring their research innovations into the classroom and involve students at all levels in their research and educational experiences. As the new dean, I look forward to stimulating new initiatives that leverage the interface of all these areas so that our faculty and students can have a global impact on society.

Although I am new as dean, I have been a member of the College of Engineering family for a long time. Over the course of the coming year, I intend to have a great many discussions with alumni and other members of our family as I develop specific plans for the College's future. I will be asking for advice, suggestions and help, but I come to the job with a philosophy and some initial goals.

First, the faculty is well positioned to work together in the cross-cutting areas mentioned earlier and, in particular, to identify specific high-impact initiatives for the coming decade. Second, we are positioned to remodel several of our existing disciplines to address the emerging challenges of society. Third, we will continue to enhance our educational programs so that students can become "Societal Engineers," individuals who are trained in the core competencies of their chosen discipline but who also have the experience, skill sets and confidence to appreciate their potential impact and role in society at large. Our graduates will be empowered with quantitative and problem-solving skills and experiences that will enable them to interface and communicate with all relevant sectors of society. In short, we want to ensure that we graduate society's future leaders—individuals prepared for life-long success and learning—whether or not they remain engineers throughout their careers.

I believe all of this is within our reach, but we will need to meet many challenges along the way and that will take the work and support of our entire College family. For example, we need more fellowships to support our undergraduate and graduate students. In order to recruit and retain the best faculty in the world who are dedicated to excellence in both education and research, we need more physical space and we must endow our professorships in a prestigious manner akin to that of our peer institutions. These and other needs require that we partner with our alumni and corporate friends.

As I begin my stewardship of the College of Engineering, I ask for your support. I have a vision for the College's future; one that I believe offers promise and pride to our entire College family, but making that vision a reality will require the participation of us all. Working together, we will make great things happen. I begin this task with great enthusiasm and justifiable optimism, and invite you to join me in bringing the College of Engineering to the next level of excellence. ■

Long-time BME Chairman Lutchen Named College of Engineering Dean

By Michael Seele

Boston University President Robert A. Brown appointed Kenneth R. Lutchen dean of the College of Engineering, effective August 1.

The College's Biomedical Engineering Department chairman for the past eight years, Lutchen has led it into the front rank of such departments nationwide.

"As chair of the Department of Biomedical Engineering, he has demonstrated the vision, creativity and drive needed to lead in a world-class academic research environment," Brown said. "With Ken's leadership, engineering at Boston University is well positioned to increase in quality and visibility in the years ahead."

Lutchen joined the University's engineering faculty in 1984 and became department chair in 1998. He has developed a significant list of accomplishments during his tenure, most recently helping the Biomedical Engineering Department obtain a $2.9 million Translational Partnership Award from the Coulter Foundation designed to accelerate the delivery of biomedical innovations to the care of hospital patients. He was the principal investigator and chief architect of a $14 million Leadership Award from the Whitaker Foundation in 2001, which was used in part to construct the Life Science and Engineering Building on Cummington Street. Boston University was one of only three institutions to receive a Whitaker award and is the only one that received both Whitaker and Coulter grants.

Under Lutchen's leadership, the department jumped from 18th to 7th in the *U.S. News & World Report* national rankings of biomedical engineering departments.

A national search for a new dean was launched last fall after David K. Campbell relinquished the deanship to assume the position of Boston University Provost. Associate Dean for Undergraduate Programs Solomon R. Eisenberg agreed to serve as dean *ad interim* while a search committee led by Manufacturing Engineering Professor Thomas Bifano began the work of screening and interviewing applicants.

Campbell called Lutchen an inspiring leader and a dedicated and creative educator.

"Ken has demonstrated all the characteristics of an outstanding academic leader," Campbell added, "and President Brown and I are confident that he is the right choice to take the College of Engineering at Boston University to still higher levels of excellence."

Lutchen earned a doctorate in biomedical engineering at Case Western Reserve University and worked at MIT's Lincoln Laboratory before coming to BU. An expert in pulmonary physiology, he has written more than 100 peer-reviewed journal articles and has advanced methods for probing the structure-function relations governing lung disease, especially asthma. An innovative educator committed to making the laboratory research experience more accessible to undergraduates, he has won the College of Engineering's Professor of the Year Award and twice received the Biomedical Engineering Professor of the Year Award.

"The College of Engineering has embraced a culture of a cross-disciplinary, team-oriented approach to research and education," Lutchen said. "What excites me most is the opportunity to develop this culture, and our faculty, so that Boston University can have an important global impact in engineering education and new research."

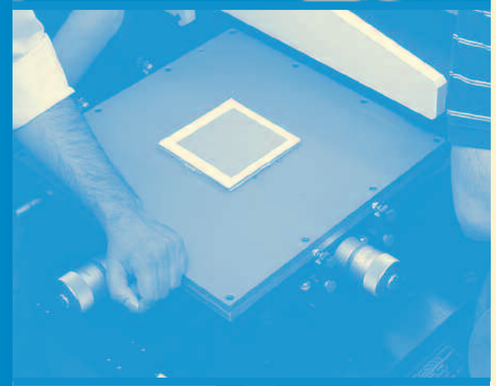
He is most proud, he said, of "the quality of the faculty that we have been able to put together and the community-like approach that exists throughout our faculty." Lutchen said he hopes to continue to "integrate engineering throughout so many other units at BU in a variety of applications, including sensors, materials, imaging, photonics, micro and nano technologies, and information and networked systems."

Lutchen lives in Brookline with his wife, Gayle, who is the assistant director for administration at the McGovern Institute for Brain Research at MIT. They have four children, two of whom are BU undergraduates. ■

The Real World

INNOVATIONS FIND THEIR WAY FROM ENGINEERING LABS TO PRACTICAL APPLICATION

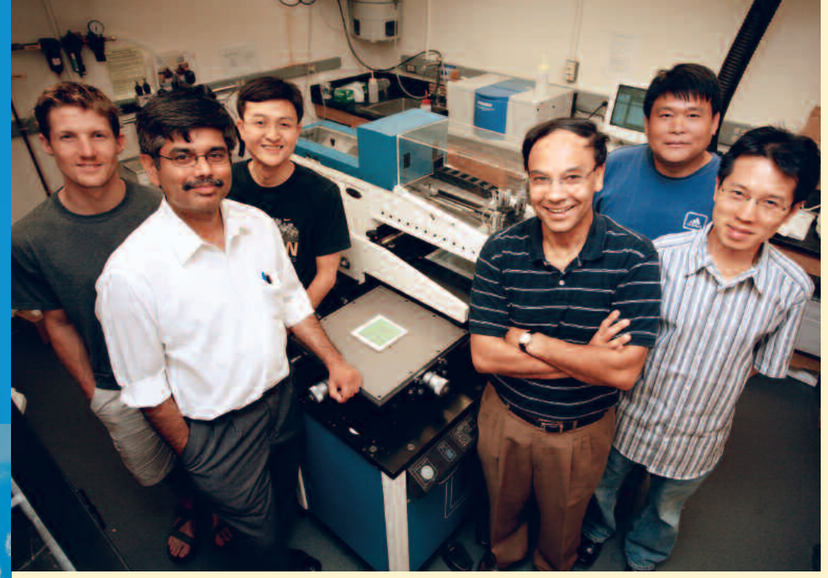
By Trina Arpin and Chhavi Sachdev



UNIVERSITIES ARE OFTEN CHARACTERIZED as insulated from the real world, their researchers immured in solitary ivory towers. What is not always obvious is a burgeoning global movement to translate university research into practical application and Boston University is riding the first wave.

In 1976, BU became one of the first universities in the country to form a technology transfer program to help render research into new goods and services that benefit the general population [see accompanying story]. "Successfully commercializing innovative technologies often requires a close collaboration between researchers and practitioners. Researchers who think that they can simply throw their ideas over a wall and some practitioner will pick them up and run with them may be in for a surprise," says Stanford Willie, executive director of the Office of Technology Development. Researchers can now collaborate with industry in several ways. In some cases, companies sponsor and often cooperate on research projects. Boston University researchers, with University participation, can also patent ideas and launch start-up companies to develop their ideas.

At the College of Engineering, Boston University engineers are working with big corporations and the armed forces on projects such as developing new energy technology that could reduce our dependence on gasoline, eliminate the irritating noise of squealing brakes, and help military robots protect soldiers from snipers.



Assistant Professor Srikanth Gopalan *(front left)*, Professor Uday Pal *(front right)*, and graduate students *(from left)* Peter Zink, Wenhua Huang, Guoshen Ye and Kyung Joong Yoon.

Packing a Lot of Power

They look like a squat stack of five black coasters inside a white plastic box but those five-inch squares are solid oxide fuel cells, each capable of delivering 100 watts of power to homes, malls, office buildings and even power plants in a more efficient, less polluting way. Professor Uday Pal and Assistant Professor Srikanth Gopalan of the Department of Manufacturing Engineering are making these fuel cells cheaper and easier to manufacture, meaning they could be powering a building near you in the not-too-distant future.

Many people are excited about fuel cells because they have the potential to be cleaner and more efficient than the fossil fuel-burning engines and turbines currently in our cars and power plants. Engines and turbines convert mechanical energy into electricity; fuel cells are essentially batteries that convert chemical energy into electricity. While a car engine might have an efficiency of 20 percent, fuel cells can achieve efficiencies of 60 to 80 percent. And while fuel cells can be run off a range of chemicals (solid oxide cells usually run off hydrocarbons like butane or propane), they produce less pollution than other state-of-the-art methods.

Unlike the double As in your flashlight, fuel cells have a continuous supply of chemicals so they do not burn out. By linking multiple fuel cells together, enough energy can be generated to power a building or a city. Pal estimates that a stack of solid oxide fuel cells measuring six by six inches and 40 inches high could power BU's 289,000-square-foot Photonics Center. The entire system, including the fuel supply, could fit in a large janitorial closet.

While fuel cells have tremendous promise, they have so far been expensive to produce, severely limiting their economic viability. Like most batteries, fuel cells consist of a cathode and an anode with an electrolyte in between. In solid oxide fuel cells, these components are made from three different materials, each of which needs to be fired before the next layer can be added. In their unfired state, the oxides lack mechanical strength. Pal compares them to wet clay that has been shaped into a pot. Firing drives off traces of organics in the oxides, increasing their strength. It also binds the anode and cathode to the electrolyte. But the firings must be done at temperatures that produce porous cathodes and anodes—allowing for reactants to arrive and products to leave—and a dense electrolyte to separate them. Typically, this has meant three separate firings and a sharp rise in production costs.

Pal says that he and Gopalan have been able to fire all three layers in one step: "We are the first ones to do this at less than 1,300°C." The key has been in carefully selecting the oxides used and in finding material to add to the electrolyte that lowers its firing temperature while producing the required structure. Another aspect of their research is altering the architecture of the fuel cell to increase its efficiency. Also, currently the solid oxide fuel cells operate at 900–1,000°C, and decreasing the operating temperature to 600°C can have tremendous beneficial effect on both cell life and cost.

