May 17  Retiring Faculty Reception  
*Rodman Room, Thornton Hall*

May 18  TJ Society Luncheon and Class of '55 Reunion  
*Alumni Hall*

June 3–5  Undergraduate Reunion Weekend  
('60, '65, '70, '75, '80, '85, '90, '95, '00)

June 4  Engineering Reunion Luncheon  
*Thornton Hall, Darden Court*

September 24  VEF Homecoming Tailgate Party  
*Darden Court*

September 30  Thornton Society Dinner  
*Boar’s Head Inn*

September 30 – October 1  Fall SEAS Trustees Meeting

Call 434.924.1382 for information.

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features

Engineering Students Live School’s Mission/ 11
Markus Weisner, Sophie Johnson and Dan Laufer embody the Jeffersonian ideal of public service in the Commonwealth and beyond.

An Engineering Degree that Means Business/ 15
A degree in engineering really does prepare you for anything, as these alums prove with their extraordinary business careers.

Discovery of New Metal Could Revolutionize Industry/ 18
The research partnership of Gary Shiflet and Joseph Poon has led to the discovery of large-scale amorphous steel that can be scaled up for mass production.

departments

Faculty Notes / 2
Dean’s Message / 3
Faculty Briefs / 6
School Notes / 7
Class Notes / 20
In Memoriam / 23
End Note / 24

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Front cover photo by Tom Cogill:
Markus Weisner, student, firefighter, Truman and Mitchell Scholarships winner
Since the 1973 oil crisis, when the OPEC cartel squeezed production of crude oil to drive up prices worldwide, experts have recognized the vital need to develop alternative sources of energy.

In recent years, researchers in the chemical industry have begun to shoulder this challenge and are working to develop new processes and products that use renewable, carbon-based materials, such as plant-based carbohydrates, rather than petroleum. Among these researchers is Robert J. Davis (ChE).

Davis received a three-year, $290,000 grant from the National Science Foundation to study ways that the structure of sugar molecules can be manipulated to produce carbon-based molecules from which plastics, paints, solvents and fibers can be made.

Davis said that the use of water-soluble carbohydrates also may lead to advances in chemical technology and the adoption of more environmentally sound practices that are not possible using traditional petrochemistry.

In particular, Davis and his research team, Erin McKoon and William Ketchie, are working to understand how certain factors, such as temperature and solutions’ alkaline levels, affect the action of ruthenium catalysts in controlling the rate of reaction and development of desired products during carbohydrate conversion. Their goal is to be able to control the reactions to create various intermediate chemical products. Read more: www.che.virginia.edu/davis.html.

SIE Researcher Designs Web-based Crime Analysis Toolkit

Donald Brown (SIE) won a research award from the Commonwealth of Virginia to investigate the creation of a statewide crime-reporting system that will provide all local jurisdictions with access to criminal incident reports. The team is working on a new approach to data-sharing known as Web-based Crime Analysis Toolkit (WebCAT). This statewide system will link all jurisdictions in the Commonwealth using National Incident-Based Reporting System data and enable them to share spatially referenced data on crimes and improve their analytical and crime-prevention capabilities.
THIS ISSUE OF VIRGINIA ENGINEERING MAGAZINE CELEBRATES the primary qualities that make the School of Engineering and Applied Science a unique educational institution: breadth of undergraduate experience, opportunities for service, introduction to ethics, and cutting-edge faculty research.

In our mission statement we say that we “educate students to be leaders in technology and society who contribute to the well-being of our citizens through the creation and transfer of knowledge.” The importance of that mission grows daily as our society becomes increasingly reliant on technology and as the ethical and moral implications of technology become increasingly important.

We are able to develop the engineering leaders of tomorrow thanks to our excellent faculty and the broad-based educational program we have here, which includes excellent classes in the liberal arts. Our undergraduates have the opportunity to participate in research and real-world problem solving side by side with renowned researchers. Through student-run projects and volunteerism, they are able to grow and develop as student leaders and come to understand the impact of technology on a worldwide level. Through our thesis requirement and other required coursework, they learn the writing and presentation skills essential to being a successful leader, and many of our students take advantage of the opportunity to double-major and minor in other subjects that are part of the comprehensive University.

