COLUMBIA | ENGINEERING

THE FU FOUNDATION SCHOOL OF ENGINEERING AND APPLIED SCIENCE

SPRING 2010

LEADERS MAKING AN IMPACT

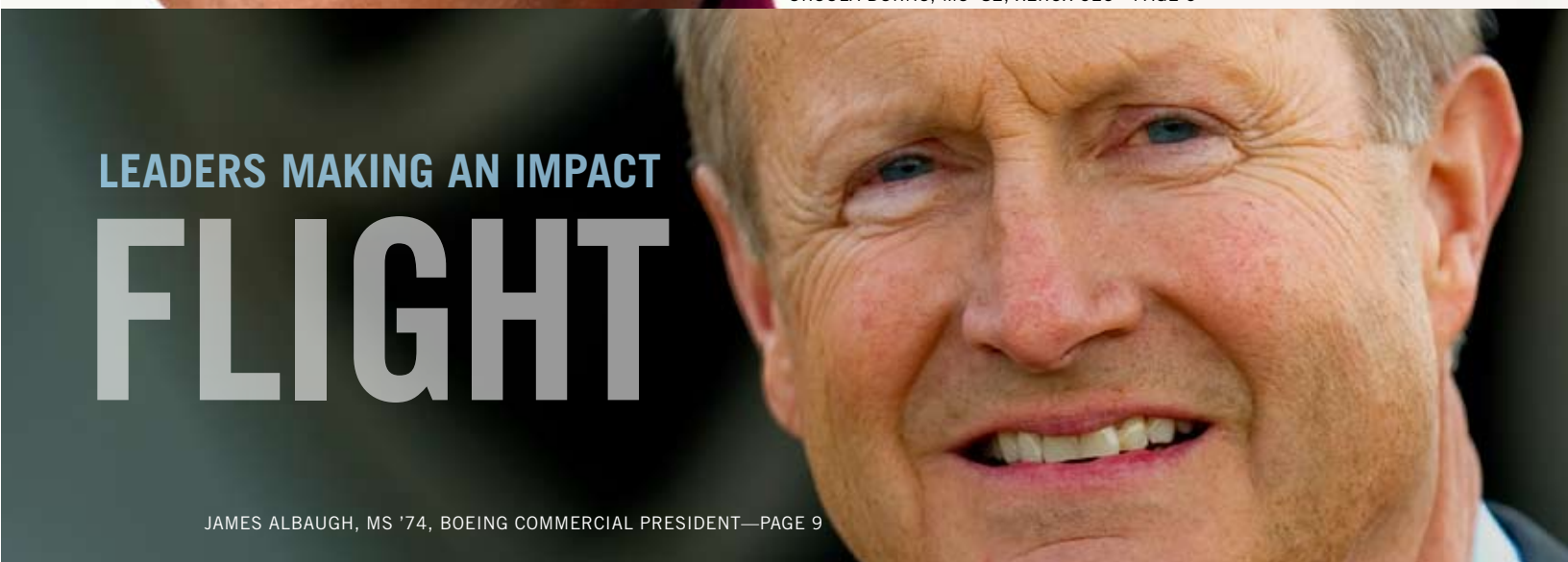
SPACE

MICHAEL MASSIMINO, BS '84, NASA ASTRONAUT—PAGE 15

LEADERS MAKING AN IMPACT

TECH

URSULA BURNS, MS '82, XEROX CEO—PAGE 5



LEADERS MAKING AN IMPACT

FLIGHT

JAMES ALBAUGH, MS '74, BOEING COMMERCIAL PRESIDENT—PAGE 9

Comments, suggestions, or address changes may be mailed to:
Columbia University
The Fu Foundation School of Engineering and Applied Science
Room 510, MC 4714
500 West 120th Street
New York, NY 10027

Phone: 212-854-2993
Fax: 212-864-0104
E-mail: mk321@columbia.edu

Read more about Columbia Engineering's
LEADERS MAKING AN IMPACT
http://www.engineering.columbia.edu

Dean of the School
Feniosky Peña-Mora

Editor/Writer: Margaret R. Kelly

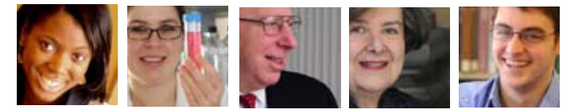
Contributing Writers: Jeff Ballinger, Ken Kostel, Karen Springen

Design and Art Direction: University Publications

Photography credits: page 2: Columbiana; pages 3, 6, 10, 11, 13, 15, 25, 27, 31, 32, 34, 56: Eileen Barroso; page 4: Xerox; page 8: Boeing; page 12: Michael Dames; page 14: NASA; page 17: Jill LeVine; page 18: Lynn Saville; page 20: Bruce Maxwell; page 21: AP Worldwide; page 26: UIC Photography; page 28: Rebecca Maxon; page 57: Ken Tannenbaum

Columbia Engineering is published twice a year by:

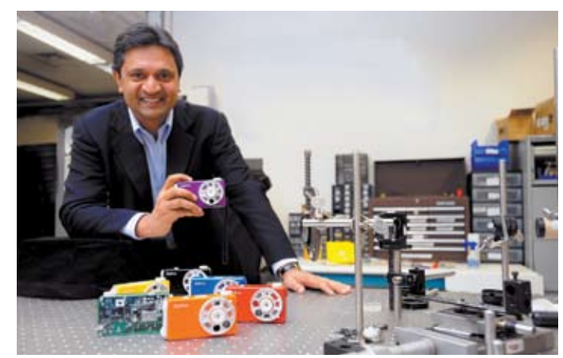
Columbia University in the City of New York
The Fu Foundation School of Engineering and Applied Science
500 West 120th Street, MC 4714
New York, NY 10027



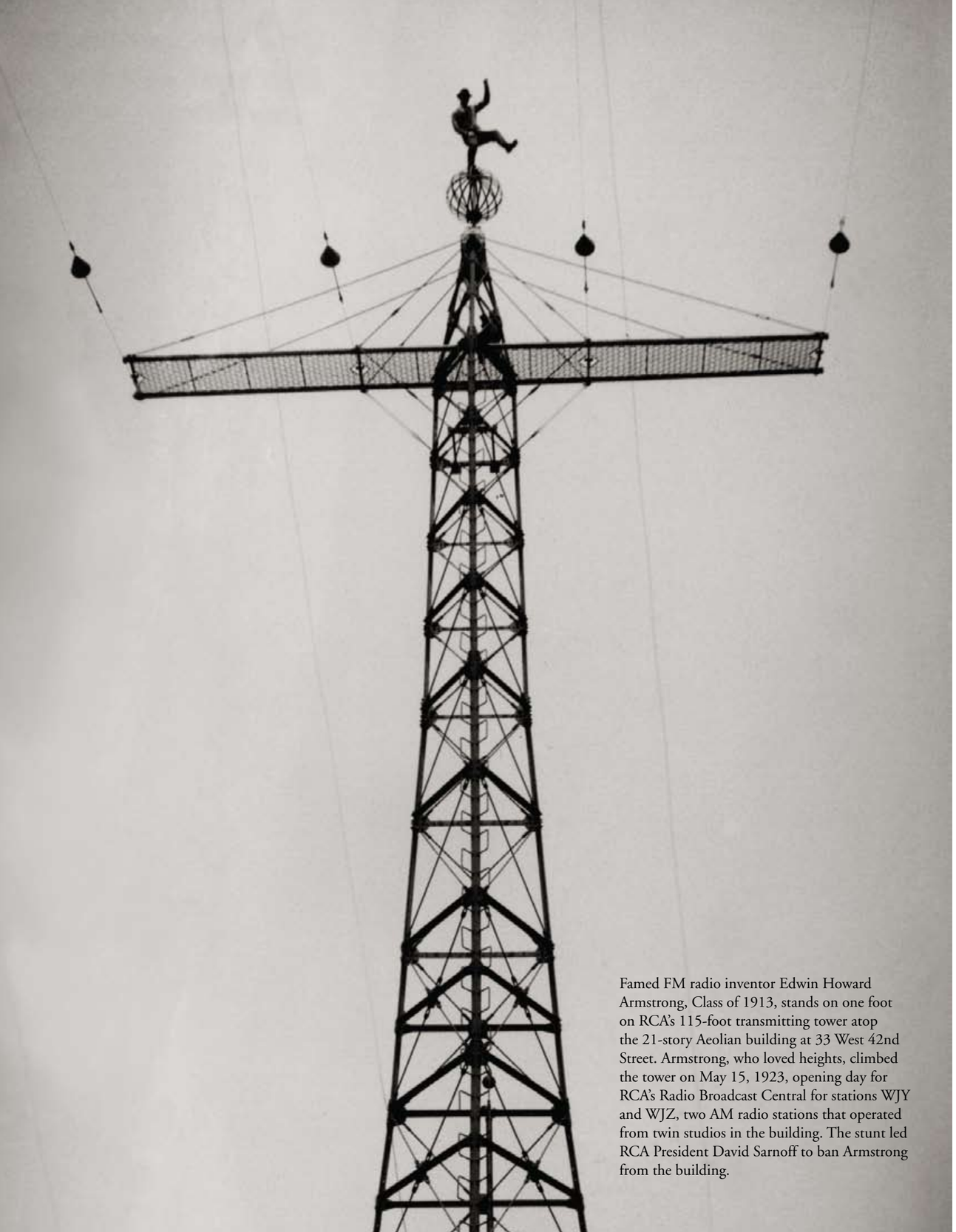
contents

Spring 2010 | Volume 51, No.2

LEADERS MAKING AN IMPACT



Columbia Engineering online at:
http://www.engineering.columbia.edu



Famed FM radio inventor Edwin Howard Armstrong, Class of 1913, stands on one foot on RCA's 115-foot transmitting tower atop the 21-story Aeolian building at 33 West 42nd Street. Armstrong, who loved heights, climbed the tower on May 15, 1923, opening day for RCA's Radio Broadcast Central for stations WJY and WJZ, two AM radio stations that operated from twin studios in the building. The stunt led RCA President David Sarnoff to ban Armstrong from the building.

This issue of *Columbia Engineering* magazine focuses on engineering and applied science leaders making an impact—alumni and students who have made their mark on this generation and hold the promise of doing so for the next. While we are highlighting only a small fraction of our present and future leaders, these men and women are standing on the shoulders of giants, those alumni of generations before us.

It was Sir Isaac Newton who first recognized the importance of the foundation laid by those who had preceded him. "If I have seen further, "he said, "it is because I am standing on the shoulders of giants," an axiom for Columbia Engineering. For each generation, our alumni have become the teachers and mentors for the next generation of leaders.

One of the early graduates of the Engineering School, Michael I. Pupin, Class of 1883, was such a giant, earning fame as the inventor of the Pupin coil and father of long-distance telephony. His pupil and, later, faculty colleague in the Department of Electrical Engineering, Edwin Howard Armstrong, Class of 1913 (see photo at left), invented three electronic circuits fundamental to modern FM radio, television, and radar.

As our alumni were developing the new discipline of electrical engineering, our civil engineering alumni also were continuing to transform the world. William Barclay Parsons, Class of 1882, founded an engineering firm, today's Parsons Brinckerhoff, that early on was international in scope. He was chief surveyor of China's 1,000-mile route from Hankow to Canton (a line still in use today), built docks in Cuba, and was instrumental in the construction of the Panama Canal. During the 1990s, his firm was led by our alumnus, the late Henry Michel '49, who, as president and chairman, oversaw its growth to a thoroughly international firm that now employs 15,000 people world-wide.

Our School today has more than 24,000 living alumni, each of them leaders in their own right. As you will see in the following pages, these featured alumni and students—no matter what their field of endeavor—are having an impact on the way we live our lives, both now and in the future. Please join me in celebrating their achievements.

We also know that there are other Columbia Engineering alumni whose work has left its mark on our daily lives. If you have information about other alumni leaders, please visit our Web site to share your story or the story of a classmate. See page 33.

I look forward to reading all your stories and learning more about the influence of our Columbia engineering and applied science leaders. The original mission of King's College in 1754 was to teach "everything useful for the Comfort, the Convenience and Elegance of Life." For our nearly 150-year history, Columbia Engineering continues to do just that. It is thanks to all of you who are doing your part to keep us faithful to our charter.