Their research has been funded in a development agreement with BTU International, a leading manufacturer of thermal technology for electronics manufacturing and energy generation. The current research project is an outgrowth of several years of collaboration between BTU and the College of Engineering; both sides feel that it is a mutually beneficial arrangement with BU supplying technical know-how and BTU adding their knowledge of real-world problems.

Now that they have developed their one-step firing process, Pal says they hope to demonstrate manufacturing a 5-cell stack by November. The company is currently scouting locations for the first pilot plant. While fuel cells currently cost $3,000 to $4,000 per kilowatt hour, Pal thinks the cost can be reduced to $400 per kilowatt hour. And since the heat produced by solid oxide fuel cells can be used to power turbines and produce more energy, the final cost of energy could be even lower.

Everyone involved in the project has high hopes for its potential to produce energy cleanly and efficiently. Says Pal, "If you can make it cheap and it will last, it will be everywhere."

Bringing Brake Squeal to a Quiet Halt

Chalk on the chalkboard, feedback through a microphone and the squeal of a car's brakes—all count among the most annoying sounds of everyday life. The engineering know-how and supercomputing abilities of the College of Engineering are being used to solve at least one of them. Greg McDaniel, an associate professor of Aerospace and Mechanical Engineering, has spent more than seven years studying how to take the squeal out of brakes. In his most recent project—funded by international brake parts companies TMD, Meneta and Bosch—he is creating brake models with dampened sound.

Although they rarely pose a problem for the function of the car, squealing brakes are one of the most common complaints that mechanics face. Each year, auto manufacturers in North America spend $1 billion to fix squealing on cars under warranty; that staggering sum gives manufacturers a mighty incentive to eliminate the squeal.

In 1998 the Ford Motor Company approached McDaniel—who had researched structural acoustics for the Navy—with their problem. A good deal of research already had looked at what produced vibrations in braking systems, but vibrations are not always converted to sound and no one had studied why the vibrations in brakes resulted in squeals.

McDaniel, however, found that the design of the rotor converts any vibrations into sound with an unfortunate proficiency. "I was surprised to find that a rotor can radiate sound more efficiently than a Stradivarius," he says.

In a series of subsequent research projects funded by TMD, Meneta and Bosch, McDaniel has been working on models that will predict how changes in braking systems alter the pattern of vibrations. Since car manufacturers will not allow a major redesign of the braking system, McDaniel and his sponsors are exploring how small changes in the design of brakes and the materials used can dampen vibrations.

The companies sponsoring McDaniel's research think it is paying off. "Last year our orders doubled to three million units and this year they are at 6.9 million," says John Flint, the R&D manager at Meneta, a company that produces the shims that attach to brake pads to increase damping. "Part of this very positive development comes out of improving our technical capabilities, and here our collaboration with Boston University is very important." While Meneta and the other companies sponsoring this research have provided both the real-world problem and data, Flint says that McDaniel and the University have given them the ability to simulate vibration through mathematical models. Their model has become so sophisticated that they have turned to Kadin Tseng at BU's Scientific Computing and Visualization Group to develop a program that can analyze all of their data.

Associate Professor J. Gregory McDaniel

While the companies involved have seen their technical knowledge and sales increase, McDaniel says the University also benefits. He notes that many students—graduate and undergraduate—have had the opportunity to participate in the research. He also notes that he has used brake squeal as an example in every undergraduate class he teaches. "It's a problem that naturally inspires undergrads."

BU Helps Move Innovation from the Lab to the Marketplace

By Heather J. Ciras

Creating a useful gadget is one story; getting it out to the public is quite another. To facilitate the transfer of innovation from the lab to the marketplace, Boston University has an infrastructure to help faculty navigate the numerous steps involved in turning research into commercial products: the Office of Technology Development (OTD).

The OTD provides a comprehensive approach to the commercialization process through the integration of five core programs focused on patenting and licensing, new company creation, business incubation, corporate relationships and funding opportunities. "The Office of Technology Development strives to foster an entrepreneurial environment among faculty and students at the University," according to Stanford Willie, executive director of the OTD.

The OTD staff consult with faculty members who have ideas that could be salable, no matter how "wild and crazy" the idea might be, says Ashley Stevens, director of OTD's Office of Technology Transfer (OTT) which focuses on patenting and licensing activities.

In addition to licensing new innovations to industry, some ideas end up as the seeds for a new start-up venture. Faculty interested in pursuing this commercialization route are assisted in their efforts by OTD's Innovation and Entrepreneurship (I&E) program. Under the leadership of Stephen Ober, I&E supports faculty in all aspects of early-stage company creation. Once created, a company may be offered state-of-the-art office and laboratory space in one of BU's business incubation facilities. Also at this formative stage, OTD's Corporate and Business Development program may assist faculty in forming early relationships with industry. "We broker relationships

BU Helps Move Innovation *continued on page 8*

Smart Warfare

Psychologists call it the Cocktail Party Effect: In a noisy environment—a party or a subway train—not only are people able to selectively filter noise and pay attention to whomever they're talking to, but if their name is uttered by someone in the crowd, they instantly tune that in, even approximating the general direction from which the sound came.

Using the principles behind these qualities of our auditory systems, Allyn E. Hubbard—a professor in the Electrical and Computer Engineering Department with a joint appointment in the Department of Biomedical Engineering—and David C. Mountain, a professor in BME, have worked with students to create a system that can recognize specific sounds among others and locate their origin.

The Acoustic Direction Finder (ADF) is a biomimetic system modeled on mammalian hearing. Though the researchers initially started with the aim of helping deaf people hear again, its most visible and famous application is for sniper-detection in the U.S. Army's most widely used battlefield robot: The REDOWL (Robotic Enhanced Detection Outpost With Lasers). The REDOWL is being developed in Boston University's Photonics Center by Deputy Director Glenn Thoren in conjunction with iRobot Corporation and Insight Technologies, Inc.

Consisting of four tiny microphones and sophisticated hardware that simulates many aspects of binaural human audition—from sound waves in the outer ears, to electrical impulses that travel to our brains—the ADF is bundled into a nondescript black box the size of a textbook, which is mounted on the head of an all-terrain REDOWL vehicle. These sensors work in tandem with other electronic components in the REDOWL head, which include optical and infrared cameras and laser rangefinders.

The ADF listens for gunshots. It can tell the difference between the report of an M-16 used by U.S. forces and that of a Kalashnikov. Besides identifying the type of gun used, "It can sense azimuth and elevation. Then it communicates that to the robot," says Hubbard. When a shot is heard, the robot's head automatically swivels to face the direction the shot came from and its field of vision is transmitted to the robot operator's screen.

"The electronics of the ADF can capture and process information at rates up to 200 times a second because the discrimination window is only five milliseconds. But the robot itself cannot respond at that rate, so after the first shot, the ADF communicates with the robot and waits for about five seconds while the robot turns its cameras in the direction of the shot," says Socrates Deligeorges (BME '97, '04), who did his doctoral work with Mountain. Deligeorges now heads up BioMimetic Systems, the company they spun off in 2004.

Besides its accuracy, what has made the ADF unique—and successful in garnering military attention—is its size. Other "pitch and bearing" sensors in the market average about two square meters with six to eight microphones. The manufacturers of these devices were skeptical about the ADF, which, even in its first incarnation, was only as large as a shoebox. "Our ultimate goal is to fit everything into a one-inch cube," says Hubbard.

Though their rivals have scoffed at using such a small acoustic aperture, Deligeorges points out, "There are plenty of examples in nature of small animals with very little space between their ears. If they can do it, we can replicate it."

Shrinking the ADF further will also help in its second military application—sniper detection in soldiers' helmets. Currently, the helmets are rigged with microphones but soldiers have to carry the hardware on their belts or in backpacks. "The next generation will be closer to a pack of cigarettes in size and could be clipped almost anywhere that is conven-

Smart Warfare *continued on page 8*

The ADF team clockwise from left: Professor David C. Mountain, David Freedman, (Dummy with helmet), software architect David Anderson, Professor Allyn Hubbard, Howard I. Cohen, Zibing Yang ('00, '04), Christian Karl ('05, '06), Aleks Zosuls ('01) and Socrates Deligeorges ('97, '04). Not pictured are Tyler Gore ('03,'04), Jihad Boura ('89 '91 '98) and Marianne Nourzad Karl ('03).

Smart Warfare *continued from page 7*

ient for the soldier," says Deligeorges.

Hubbard and Mountain—who have worked together since their graduate days in Wisconsin—have collaborated on many projects in the field, though they have distinct, but complementary, regions of expertise. "I tend to emphasize the biological and algorithm side of the work more and Al Hubbard now puts more emphasis on the hardware side," says Mountain.

Up to about a decade ago, their work was almost pure science; serendipitous forks in the road to funding led them to more applied work, including projects from the Office of Naval Research (ONR), Defense Advanced Research Projects Agency (DARPA), and the Army Research Labs (ARL). The professors' collaboration with iRobot and BU's Photonics Center on the REDOWL project was circuitous and unexpected. The ADF they had developed for the Army in 2000 originally focused on identifying nine classes of military vehicles based on the unique auditory signature of their wheels or tracks.

Unexpected gunshots at a field demonstration at Aberdeen Proving Ground in 2003 led to the discovery that the ADF can also be used to point in the direction of gunfire. The sharpshooter had been sent out as a surprise test by a DARPA review team member, Nino Srour, chief of the Battlefield Acoustics Branch at Army Research Laboratories. Srour was soon impressed with how the system performed on a battery of shots. That was the start of the helmet-mounted sniper detection project, which was funded by ARL when the DARPA funding ran out. Funding for the helmet was piggybacked on the existing REDOWL project, which was focused on optics, and the result is a dual-purpose ADF that gives superior battlefield performance for the REDOWL in addition to working with a helmet.

The ADF also has a tool monitoring aspect. From 1996 to 2000, the team worked with the University of Maryland through a Multi University Research Initiative grant (MURI) helping machinists find machines that needed repair or replacement by listening for unusual vibrations and noises.

Two years ago, Hubbard, Mountain and seven BU alums founded BioMimetic Systems. With the groundwork laid at the College and the ongoing research work still based at BU, BioMimetic Systems is poised at the cutting edge of acoustic research. BioMimetic Systems is housed in the Photonic Center's incubation space, under the aegis of Director Tom Bifano, the former chair of Manufacturing Engineering.

"There's no one in industry right now like us; coming out of a university we have all the disciplines together," says researcher Christian Karl (ECE '05, '06), who works with Intel and is a cofounder of BioMimetic Systems. "Where else would you get the electrical engineers, the chip designers, the algorithm developers, the software people, and the biomedical engineers all in the same place?" adds Deligeorges.