The strong foundation gained here can take our alums far and wide, as you’ll read in “An Engineering Degree that Means Business.” Featured alums include John Muleta (SIE ’86, Law/Darden ’93), who is currently bureau chief for the Wireless Telecommunications Bureau at the Federal Communications Commission and Loria Yeadon, (ECE ’85), who is CEO of Honeywell Intellectual Properties. These individuals and others are living examples of the breadth of professional opportunities available to the “Virginia Engineer.”

In “Engineering Students Live School’s Mission,” you’ll read about engineering students who are contributing to the well-being of society well before they leave these Grounds. Markus Weisner, recent Truman and Mitchell Scholar, spends his free time fighting fires. Sophie Johnson spends her summers in primitive communities of the world trying to provide technological solutions that fit the environments she finds there. And closer to home, third-year student Dan Laufer chaired Run Across Virginia and raised $66,000 for cancer research.

We have a great deal to be proud of in our School, and so much of that is thanks to the support of our loyal alums who continue to contribute to the School through the Virginia Engineering Foundation. We have some good news to celebrate there as well, with the creation of the new SEAS Trustees and the arrival of Nancy Cable, our new Associate Dean for Development and Virginia Engineering Foundation Vice President for Development. I am looking forward to working with Nancy and the Trustees and with each of you as we continue to do what we do so well—educate students who share your values, your technical expertise, and your understanding of the vital importance of engineering to the whole of society.

I thank you for your continued loyalty and support.

James H. Aylor, Interim Dean
CS Faculty Member Wins Medal for Outstanding Contribution

WILLIAM A. WULF (CS), PRESIDENT OF THE NATIONAL ACADEMY OF Engineering, was awarded the Ralph Coats Roe Medal from the American Society of Mechanical Engineering in November.

The medal, established in 1972, recognizes an outstanding contribution toward a better public understanding and appreciation of the engineer’s worth to contemporary society.

As the medal winner, Wulf will give an authoritative lecture in his field at a general session during the International Mechanical Engineering Congress.

Ralph Coats Roe was a pioneer and innovator in the design and construction of highly efficient power plants and advanced desalting processes. He was an inspiration to his colleagues by his great achievements through self-education in highly sophisticated technologies.

Previous winners of the medal include Carl Sagan, Tracy Kidder, Lee Iacocca, and Congressman Donald L. Ritter.

University Professor Elected to the Institute of Medicine

DR. CATO T. LAURENCIN, UNIVERSITY PROFESSOR WITH APPOINTMENTS IN BME and ChE, and the Lillian T. Pratt Distinguished Professor and chair of orthopedic surgery, was elected to the Institute of Medicine, part of the National Academies, in honor of his contributions to health and medicine.

“Election to the National Academy of Sciences Institute of Medicine is a great distinction in the field of medicine. I am deeply honored to have been chosen,” Laurencin said.

Laurencin is a world-renowned expert in shoulder and knee surgery and an international leader in biomaterials and tissue engineering research. He joined U.Va. as a University professor and chairman of orthopedic surgery in 2003. Laurencin is currently Speaker of the House of Delegates of the National Medical Association and a member of the National Science Board of the Food and Drug Administration. He earned his BSE in chemical engineering from Princeton University and his M.D. from Harvard Medical School, where he graduated magna cum laude. Simultaneously, he earned a Ph.D. in biochemical engineering/biotechnology from the Massachusetts Institute of Technology.

Laurencin has been named to America’s Top Doctors for 2004 and has also been named to Who’s Who in America and Who’s Who in Medicine and Health Care. Most recently he has been named to the African Scientific Committee of the African Institutes of Science and Technology.
Hilary Bart-Smith (MAE) HOPES ONE DAY TO CREATE vehicles that move so gracefully through the air and water they may be mistaken for living creatures. Science fiction? Not for Bart-Smith, who has made this seemingly far-fetched idea her life’s work—work that has garnered recognition from the David and Lucile Packard Foundation and the National Science Foundation.