Feniosky Peña-Mora
Dean

Leading Xerox

URSULA BURNS
MS '82 MECHANICAL ENGINEERING
CEO, XEROX CORPORATION

By all accounts, Xerox was a difficult place to be in 2001. Burdened by debt and facing a government investigation of its accounting practices, the company was losing market share and hemorrhaging money. It would have been understandable had Ursula Burns taken another job offer and continued her fast-rising career elsewhere. But she didn't.

The following year, Burns was promoted to president of the company's document systems and solutions group, where she oversaw product development, global manufacturing, and high-end printing. Then-CEO Anne Mulcahy called Burns' performance the "key to the company's future," and Burns did not disappoint, cutting nearly $2 billion in costs and refocusing on the company's core businesses. Slowly, profits returned and market share rebounded.

In 2007, Mulcahy surprised no one when she appointed Burns president of the company, setting the stage for Burns to take over the top spot at Xerox in 2009 in what was called the most uneventful and well-scripted executive transition in modern times. In hindsight, it all worked out. But why did Burns decide to stay?

Loyalty and the lure of a challenge.

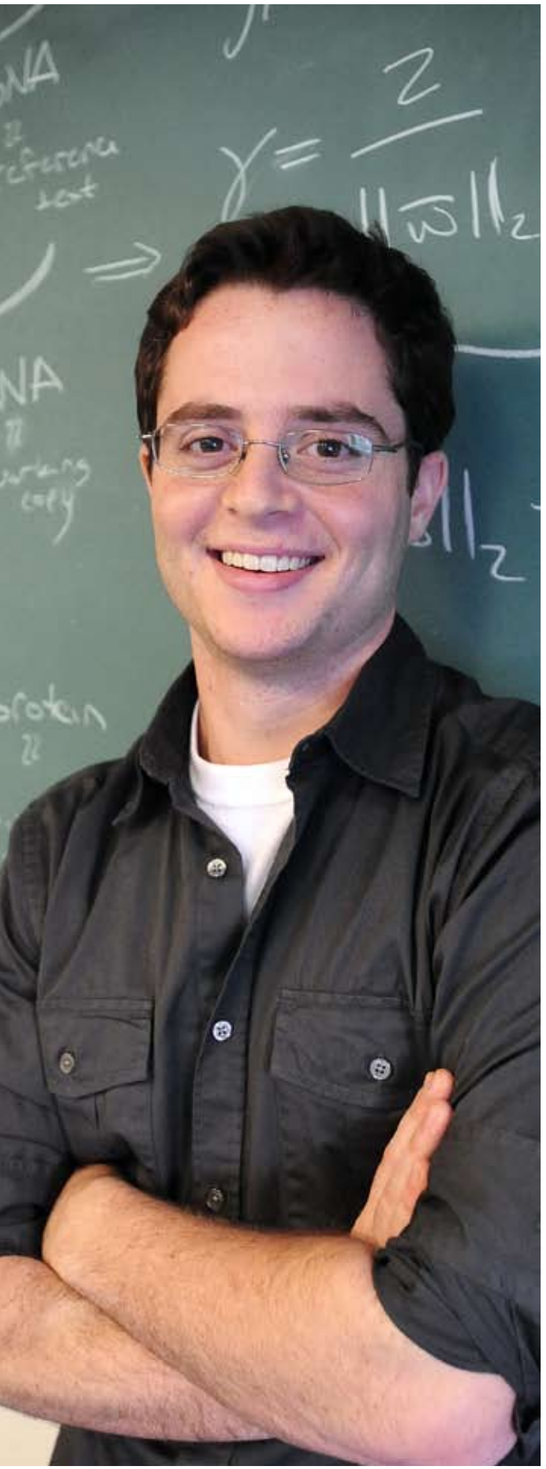
"When I joined Xerox in 1980 as an engineering intern, there weren't a lot of women in research or product development," she said. "And there were even fewer black women. But no one ever stopped me from chasing my ambitions. I was given assignments to tackle big projects. I increased my visibility in the corporation by embracing opportunity and working hard to succeed."

As an undergraduate, Burns gravitated first toward chemical engineering, in part because she once read that chemical engineers make a lot of money. But she is a firm believer that a person is more likely to succeed if they have a passion for what they do. So, she switched to mechanical engineering and never looked back, eventually completing a master's degree at Columbia in 1981.

"Columbia offered the high-quality engineering focus I was seeking to advance my skills and be well-positioned to apply these skills in the real world," she said. "From my science and engineering background, I learned discipline, problem solving, turning complexity into simplicity, managing by fact—all of these are fundamental attributes of successful engineers and, I believe, of successful leaders."

Given all that she has achieved, it wouldn't seem there is much more for her to do except keep a steady hand at Xerox as CEO, but Burns still sees work to be done. In November 2009, Burns was appointed by President Obama to help lead Educate to Innovate, an initiative intended to improve performance of U.S. high school students in STEM (science, technology, engineering, and math) subjects.

"We need more people to pursue engineering careers, especially women and minorities, because our companies are better when we build engineering communities that are diverse," she said. "Those who enjoy the challenges of science and math—and are good at it—will be able to find academic and job opportunities that can lead to rewarding career paths. I want to help them get there."



Predicting Diseases

ADRIAN HAIMOVICH BS '10
APPLIED PHYSICS AND APPLIED MATHEMATICS

Seven major diseases—diabetes types I and II, bipolar, high cholesterol, coronary artery disease, rheumatoid arthritis, and high blood pressure—may be reliably predicted based on analysis of genome-wide association studies (GWAS), while unlocking complex problems like the biological cause of cancer—the second-leading cause of all deaths—may lie in these fundamental building blocks of life.

As researchers delve further into network-based biology, investigators have found themselves increasingly reliant on not only clinical knowledge, but also statistics, computational sciences, and mathematics. Adrian Haimovich '10, an applied mathematics major, has been interested in computational biology since the ninth grade.

By the time he finished high school, he had several years of summer lab experience as well as an academic publication. Upon arriving at Columbia Engineering, he sought out those professors whose work provided the foundation of his own research, including electrical engineering Professor Dimitris Anastassiou. Anastassiou's genomics research spans seven major diseases and is of a computationally challenging scale. His work applies tools from electrical engineering to problems in quantitative biology.

"While working on those large-scale genomic data, I became interested in applications of Professor Anastassious's ideas in information theory to other types of clinically relevant problems," says Haimovich, specifically those that trace physiological responses, in the form of gene expression, to either medical conditions or experimental protocols. By junior year, Haimovich had begun to work with new datasets based on the clinical condition sepsis, which is characterized by severe systemic inflammation.

He looked to extend the work on sepsis under the supervision of Associate Professor Chris Wiggins of the Department of Applied Physics and Applied Mathematics. Wiggins suggested using machine learning methods central to his own lab's work to help Haimovich analyze his data. Working in the Wiggins laboratory, Haimovich applied support vector machine (SVM) techniques using data from patients who were treated with either an endotoxin or placebo. The results from this work indicate genes that are strong classifiers for sepsis. The work continues as Haimovich looks to use SVMs to make clinical studies more efficient.

"Engineering mathematics is a powerful and elegant way to look at a biological problem," says Haimovich, "and computational biology can be used to make great advances in patient care."

Controlling Hazardous Materials

BARBARA C. YU
BS '79 CHEMICAL ENGINEERING
LOS ANGELES COUNTY FIRE DEPARTMENT

After being downsized from two positions with large manufacturers and with chemical engineering jobs fleeing California in the 1980s, Barbara Yu just wanted to find a nice "safe" job that would allow her to keep her family in Los Angeles. So she took a job keeping track of hazardous materials and responding to chemical spills. Nice and safe.

"That's what Columbia taught me," said Yu. "Roll with the punches and go with the flow."

For Yu, going with the flow today means being on call 24 hours a day to respond to hazardous materials releases and running toward many situations others would rather avoid. As head of the Los Angeles County Fire Department's Emergency Operations Section, she is a first responder charged with keeping other first responders, and the general public, safe.

Leaking ammonia-filled rail cars, refinery fires, even suspected anthrax releases, fall under her responsibility but fortunately account for a small part of what she does day to day. "Usually it's pretty quiet," said Yu. "Only about 5 percent of the time the adrenaline goes up. The rest is preparation."

An important part of that preparation is Yu's chemical engineering background and her experience with industrial processes. When she first applied to the department, however, her interviewers thought they needed a chemist to simply help them decipher new regulations governing hazardous materials. Yu had to explain that, in her, they were getting much more—someone who understood manufacturing processes and the real-world applications of hazardous chemicals.

Today, when she responds to a call, that knowledge helps create what she calls an intuition of what is happening, and it commands the respect of other emergency personnel when seconds count and lives may be in danger. It also helps her prepare for the next emergency because as Yu describes her line of work, "It's not if, it's when."

Launching the Newest Airliners

JAMES ALBAUGH
MS '74 CIVIL ENGINEERING
PRESIDENT, BOEING COMMERCIAL AIRPLANES

A little more than 50 years ago, Jim Albaugh sat in his second grade class transfixed by the rhythmic signal transmitted to Earth by Sputnik. Little did he know that a few decades later he would help put satellites into space—and other, much more complex things.

Originally, Albaugh had hoped to build dams, but by the time he graduated, most of the country's dams had been or were nearly finished. So he turned to rocket science. In 1996, he was president of Rocketdyne when it was acquired by Boeing and he was made president of Boeing Space Transportation, a group that he grew and merged with others to eventually form the sprawling Integrated Defense Systems unit. Later, he was selected to lead an equally Sisyphean task—integrating Boeing's military aircraft and space units. He succeeded in part by building better products, but also by assembling strong teams.

"At Columbia, we learned the power of teamwork in engineering and in problem solving," said Albaugh. "I also learned the discipline of engineering, the rewards of hard work and, most important for my role today, that everyone has something constructive to add to any discussion or debate. Diversity of thought brings strength to Boeing, as it does to any organization. This is one of the most important things I learned at Columbia."

Today, Albaugh is executive vice president at Boeing as well as president and CEO of the company's commercial airplanes unit. In less than two months, between December 2009 and February 2010, Albaugh oversaw first flights of Boeing's two newest models: the 787 Dreamliner, the world's first major commercial airplane to incorporate lightweight composite materials to increase fuel efficiency, and the 747-8F, the largest airplane Boeing has ever made.

Despite the countless technical questions that must be solved in order to successfully design, build, and fly machines such as these, they remain, at heart, complex, human-oriented systems that rely on thousands of people doing their jobs to near perfection in an uncertain business environment. Assembling one is much like assembling a complex business unit from other, equally complex groups. This, says Albaugh, is precisely why an engineer is the ideal person to lead a massive undertaking like Boeing.

"Without a technical background, having a view of the future and leading a large business is difficult," he said. "I often say—and my apologies to the business school—I can teach an engineer to be a businessman, but I don't think I can teach a businessman to be an engineer."

It's also a challenge that Albaugh seems to relish. With the potential for risk lurking behind every headline about the recession or terrorism or global warming these days, it takes a steady hand to make Boeing successful in the global marketplace. It also takes the kind of leadership that shows others will follow.

"The essence of leadership is making yourself and your team better every day," he said. "This means challenging yourself, setting high expectations, and holding yourself personally accountable. These are all things I learned at Columbia."

Fashion and Technology

MERCEDES DE LUCA
BS '79 ELECTRICAL ENGINEERING/ COMPUTER SCIENCE
PRESIDENT, MYSHAPE, INC.

Stay-at-home moms, take heart. Mercedes De Luca stepped out of the workforce for a dozen years to raise her two sons, now 25 and 26. Then she went on to become vice president of global IT for Yahoo and now president of the online fashion retailer MyShape.com.

Her reinvention story began a decade ago, when she returned to school to get her MBA, changed her first name (Gladys) to an initial (G.), and used her middle name, Mercedes, as her first name. With her new degree and new name, the Columbia-educated electrical engineer moved on to Yahoo, where she led 400 employees as vice president of the global information technology group.