There are only a few people in the world with decades of experience in hearing research as well as applied engineering, says Zibing Yang (ECE '00, '04), who also works with Intel and is a cofounder of BioMimetic Systems. "We have two of them here at BU." ■

BU Helps Move Innovation *continued from page 6*

between companies and faculty before there's a product to market. This helps speed commercialization by rapidly moving knowledge from point A to point B," says Michael Pratt, OTD's director of Corporate and Business Development.

Faculty interested in any of these commercialization outlets submit a proposal describing their ideas and inventions. If the proposal appears viable, OTT instructs a patent attorney to file a provisional patent application. Now the proposal has become a plan. After eight months, the inventor, patent attorney and OTT staff meet again to reevaluate the plan's potential. If the product still seems worth creating in light of market research and the most recent lab work, the office files a full (utility) patent application and contacts businesses that might want to fund the product's development, perhaps the same companies the office has previously introduced to faculty members. According to Stevens, the whole process—from proposal submission to licensure—can take anywhere from six months to six years, depending on the project's maturity.

This arrangement facilitates innovation "by providing incentives to everyone to put in the extra effort to turn scientific ideas into intellectual property that can be turned into new products," said Stevens.

Financially, BU benefits differently on each project depending on specific terms and conditions. However, approximately "30 percent of license income goes directly to the inventor," says Stevens. Inventors also have the potential for sponsored research and consulting, he adds. If a new company is launched, inventors may be on the company's scientific advisory board and receive an ownership stake in the company.

Numerous products from the College of Engineering have been fostered by OTT, such as the numerical aperture increasing lens—which improves the light-gathering, resolving and magnifying power of a conventional optical microscope—and the method for manufacturing blue light-emitting diodes (LEDS).

At BU, the number of innovations has increased in the last 10 years. This is directly related to the increased resources OTT has received from the University, says Stevens, who once was one of only two staff members and now heads a team of eight professionals.

"Technology transfer has had a big impact in the U.S. in the 26 years since the passage of the Bayh-Dole Act, which enabled universities to own and patent inventions developed under federally funded research programs," Stevens says. "More and more innovations are made at not-for-profits. More and more are made at universities."

"Our primary motivation isn't making a buck," adds Pratt. "Our purpose is to transfer the knowledge that our faculty and students create to the commercial world where it can benefit the public whose taxes funded most of the research." ■

Class Dismissed

MERRILL EBNER PUTS DOWN THE CHALK AFTER 42 REMARKABLE YEARS

By Chhavi Sachdev

When he arrived as an assistant professor in 1964, the College of Engineering was brand new, having just abandoned the College of Industrial Technology moniker. It was housed in a single building and had no discreet departments. Forty-two years later, the College is very different, in no small part due to the efforts of Merrill L. Ebner, who helped build the College's character, reputation and reach, and created the discipline of manufacturing engineering along the way. The College will have to face its future without Merrill Ebner, who will drop the curtain on a distinguished career when he retires on December 31.

He remembers the College long before it had several buildings and centers, and when 15 St. Mary's Street, where the Department of Manufacturing Engineering is now located, was a parking garage. He remembers when everyone wrote with fountain pens and overhead slides were a novelty. He was there when Engineering got its first computers as well as the high-speed wind tunnel, and he remembers teaching Saturday morning engineering courses at local high schools in order to boost enrollment in the College.

"The elevated stature of the College of Engineering today is a result in significant degree from his contributions," says John Silber, Boston University's president *emeritus.*

A Twinned History

Ebner's arrival came shortly after a move away from a split campus—Logan Airport and 775 Commonwealth Avenue—and toward consolidation at 110 Cummington Street. A new, visionary dean had changed the College's name and set about making his early faculty hires, not knowing the deep, lasting impact his decision would have.

"Arthur Thompson was appointed dean in 1963, and he hired two young assistant professors—Merrill Ebner and Richard Vidale," recalls John Baillieul, professor and chairman of Aerospace and Mechanical Engineering. "The three of them together founded the BU College of Engineering. Ebner and Thompson invented the previously unheard-of field of Manufacturing Engineering."

From 1969 to 1986, Ebner remained chairman of Manufacturing Engineering and was instrumental in defining the discipline. In 1969 and 1971, he successfully fielded the accreditation team and got manufacturing engineering established as a separate area from mechanical and industrial engineering, even gaining a seat on the board of accreditation himself. In 1989, BU awarded the first Manufacturing Engineering Ph.D. in the United States.

"[Ebner] contributed a great deal to ENG as a department chairman and interim dean during a difficult period—the early 70s," says Professor *Emeritus* of

Professor Merrill Ebner seated before new software he piloted for the Distance Learning Program he has headed up since 1995.

Electrical and Computer Engineering Dick Vidale. "I think it is fair to say he was one of three faculty who stepped up to the plate and saved the College when our freshman class bottomed out at 32."

"The personal attention offered by Professor Ebner and other colleagues created an atmosphere in the school that made it highly attractive to prospective students," adds President *Emeritus* Silber.

Artistic Engineer

The son of a banker and a music teacher from Pullman, Washington, Ebner attended MIT on an ROTC scholarship for mechanical engineering. He says he stayed to do graduate work in material science, or "'metallurgy' as it was called in those days." He also took art classes at the Museum School across the river from MIT. "It's not a big stretch from designing products to other shapes," he says with a laugh.

After earning his doctorate, he went to the experimental flight station at Edwards Air Force Base near Mojave, California, where in the early days of the jet engine, large varieties of jet aircraft were being produced.

"Many of them were untried and still in the experimental process—and many crashed," Ebner recalls. "My job was to piece them back together and figure out why they fell down from the sky. It was quite an experience. Every two weeks there was a crash. We're much more sophisticated in these things now and we're also slower at developing an aircraft."

After that stint, Ebner had a choice: art restoration or postdoctoral research at MIT. A New York museum was keen on him for his background in art and x-ray analysis. "They were interested in upscaling the profession of art restoration. They wanted better-trained, more materials-oriented people in the trade. But I had a young, growing family to support and Cambridge seemed like a better situation." Although he turned down the job, sculpture remained and is a hobby, something he still enjoys.

For a while after he moved back to Massachusetts, Ebner had a bronze foundry for small statuary. He rented a foundry building in Cambridge and a studio in the old West End, near what is now the Charles River Park. "It was fun and interesting but financially prohibitive." Now he makes smaller pieces, about 12–14 inches tall, with copper-based alloy with a particular interest in portraiture—but not as much as he used to. He's looking forward to returning to his hobby upon retirement.

He's also tried his hand at business. While a postdoctoral research associate at MIT, he started a small, part-time consultancy with a colleague. "We did quite a bit of material testing, for welder certification, plastics injection molding for disposable medical parts. I was quite interested in design," he says. They sold the company after a few profitable years. Today, the company, SRC Medical, not only exists, it still makes the specimen collectors, valves and other parts Ebner designed four decades ago.

Teacher and Mentor

Recruiting students was hard back when they started the College of Engineering, says Ebner. Boston already had a few engineering colleges, and BU's facilities were spartan. There was no plumbing in the material sciences' polishing lab, for example, and runoff was collected in a wastebasket. But in the late 1960s and early

Above: **From left to right: Chairs of the three departments at ENG in 1971 — Merrill Ebner (Manufacturing), Richard Vidale (Systems) and Ming Chen (Aerospace).**
Below: **Professor Ebner teaching an EK156 Design and Manufacture lab in the basement of 112 Cummington Street, circa 1980.**

1970s BU's unique Department of Manufacturing Engineering became a "tremendous coup for admissions and the placement office," says Ebner, because it managed to attract students from all backgrounds.

Ebner designed the Introduction to Manufacturing class, EK 156, in the '70s. "Nowadays, in engineering, you don't have much opportunity to actually do things," says Ebner. "In EK 156, they get to think about things and analyze things and also get to do things. It's been a very durable course."

Every undergraduate in Manufacturing has had a class with Merrill Ebner. This fall is the last time Ebner is teaching his senior design course and his graduate class on improving operations and process design. Although he has been teaching for more than 40 years, he has not lost enthusiasm for the subject matter or the ability to connect with students. This past spring, Manufacturing Engineering students voted him the department's best teacher.

In an anonymous evaluation, one student wrote, "He is just filled with information and passion about manufacturing. After hearing him talk about something, it is hard to not be enthusiastic and truly interested to learn more."

Another wrote, "He assigned some of the hardest projects I have had at BU, and even when I had no idea how I was going to finish them or where to start, I got them done. These taught me more than I ever expected."

Roger Dorf ('70), chief executive officer and president of Navini Networks, got his master's degree at BU while he worked for IBM. "[Ebner's] classes were excellent and I enjoyed every minute of them," recalls Dorf. "Dr. Ebner's approach to things, his curiosity and excitement" impressed Dorf right away. "He questioned us, pushed us to think about things in different ways and taught us to learn from what's going on."

Dorf's regard and fondness for his former professor kept him in touch for years. "When it came time to give back to the places that made me, he stood out in my memory. He changed the way I look at things," says Dorf. "We didn't want the College to name a building after us," he says. Instead he and his wife pushed for something that would honor Ebner and his work. They started with a donation of $50,000 to the Merrill L. Ebner Fund, which they doubled last year. The fund supports student-based programs that encourage creative design in Manufacturing Engineering. One growing offshoot is the annual student design portfolio contest, held for the second time this year.

"He loves his work so much, maybe he doesn't think of it as work, and that's inspiring," says Dorf.

Carlo De Luca, professor and former dean *ad interim,* agrees. Ebner's real-world experience made him a good teacher and students enjoyed being taught by him. "I recall one particular Manufacturing Engineering student who came to me hurling angry remarks about a host of issues and he ended by saying, 'None of that applies to Professor Ebner.'"

Former Director of Development Steve Witkowski, Professor Ebner, Roger Dorf and then-Dean David Campbell at the inauguration of the Merrill L. Ebner Fund.

Then and Now

"All engineering fields have historical roots," says Ebner. "Civil engineering came out of military needs, mechanical was born with the steam engine and the first industrial revolution. Electrical engineering was born simultaneously at MIT and at Cornell after Thomas Edison electrified New York. Industrial engineering had come along in the '30s. Manufacturing, which started formally in the '70s, has much more emphasis on the development and design of a product, which seemed like an unfulfilled need."

The character of the College has changed enormously with time, says Ebner. "When we started, we were struggling to be respectable. We started from a technology background and really wanted the quality of educational experience and curriculum to be high. In time, we caught up with more mature colleges nationwide."

Being in Boston helped define the field. "Boston is very diverse in its industry. At BU, we take, by far, the broadest view on what manufacturing is. The result is that we work in semiconductor lithography, MEMS, green manufacturing, extended systems—and what they have in common is the design and processing. What gives the department vibrancy is the breadth of area we are engaged in."