A native of Scotland, Bart-Smith has been interested in engineering since high school. At 16, she participated in a math and physics program for women.

“That experience led to a fascination with understanding how things around me function,” she said. “I’m the only woman I know who saw the movie ‘Titanic’ and was gaga not over Leonardo DiCaprio, but over the boiler room.”

Bart-Smith, 30, completed her undergraduate studies at the University of Glasgow, graduating first in her class in mechanical engineering, and received her doctorate from Harvard University in 2000. She completed two years of post-doctoral work at Princeton University where she worked on ultralight materials (metallic foams), before joining the University of Virginia faculty in 2002. Her research interests include multifunctional materials, such as ultralight materials, morphing structures, and electro-active polymers.

It’s the morphing structures, in particular, that fuel her imagination. For now they exist only in the laboratory, but some day, Bart-Smith expects to see morphing wings moving submarines silently through the ocean like manta rays. “Mother Nature has had the advantage of millennia to design the most efficient structures and systems,” she said. “Design engineers and material scientists have a lot of catching up to do.” Using new materials and techniques, Bart-Smith is borrowing from nature to create the vehicles of the future.

The Packard grant gives Bart-Smith $625,000 over five years to pursue her research. The NSF grant provides a similar level of funding. In her career, Bart-Smith has chosen to navigate between what nature has done, what humankind is doing now and what, with a little math and a lot of creativity, might be done in the years ahead. Her journey may not always be free of turbulence, but it is sure to be an interesting ride.
Paul Allaire (MAE) received a Lifetime Achievement Award from the International Symposium on Magnetic Bearings.

Raul A. Baragiola (MSE) was plenary speaker at the Workshop on Inelastic Ion-Surface Collisions and gave invited talks at the European Science Foundation Mercury Workshop, the Okayama Symposium on Ion-Surface Interactions, and Fujitsu Corporation in Japan. With Professor R. E. Johnson (MSE) and graduate students, he participated in the Cassini mission, obtaining the first scientific results after orbital insertion around Saturn.

Ellen J. Bass (SIE) was recently elected to the IEEE Systems, Man and Cybernetics Board of Governors for a three-year term.

W. Bernard Carlson’s (STS) article on Nikola Tesla, titled “Inventor of Dreams,” was published in the March 2005 issue of Scientific American. He is working on a biography of Tesla with support from the Sloan Foundation.

George T. Gillies (BME) was accepted as a Fellow in the American Institute for Medical and Biological Engineering.

The Society of Engineering Science at the University of Nebraska paid tribute to the research of Cornelius O. Horgan (CE) with a five-session symposium in his honor. The January 2004 issue of the Journal of Elasticity was dedicated to him, and a special two-issue volume of the International Journal of Nonlinear Mechanics was published containing 23 invited papers dedicated to him.

Jim M. Howe (MSE) received the 2005 Champion H. Mathewson Award from the Minerals, Metals and Materials Society.

John L. Hudson (ChE) won the 2004 Blum Award of the Electrochemical Society National Capital Section.

Anita K. Jones (CS) was awarded the Augusta Ada Lovelace Award by the Association of Women in Computing for outstanding scientific and technical achievement. The award is named after the first computer programmer, Augusta Ada Byron Lovelace.

James H. Lambert (SIE) received a commendation from the Virginia Secretary of Transportation for his research supporting VTrans2025, the Virginia Statewide Long-Range Transportation Plan.

Zongli Lin (ECE) was appointed Associate Editor of Automatica. His book, Linear Systems Theory: A Structural Decomposition Approach, was published by Birkhauser, Boston.

Robert E. Lindberg (MAE) was chosen as an AIAA Fellow.

Pamela M. Norris (MAE) chairs the Education Committee of the ASME Nanotechnology Institute. She is in charge of organizing the annual Nano Training Bootcamp, which offers a detailed and tutorial-based account of advances in fundamentals related to nanoscience in a wide variety of fields.

Shayn Peirce-Cottler (BME) won the Rita Schaffer Young Investigator Memorial Award from the Biomedical Engineering Society.