Three years ago, she was recruited to MyShape.com, where she oversees 100 employees, in a job that lets her combine what she calls her "passion for fashion and passion for technology." Since the MyShape.com site launch, nearly a million women have signed up to be members. They fill in their measurements and style preferences, and the site's software matches them with clothing that "fits and flatters," says De Luca. Users also specify favorite brands, such as Tahari and Paige Premium Denim.

De Luca and her colleagues hold patents on their "shape matching" and "personal shop" applications. Their goal: to "surprise and delight" women and to help them "play to their strengths," she says. Her engineering background comes in handy. "It's being able to hear what the business problem is and come up with a software solution," she says. "You drive your team to create a technology solution that's the way a person thinks and does things." Off-line, women like to shop with their friends. So online, as of last August, MyShape.com lets them leave comments for their friends about outfits they have chosen. "For most women, shopping with your friend is a very social activity," says De Luca. "A lot of us want our friends' advice. We offer that same experience in the online world." This has led to additional success. MyShape.com's "conversion rate" (the percent of visitors who actually buy) is now significantly higher than average for online apparel retailers.

LEADERS MAKING AN IMPACT

Blood-Cleansing System

EDGAR NANNE
PhD '10 CHEMICAL ENGINEERING

To remain alive, nearly 500,000 Americans depend on thrice-weekly, in-clinic kidney dialysis. The treatment is costly ($23 billion a year—or about $46,000 per person), very demanding, and provides only a low quality of life. Some 80,000 Americans are on waiting lists for kidney transplants, with 4,000 dying each year before they get one. A steadily operating, ambulatory blood purification system would decrease patients' burdens and increase quality of life for all of these patients.

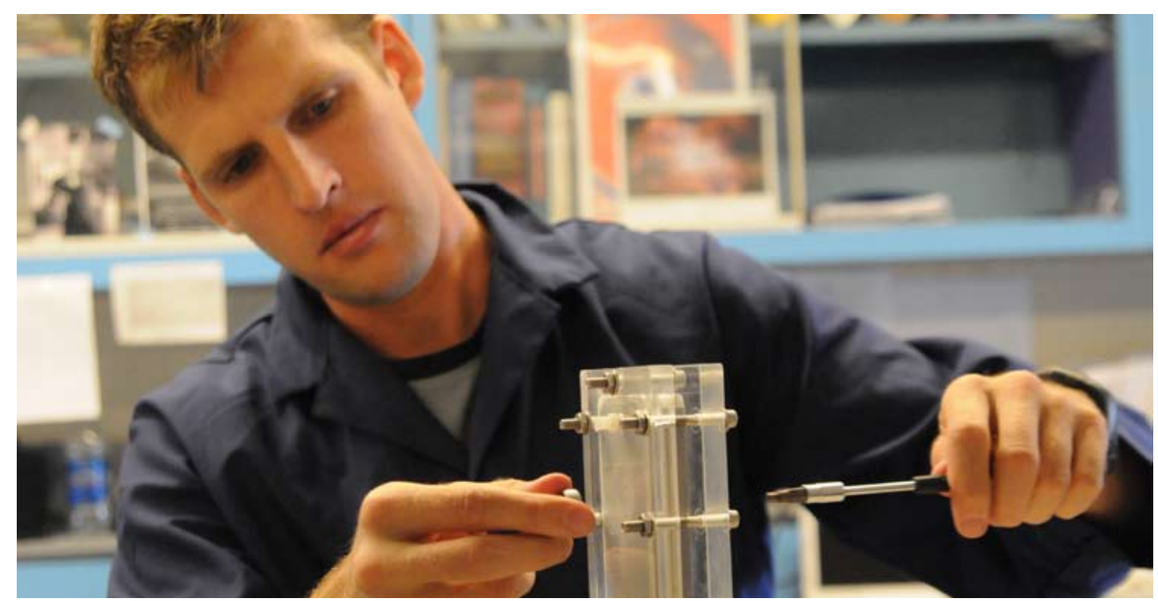
Edgar Nanne, a PhD candidate working with Chemical Engineering Professor Edward Leonard, has been researching the properties of mass transfer in laminar flows of blood, creating the groundwork for the operation of the final dialysis apparatus.

"My contribution to the project, and to the patent, was the evaluation of how different substances of interest diffuse within blood flows as a function of flow properties, red blood cell concentration, and cell-membrane-molecule interactions," says Nanne, a native of Guatemala.

The novel device uses the properties of transport phenomena combined with new manufacturing capabilities to exponentially increase the efficiency and efficacy in the removal of unwanted substances from the bloodstream. "Using the properties of dynamic similarity of fluid flow, we are able to flow blood and a protein solution with minimal mixing," says Nanne.

The system, which is expected to be about 4 inches square and 1 ½ inches high, is designed to be worn by the patient at all times. It will remove water nearly continuously and remove other wastes whenever the patient is stationary.

The advantages to this new blood-cleansing system are many—improving patient quality of life; reducing the need for anticoagulant therapy and its side effects; eliminating the need for a surgical fistula that connects a patient's artery and vein; and cutting treatment costs. It is expected that the first clinical trials on patients will be in 2011. "The challenges are big," says Nanne, "but I believe that if this technology is to succeed, Professor Leonard should get a Nobel Prize for this work. It will mean a new life for dialysis patients."



Googling the Target Audience

CHASE HENSEL
BS '10 COMPUTER SCIENCE

Advertisers will have an easier time finding more efficient ways to reach their target audiences on television, thanks to a computer tool designed by Chase Hensel BS'10.

"I developed a tool that generates a list of TV programs likely to be the most cost effective for an advertiser based on their daily budget and target audience," says Hensel, who devised it during an internship with Google last summer.

"This system provided advertisers close to optimal bids for each program in Google's TV auction and reduced the price by an average of 30 percent to reach their target audience. My work was adopted internally during my internship and was released in October into production for customer use."

For someone who was a Rhodes Scholarship finalist last fall and landed a job at Google before he graduated, Hensel's personal credo—"Mo' money, mo' pizza"—might appear a bit laid back at first glance.

Do not be deceived—he gets results with this basic approach.

"My aim is not to make tons of money but rather to lead a fulfilled life," he says, noting that he enjoys pizza. "I figure the more money I make, the more I will get to enjoy pizza."

Hensel had quite a fulfilling experience at Columbia Engineering, where he finished his degree requirements last month. In addition to being a Rhodes finalist, he earned his degree in just seven semesters, making the Dean's list each time and winding up with a 3.94 grade point average in his major.

Outside class and his studies, he was an officer in a fraternity, a member of the editorial board of the *Columbia Spectator,* designed the electronics system for a student-built race car, was a teaching assistant for two master's-level computer science courses, and mentored an elementary school student in the Harlem Robotics program. In addition, he served as an undergraduate research scientist on campus with the Center for Computational Learning Systems and the Cardiac Biomechanics Group, and was a summer software engineering intern at Google.

Hensel's academic work has focused on machine learning —teaching a computer to recognize patterns.

"I have worked in developing techniques on learning information from sensitive data—like medical records—while protecting the privacy of the records, and also on distributed data mining, which is learning when you have too much information to store on one computer."

Hensel credits his preparation for the skills he learned to his degree program.

"The courses I took in my field were pivotal in my development, as was the time I spent in independent projects and working directly with professors."

This fall, Hensel begins full time in Google's Associate Product Management program.

Much like his Columbia career, however, he intends to keep one foot in academia and one in other endeavors. He'd like to be an adjunct professor of computer science, while also working in a high tech field or in public policy.

"I want to work to be happy," he says. "Fortunately I have thus far been able to work in fields allowing me to do so."

Clues to the Early Universe

MICHAEL J. MASSIMINO
BS '84 INDUSTRIAL ENGINEERING AND OPERATIONS RESEARCH
NASA ASTRONAUT

Scientists and astronomers are beginning to see, for the first time, images of the earliest and most distant galaxies, providing a glimpse into the history of the early universe. In the few short months since Mike "Mass" Massimino and his team successfully updated the Hubble Space telescope, 21 new galaxies have been identified and we are seeing light that has been on its way to Earth for 13 billion years.

At one point, though, Massimino and his partner Mike Goode hit a snag that could have prevented these new views from ever being seen. During their fourth of five planned space walks, a handrail with a stuck bolt threatened to derail efforts to replace the Space Telescope Imaging Spectrograph, an instrument that can detect supermassive black holes and the chemical makeup of the atmosphere around distant alien planets. Massimino resorted to an indelicate solution that was not a part of the mission handbook. With oxygen running out and ignoring all of the 117 tools at his disposal, many of which were created just for the repair mission, he grabbed hold of the offending handrail, ripped it from the side of the satellite, and then calmly continued with the repair job.

"Sometimes the simplest solution is the best," said Massimino '84.

To be fair, his admittedly primitive problem solving came at the suggestion of teammates on the ground who carefully vetted the idea and determined it would take about 60 linear pounds of force for Massimino to remove the handrail. More importantly, they figured it would be the safest way to quickly remove the obstacle.

Space flight is like that. A few astronauts ride up to orbit on the shoulders of thousands of others who will never experience the rush of liftoff or the unending freefall of weightlessness and whose job it is to simply make sure everything goes as smoothly as possible or to confront the unexpected with aplomb. As a result, said Massimino, one of the most important qualities an astronaut can possess is to be the quintessential team player—someone who can work well with others in tight quarters and under often stressful circumstances.

"I tell people being an astronaut is a lot like getting into Columbia," said Massimino. "They don't necessarily take the ones with the highest SAT scores. They're looking for someone who will be able to contribute in a meaningful way."

The general public only sees those lucky few who are tapped to fly a few times each year on one of the increasingly rare shuttle missions. The rest of the time, Massimino and his fellow astronauts contribute to NASA by fulfilling less glamorous but no less important roles that include helping other astronauts prepare for missions, designing and evaluating new equipment, and acting as the public face of the agency.

In all of his roles, Massimino finds himself regularly falling back on what he learned as a Columbia Engineering student. In particular, he says, it's the engineering mindset—a way of looking at a problem—that helps him the most. "Engineering teaches you how to solve problems," said Massimino. "It teaches you to look at a problem, decide what's important, and break it down into something you can engage."

Whether that problem to be broken down is a balky satellite or not, it appears Massimino has the solution well in hand.

Securing Air Space

GUS ORDOÑEZ
MS '82 MECHANICAL ENGINEERING
MANAGING DIRECTOR, DEFENSE ENTERPRISE, HAMILTON SUNDSTRAND

Gus Ordoñez remembers his time at Columbia as a workout—for his body and his brain. Climbing the stairs in Mudd and Fairchild halls between Mechanical, Civil, and Biomedical Engineering gave him the opportunity to get a little exercise and it also set the stage for his eventual climb to managing director of an S&P 500 company.

As a graduate student, Ordoñez studied a problem involving low-speed aerodynamics that required advice from professors in all three departments. He also built the School's first low-speed wind tunnel in the basement of Mudd so that he could examine airflow over butterfly wings and other structures.

"I had to connect a lot of dots and rely on the full breadth of my engineering knowledge to be successful," said Ordoñez. "It gave me the ability to learn from all different people. It also opened up my mind to other disciplines that engineers can apply their knowledge to."

After graduation, Ordoñez went on to a career with a series of defense companies, including Northrop-Grumman, where he worked on the flight test program for the B-2 Stealth Bomber, and Honeywell, where he captured the first mini-robotic reconnaissance drone contract that is now used in Iraq. He also managed Plastek, a company that manufactures a chemical compound used to restore clarity to pitted and scratched cockpit canopies.

Today, Ordoñez finds himself doing more general management than project management as the managing director of the Defense Enterprise at Hamilton Sundstrand Corporation, a part of United Technologies, where he oversees the company's operations, building and developing products ranging from biological and chemical detectors to cryogenic tanks for rockets. But he still traces his success scaling the corporate ladder back to all those years climbing.

"Innovation and creation come from being able to connect as many dots as possible," said Ordoñez. "Whether it's a widget or software or anything, you still have to go back to the fundamentals of engineering to make it work."

LEADERS MAKING AN IMPACT

Safer Groundwater

BRIAN ALBERT
BS '10 CHEMICAL ENGINEERING

Brian Albert's work in the laboratory of Chemical Engineering Professor Alan West is helping lead to the first field test of groundwater for hazardous ammunition compounds.