Colleagues and former students agree that a major part of the vibrancy comes from the man himself. From hiring faculty involved in seemingly obscure research to pushing for better industry collaborations, Ebner has kept himself and the College on the cutting edge.

Ten years ago, he took over the College's Distance Learning Program. Classes used to be beamed by satellite onto televisions. Times have changed, though, and 75-year-old Ebner's eyes light up as he talks about the new videoconferencing software he's piloting that will let multiple students interact simultaneously with real-time audio and video, even following a lab course from their homes.

His sons—he has three sons and a daughter, plus six grandchildren—think he's technologically challenged, he says. But he's perfectly happy tinkering with the videoconferencing software and instant messaging as well as with his digital camera and DVD burner.

This year, he and his wife, June, celebrated 50 years of marriage. Together with several college friends, they are going on a cruise to Alaska next summer and he's looking forward to that.

"I'm still going to maintain an office at the College," says Ebner, mischievously. "You won't be rid of me completely." ■

Racing Toward a Green Earth

KRISTA BOTSFORD (AME '97) NOT ONLY RACES CARS BUT ALSO WANTS TO KEEP OUR ELECTRONICS ECOLOGICAL

By Chhavi Sachdev

For a girl who grew up in Boring, Oregon, life has been anything but. Krista Botsford ('97) started racing cars with her father when she was 18, graduated as a mechanical engineer at 22, and today, at 31, is CEO of 5-Trees, an environmental compliance firm she cofounded.

"When someone tells me I can't do something I tend to pursue it," she said during a visit to the College of Engineering between interviewing potential summer interns. Botsford has applied the same intense drive to succeed on the race track to bear on her new business venture, which provides advice and documentation to companies that export electronic devices to the European Union and the United Kingdom.

She started racing cars at the Portland International Roadway as a senior in high school. Her father was interested and they signed up for drivers' school together during spring break. Her father stopped racing a while ago due to time constraints. "The fact that I beat him might have something to do with it, too," she says with a chuckle.

A student advisor and dean's host at BU, Botsford took a brief hiatus from the racing world when she arrived at the University. Soon enough, though, she joined the local chapter of the Sports Car Club of America. To keep her license, she learned she had to run in four events. Renting a Formula Ford for her first year in 1995, she raced at Pocono in Pennsylvania, the New Hampshire International Speedway, and Lime Rock in Connecticut. In 1996, she purchased her first race car—a Formula Ford Swift DB-1—and took home the Oregon Region championship in 1998.

In 2000, she won the North Atlantic Road Racing championship and the New England Region Championship. Two years ago, she won the Hard Charger Award for moving up the most number of spots in a race at Lime Rock.

Balancing school and racing was hard, but she kept her grades up and managed to have a social life as well. "Some people thought [racing] was cool; some people thought I was out of my mind," she recalls.

"People could—and still can—tell when I've been at the race track for the weekend, as my nails are painted if I cannot get the grease out from under them," she says.

In her junior year, Botsford did a co-op at Connecticut turbine-engine firm Pratt & Whitney and found herself having to decide whether to race full time or become an engineer with an expensive, dangerous hobby. She stayed in engineering and was one of seven Mechanical Engineering students and about 15 women in the AME class of '97.

Few professors knew about her weekend passion and initially she did not tell potential employers about her racing. "I didn't have it on my résumé for a while. But, in the professional world, racing has opened more doors for me than it has closed," she says. Potential employers as well as clients have been impressed with her drive, risk-taking and time-management skills.

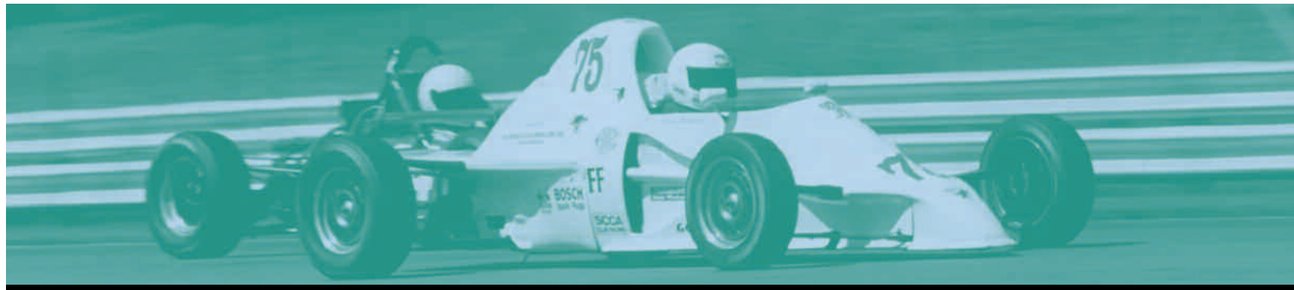
Her jobs have varied but her trajectory has remained defined. At IBM, where she worked while getting her master's at RPI, she essentially did manufacturing engineering, working to assemble customized hard drives and updating them for ergonomically correct tooling. Within nine months of starting, she was in Singapore setting up an assembly line.

In 2000, she moved to IBM's microelectronics division and became familiar with a new European Union directive prohibiting electronic devices from containing lead, cadmium, mercury, hexavalent chromium, PBE and PBDE. Nearly everything electronic qualifies for the change. "If you can imagine it in a landfill, it needs to be compliant," says Botsford.

She co-led the corporate procurement team in qualifying IBM electronic packages that were going to the European Union as compliant with the directive. Last year, when layoffs looked imminent, she landed an interview with Gerhart Pawelka, the CEO of Cooper Perkins, a Burlington, Massachusetts design firm. Within two weeks, she was on board as managing partner of the spin-off company they cofounded: 5-Trees.

Since last May, the company has helped American firms meet the European Union's and the UK's environmental directives when exporting devices or components across the Atlantic. Botsford works with clients to create, update and document their corporate, social and environmental responsibility policies. "The EU is the tip of the iceberg," she says. "The most stringent standards generally become universal and a number of countries have already followed suit."

With more Green directives overseas, the firm is flourishing and Krista feels a measure of satisfaction and excitement. "Our work meets a need now and in the future," she says. She credits Boston University and the College of Engineering for pushing her hard and making her an effective and efficient engineer. ■



"People could—and still can—tell when I've been at the race track for the weekend, as my nails are painted if I cannot get the grease out from under them."

Above: Krista Botsford at the races. Photo/Vinny Blancuzzi
Left: Botsford and other racers at the 35th Formula Ford Festival at Lime Rock Park in May 2004. Photo/Kristen Donaldson (ENG '98)
Below: Botsford with Marge Dexter, wife of racer Dave Dexter, in the infield at Lime Rock. Marge is holding the quilt Krista and her mother made for Dave during his battle with cancer. Photo/Kristen Donaldson (ENG '98)

Extra Gears

- Botsford also quilts, a hobby she picked up from her mother. She has taught quilting and her work has been exhibited in shows.
- Her New Hampshire home is smaller than her garage, which houses three race cars, a jeep, an Austin Healey and a '66 Mustang.
- She is certified as a national scrutineer, inspecting cars for safety. As an EMT, she is also part of the emergency response services for the SCCA.
- Botsford is the only woman in the Formula Ford class.
- Learn more about Botsford's work at *www.5-trees.com*

Summer Research Experience for Undergraduates Program Expands

By Chhavi Sachdev

Every summer for the last 11 years, sophomores and juniors from colleges and universities across the nation have done summer research at the Biomedical Engineering Department under the aegis of the National Science Foundation. This year, the Electrical and Computer Engineering Department and the Photonics Center received the thumbs-up from the NSF to launch their own interdisciplinary Research Experience for Undergraduates program, making Boston University one of few schools to have multiple REU programs.

Open to sophomores and juniors (and some enterprising freshmen) from engineering, natural science or mathematics backgrounds, the program is designed to introduce students to the rigors—and joys—of research. While some applicants hail from Ivy League schools, others are from smaller schools with minimal research facilities.

The REU program links students with research projects. For both Photonics and BME, the projects are posted on a website and applicants are invited to rank their top three lab choices. The researchers then rank their top applicants and matches are made.

Sixteen students in Photonics and 15 in BME are funded by the NSF. The University sponsors an additional 6 BU students in the BME program annually. For 10 intense weeks of research during the summer, the students receive a small stipend and free on-campus housing.

"The Photonics REU is a great endeavor," says Professor Herbert Voigt (BME), the principal investigator for the BME program. "Ours is very broad in scope; theirs is more focused."

The Photonics REU program had 250 applicants, says ECE Professor Michael Ruane, the program's principal investigator. Forty percent of those accepted were female. Seven students were from BU; others came from as far as Stanford University, RPI, Colorado Institute of Mines and Florida Institute of Technology.

The BME program, one of a handful that has received continued funding for several terms, had over 500 applicants this year, says Professor Voigt. Their site grant has been renewed three times and more than 50 percent of the students are women.

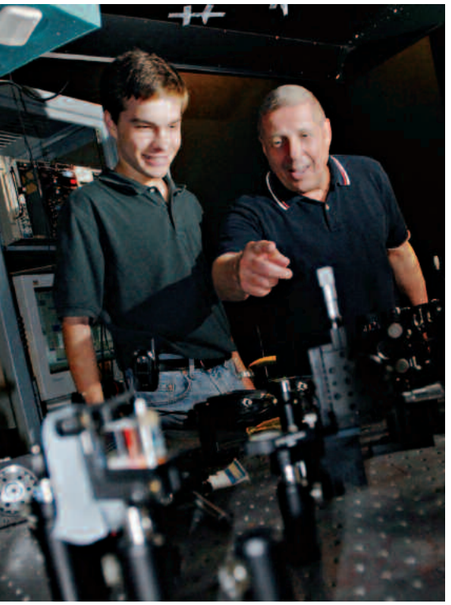
Students not only conducted research with top scholars in state-of-the-art labs, they also gained exposure to the real-world ethics involved in the research.

"Our goal is to get those students who might only have a vague idea of what research entails before they tune out," says Professor Ruane.

For freshman Eric Cornelius (CAS), a biochemistry and molecular biology and physics double-major, the program provided his first brush with research. "I hope that the REU program will expose me to a more realistic working environment, help prepare me for my career, and be interesting and engaging research in its own right," he says.

Princeton University's YunMi Kong read about the REU program on the NSF website and applied to work with Professor Steven Colburn (BME) in acoustical research. "This is a new field for me," says the junior. In 10 weeks, she designed "a pretty contained experiment to look at how well people can locate a sound using one ear."

Others are veterans. David Whitney—a senior majoring in engineering physics and chemistry at the Colorado School of Mines—had done an REU before, though not at BU. Enrolled in the Photonics REU in 2006, he worked with Professor Mal Teich and postdoctoral researcher Magued Boshra Nasr on quantum optical coherence tomography. Whitney said he "created a graphical user interface to help automate the experiment."



David Whitney from the Colorado School of Mines with Professor Mal Teich.

Students not only conducted research with top scholars in state-of-the-art labs, they also gained exposure to the real-world ethics involved in the research—both Ruane and Voigt invited weekly speakers on ethics and best practices.

Some alumni of the BME REU program are now enrolled at BU as graduate students, says Voigt.

"In the long run, we're giving these students an opportunity," says Ruane. "All the professors involved hope that these kids will become researchers. They might not necessarily land on our doorstep, but they'll be good researchers." ■

Assistant Professor Joe Tien and Russell Condie from the University of Utah.

2006 Design Competition

Each year, the College of Engineering hosts a design competition open to high school students.

On June 4, 67 teams of 126 students from 32 New England schools competed for prizes, which included scholarships to BU.

Their task: To design and construct a vehicle that will descend a hill from the start line, drop a "hacky sack" bean bag through the hole in the vertical wall at the bottom of the hill, climb back up the hill, knock over a flag located at the centerline (to the right of the vehicle), stop at the "top-of-the-hill," hold its position against an opposing vehicle, and be closest to the centerline at the end of a 20-second time interval.

First-place winners Andrew McGlathery and James Gaewsky, freshmen at Reading High School in Massachusetts, won the biggest trophies as well as tuition scholarships to Boston University of $5,000 per year for four years. Associate Dean Mark Horenstein presented the trophies.

Thank You for Another Record Year

The 2005–06 year was a milestone for the College of Engineering and for Boston University in general. We inaugurated Robert A. Brown as our new president, BU's first leader to come from an engineering background, and wished Dean David K. Campbell well as he moved on to assume the responsibilities of University Provost. Under the leadership of Dean *ad interim* Solomon R. Eisenberg, the College continued to move forward on all fronts. During all of this exciting transition, it was clear that our alumni and friends had not forgotten about the College as we set several records in the fund-raising department.

Supporting the College's twin missions of education and research requires more than just tuition dollars. It requires donations from a number of sources, including you, the College's alumni and friends. During the 2005–06 year, you showed your support in record numbers both in terms of participation and total dollars donated. Records established just a year ago were surpassed. At the year's conclusion in June, contributions to the College's Annual Fund stood at $168,534, a 5 percent increase over the prior year. The number of Annual Fund donors also rose; 792 donors were counted this year, an increase of four over the previous year.

One of the biggest areas of growth was in the Annual Fund Leadership Giving Societies, which saw an impressive 39 percent increase in membership over 2004–05. The College of Engineering Excellence in Engineering Fund was reinvigorated through the annual golf tournament, auctions and raffles, which garnered a 76 percent increase in income.

On behalf of all the students, faculty and staff of the College of Engineering, I would like to thank you for your record level of support.

As much as these trends forecast a bright future, they are critical for the College's present, too. Providing the enrichment experiences that are the hallmark of an exceptional education and the research infrastructure that is the seedbed of tomorrow's innovation requires more than what tuition dollars alone can sustain. The Annual Fund provides the resources that make all that possible.

As we welcome Ken Lutchen to the Dean's Office this year and continue on our journey into the ranks of the nation's very best engineering colleges, your support will be ever more important. Although the Annual Fund is at record levels, it is still far below what is needed to support all of the programs we would like to provide to our students, and far below what our peer institutions raise. If you have supported the College in the past, I thank you and hope that you will continue to do so. If you haven't made a gift, I hope that you will consider doing so this year in whatever amount you can.

Your support provides the students of today with an outstanding education and sows the seeds for the engineering breakthroughs of tomorrow.

Richard Lally
Assistant Dean of Administration
Director of Development and Alumni Relations

COLLEGE TOUR May 13, 2006

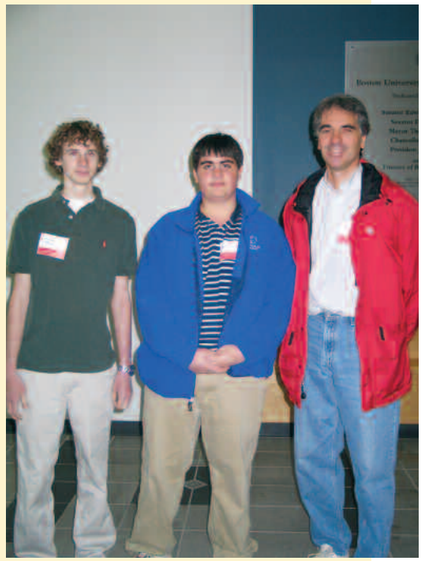
Alumni and their families were welcomed back to the College for a continental breakfast and a tour of new buildings, labs and facilities.

Janet Fraser (ENG '81) and her daughter

Siavash Yazdanfar (ENG '96) chats with Dean *ad interim* Solomon R. Eisenberg.

Gregory Walsh, Jack Ciriello and his father, Peter Ciriello (ENG '94)

Carlos Colosqui talks to alums in the Wind Tunnel lab at 110 Cummington Street.



ENGINEERING BBQ May 12, 2006

The barbeque inducted graduating seniors as new alumni and also welcomed returning alumni to Reunion Weekend.

Alumni Board member Pete Cirak ('01) and Board President Al Muccini ('62)

James Horton ('06) with Dean *ad interim* Solomon R. Eisenberg

Cristina Valente (CAS '00) and Matt Kubik ('92)

Class of '86—*Clockwise:* Victor Almeida, with wife Doreen (SAR '86) and daughter Marissa; Dean *ad interim* Solomon R. Eisenberg; Elizabeth Coxon; Tracey (Barber) Estabrook; Deborah Miller; Ed Sullivan; Rich Lally, the assistant dean of administration; Soula (Litsikis) Spaziani; Alycia McGoldrick; and Rolanda (Borrelli) Sylvain

Ruth Hunter ('64), Victor Anderson, Roger Williams ('68)

Beth Partridge from Undergraduate Programs hands seniors ENG memorabilia.

John Misasi ('96)

STAR WARS April 23, 2006

Alumni gathered for the Star Wars exhibit at the Museum of Science in Boston.

Stephen Foraste ('91,'94) and his wife, Alyssa Duffy

Susan Stevens ('88), *right,* with Paul Stevens and their daughter Taylor.

ENG Alumni Awards 2006

Five ENG alumni were recognized for their outstanding contributions to the College and the engineering profession during Commencement Weekend in the spring. Each year, the College presents three awards to distinguished alumni.

The Service to Alma Mater Award is presented to alumni who have shown a commitment to the advancement and success of Boston University and the College of Engineering. **The Service to Profession Award** honors alumni who have made significant contributions to the field of engineering. **The Service to Community Award** honors alumni who, whether through volunteer service or paid work, have made exceptional contributions to the betterment of their community or the circumstances of a group of people.

SERVICE TO ALMA MATER AWARD

PATRICK FOLEY ('91, '94) & KERRY FOLEY ('91)

Patrick Foley, CFA, serves as a vice president and portfolio manager at Monarch Financial Corporation of America, where he combines fundamental and statistical analysis in managing institutional portfolios. Prior to joining Monarch Financial, he worked at Kidder Peabody and Co., Ladenburg Thalman and Co., and World Financial Services.

After completing her bachelor's degree at the College of Engineering, Kerry Foley graduated from Harvard Law School. She worked as an associate at Weil, Gotshal & Manges LLP in its New York office for seven years, specializing in commercial litigation. For the past three years she has been raising their children, Jack and Maggie, and working on a part-time basis as counsel to The Shapiro Firm.

Patrick and Kerry earned their bachelor's degrees in biomedical engineering from Boston University in 1991.

Both Patrick and Kerry serve on the Biomedical Engineering Alumni Board. They were actively involved in planning the 2005 Senior Project Reunion Gala, which celebrated the 20th anniversary of the BME Senior Project Conference. Kerry, who was a co-chair of the board, also chaired the Class Agent Committee, coordinating class agents and personally contacting alumni from the previous 20 graduating classes. Patrick chaired the Events Committee, which planned and organized the weekend's activities. Both Kerry and Patrick regularly attend ENG and BME alumni functions and are inaugural members of the ENG Annual Fund Leadership Giving Society.

SERVICE TO PROFESSION AWARD

CHRIS NOEL ('82)

A well-known entrepreneur in the telecommunications field, Noel was honored for his service to profession posthumously. He cofounded Equipe Corporation in 1999, where he was also vice president of engineering. Remembered for his ability to bring people together, Noel created a culture of camaraderie and respect; he wanted people to love their work as much as he did.

Before launching Equipe, Noel was director of engineering at Ascend Communications, which was purchased by Lucent Technologies in 1999. Prior to his work at Ascend, he was employed at Cascade Communications and Baytex Communications. A holder of many patents, Noel was an inventor who enjoyed learning as much as he enjoyed teaching.

He graduated from ENG with a bachelor's degree in electrical engineering in 1982 and later earned a master's degree from Worcester Polytechnic Institute.

Noel passed away on January 29, after a lifelong battle with Kearns-Sayre disease. He is remembered as well by friends and family for his passion for life, enthusiasm, optimism and caring attitude towards others.

Previous page, left: **Patrick and Kerry Foley. (Photo courtesy Kerry Foley)**
Previous page, right: **Chris Noel's parents receive the award on his behalf.**
Above: **Karen Panetta, Dean *ad interim* Solomon R. Eisenberg and Mick Scully**

SERVICE TO COMMUNITY AWARD

KAREN PANETTA ('85)

A professor of electrical and computer engineering at Tufts University, Panetta also heads the *Breaking the Stigmas and Stereotypes of Women in Engineering* program, more popularly known as "Nerd Girls."

The program is designed to break stereotypes and build confidence in young women interested in engineering, while highlighting their diverse backgrounds and skills.

Together, the first Nerd Girls built a solar-powered automobile and eventually took it on the road, stopping to visit communities along the East Coast to share their experiences as engineers and educate K–12 students on renewable energy.

Currently, the group is creating renewable energy programs on Thacher Island off the coast of Massachusetts.

Panetta received her bachelor's degree in computer engineering from Boston University in 1985 and her master's and doctoral degrees in computer systems engineering from Northeastern University. She is the recipient of an NSF CAREER Award and is a NASA Research Scientist Fellow. Panetta is also an active member of the College of Engineering Alumni Board.

SERVICE TO PROFESSION AWARD

RICHARD "MICK" SCULLY ('81)

Scully has been on the forefront of networking technology for over 20 years. He graduated from Boston University with a bachelor's degree in business administration but abandoned a career in marketing to return to BU and earn his master's degree in computer engineering.

He was one of the first members of the University's Academic Computing Center and was integral to the efforts of the Network and Systems Engineering Group, which designed one of the nation's first academic computing environments.

In 1986 Scully joined Proteon Incorporated as a senior software engineer. He remained at the company for the next seven years managing research and development efforts for technologies that are now industry standards.