Albert is working on a project to develop a portable and highly sensitive electrochemical sensor of ammunition compounds in groundwater. Currently, such testing can be done only by taking samples to laboratories.

He has been mentored by the project's leader, Lt. Col. Robert Bozic of the U.S. Military Academy and an adjunct associate research scientist in the Department of Chemical Engineering, and, since his first semester on campus working in the lab, he has taken on a greater role in the research.

"Initially, I was responsible for obtaining current response vs. concentration calibration curves for TNT and RDX (an explosive nitroamine) in salt water using a rotating disc electrode and solutions prepared in the laboratory," he says. "As the project progressed, I helped construct microfluidic devices via drilling and resin casting. More recently, I will be obtaining kinetics data on peptide adsorption of TNT."

Albert said that long-term monitoring is required at ammunition disposal locations, since TNT is hazardous even at parts per billion concentrations.

"A portable electrochemical technique to be used on-site would be more cost-effective and convenient," he says.

Albert is inspired by his participation in the project to pursue a PhD in either chemical engineering or materials science. His long-term goal is to become a professor and lead a research group focused in energy-related areas, such as photovoltaics and batteries, subjects in which he has already done some research.

"In the summers of 2006 and 2007 at Brookhaven National Laboratory, I was assigned to conduct chemistry research that had potential applications to novel solar energy technologies," he says. "Because I already had a general interest in alternative energy, after this experience I focused my curiosity on photovoltaic research and sought research opportunities in that area.

"My research focused on fabricating light trapping structures for silicon thin film photovoltaic cells. These photonic structures would help the cell absorb more incoming radiation, thereby increasing the solar cell's efficiency."

Mega-Construction Projects

RAYMOND DADDAZIO
BS '75, MS '76, EngScD '82 CIVIL ENGINEERING
CEO, WEIDLINGER ASSOCIATES

It has become common to describe the events of September 11, 2001, as a turning point. For Raymond Daddazio, the day marked a fundamental change in the way he looked at and went about his work as a structural engineer.

In 2001, Daddazio was head of the Applied Sciences Division at Weidlinger Associates, a group started by Columbia Professors Mario Salvadori and Melvin Baron to advance the science underlying the field of structural engineering. As a whole, the firm itself was also continuing its tradition of designing iconic, cutting-edge structures, such as the glass-and-steel cube at the American Museum of Natural History, and major infrastructure projects, such as Boston's Big Dig.

After the World Trade Center towers fell, however, Daddazio came to the realization that engineers do more than just design major landmarks. "My whole concept of what the job is changed at that point," said Daddazio. "I found myself educating and interacting with decision makers, many of whom do not have technical backgrounds, to help them decide how best to spend billions of dollars to protect infrastructure. That linkage was never cemented before 9/11. Before, we would have worked on the project as presented to us. Now, instead of being reactive, we need to be more proactive in advising our clients."

The firm, too, quickly found its focus shifted and completed the most extensive analysis of how and why the towers collapsed. Today, Daddazio is president of Weidlinger Associates and has overseen a dramatic growth in the firm's work analyzing security threats, protecting infrastructure, and conducting forensic analysis while also maintaining its core strengths in building and bridge design.

Daddazio has spent almost his entire career at Weidlinger Associates, beginning in 1979 as a graduate student studying the effects of shock waves on submerged, stiffened thin shells. It was a specialized focus, and Daddazio was studying under the mentorship of Baron, a world-renowned expert on the physics of thin shells, a near-perfect combination for an engineer to become pigeonholed. But the culture at Weidlinger encouraged its staff to follow their interests, and Daddazio soon found himself addressing problems related to slope failure during earthquakes and the dynamic response of structures to extreme loading.

Throughout it all, Daddazio found one constant—the need for effective communication. As engineering work expanded to include ever-greater interactions with experts from other fields, including public policy, he kept falling back on the basics instilled by Columbia's Core Curriculum. "One thing that differentiates me from many of my colleagues is my ability to write and communicate," he said. "No matter what you do, eventually you're going to have to write something."

But to Daddazio, no matter how wide ranging those collaborations become or how political the decisions are, it remains fundamentally important that he do his job and do it well. "Society needs engineers," he said. "It's up to us to take on the problems no one else wants to solve and solve them well."

Recasting Steel

STANLEY A. RABIN
BS '59 MINING ENGINEERING
FORMER CHAIRMAN, COMMERCIAL METALS COMPANY, INC.

Over the 28 years that he headed the Dallas-based steel company Commercial Metals, Stanley Rabin dealt with challenges from imports, workers, and competition. But the man whom *Forbes* magazine described as a "mild-mannered metallurgical engineer" simply put his engineering skills to good use.

To lower costs and maintain control over the entire steel-making process, Rabin brought a new way of doing business to Commercial Metals. Originally, the company just collected scrap and processed it. Under Rabin's leadership, the company became "vertically integrated," producing steel parts from start to finish. The company operation expanded to include gathering the scrap metal, melting it, casting and fabricating it and, finally, distributing it for use in highway and building construction.

To make his decisions, Rabin used the skills he learned as a metallurgical engineering student at Columbia—"how to do things systematically, hopefully logically," he says. For example, he kept his company out of debt and maintained a good relationship with workers by "treating all the employees fairly and giving them some incentives," such as profit sharing and using defined-contribution plans instead of traditional pensions, he says. He also started operations in Poland, Croatia, Germany, and Singapore, always insisting on ethical conduct. "You're in markets where you may have competitors who are bribing," he says. "I just made it clear that's not how we're going to operate." That went for paying corporate taxes, too.

After he graduated from Columbia's dual-degree program with a BA in 1958 and a BS in metallurgical engineering in 1959, the Bronx High School of Science graduate left New York. For more than 40 years, he has lived in Dallas with his wife, the former Barbara Benjamin. He keeps busy volunteering his time to the United Way, the American Jewish Joint Distribution Committee, and the American Jewish Committee. A member of Columbia's crew team, he still occasionally rows, but on a machine. He is no longer involved with the steel business (except as a shareholder), but he knows what he would do with federal stimulus money. Spend it, wisely and carefully, on infrastructure. His motto as a CEO, a volunteer, and an engineer is simple: "Do it right."

Helping Haiti

CHRISTINA BRELSFORD
BS '07 CIVIL ENGINEERING
CO-FOUNDER OF CHRISTA'S ANGELS

To Christa Brelsford, sustainable development is not about building a perfect world, it's about building one that works. Brelsford became interested in sustainability through her favorite undergraduate class—Engineering for Developing Communities. After graduation, she built on that interest, completing the one-year MA in Climate and Society at Columbia before beginning a PhD in sustainability at Arizona State University.

Just after New Year's, Brelsford and her brother Julian went to Haiti, where she began an informal feasibility study of a proposed retaining wall in a small town near Port-au-Prince intended to help protect the town from flooding caused by hurricanes. Brelsford hoped to find a less expensive and simpler solution that also would address the root cause of the flooding.

"When you design something for the developing world, you still need to make it fit with existing infrastructure and existing conditions," said Brelsford. "If you have a half million dollars to spend, it would probably be better spent on reforestation efforts."

Today, Brelsford may not do much design and construction work, but she does see her role as building bridges within the development community. Her ability to quantify problems in particular has helped her make connections across the many disciplines. "Understanding what you're trying to count and why you're trying to count it are all questions an engineer deals with every day, but not everyone in the world has practice with that," she said. "It's a pretty useful and unique skill set I bring to the developing world."

Now she also brings some firsthand experience with the effects and aftermath of a natural disaster. On January 12, Brelsford and her brother were at a friend's house checking their e-mail when a 7.0-magnitude earthquake devastated western Haiti. The house collapsed, pinning under the rubble Christa's right leg, which later had to be amputated below the knee.

Brelsford and her family recently established Christa's Angels, a foundation intended to help the country recover from the earthquake. Just one more way that she is helping build a world that works.

Explosion-resistant Green Buildings

EVE HINMAN
BS '82, MS '83, PhD '94 CIVIL ENGINEERING
PRESIDENT, HINMAN CONSULTING ENGINEERING, INC.

Eve Hinman is an accidental engineer. As a New York City teenager, she attended the Fiorello H. LaGuardia High School of Music & Art. She asked to study calculus. No dice. "I was told it interfered with my art classes!" says Hinman, president of Hinman Consulting Engineers, Inc., in San Francisco. She entered Queens College and then Hunter College (it was closer to home)—but quickly realized liberal arts programs didn't play to her strengths.

"I thought, maybe I'll become an engineer. I like buildings a lot," she says. "Maybe I'll become a structural engineer." She took the pre-engineering curriculum and "aced everything," she says. While working her way through school, she did data entry for a market-research firm—and a colleague there suggested she apply to Columbia's engineering program. She did. At Columbia, where she was one of the seven women in her class of 28, she got her BS and her MS, both in civil engineering. She remains grateful to the University for giving her a full scholarship for the one-year master's program.

While working at a New York engineering firm, she spent 10 years getting her PhD (in 1994). For her dissertation, she used chaos theory to look at how buildings and soil interact during earthquakes. She promptly put that knowledge to work. She headed to California, where she worked at a forensic engineering firm and figured out how explosions (usually from gas leaks) occurred. One of her tasks: going to Oklahoma City after the bombing. Previously, she had spent most of her time doing calculations in an office. "This was my first time on the site of a terrorist bombing," she says. "It was an unbelievable experience in terms of actually seeing what an explosion does to a building." Through this experience, she realized she wanted to help with the design and construction of safe buildings, but her employer didn't have the professional liability insurance for her to develop that practice area.

So in 1997, Hinman started her own San Francisco firm to help both retrofit and build new structures that can survive explosions. (Think lots of concrete and steel.) She started out with courthouses and moved into other federal buildings. "Every time there's a bombing, a new federal agency comes on board," she says. Being a woman helps. "It's a differentiator," she says. "People remember me." She gets a lot of female applicants, who know she is "family friendly." After all, she knows what it's like to be a working mom. She juggles running her 16-engineer business with raising 7- and 9-year-old boys—and taking the 40-minute bus ride to and from her home in Marin. (She met her husband, the IT consultant for her firm, while mountain biking in the Sierra Nevada.)

Today, business is booming, particularly with federal stimulus money going toward her type of projects. After all, she and her fellow "blast consultants" help make explosion-proof, but still green, buildings—just what the White House wants to see. Steel is largely recycled, and concrete is greener if it's made with slag or fly ash (the residue from coal combustion). Fortunately for her business, the federal stimulus money requires high levels of green design that can withstand everything from terrorist attacks to earthquakes.

"With climate change, it's hard to know exactly what hazards your building is going to be exposed to in the next hundred years," she says. "We don't even need a terrorist to bomb our infrastructure. It may fall down by itself if we don't replace it soon, Or worse, it may collapse due to natural hazards if we don't rebuild it in a smart way that anticipates future conditions. How can we build a building so it can withstand anything that is likely to happen in the next 100 years? That is the question we are working on now."

Linking Ideas on the Web

NICHOLAS ARETAKIS
BS '84 ELECTRICAL ENGINEERING
CEO, ARKAYNE

Nicholas Aretakis spent 22 successful years in the semiconductor business, helping increase profits tenfold in the '90s at ESS Technology, one of the first to introduce an audio chip for PC motherboards. He also led lucrative IPOs at two other semiconductor companies.

Seems he learned more than engineering at Columbia as a transfer student more than 25 years ago.

Although he credits the competitiveness of his fellow students and the talent and dedication of his professors for the quality of his education, several experiences outside the classroom—including a brush with death, an arduous summer job, and playing on the rugby team—were key elements that forged his character and leadership abilities that helped him become a success as an entrepreneur and book author.

As a rugby player, he picked up some valuable entrepreneurial skills collaborating on a fundraising idea to cover international travel expenses.

"I contacted an alumnus at Columbia Pictures, and instead of money, I asked him if he could loan us a few recent movies so we could conduct a fundraiser on campus," he says. "We raised enough to send everyone overseas."

By the time he was 30 years old, Aretakis had become a millionaire and later helped develop landmark technologies in computer sound and advanced DSL capabilities.

His professional background includes 24 years in sales, marketing, and operations leadership in Silicon Valley, and two successful high-tech IPOs. Aretakis is also heavily involved leading Arkayne, a company he started several years ago with the intention of changing the way businesses can run online marketing campaigns. The company's product is a related-posts plugin, initially designed for blogs with some additional features allowing networking and building links. The tool examines the content on a blog or any Web page and compares every post to other content to create a list of related links within the user's collection of trusted friends and partner sites.

Aretakis intends to see Arkayne repeat his past successes.

LEADERS MAKING AN IMPACT

Providing Power in Uganda

JANELLE HESLOP
BS '10 EARTH AND ENVIRONMENTAL ENGINEERING

Two life-changing experiences guide Earth and Environmental Engineering senior Janelle Heslop to her May graduation date.

The first happened nearly a decade ago, when she attended the summer science program in her hometown of Yonkers, N.Y., after her sixth- and seventh-grade years in that city's public school system. The experience triggered her interest—and the attention of program advisers, who saw her potential —and led to scholarships at the exclusive Riverdale Country School in the Riverdale section of the Bronx.

The second life-changing event happened here at Columbia, shortly after she joined the University's chapter of Engineers Without Borders (EWB). "It changed my career path," she says.

While Heslop knew she wanted to study some kind of engineering, her experiences with EWB helped focus her attention on wanting to find sustainable solutions as a career. "I really want to serve communities," she says.

Heslop is the technical lead for the water team on EWB's Uganda project, which seeks to supply power for agricultural machines via an engine that runs on jatropha oil obtained from seeds of a native tree. The Environmental Protection Agency awarded the project a $75,000 grant last fall.

Last summer, she was a member of one of two teams that went to Uganda. Her team continued work on diesel engines that power generators, pumps, and other equipment. The team also assessed community needs, like water access and reliability at the local school, and is continuing work back on campus designing the needed water systems for later installation.

Heslop says the experience has opened her eyes to injustice on a global scale, while helping prepare her for finding ways to contribute something positive. "It's a great opportunity to serve an underserved community and apply some of the engineering skills I've learned in my academics," she says. "I use my engineering skills all the time (on the project). I've been applying just everything I've learned."

Heslop plans to take a year off before graduate school, in part because she's exploring which path to pursue. She is confident the past four years have prepared her well to arrive at her decision. "Columbia Engineering has given me a set of problem-solving skills I apply in all sorts of areas—the computational, quantitative, and qualitative skills you need to succeed."

Engineering Public Health

PAUL BRANDT-RAUF
BS '70, MS '73, EngScD '74 CHEMICAL ENGINEERING, MD '79, MPH '80, DrPH '87
DEAN, SCHOOL OF PUBLIC HEALTH
UNIVERSITY OF ILLINOIS AT CHICAGO

Paul Brandt-Rauf is trying to prevent and reduce health problems in the United States—and the rest of the world. The challenges are huge: A third of Earth's 6 billion inhabitants lack clean water and 45 million Americans go without health insurance.

But engineering can come to the rescue, says Brandt-Rauf, dean since last year of the school of public health at the University of Illinois at Chicago. "Engineers can and should be agents of social justice. Part of that is helping to ensure the health of the public." There's a precedent for it. While antibiotics and vaccines improved Americans' health and longevity, water purification and sewer systems proved even more important. "Engineers were able to re-engineer society in a way that gave us clean water and sanitation," says Brandt-Rauf. "If you think about why the developing world has such poor health now, it's because they don't have clean water and sanitation."

"We know the engineering solutions, but we haven't been able to invest in them," he says. Ninety-five percent of health care dollars go toward treating, rather than preventing, health problems. "Public health suffers from the problem that, when we do our jobs right, nobody notices because nobody gets sick," says Brandt-Rauf, who oversees 100 faculty and 700 students.

But Brandt-Rauf is trying to prevent disease. The father of five sits on the national board of directors for Engineers Without Borders, which uses engineering to solve public health problems in Third World villages and gives students vital, practical experiencing in solving real-world problems. An advocate of engineers as agents of social justice, he says "engineering is not just a job or career but sort of a 'calling,' which entails a high responsibility to society and a duty to give back."

LEADERS MAKING AN IMPACT

Understanding Knots

MEHVISH POSHNI AND IMRAN FARID KHAN
PhD '10 COMPUTER SCIENCE

Husband and wife scientific teams are not new—think Pierre and Marie Curie—and Columbia Engineering provides an environment that Mehvish Poshni and Imran Farid Khan found welcoming.

Both are PhD students in the Department of Computer Science, with an emphasis in topological graph theory. Both are working with Professor Jonathan Gross. Both are Fulbright Scholars and came to Columbia Engineering from their native Pakistan, and each hopes to return after earning their terminal degrees to become professors in their homeland.

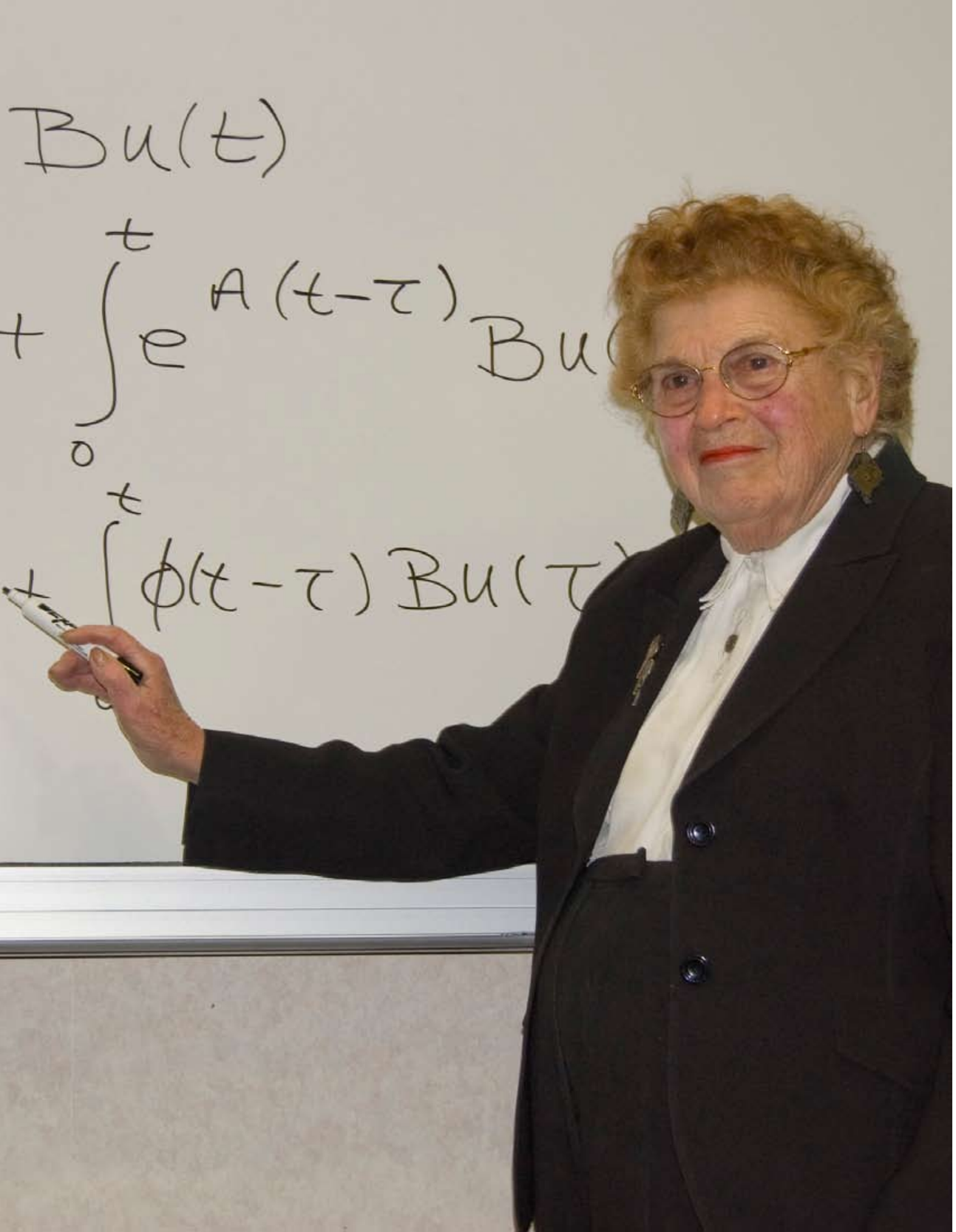
They say that balancing their five-year marriage with their shared career pursuit is not as complicated as it might seem to others. "We have never had to consciously balance work and life," says Poshni. "It happens naturally."

It certainly does not seem as complex as the topological graph theory they are exploring. Professor Gross explains that discovery in this field is an objective in its own right and that the motivating factor is rarely to seek a direct practical application. There is the potential for an eventual one, however, in the work the couple is doing with Gross.

"A potential application of our work on topological aspects of network layouts is to the design of computer chips, which could be realized by augmenting our topological models with geometric specifications," Gross says. "Our present work on knots is aimed at developing a theory of design for the graphic art forms called 'Celtic knots,' with the expectation that this will lead to a theory encompassing all knots. Knot theory is applicable to things as far apart as textiles and string theory in physics. Nonetheless, our focus is on the mathematics, rather than on these or any other applications."

Poshni said that such theoretical flavors were what initially attracted them to Columbia Engineering. "It was one of the few programs that both my husband and I felt could provide the kind of academic development we were at the time looking for," she said.

"Mehvish and I have been jointly working with our adviser on developing methods for computing genus distribution of various families of graphs," Khan said. "Most of the prior work in this problem area by others had dealt with specific families of graphs, whereas the methods that we have been developing are more generic."



Pioneering Bioengineering

GLORIA REINISH
BS '45, MS '48 ELECTRICAL ENGINEERING, EngScD '74 BIOENGINEERING
PROFESSOR OF BIOENGINEERING, FAIRLEIGH DICKINSON UNIVERSITY

In the record books, Gloria Brooks Reinish can rightly claim to be the first woman graduate of Columbia Engineering, receiving her BS degree in electrical engineering in 1945. She is also a pioneer in the field of bioengineering and, in 1974, became one of the first Columbia women to earn a doctorate in that emerging field.

Reinish's revolutionary work for her doctoral thesis was on the electrical properties of human bones, using electricity to stimulate bone growth. Her expertise led to an appointment as a consultant to the FDA panel that approved medical devices designed to provide electrical stimulation to help bones knit together more quickly.

But Reinish did not move directly from an established academic field (electrical engineering) to a nascent interdisciplinary one (bioengineering). Life, love, and children intervened.

Following her graduation from Columbia Engineering at the age of 19 (she was part of the war-time accelerated program), she went to work for Bell Labs and then to Sperry Gyroscope, where she worked on radar systems. Her research at Sperry led to a patent on a radar ranging system.

During these years, she met her University of Pennsylvania-trained chemical engineer husband in the Poconos. They married in 1948, and he went on to become a Research Fellow in R&D for detergents. When she became pregnant in 1951, she retired from the workforce—temporarily. She wanted to stay home with her baby—at least for the short term. Soon she realized she also wanted something "mentally stimulating," so she started taking some classes at Columbia. "I started out not really thinking I was going to do it toward the doctorate," she says.

After three children (two girls and a boy), she tried being a high school substitute teacher for math and physics. It was not a good fit. Then, in 1961, she sent her qualifications to Fairleigh Dickinson University, 10 minutes from her home. "Much to my amazement, I got a call immediately," she says. Two days later, she started teaching an electronics class there. That made life a little difficult for her because her children were then 1, 5, and 10 years old.

As it turns out, the children grew up unscathed, and all engineers. Jim Reinish received his degree in operations research from Columbia Engineering in 1982; Julie Askins received her degree in electrical engineering from Princeton in 1977; and Nancy Passow received her degree in chemical engineering from Columbia in 1972. Even in this arena, Reinish can boast of two "firsts." She is the only woman who has been a student at Columbia Engineering at the same time as her daughter (Nancy Passow), and, in a matter of months, will be the only Columbia alumna who can boast that a child (Jim Reinish) and grandchild (Jim's daughter, Ariel '10) are also graduates of the School.