In 1993, he was hired as vice president of project management at Wellfleet Communications and played a significant role in that company's merger with Synoptics to form Bay Networks, a company that would grow to $2.5 billion in under five years.

Scully left Bay in 1998 to found Appian Communication in Acton, Massachusetts, where he served as president and CEO. The company enjoyed success with major strategic partners and industry partnerships before the downturn in the telecommunications market in 2001.

After 32 years in Boston, in April of 2005 Scully accepted a position as vice president of product management for Cisco Systems in San Jose, California, where he is, once again, responsible for growing an advanced technology business. ■

Five Faculty Members Earn Promotions

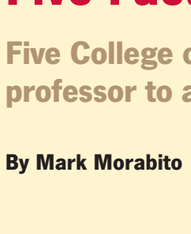
Five College of Engineering faculty members rose from assistant professor to associate professor with tenure this year.

By Mark Morabito

Ari Trachtenberg, of the Department of Electrical and Computer Engineering, has been working at Boston University since 2000 after receiving his master's and doctoral degrees in computer science at University of Illinois, Urbana-Champaign.

At BU, he cofounded the Laboratory of Networking and Information Systems and is a member of the Reliable Computing Lab and the Center for Information and Systems Engineering. He received a National Science Foundation CAREER Award in 2002 and won the ECE award for excellence in teaching in 2003.

His research involves error-correcting codes, data synchronization (especially for PDAs and mobile networks), sensor-based location detection, and algorithms. Along with 13 publications, he has conducted a number of talks on set and data reconciliation.



David Starobinski, also of ECE, joined Boston University in 2000 after completing his bachelor's, master's and doctoral degrees in electrical engineering at Technion-Israel Institute of Technology in Haifa, Israel.

A 2002 NSF CAREER Award and a 2004 Department of Energy Early Career Award are among the honors he has garnered.

His research focuses on wireless and sensor networks, quality of service and traffic engineering, network modeling and networks performance evaluation.

Enrico Bellotti earned a doctorate in electrical engineering from the Georgia Institute of Technology and arrived at ECE in 2000.

He has received the Office of Naval Research Young Investigator Award in 2003 and an NSF CAREER Award in 2005.

His research interests include semiconductor materials and device simulations, power electronics and parallel computing.

Xin Zhang joined the Department of Manufacturing Engineering in 2002 and founded the Laboratory for Microsystems Technology. She holds a doctorate in mechanical engineering from Hong Kong University of Science and Technology.

She won BU's SPRInG Award in 2002 and Technology Development Award in 2004, along with an NSF CAREER Award in 2003. She is a member of the Photonics Center and the Center for Nanoscience and Nanobiotechnology.

Her research interests include microelectromechanical systems, nanoelectromechanical systems, issues related to materials science, micro and nano mechanics and manufacturing technologies motivated by practical applications, and emerging bionanotechnologies.

Joyce Wong of the Biomedical Engineering Department received her doctorate in materials science and engineering from the Massachusetts Institute of Technology.

In 1998, she came to Boston University with research interests in biomaterials, tailoring cell-material interfaces for drug delivery and tissue engineering applications, and direct quantitative measurement of biological interactions.

Some of her awards and honors include the Dupont Young Professor Award in 2004 and the National Academy of Science Frontiers in Engineering Award in 2001.

Her most recent research involves cell cultures and biophysics with a conglomeration of sciences.

New Faculty Member

Tyrone Porter, an assistant professor, has joined AME from the University of Cincinnati, where he was a postdoctoral research fellow. Prior to that, he received his Ph.D. from the department of bioengineering at the University of Washington in 2003. His research interests focus on the integration of ultrasound technologies with chemical and biomolecular engineered vesicles for diagnostic and therapeutic applications.

"The overall goal of my research program is to push the application of ultrasound technology in new and exciting directions," says Porter. Applications could include using ultrasound technology to test the growth of cancer and drug delivery through microscopic carriers. "My lab is working on new ultrasound technologies and novel chemical formulations for assessing tissue perfusion, targeted contrast enhancement of diseases in ultrasound images, and improving the uptake and activity of drugs while reducing adverse side effects."

Two ECE Professors Receive Awards for Paper, Thesis

Janusz Konrad, an associate professor in Electrical and Computer Engineering, won the EURASIP *Image Communication Journal* Best Paper Award for 2004–2005. The paper, "Motion Analysis in 3-D DCT Domain and its Application to Video Coding," authored by Konrad and Nikola Bozinovic, ECE ('01, '06) explores the relationship between space-time and 3-D discrete cosine transform, or DCT, characteristics, and "an end-to-end video coding solution developed using the three-dimensional (3-D) DCT."

Their paper was selected by the Editorial Board and Awards Committee of the European Association for Signal, Speech and Image Processing (EURASIP). The paper appeared in *Signal Processing: Image Communication,* and was among the top 25 downloaded papers from the journal's website.

This award is granted every few years only if a noteworthy paper is found. Both of the authors received a prize of 1,000, which was presented at the EURASIP convention in Florence, Italy, in September.

Masoud Sharif, who joined the Electrical and Computer Engineering Department as an assistant professor in January after completing his doctorate at the California Institute of Technology, saw his doctoral thesis singled out for excellence. He was named winner of Caltech's Charles Wilts Prize for his thesis, "Broadband Wireless Broadcast Channels: Throughput, Performance, and PAPR Reduction."

"The Charles Wilts Prize is awarded every year to one EE graduate student for outstanding independent research in electrical engineering leading to a Ph.D.," said ECE Chairman Professor Bahaa Saleh.

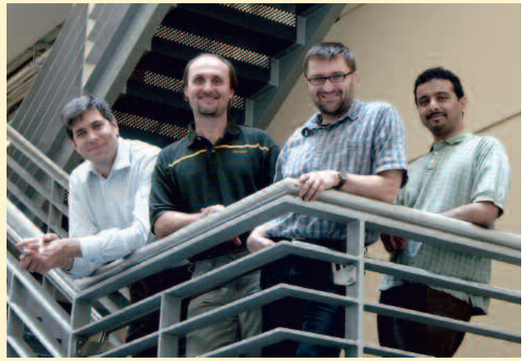
NSF Awards Early Career Grants to Four ENG Faculty Members

By Chhavi Sachdev

Every year, the National Science Foundation recognizes up-and-coming researchers for their promise. This year, four College of Engineering faculty members received NSF Faculty Early Career Development (CAREER) Program awards.

Approximately 400 five-year CAREER grants—of which about 100 are in engineering—are given every year to professors early in their careers, said Sharon Middledorf, the engineering representative at the NSF CAREER program. Fourteen of the 23 CAREER awards at Boston University between 2001 and 2005 have been in engineering.

"The number of successful candidates is indicative of the quality of the faculty we attract and also of the problems they want to tackle," said Solomon R. Eisenberg, dean *ad interim* at the time the awards were announced.



NSF CAREER award recipients Joshua Semeter, Chris Passaglia, Calin Belta and Prakash Ishwar

This year's recipients are:

Calin Belta, assistant professor of Manufacturing, came to Boston University from Drexel University, bringing with him a grant from the NSF to fund five years of research into modeling and controlling robotic swarms.

A hundred small autonomous machines, or swarm, could have applications in mapping, military search-and-rescue missions or even a fire rescue, said Belta.

"In a fire, 100 robots inside a building have a better chance than just one," he says. "But the problem is how to coordinate 100 robots." Belta is using the CAREER funding to develop architectures to control and coordinate a swarm.

Prakash Ishwar, assistant professor of Electrical and Computer Engineering, works at the intersection of signal processing and information theory. While wireless sensors, or motes, hold some advantages over their hardwired cousins, they are limited by size and power constraints. Ishwar's work aims to overcome the performance limitations and manage the dynamics of these motes.

"Although the world is increasingly digitized, data—such as the vibrations of an earthquake or the chemical signatures of polluted air—are all analog," he says.

Ishwar is using his CAREER award to develop an algorithm that will help coordinate input data in a distributed manner and compress the information more efficiently.

Chris Passaglia, an assistant professor of Biomedical Engineering, is using his CAREER award to gain a deeper understanding of visual systems by examining the eyes of the horseshoe crab. He is hoping to better understand how it processes images so that edges are visible—a function called lateral inhibition—and how its keen night vision works.

Passaglia has already developed an algorithm to match visual data from a single light receptor in a horseshoe crab's eye to a whole network. His team is now attempting to extrapolate this model to the crab's nighttime vision and to develop a web-based model of the animal's vision system.

"The horseshoe crab is an excellent model to understand the basic principles of all visual systems," says Passaglia.

Joshua Semeter, assistant professor of Electrical and Computer Engineering, focuses on space physics. "The vast majority of the universe is in plasma state," says Semeter. The Earth is surrounded by plasma in the ionosphere, which extends from 50 miles to 500 miles above its surface.

Researchers are still using rockets, satellites, radar, and even the aurora borealis to gather data: "We want to combine these diagnostics to study this region."

With the CAREER award, Semeter proposes to combine instrument design and signal processing. This will aid in developing a systematic way to connect the measured data from ground-based instruments with that gathered from rockets and satellites. ■

Sound From Light

ENG researchers lead the way to nano-scale detection devices

By Michael Seele

Two College of Engineering faculty researchers are combining nano-mechanics with photonics to produce tiny devices that may one day detect minute traces of cancer or the tiniest amounts of biological or chemical hazards in the environment. AME assistant professors Kamil Ekinci and Todd Murray are studying the vibrations of nano-scale wires that could be used to detect the presence of particles measured in tens of atoms.

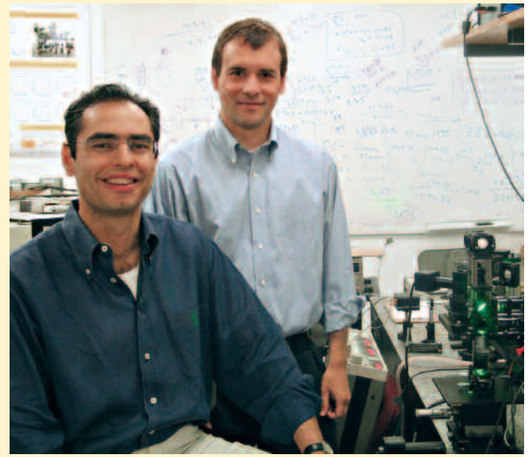
Other researchers have plucked such wires and measured the vibrations before, but mostly in a cold vacuum—where the vibrations are exaggerated—and using electrical stimulation and measurement techniques. Murray, Ekinci and graduate student Ashwin Sampathkumar have demonstrated how to stimulate and measure such wires at room temperature outside of a vacuum using only light. Their approach dramatically decreases the size of the apparatus required and more closely mimics real-world conditions.

The research is identifying the resonance frequencies of the wires, which, like harp or guitar strings, resonate at frequencies corresponding to their lengths. Establishing this baseline data is crucial to the development of the technology, since the presence of even a single molecule on a wire will alter its resonance frequency and indicate the presence of an unwanted substance.