During her tenure at FDU, Reinish has been chair of the Electrical Engineering Department and founding chair of the bioengineering program. Reinish still teaches at least four classes each semester, in the classroom and on the Web.

As she approaches her 65th reunion this year, she is prepared to be one of the few engineers who are still working, and certainly the only woman. In this respect, too, Reinish may go into the record books.

Advancing Medical Imaging

RAYMOND A. SCHULZ
MS '75 ELECTRICAL ENGINEERING
SENIOR PRODUCT MANAGER, VARIAN MEDICAL SYSTEMS

It's hard to talk to Raymond Schulz and not notice how often he uses the word "fun"—to describe his career, his outside interests, the way he approaches life. A self-described "outgoing guy who loves to get up on stage," Schulz has spent his entire career advancing medical imaging, first as a software developer and more recently as a medical marketing executive and technical marketer, along the way authoring or co-authoring nearly 200 papers, chapters, and books.

Schulz came to Columbia in 1972 as a medical physicist with an undergraduate degree in physics and an interest in developing non-invasive ways to study the human body. After doing early imaging research at Sloan-Kettering Institute for Cancer Research, he jumped into the nascent field of computerized tomography, or CT scanning, at the Columbia Medical Center's Neurological Institute of New York. During one heady two-year period, he used early minicomputers to help make revolutionary strides in the speed and quality of whole-body scanning.

Schulz continued his passion for learning and staying ahead of the curve by launching himself headlong into nascent fields every decade or so—from CT in the 1970s, to magnetic resonance imaging (MRI) in the 1980s, to digital holography in the 1990s. As part of the Surgical Sciences Group at Varian Medical Systems in Palo Alto, Calif., Schulz currently works with institutions around the world, including Memorial Sloan-Kettering Cancer Center where he started, to advance techniques in radiosurgery—a method of treating tumors with high doses of radiation, guided into small places with three-dimensional imagery, over one to five sessions.

Part of his enthusiasm for his life-saving work comes from a more general enthusiasm for life, something he credits to his father, Helmut W. Schulz. The elder Schulz, a highly respected professor of chemical engineering at Columbia and the 2004 Egleston Medal recipient, lost his sight at age 28 in a lab accident, but never let that hold him back. "Dad taught us not to be afraid to open our arms to new ideas," said Schulz.

As an engineer, that philosophy has driven Schulz to open his arms to new ideas and to push the boundaries of what it means to be an engineer by becoming a leader in a field dominated by clinicians and physicists. "I think it's important to be more than just an engineer," said Schulz. "You have to be a whole person and not restrict yourself."

LEADERS MAKING AN IMPACT

Mending Hearts

AMANDINE GODIER-FURNÉMONT
BS '09, PHD '14 BIOMEDICAL ENGINEERING

From the time she was a sophomore, Amandine Godier-Furnémont has been working in Professor Gordana Vunjak-Novakovic's Laboratory for Stem Cells and Tissue Engineering, making strides in discovering how to mend broken hearts using cell therapy.

"Carrying out research as an undergraduate, I was given the opportunity to do a lot of independent work in designing and carrying out experiments, writing research papers, and traveling to conferences and meeting other researchers," she says. Some of Godier's undergraduate research was supported by an NHLBI Research Supplement for research focusing on electrical signaling and using a native heart matrix to develop functional cardiac tissue.

Now, as a first-year PhD student who holds an NSF Graduate Research Fellowship, she is continuing the work that initially attracted her to biomedical engineering. "As a graduate student, many of the courses I am taking are geared towards research applications, and there is this continued effort to foster collaborations throughout the departments here," she says.

"I work with embryonic stem cell–derived heart cells to investigate how we can mediate repair in the heart," she says. "I'm really interested in going back to fundamentals and understanding how to generate an ideal heart cell—one that both looks and behaves like any heart cell, can assemble into heart tissue, and function optimally when it's implanted into the harsh environment of the heart."

Godier-Furnémont is hopeful about her future and her chosen field.

"The practical applications of my work are all in the near future, where I hope we can make some significant contributions to the already large body of knowledge of cell therapy for cardiovascular diseases," she says. Her hope is to achieve this "by bridging the gap between basic research and translational work that has already led to preclinical testing and early human trials for cell therapy."

She intends to stay in academia, but acknowledges—with a smile—harboring other creative urges as well.

"I still like to imagine achieving my childhood dreams of having my own bakery."

Technology Management

ANNA KAZANJIAN LONGOBARDO BS '49, MS '52 MECHANICAL ENGINEERING

Anna Kazanjian Longobardo may be one of the few who can say that she has had an impact on technology management in the air, on land, and at sea. At Unisys, she directed a program to develop and test radiation-tolerant computers for the Air Force and also managed a program for the Federal Highway Safety Administration, studying roadway geometries that caused accidents. Earlier, at United Technologies, she worked on board U.S. Navy submarines and destroyers. Her innovative design to calibrate sonar increased navigational accuracy for submarines operating below periscope depth.

During her career, Longobardo took on larger and larger leadership roles, becoming the senior woman executive at the Unisys Corporation defense unit, heading a global organization supporting complex military and weather radar systems in more than 100 locations worldwide, supervising nearly 900 engineers.

Despite the demands of her professional life, Longobardo always found time to volunteer for Columbia. She has served as University Trustee for six years and is now a Trustee Emerita. The University cited her "indefatigable energy and intellect" in her retirement resolution. The recipient of the University's Alumni Medal for Service, she has been the first woman to hold positions as president of the Engineering Alumni Association, president of the University's Alumni Federation, and chair of the Dean's Engineering Council, now the Board of Visitors. She is currently serving as chair of the Mechanical Engineering External Advisory Board. "I like to take a leadership role," she says. "I'm talkative, and I say what I think."

Volunteering is second nature to Longobardo who, while an undergraduate, helped found the National Society of Women Engineers, which elected her a fellow in 1991. She has also been involved in her community in many ways over the years. Currently, her civic posts include vice chair of the Bronxville (N.Y.) Planning Board and chair of its Design Review Committee, and, in 2008, she was elected Westchester County's Citizen Planner.

Longobardo added another first to her portfolio when she became the first woman to receive the Egleston Medal for Distinguished Engineering achievement. "Whenever a new assignment or responsibility was given to me, I just gave it my maximum effort," she said. "I was immensely honored to be recognized by the Engineering alumni for my work; I never thought about being the first at anything." Longobardo credits her Columbia Engineering professors, who, she says, "told us that they were preparing us for leadership roles in American industry, and we believed them."

LEADERS MAKING AN IMPACT

Society, Industry, Government, and Academia

YOU, OUR ALUMNI AND STUDENTS BS, MS, EngScD, PhD, ANY YEAR, ANY DEPARTMENT

All of you, our Columbia Engineering alumni and students, are leaders in your own field and have made a mark, and are continuing to make a mark, on the society in which we are living. This issue of *Columbia Engineering* has been focused on our leaders of today—our alumni—and our leaders of tomorrow—our students. We have been limited by space in telling the story of all our great alumni and students, such as yourself and your classmates or program mates. Future issues will highlight other alumni leaders in different fields, but we are counting on you to help us fill out our history with your most recent successes.

Columbia Engineering continues to be a school whose mission is to educate socially responsible engineering and applied science leaders whose work results in the betterment of the human condition, locally, nationally, and globally.

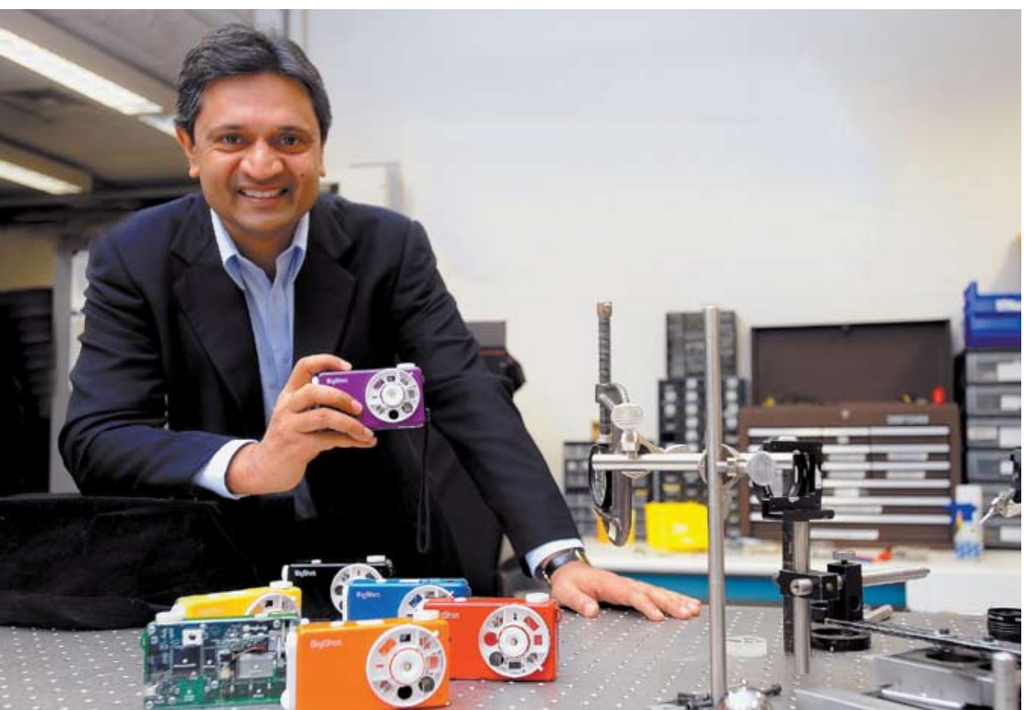
We trace the academic lineage of educating engineering and applied science leaders back to the original charter of King's College in 1754, when the nascent sciences and engineering were described as areas worthy of academic endeavor. Following the American Revolution and early development of the United States, engineering and applied science disciplines became more important and scientific methods and research gained greater academic importance. The impact of these disciplines on academia was recognized by the Trustees of Columbia, when they agreed, in 1864, to a proposal by Thomas A. Egleston to establish the Columbia College School of Mines.

There were very few engineering schools in the country at that time, and our School became the first in the nation to bear the sole designation as a School of Mines. Four years from now, in 2014, Columbia Engineering will celebrate the 150th anniversary of its founding. We expect that this fact, and other facts about our School's history, will become more widely known during the special celebration of our sesquicentennial year.

This historic benchmark of our founding is one that we already are eagerly anticipating. To help us learn more about all of you, we are establishing a page on our Web site where you can tell your stories or bring to our attention the most recent contributions of some of your fellow alumni or students.

Become a proactive Columbia Engineering leader in this effort to record our history. Go to www.engineering.columbia.edu/leaders and let us know your story or that of someone you know.

T.C. Chang Professor of Computer Science Shree Nayar, the creator of the BigShot Camera, lower left, is shown amid the candy-colored cameras now in prototype and being used by children in New York, Bengaluru, India, Vung Tau, Vietnam, and Tokyo, Japan, to take photos such as those illustrated here.



Little Big Shots

Shree Nayar is well known in computer vision circles as the inventor of the Omnicam, a camera that captures a 360 degree image, but he is becoming even better known nationally and internationally with grade schoolers.

As the creator of BigShot Camera, a build-it-yourself digital camera kit for children, Nayar is hoping to stimulate children's curiosity and, at the same time, hook them on the wonders of science and technology

"I've believed for a long time that the camera, as a piece of technology, has a very special place in society," says Nayar, the T.C. Chang Professor of Computer Science. "It allows us to express ourselves and to communicate with each other in a very powerful way. In the hands of children, it becomes a way to learn about other cultures and communities."

Four years ago, Nayar had the idea to create a workable digital camera with snap-together parts that could be put together by youngsters who would then take photos and share them with each other, across the globe, via the Internet. Each camera component teaches the builder about science basics—how mechanical energy of the crank is converted into electrical energy to power the battery, how gears work, how light bends as it pass through a lens.

"This process of building the camera exposes them to mechanics, to electromagnetism, to power generation and storage," he says. "Before a piece is snapped together, they learn how it works—it is really a bait for learning."

BigShot also has big capabilities. It has a flash and three lenses, standard, stereoscopic (3-D), and panoramic, and comes in an array of vibrant candy colors. Children in New York City, Bangalore, India, and Vung Tau, Vietnam, have been field-testing the cameras since this summer. During the school year, Nayar holds workshops on Saturdays at Columbia Engineering, bringing in 10 to 12 different neighborhood children for each session. Each has an opportunity to learn about technology as they build the camera, to learn about the fundamentals of photography, and then to go outside and take pictures.

"This is an opportunity to use the camera to educate children," says Nayar. "It is much more engaging than being taught using a blackboard. We go from science to engineering to art, and ultimately, to communicating with kids from different cultures and communities."

While the long-term goal is to create a Flickr for kids to upload and share and comment on photos, says Nayar, they can upload their pictures now on the project's Web site: bigshotcamera.org.

"The photos are remarkable," says Nayar. "The kids learn how things start as designs on paper and then become real things."

Nayar, whose current work is funded by Google, is looking for a partner to underwrite the manufacture of the BigShot kit. Once that happens, the world will be full of little Big Shots.

Celebrating Faculty Excellence

Dean Feniosky Peña-Mora inaugurated an annual celebration of faculty excellence by honoring 32 faculty members who won major awards during the 2008–2009 academic year. At a reception held at the newly renovated Faculty House, Dean Peña-Mora noted that many exceptional students became members of the faculty, including Michael I. Pupin, Class of 1883, whose students included Nobel Laureate Irving Langmuir of the Class of 1903, and Edwin Howard Armstrong, Class of 1913.

"The hallmark of Columbia Engineering faculty always was, and continues to be, excellence and impact," said the dean, addressing the honorees. "Each of you is part of this great tradition of teaching and research, of excellence and impact. For some of you starting your career, the awards you are honored for today are but the beginning. For those of you who are more seasoned, these honors are but another recognition of decades-long contributions to your field."

Faculty honorees included:

KEREN BERGMAN
Professor, Electrical Engineering
Fellow, Institute of Electrical and Electronics Engineers (IEEE)

JOSÉ BLANCHET
Assistant Professor, Industrial Engineering and Operations Research
NSF Faculty Early Career Development (CAREER) Award

MARCO CASTALDI
Assistant Professor, Earth and Environmental Engineering
NSF Faculty Early Career Development (CAREER) Award

SIU-WAI CHAN
Professor, Applied Physics and Applied Mathematics
Fellow, American Ceramic Society Board of Directors

KARTIK CHANDRAN
Assistant Professor, Earth and Environmental Engineering
NSF Faculty Early Career Development (CAREER) Award

SHIH-FU CHANG
Professor and Chair, Electrical Engineering
2009 Kiyo Tomiyasu Award

XI CHEN
Associate Professor, Earth and Environmental Engineering
Presidential Early Career Award for Scientists and Engineers (PECASE) (National Science Foundation nominee)

MARIA CHUDNOVSKY
Associate Professor, Industrial Relations and Operations Research
Delbert Ray Fulkerson Prize

GEORGE DEODATIS
Santiago and Robertina Calatrava Family Professor, Civil Engineering and Engineering Mechanics
Elected president, International Association for Structural Safety and Reliability

DAN ELLIS
Associate Professor, Electrical Engineering
NSF Frontiers of Engineering Selectee 2009
NSF Frontiers of Engineering Symposium Organizer 2010

TONY HEINZ
David M. Rickey Professor of Optical Communications, Electrical Engineering
Julius Springer Prize for Applied Physics

JULIA HIRSCHBERG
Professor, Computer Science
Fellow, International Speech Communications Association

CLARK HUNG
Professor, Biomedical Engineering
Fellow, American Institute of Medical and Biological Engineering

HELEN LU
Associate Professor, Biomedical Engineering
Presidential Early Career Award for Scientists and Engineer (PECASE) (National Institutes of Health nominee)

V. FAYE MCNEILL
Assistant Professor, Chemical Engineering
NSF Faculty Early Career Development (CAREER) Award

VAN C. MOW
Stanley Dicker Professor of Biomedical Engineering and Chair, Biomedical Engineering
Associate Fellow of the Academy of Sciences for the Developing World

GERTRUDE F. NEUMARK
Howe Professor Emerita of Materials Science and Engineering and Professor Emerita, Applied Physics and Applied Mathematics
Honorary Doctor of Science Degree

STEVEN NOWICK
Professor, Computer Science
Fellow, Institute of Electrical and Electronics Engineers (IEEE)

AH-HYUNG (ALISSA) PARK
Lenfest Earth Institute Assistant Professor of Climate Change, Earth and Environmental Engineering
NSF Faculty Early Career Development (CAREER) Award

ARON PINCZUK
Professor, Applied Physics and Applied Mathematics
Fellow, American Academy of Arts and Sciences

PAUL SAJDA
Associate Professor, Biomedical Engineering
Fellow American Institute of Medical and Biological Engineering

MISCHA SCHWARTZ
Charles Batchelor Professor Emeritus, Electrical Engineering
IEEE Educational Activities Board Vice President's Recognition Award

NABIL SIMAAN
Assistant Professor, Mechanical Engineering
NSF Faculty Early Career Development (CAREER) Award

ADAM SOBEL
Associate Professor, Applied Physics and Applied Mathematics
Clarence Leroy Meisinger Award of the American Meteorological Society Council

JOHN TAYLOR
Assistant Professor, Civil Engineering and Engineering Mechanics
Sloan Industry Studies Fellowship

VLADIMIR VAPNIK
Professor, Computer Science, and Senior Research Scientist at the Center for Computational Learning Systems (CCLS)
Paris Kanellakis Theory and Practice Award

LATHA VENKATARAMAN
Assistant Professor, Applied Physics and Applied Mathematics
NSF Faculty Early Career Development (CAREER) Award

GORDANA VUNJAK-NOVAKOVIC
Professor, Biomedical Engineering
Elected Member, Women in Technology International Hall of Fame

CHEE-WEI WONG
Associate Professor, Mechanical Engineering
2009 3M Young Faculty Award

Y. LAWRENCE YAO
Professor and Chair, Mechanical Engineering
Fellow, Society of Manufacturing Engineers (SME), and President, North American Manufacturing Research Institution of SME

THEODORE ZOLI
Adjunct Professor, Civil Engineering and Engineering Mechanics
MacArthur Foundation Genius Award

GIL ZUSSMAN
Associate Professor, Electrical Engineering
Young Investigator Award, Defense Threat Reduction Agency

in memoriam

faculty

Theodore R. Bashkow

Dr. Theodore R. Bashkow, professor emeritus of electricial engineering and computer science, died Dec. 23, 2009, at his home in Katonah, N.Y. He was born in St. Louis, Mo., and attended Washington University, where he received his BS degree in mechanical engineering. He went on to receive his master's and doctorate degrees at Stanford University. He served in the U.S. Air Force as a first lieutenant during World War II from 1943 to 1945.

While in the Air Force, he served as maintenance officer and helped to stage the Enola Gay. In the 1950s, while at Bell Labs, Professor Bashkow became well known for his development of a new method for analyzing linear electrical networks, Professor Bashkow's A matrix. He also became involved with digital computers. He joined the faculty of the Columbia Electrical Engineering Department in 1958 and helped transform the Electrical Engineering Department into the Department of Electrical Engineering and Computer Science. When, in 1979, this department was divided into the Electrical Engineering and Computer Science departments, Bashkow became one of the founding faculty members of Computer Science. He taught courses in digital logic, computer organization, and computer programming. He did research on parallel processing. In collaboration with Herbert Sullivan, he pioneered a new approach to that subject through the development of CHoPP, Columbia Homogeneous Parallel Processor, a large-scale, homogeneous, fully distributed parallel machine. A number of Columbia graduate students and a junior faculty member, David Klappholz, were also involved at various stages.

In 1980, the Computer Science Department instituted an annual award in his honor, the Theodore R. Bashkow Award. Among his many affiliations, Professor Bashkow was an active member of IEEE, ACM, and Sigma Xi organizations.

Praveen Chaudhari

Praveen Chaudhari, a member of the National Academy of Engineering and winner of the National Medal for Technology and an adjunct professor in the Department of Applied Physics and Applied Mathematics, died on Jan. 13, 2010, at his home in Briarcliff Manor, N.Y., after a battle with cancer. Professor Chaudhari and two colleagues discovered and developed a new class of materials, the amorphous magnetic materials that are the basis of erasable, read-write, optical storage technology, now the foundation of the worldwide magnetic-optic disk industry. It was this technology that earned him the National Medal of Technology in 1995. A graduate of the Indian Institute of Technology–Kharagpur, he received his doctoral degree from Massachusetts Institute of Technology in physical metallurgy. He joined IBM in 1966 and held various research and management responsibilities for three decades in scientific research and technology development. He was appointed director in 1981 and vice-president of science in 1982. During his stewardship, IBM scientists were awarded Nobel Prizes for two consecutive years and the science programs at the IBM research laboratories across the globe grew significantly.

After retiring from IBM in March 2003, he became the director of Brookhaven National Laboratory, a position he held until April 2006. With the help of New York's senators and with private funding from Renaissance Technology, he enabled Brookhaven to implement a new vision and set itself on a growth curve that continues to this day. After 2006, he continued to work at Brookhaven part time as a research scientist and joined Columbia Engineering as an adjunct professor in the Materials Science Program.

He was the author of more than 160 scientific papers and held more than three dozen patents. In addition to his election to the NAE, he was also a member of the National Academy of Sciences, and a fellow of the American Academy of Arts and Sciences and of the American Physical Society.

Dr. Chaudhari was active in many committees nationwide and internationally, including the Physics Policy Committee of the American Physical Society, the Governing Board of the New York Academy of Sciences, the Advisory Board of the Mathematical and Physical Sciences of the National Science Foundation, and the Scientific Advisory Council of the International Center for Theoretical Physics. He served as the executive secretary of President Reagan's Advisory Council on Superconductivity and was a member of the National Commission on Superconductivity that reported its findings to President Bush. In 1988, he reported to Prime Minister Rajiv Gandhi of India on science and technology, and in 1993, at the request of the Indian minister for sciences and technology, led an IBM group to evaluate the parallel computer activities in India.

alumni

1930

Richard (Dick) Silberstein died Nov. 30, 2009, in his home of natural causes. He was 103 years old. He received an electrical engineering degree from Columbia University in 1930 and did graduate work at the University of Pennsylvania. Silberstein first became fascinated with radio when, at age 9, he saw equipment operating aboard a coastal steamship. This interest produced a lifetime hobby (amateur radio) and eventually a professional career. His interests also included travel and photography, but amateur radio was always his primary hobby. During the Great Depression, he held various jobs or was

self-employed in the radio industry. In 1941, he joined the National Bureau of Standards in Washington, D.C. In 1948, he married Florence K. Baker, and in 1954 the couple moved to Boulder, where Richard was involved with radio-propagation research for the Department of Commerce. Then after a 6-year period of working as a radio engineer for the Army in New Jersey, Dick took retirement. He is survived by his wife.

1940

George H. Brown '40, ChE '41, '39CC died Sept. 24, 2009. He was a chemical engineer for 48 years with Pfizer, Inc. His wife, Elinor Schubert '42 Barnard, wrote, "His Columbia education was the key to a successful career and a long life of 93 years."

1942

Charles (Chuck) Newlon of West Knoxville, Tenn., died on Oct. 20, 2009. He was a long-time and faithful member of Church Street United Methodist Church and the Murphy Builders Sunday School Class. Born in Point Marion, Pa., he attended Columbia through a music scholarship, receiving a BS and MS in chemical engineering. His college nickname, "Tuba Charlie," followed him throughout his lifetime. While employed at E. I. DuPont in Charleston, W. Va., he married Dorothy Craumer on June 17, 1944. A veteran of the U.S. Army during WWII, he was transferred to Oak Ridge, Tenn., in 1944 to work on the Manhattan Project. Following the war, he joined Union Carbide as a nuclear engineer specializing in national health safety until his retirement in 1971.

During his career, several of his inventions were patented, and he developed a mathematical formula still used today for measuring the volume inside a cone. He was a member of the American Society of Chemical Engineers, Who's Who of Men of Science, and a Fellow of American Chemists.