"These wires are very sensitive to added mass," says Murray. "They can detect trace amounts."

"Putting mass on them changes resonance frequency," Ekinci adds. "Using this method, it would be possible to detect how much mass is present."

The researchers carved the wires out of wafers of chromium-coated silicon 250 nanometers thick. The wires are, in effect, strung between two wafers at different lengths, similar to a harp, only about a million times smaller. The nano-wires range in length from 2.5 microns to 10 microns. Using a new light microscope built specifically for this experiment, the researchers focused a laser to produce the smallest spot of light physically possible—less than one micron, or one-thousandth of a millimeter, across—and used it to "pluck" each wire at various points along its length. The laser produces vibration in the wires not by physical contact like a guitar pick, but by heating specific spots. A second tightly focused laser was used to measure resultant vibrations.



Kamil Ekinci and Todd Murray

Ekinci and Murray recently won a National Science Foundation grant to fund the next step of the project, which involves multiplying these devices into arrays that would work more efficiently.

"Obviously, the probability of a single molecule finding a single wire is pretty small," Murray explains. "Adding hundreds or thousands of these wires increases the probability that a molecule is going to land on one of them."

Ekinci is also exploring the possibility of immersing these arrays in liquid and measuring how the medium affects vibration. This would be critical to developing medical applications for the technology, he says. ■

SmarTrash

The ECE seniors from the Class of '06 who made "smart" trash cans that signal when they need to be emptied ("The Best of the Brightest," Spring 2006) have garnered a lot of attention. The quartet who imagined and prototyped this concept—Yaniv Ophir, Joseph D'Errico, Andrew Hagedorn and Vyas Venkataraman—were chosen as one of only 10 finalist teams worldwide (and one of only two from the U.S.) in the Computer Society International Design Competition.

Competing against teams from China, Jordan, India, Poland and Romania in Washington, D.C., in July, the ENG team earned an honorable mention. The SmarTrash system uses sensors and motes to tell park managers which trash cans need to be emptied and which don't, allowing them to deploy workers more efficiently.

"The team was commended for their entrepreneurial approach," said Professor Michael Ruane, who leads the Senior Design class in ECE. "The senior design faculty is proud of this team, which put together an outstanding project and a very strong presentation. They were excellent representatives of the University."

The students were also invited to demonstrate their invention at New York City's annual Fleet Show, where they received queries from vendors and park authorities interested in using their technology. ■

Yaniv Ophir, Joseph D'Errico, Andrew Hagedorn and Vyas Venkataraman with their "smart" trash prototype.

A Milestone for Biomedical Engineering

Department marks five-year expansion

By Chhavi Sachdev

On June 30, the College of Engineering Biomedical Engineering Department officially ended a five-year period of expansion fueled by a $14 million Whitaker Leadership Award received in 2001.

The department opened new core facilities—its last task in fulfilling the terms of the award—with a reception on June 21.

"We sit together with great facilities, great faculty, having spent a great grant, in the wonderful position of being one of the top programs in BME," said University President Robert A. Brown. "The Whitaker Foundation grant has been a boost in propelling us forward."

In the last five years, the Whitaker Leadership Award has helped Boston University reach "the cusp of having a global impact," said Kenneth Lutchen, then BME chairman. "With our human—and facilities—firepower, we are poised to really understand and impact human life."

Brown said the conclusion of the award "marks a pivotal point in the history of BU and biomedical engineering at BU," adding that the Whitaker Foundation grant has been instrumental in establishing Boston University and its biomedical engineering program as one of the best, nationally and globally.

The Whitaker Foundation, named for the late scientist and inventor Uncas A. Whitaker, established its Leadership Awards in the late 1990s for "institutions that have already demonstrated national leadership in biomedical engineering and have articulated a clear and exciting vision for enhancing their leadership position," said Lutchen.

Under the deanship first of Charles DeLisi, BU's Arthur G. B. Metcalf Professor of Science and Engineering and senior associate provost for bioscience, and then David K. Campbell, now BU provost, the University applied for a Whitaker award and was one of only three institutions to win one. The foundation gave BU $14 million in 2001, with an $18 million cost-share investment from the University.

The grant was used in part to build the Life Science and Engineering Building at 24 Cummington Street and to hire 12 new faculty members with secondary appointments in eight other departments, among them ophthalmology, pharmacology, physics, and genetics and genomics. The College of Engineering also built laboratories and created dynamic cross-disciplinary and innovative courses with the money. The catch, Lutchen said, was that they had to get it done "soup-to-nuts, in five years."

Former Chairman of BME Kenneth R. Lutchen, University President Robert A. Brown and Dean *ad interim* Solomon R. Eisenberg mark the opening of the Whitaker Core Facilities.

This past summer, BU completed the implementation of the award. The June 21 event officially opened the BioInterface Technologies Units, the Micro/Nano BioImaging Facility, the Micro/Nano Biosystems Fabrication and Teaching Facility (all at 44 Cummington Street) and the BME Computational Simulation Facility (in the Life Science and Engineering Building).

"With the tremendous effort of BME faculty and staff and the BU administration, we have completed the project on time and on budget," said Lutchen.

Brown was impressed, he said, with the BME department, which has kept abreast of developments in the field as biomedical engineering has become "more molecular in nature: it has transitioned from bones and circuits to understanding life and life sciences."

"Now we're just moving forward," said Matthew E. Barber, BME department director. "We'll have other initiatives that will come down the road because of this."

"With all that strength and financial support, we can do fantastic things," Brown said at the conclusion of the June 21 ceremony. "BME will continue to be a jewel in the crown of Boston University." ■

John White, Chairman *ad interim* of Biomedical Engineering

College of Engineering Dean Kenneth R. Lutchen has announced the appointment of Associate Professor John White as chairman *ad interim* of the Department of Biomedical Engineering, effective September 1.

White, who also holds a joint appointment in the Department of Pharmacology and Experimental Therapeutics at the Medical School, has served as BME's associate chair for undergraduate and graduate studies. He joined the faculty in 1994 as an assistant professor and was promoted to associate professor in 2000.

His appointment as chair *ad interim* came a few weeks after Lutchen left the BME chairman's office to assume deanship of the College of Engineering. Lutchen's eight-year tenure as BME chairman was marked by a dramatic rise in the department's national profile, with the department currently ranked 7th in the nation by *U.S. News & World Report.* Lutchen said the great majority of BME faculty recommended White to be his immediate successor.

"John has been an extraordinarily productive scientist, educator, administrator and leader for BME," Lutchen said. "He has the enthusiastic support of the BME faculty and has worked tirelessly for enhancing a cross-disciplinary, student-centric approach to both undergraduate and graduate education in Biomedical Engineering. He is very well known in the BME research and professional communities. John's background, approach and leadership style make him a perfect choice to sustain the department's stature and address future initiatives."

Lutchen said that continuity necessitated the appointment of an interim chair quickly. He added that he will work with BME faculty in the coming months to determine the best approach for identifying a permanent chair.

"I'm honored that the BME faculty, Dean Kenneth Lutchen and the administration have sufficient confidence in me to grant me the position of chair *ad interim,*" says White. "Ken, the faculty, the students and the staff have worked tirelessly for decades to produce a world-class department with a wonderful sense of camaraderie. I hope to build upon our momentum as a department that others look to for leadership in both research and education."

Associate Professor John White

White's research into the function of mammalian brains has yielded millions of dollars in support from the National Institute of Mental Health, the National Science Foundation, the National Institutes of Health, the Whitaker Foundation and other sources, and has produced dozens of publications. White is the associate director of the Center for Memory and Brain at Boston University.

As a teacher, White has placed equal emphasis on directing graduate students while also teaching undergraduates and making them part of his laboratory research. He annually mentors undergraduates working on senior projects. His contributions to the College were recognized in 2002 with the Faculty Service Award.

White is a fellow of the American Institute of Medical and Biological Engineering and a full-time member of the NIH Study Section on Learning and Memory. He is co-director of the Methods in Computational Neuroscience course at the Marine Biological Laboratory at Woods Hole.

White holds a doctorate in biomedical engineering from Johns Hopkins University and a bachelor's degree in biomedical engineering from Louisiana Tech University. ■

New Fellowship Established for Asian Graduate Students

By Chhavi Sachdev

The father of three Boston University alumni has endowed the College of Engineering with a $200,000 fellowship to aid Asian graduate students.

At a September 5 ceremony to honor the benefactor, Hing Wah Cheung, the first recipient of the Cheung Graduate Fellowship thanked the Cheung family.

"The fellowship will help me focus on research and study," said Ting Sun from Dalian, China, who will research robotics in the Department of Aerospace and Mechanical Engineering.

The fellowship is an important kind of gift for the College, said Dean Kenneth R. Lutchen. "Over the past decade, we have propelled ourselves to being among the top research engineering colleges in the nation based partly on the quality of our faculty but also equally because we attract the best graduate students," he said. "Additionally, having many cultures in a laboratory amplifies the creative energy and perspective."

This kind of fellowship "helps ensure that we can address cross-disciplinary challenges and move to the next level of excellence," Lutchen added.

Cheung, the director of Beautiful Enterprise Company, Ltd., in Hong Kong, is known for his philanthropy in Hong Kong as well as in rural China. His association with the University started a decade ago, when his son Wayne (ENG '99) attended BU, followed by his daughter Wendy (SHA '02) and son William (ENG '05).

By endowing this fellowship, Cheung hopes to help Asian students from "modest backgrounds get a superior education, so they can return and facilitate industrial and educational experiences for people in their home country," said Richard Lally, Director of Development and Alumni Relations for the College.

The Cheung Family Graduate Fellowship will help the College recruit the best students in Asia, said Mark N. Horenstein, the associate dean for Graduate Programs and Research at the College of Engineering. "Ting Sun was, by far, the strongest candidate from this year's applicant pool," added Horenstein, who headed the selection committee for the fellowship.

Sun, whose undergraduate degree in engineering is from China's Northeastern University, has four patents on a robot she designed to help train soccer goalies. In addition to showing potential as a top researcher, Horenstein added, Sun also demonstrates civic sensibilities. While an undergraduate, she taught elementary school children in rural China and also tutored high school English.

The Cheung Family Graduate Fellowship will aid a full-time Asian graduate student who is not only academically outstanding but also invested in philanthropy and giving back to society. Candidates from China, Hong Kong, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Taiwan and Thailand are eligible for the fellowship, which includes tuition, fees and a generous stipend for a year.

"I hope someday I will make contributions to this fabulous school and make my country proud," Sun said. ■

Benefactor Hing Wah Cheung, fellowship recipient Ting Sun and Dean Kenneth R. Lutchen at the ceremony.