After retirement, he became an avid tennis player, traveled worldwide, and created the "Charles E. Newlon and Dotty Jean" musical show, entertaining at nursing homes throughout the area. He was also a generous philanthropist to many charities. He is survived by his beloved wife of 65 years, Dorothy Craumer Newlon, two sons, and two daughters.

1945

Jerome W. Heller passed away Nov. 27, 2009, in Corona del Mar, Calif. He received his BS and MS degrees in industrial engineering and operations research from Columbia Engineering. Heller served as a naval officer in WWII and Korea.

William F. Schreiber, professor emeritus at Massachusetts Institute of Technology, died suddenly at home on Sept. 21, 2009, at the age of 84. Dr. Schreiber attended New York City public schools and Columbia Engineering, where he received BS and MS degrees in electrical engineering. In 1953, he received the PhD in applied physics at Harvard, where he was a Gordon McKay and Charles Coffin Fellow. Dr. Schreiber worked at Sylvania and at Technicolor Corporation in Hollywood, Calif., prior to l959, when he joined the faculty at Massachusetts Institute of Technology as professor of electrical engineering. He was director of the Advanced Television Research Program from 1983 until his retirement in 1990.

Dr. Schreiber's major professional interest was image processing systems, including printing, facsimile, and television. This work included theory and extensive practical applications, including the development of a number of successful commercial products that incorporated innovative image-processing technology developed under his direction. He worked in graphic arts, including color correction, color printing, and laser scanner and recorder design, in facsimile, and in television. His work included digital television and high-definition television. He was awarded the Honors Award of the Technical Association for the Graphic Arts, the David Sarnoff Gold Medal from the Society of Motion Picture and Television Engineers, the Gold Medal of the International Society for Optical Engineering, and was a four-time recipient of the Journal Award of SMPTE. He was a member of the National Academy of Engineering.

1948

Morton Herbert Eligator died Dec. 1, 2009. After serving in the Army during World War II, Eligator received a BS in civil engineering and joined the consulting engineering firm of Weiskopf & Pickworth in 1948. During the 1950s he helped build the firm through collaboration with prominent architects, bringing it to the fore of modernism in the United States. In 1960, he became senior partner and forged strong working relationships with many leading architects. Active with the firm for more than 40 years, he retired in 1990. Morton remained a partner in Olde Post Mall Associates in Fishkill, N.Y. He also served as president of Beechwood Homeowners Association, a townhouse development where he and his wife, Beverly, resided for 20 years. An aficionado of all the arts, he was an accomplished oenophile, delighted in traveling the world, and always remained a student of different cultures and architecture. As the active patriarch of an extended family, he was known and loved for his generosity of spirit, time, love, and humor.

Richard F. Gonseth of Yonkers, N.Y., died on Sept. 22, 2009. A native of Brooklyn, he attended the Massachusetts Institute of Technology and joined the Navy, where he trained as a pilot. He graduated from Columbia Engineering in 1948, where he was on the rowing and wrestling teams. He worked as an engineer for IBM for over 35 years and was a long-time resident of Tarrytown, N.Y., with his family, and an active parishioner and trustee of Transfiguration Church.

1951

Louis Forte, 85, died Jan. 14, 2010, in Virginia Beach, Va., after a short illness. He was drafted and served in the U.S. Army as an MP during World War II. After the war, he attended Columbia Engineering, graduating with a BS in 1951. He worked as an engineer at Northrop Grumman and the Manhattan Transit Authority until his retirement in 1987. He had been involved in several community and professional organizations, including Toast Masters, American Society of Mechanical Engineers, Sons of Italy, and The Round Table at Stony Brook University. He is survived by his daughter, Lonia, and her husband Alfred Broderick Jr. of Virginia Beach, Va., their children, Delion and Eden; son Jeffrey Forte of Fredonia, N.Y.; his brother, Jerry Sr., and his wife, Jean Forte, of Colorado Springs, Co.; his sister, Roseanne, and her husband, Ed Pfennig, of Wading River, N.Y.

1952

Arthur W. Camp died on Oct. 23, 2009, at Samaritan Hospice at the age of 87. He has been a resident of Moorestown, N.J., for 42 years. During World War II he served as a pilot with the Air Commandos in the China-Burma-India theater. His duties included working with the British behind Japanese lines, dropping Gurkha paratroopers on Rangoon and flying the treacherous mountains that lie between India and China. He was awarded the Distinguished Flying Cross, the Air Medal with three Oak Leaf Clusters, and several battle stars. After the war, he received a BS in industrial engineering from Columbia. After graduating, he worked first at IBM, helping to develop the new technology of computer operated manufacturing, and later with RCA.

1954

Robert J. Spinrad, a pioneer in computer design, died Sept. 2, 2009, in Palo Alto, Calif. Spinrad carried out his work in scientific automation first at Brookhaven National Laboratory and later at Xerox. He was director of the Palo Alto Research Center as the personal computing technology invented there in the 1970s was commercialized.

While a student at Columbia Engineering, he built his own computer from discarded telephone switching equipment. After arriving at Brookhaven, Spinrad spent a summer at Los Alamos National Laboratories, where he learned about scientific computer design by studying an early machine known as Maniac, designed by Nicholas Metropolis, a physicist. Spinrad's group at Brookhaven developed techniques for using computers to run experiments and to analyze and display data as well as to control experiments interactively in response to earlier measurements.

He has been hailed as the father of modern laboratory automation. After leaving Brookhaven, Spinrad joined Scientific Data Systems in Los Angeles as a computer designer and manager. When the company was bought by the Xerox Corporation in an effort to compete with I.B.M., he participated in Xerox's decision to put a research laboratory next to the campus of Stanford. Xerox's Palo Alto Research Center pioneered the technology that led directly to the modern personal computer and office data networks.

Taking over as director of the laboratory in 1978, Spinrad oversaw a period when the laboratory's technology was commercialized, including the first modern personal computer, the ethernet local area network, and the laser printer.

He received his BS in electrical engineering from Columbia and a PhD from the Massachusetts Institute of Technology. In addition to his wife, Verna, he is survived by two children, Paul, of San Francisco, and Susan Spinrad Esterly, of Palo Alto, and three grandchildren.

Ralph Mattson '54CC, a resident of Green Valley, Ariz., died on Oct. 17, 2009. He was a mining engineer and ran gold and copper operations in the Orient, South America, and other countries throughout his career. He is survived by his wife of 27 years, Prabha (Anneke); two brothers; as well as nephews, nieces, cousins, and more family in Finland, Thailand, and the Netherlands.

1957

James Michael Kennedy died on Nov. 12, 2009. A life-long resident of New York City, he was the valedictorian of his class at Xavier High School. He earned a BA degree from Fordham University and an MS degree from Columbia Engineering. After completing his formal studies, he joined the staff of the Columbia University Electronics Research Laboratories (CUERL) as a mathematical analyst. He continued his employment at Riverside Research Institute (RRI), the successor of CUERL, where he served as executive vice president. He retired from RRI in December 1995, after 40 years of service.

Kennedy is survived by his wife of 43 years, Mary Alice Kennedy McDonald, and family and countless friends around the world. He was a member of Holy Trinity Church of West 82nd Street in Manhattan, and the Ancient Order of Hibernians, Jack Kehoe Division, Girardville, and the New Cavendish Club of London.

1972

Steven Zeff '69CC of Harrington Park, N.J., died on Oct. 6, 2009. Born in Brooklyn, N.Y., he grew up in Valley Stream, N.Y., and moved to Harrington Park in 1978. He graduated as valedictorian from Columbia College in 1969 and received his MS from Columbia Engineering in 1972. In 1973, Mr. Zeff founded SRZ Software Services in Ridgewood, N.J. After selling SRZ Software Services, he founded Spantech Software, Inc., in 1988. He sold Spantech in 2007 but continued to serve as administrator. Zeff is survived by his wife, Marion; son, Jeremy and his wife Alyssa; daughter, Dr. Karen Hebert and her husband, Varian; mother, Shirley; grandson, Nathan; and sister, Dr. Marjorie Zeff.

2004

Garland English, a civil engineering major who was an Army platoon leader, died Jan. 10, 2010, in a rock climbing accident in Hawaii, where he was stationed. He had recently returned from a tour of Iraq.

According to newspaper reports, Garland and a friend Sunday had returned to a rocky cliff in the remote and rural Makaha Valley near Honolulu to try to retrieve a tent one of them dropped days earlier while hiking. He apparently fell while trying to reach the gear.

In a story in the *Albany Times Union,* one friend said that he had "certain deep beliefs about social justice, conservation and kindness that he tried to put into practice." In 2007, he enlisted in the Army and completed Officers Candidate School at Fort Benning, Ga. He was commissioned as 2nd lieutenant and subsequently was deployed to Iraq in November 2008. He was promoted to 1st lieutenant before returning to Hawaii last fall. While in Iraq, he was awarded the Bronze Star. His intensity for life and diversity of interests was legendary. He studied Spanish in Costa Rica, bungee jumped in South Africa, ran with the bulls in Spain, crossed North America by motorcycle, went deep sea diving in Malaysia, taught English in Japan, and journeyed from Mexico City to Peru. Read other remembrances of Garland in the Alumni Notes section, page 48.

We also have learned of the passing of the following alumni and friends:

Harold C. Sperry '39
Clark I. Fellers '40, '41, '39CC
Charles M. Kuhbach '41, '41, '39CC
James W. Cronenberg '42, '41CC
Boris J. Sterk '42, '41CC
George L. Hesse '43, '41CC
Raymond W. Arnesen '46, '48CC
Norman Rosenberg '46
Kenneth J. Sabella '46, '48CC
Dr. Robert L. Thompson '46
Dr. Peter L. Tea Jr. '47, '55
Dr. Sherman S. Weidenbaum '47, '48, '53
Walter Morykwas '48
Dr. Carl Gans '50
George E. Canuel '51
Maurice Rifkin '53
Sheldon Bilgrei '55
Anthony J. Delano '55
Philip G. Luckhardt '56
Dr. Hugh D. McNiven '58
Bijaya C. Mahapatra '76
Hanan Livneh '79
Linda R. Heffner (Friend)
Dr. Anthony Kurtz (Friend)
Connie S. Maniatty '43CC (Friend)

Homecoming

Despite all the best cheering efforts and hopeful spirits of faithful Columbians, the Lions suffered a 27–13 loss to perennial Ivy rival UPenn at the Homecoming football game. For Engineering alumni, the day was not entirely a loss. They were able to keep warm in the stands with special long striped scarves provided by the School to commemorate the event and then enjoyed the party in the Boathouse afterward, sponsored by the Engineering Alumni Association.

Giving Back: Sheldon E. Isakoff

BS ’45, MS ’47, PhD ’52
Chemical Engineering

Dr. Sheldon E. Isakoff, former director of Engineering Research and Development at DuPont, was a major force in research at DuPont for more than 40 years. After receiving his PhD from Columbia Engineering, his began his work at DuPont, which culminated in many patented developments, including the EFT Dacron and nylon processes, Mylar and Cronar process improvements, and the first Lycra plant in the world.

During his career at DuPont, Isakoff pioneered many developments in process dynamics and computer applications as both research director of the engineering materials laboratory and director of the engineering physics laboratory. He is a member of the National Academy of Engineering and served as president of the American Institute of Chemical Engineers (AIChE). He is a fellow of the American Association for the Advancement of Science, a former member of the Dean’s Engineering Council, now the Board of Visitors, and an adviser to the Chemical Engineering Department. He was awarded the Alumni Association’s Egleston Medal for Distinguished Engineering Achievement in 1993. During his retirement, Isakoff was president of United Engineering Trustees and chairman of the board of the Chemical Heritage Foundation.

Isakoff has been an ardent support of Columbia since his student days. In 1996, he established the Sheldon E. Isakoff Scholarship in the Department of Chemical Engineering. “Giving back to Columbia was crucial for me. I’ve been associated with Columbia since 1942 and I wanted to give back to the institution that gave me so much,” says Isakoff.

Brian Albert ’10, who has held the Isakoff Scholarship for three years, is shown above with Isakoff and his wife, Anita. “You might say now, because of our scholarship, Brian is a member of our extended family.”

Read more about Brian on page 17.