Segue to the Future

Inventor Kamen urges the Class of 2006 to bring technology to bear on the world's problems

By Michael Seele

Inventor Dean Kamen urged members of the College of Engineering's Class of 2006 to use their careers to help solve the world's problems with technology as nearly 400 graduating students were awarded degrees at the College's 53rd Commencement Exercises on Sunday, May 14. Kamen later used a bit of his own technology to put a new twist on commencement recessionals.

During the Commencement ceremony, the College awarded 239 bachelor's degrees, 106 master's degrees and 42 doctorates to those who completed degree requirements in the past year.

Kamen, who holds hundreds of patents for medical devices and is perhaps best known as the inventor of the Segway personal transportation vehicle, urged graduates to use their education to improve the lives of people around the world.

He noted that of all the young people on the planet, "very, very few, a virtually insignificant percentage, have the education you have. That gives you an unbelievable tool — frankly an unbelievable advantage. It's a fair advantage if you use it responsibly. It's a fair thing to do if you take that responsibility and find a way to use those tools to make the world a better place. With a huge portion of 6.3 billion people incapable of solving their problems…the very few that have the capacity to solve real problems and to spread the knowledge need to make that a high priority."

Kamen said that engineers and scientists are underrepresented in the nation's public policy debates, often taking a back seat to the entertainment and sports industries. He said that needs to change if America is to retain its standard of living, a standard that comes through the invention and application of technology.

"I would urge you—this new generation of scientists and engineers coming into a very, very complex world, the future of which will be largely determined by how wisely we use technology—to take a more expansive role in society," Kamen said.

"We need to be able to compete by having the best. It's not a birthright. Every generation has to earn it."

Offering advice on how to succeed as engineers, Kamen urged graduates to pick an important problem and stick with it until it is solved.

Kamen, who started the FIRST Robotics Competition in the 1980s as a way to get high school students interested in science and engineering, also urged the graduates to give back through activities like mentoring and bringing science and engineering to the forefront of public consciousness.

"You're starting the part of life where you need to be the givers to a world that's got a lot of people, even the wealthy ones, who have become used to being takers," he said. "If you don't get yourself ready to start becoming one of the givers, no matter how much you get it won't be enough," Kamen added. "And it doesn't end up being a very fulfilling life.

"I can assure you that the giving part turns out to be way more fun that the getting part. So make your living by what you get; make your life by what you give."

The student address was delivered by Lin Lin Goa, who received a bachelor's degree in biomedical engineering. She encouraged her classmates to be curious and creative in their search for knowledge and to be passionate about their life's work.

As the ceremonies concluded and recessional began, Dean *ad interim* Solomon Eisenberg implored the audience to remain seated and keep the center aisle clear. It soon became apparent why: Eisenberg and Kamen boarded two waiting Segways and glided down the aisle as the theme from "Star Wars" boomed over the public address system. ■

Valedictorian Paul Bower (BME) receives a certificate from Dean *ad interim* Solomon R. Eisenberg.

Commencement speaker Dean Kamen exited the platform on one of his Segway vehicles. Professor Roscoe Giles is at right.

Photos/Tricia Brenden, Commencement Photos, Inc.

1954

DAVID LOWRY (AME)

Newton, Massachusetts

David has been elected to his third term as a member of the Danbury Railway Museum's board of directors. He invites all to visit the DRM.

1963

WILLIAM A. COX, JR (BS)

Tucson, Arizona

While working for Raytheon Corporation, William won a scholarship and graduated from BU. He is still working for Raytheon at the Missile Systems in Tucson, Arizona, and has now completed 50 years of service. He continues to work full time. You can reach him at *wacox@comcast.net.*

1983

ANDREW J. MARSH (AME)

Needham, Massachusetts

Andrew is president of Rolls-Royce Naval Marine, Inc., where he is responsible for directing the company's naval marine business in North America. Previously, he was chief operating officer of Walker Magnetics Group, Inc., and executive vice president and general manager for two divisions of AEC Sterling/Cumberland Companies, a manufacturer of auxiliary equipment for the plastics processing industry.

STEWART O'NAN (AME)

Avon, Connecticut

Stewart wrote a piece for the new book *My New Orleans: Ballads to the Big Easy by Her Sons, Daughters, and Lovers* (Touchstone, 2006), which includes tributes to New Orleans by famous writers and personalities. Stewart's novel *Snow Angels* (Penguin Books, 1994) has been adapted into a film starring Kate Beckinsale, Sam Rockwell, Olivia Thirlby and Amy Sedaris.

1984

VERNON PARRISH (MS)

Arlington, Virginia

In June 2005, Vernon was promoted as a senior systems engineer in the Naval Sea Systems Command in Washington, D.C. He is responsible for determining the scope, cost and timing of all Navy engineering activities that support the joint Engineering for Reduced Maintenance/Top Management Attention programs and Fleet-sponsored projects. E-mail him at *vernon.parrish@navy.mil.*

1988

DAVID ELDER (ECE)

Gaithersburg, Maryland

David Elder of Gaithersburg, Maryland, is the director of enforcement for the U.S. Food and Drug Administration and a captain in the U.S. Public Health Service, completing his 18th year of service. He and his wife, Patricia, along with their children Jacob, 8, and Jamie, 3, recently relocated from the Boston area to Maryland. E-mail him at *david.elder@fda.hhs.gov.*

1990

JASON COLACCHIO (ECE)

Peabody, Massachusetts

Jason Colacchio and his wife Tracy are extremely proud to announce the birth of their first son, Dante Anthony Colacchio, on April 26. Both Dante and Tracy are in excellent health and spirits. Contact Jason at *jpc@adcco.com.*

MANUEL O. MENDEZ (BME)

Belgium

Manuel recently assumed the responsibilities of general manager for Abbott Laboratories in the Benelux region, based in Belgium. He reports that after three great adventure years living in Japan and South Korea, Europe's lifestyle is very different and...interesting. Also, his family is growing. After his second daughter, Cecilia, was born in Korea in 2004, his son was born in Belgium in May.

manuel.mendez@abbott.com.

1994

JOSHUA CHEONG (ECE)

Singapore

Joshua recently left Hewlett-Packard's global operations division to pursue a regional customer relationship management role at Mercury Interactive. Contact him at *joshuacheong@hotmail.com.*

HOCK MIN NG (ECE)

Westfield, New Jersey

Hock is currently a member of technical staff at Bell Labs, Lucent Technologies. He was recently awarded the Charles W. Tobias Young Investigator Award by the Electrochemical Society, which recognizes outstanding scientific and pioneering work in fundamental or applied electrochemistry or solid-state science and technology by a young scientist or engineer. Hock was recognized for contributions to the development of GaN semiconductors and related alloys; the announcement appeared in the fall issue of the Electrochemical Society publication *Interface.* He would also like to get in touch with old classmates ('94, '97, '00) from BU. E-mail him at *hock.ng@gmail.com.*

1995

WILLIAM BOWHERS (ECE)

Wayland, Massachusetts

William J. Bowhers recently completed his first year of teaching at Merrimack College in North Andover, Massachusetts. He entered a tenure track position in the college's electrical engineering department in September of 2005 after 25 years of product development for the semiconductor test industry at Teradyne, Inc. William is teaching signals and systems and control theory and uses his industry experience to mentor senior capstone projects. E-mail him at *William.Bowhers@Merrimack.edu.*

CRAIG HANNON (ME)

Richmond, Virginia

Craig and Heather Hannon are pleased to announce the birth of their son, Linus Joseph, on June 3. He joins big brother Isaac, 4, and big sister Annelise, 2.

DEANN TORRES O'HARE (ECE)

Hopkinton, Massachusetts

DeAnn and her husband, Jeremy, of Hopkinton, Massachusetts, welcomed their second daughter, Nicole, on March 29. Big sister Jacqueline is 2 years old.

DeAnn is a principal software engineer for EMC Corp. Friends can reach her at *deann@emc.com.*

JAKE P.E. ORTEGO (ME)

Pittsburgh, Pennsylvania

Jake is married with a 3-year-old son and living back in his hometown of Pittsburgh. After working nearly 9 years as a project engineer in the heavy industry sector, he is now leading Deloitte's Construction Advisory Service group for the North Central region. You can e-mail him at *jacob.ortego.1995@alum.bu.edu.*

2001

BILL MCLAY (AME)

Tampa, Florida

Bill and his wife, Shannon, had their first child, William Seanne, on February 12. In addition, Bill will become the chairman of the science department at Berkeley Preparatory School in Tampa, Florida, this year. You can e-mail Bill at *wmclay@verizon.net.*

2003

JESSICA (LIPPERT) BENVENISTE (AME)

Palmdale, California

Jessica married Steven Benveniste of Los Angeles, California, on October 16, 2005 in Hartland, Wisconsin. Adriane Baylog (ENG '03) was a member of the wedding party; Katie Peitz (ENG '03) and Kevin O'Brien (CAS '03) were also in attendance. Steve and Jessi currently reside in Palmdale, California. You can e-mail them at *lipps@alum.bu.edu.*

2004

FRANCIS SZALAY (AME)

Ashburn, Virginia

In April of 2006, Francis graduated from the University of Michigan with a Master's in Aerospace Engineering. After concentrating in gas dynamics, Francis now works at Orbital Sciences Corporation in Dulles, Virginia, as a systems engineer in the space systems group working on the ASA/JPL Dawn mission. You can reach him at *fszalay@gmail.com.*

PASSINGS

NILES A. BLACKBURN ('53), on April 20.

ROBERT E. GAMBLE ('55), on February 12.

JOHN F. LADD ('60), on February 9.

PHILLIP MICHAEL ('64), on January 4.

JOHN M. HAZELL ('66), on September 14, 2005.

JOHN HILLOCKS CARRUTHERS ('95), on August 4, 2005.

Make it Possible

Without alumni support, the W. Bradford Ingalls Engineering Resource Center would not exist and students would not have a modern, comfortable place to work together, study on their own, do research, or just relax.

Providing this kind of facility requires support above and beyond tuition dollars. Alumni donations make the difference and enable the Boston University College of Engineering to provide students with an exceptional education.

To find out how you can make a difference, contact the College's Development and Alumni Relations Office at 617-358-2806 or *engalum@bu.edu.*

CHRISTOS CASSANDRAS
PhD, Harvard University
Professor of Manufacturing Engineering
Professor of Electrical and Computer Engineering

Interactions

"My field, systems engineering, begs for cross-disciplinary interactions," says Christos Cassandras, who helped cofound the Center for Information and Systems Engineering in 2002. "These interactions help me realign my interests and keep me fresh."

"I came to BU in 1997 for a number of reasons, chief among them being that I sensed the College of Engineering was more willing and able to provide resources and take risks for non-mainstream research. The University is supportive and we're fortunate to attract some great graduate students and faculty. We have formed some critical mass in the systems engineering field and it is one of the areas in which we do world-class research."

To learn more, visit:
www.bu.edu/eng

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