Robert J. Ribando (MAE) received an award for curriculum innovation at the 2005 ASME International Mechanical Engineering Congress and Exposition.

John R. Scully (MSE) received a certificate of appreciation for service as a consultant to the Columbia Accident Investigation Board.

Brian L. Smith (CE) was selected to serve as chair of the Committee on Advanced Technologies of the ASCE Transportation and Development Institute.

Alfred C. Weaver (CS) presented a paper on information security at the Workshop on Factory Communications Systems (WFCS 2004), which was held in Vienna, Austria, in September 2004.
THE SEAS TRUSTEES — A NEW ORGANIZATION THAT combines the functions of both the Virginia Engineering Foundation Board and the Dean’s Advisory Committee — was formed in January 2005.

This new organization is charged with advising the dean on strategic planning, development, and promotion. It will provide advice, through four primary boards, on academics, development, communications, and finance (see box). It also will serve as the governing body of the Virginia Engineering Foundation, which will continue to serve as the development organization for the School.

The SEAS Trustees will work to provide opportunities for alumni and friends to become more engaged in the Engineering School and will work within the University structure to ensure that the School remains an effective, collaborative partner in the wider University community.

“These changes are very important to the School,” according to SEAS Trustees president Doug Garson. “In the world of today, it is essential that we look at the total needs of the School. And it is essential that we attract people with the interest, influence and ability to make a difference for the School. This new organization makes that possible.”

The structure of the SEAS Trustees will allow for a deeper involvement than was possible before. In addition to the four primary boards, several standing committees have been established to address ongoing concerns (e.g., strategic planning and facilities). The Facilities Committee, for instance, will monitor improvements in current structures and will actively participate in the planning and construction phases of new facilities. “This is of great importance today as the Foundation endeavors to raise funds for the completion of Wilsdorf Hall, and other new buildings,” says Garson.

The arrival of Nancy J. Cable as the Engineering School’s Associate Dean for Development and Virginia Engineering Foundation Vice President for Development is additional exciting news.

Before coming to the University, Cable was Vice President and Dean of Admission and Financial Aid at North Carolina’s Davidson College, with professional experience that includes a comprehensive background in admissions, recruitment, financial aid, marketing, publications, and development.

“I am very pleased to join the University and the Engineering School and to work with the SEAS Trustees, the VEF staff, and the Engineering School’s faculty and administration to outline the steps necessary for the School to succeed in the years ahead. As a graduate of the University, I especially look forward to engaging with individuals and organizations who want to work to enhance and sustain the quality of education and research at the School and the University,” says Cable.

“These are very exciting times,” Dean James Aylor reports. “Unprecedented opportunities are in front of us, and with the support of the SEAS Trustees, the Foundation, and our excellent faculty and staff, the Engineering School is in very good shape to move through the years ahead with our place assured as a top-quality institution of engineering education and research.”

Boards of the SEAS Trustees

The Academic Board will serve to enhance the stature of the Engineering School by providing high-level guidance and assistance on curriculum issues, academic strategy and specific departmental initiatives.

The Finance Board will oversee the financial activities of the VEF and serve in an advisory capacity on the School’s finances.

The Communications Board will provide strategic advice on plans for raising awareness of the excellence, breadth, and unique qualities of SEAS to all constituencies within and outside the University.

The Development Board will recommend, oversee, and evaluate the development policies and programs required for SEAS to accomplish its goals.
IN LESS THAN FIVE SHORT YEARS, AN IDEA ABOUT summer internships for U.Va. engineering students has grown from the proverbial twinkle in attorney James Turner’s eye to a stellar set of experiences for some 50 young men and women. This summer, the Science and Technology Policy Washington, D.C., Internship Program once again offers a select group of engineering students a chance to earn credits while exploring the ways science and technology influence—and are influenced by—public policy in the nation’s capital.

The students, typically third- and fourth-years, work directly with key policy-makers at federal agencies such as the National Science Foundation and Department of Health and Human Services, and in think tanks, Congressional offices and foreign embassies.

“We try to place our interns at the highest possible levels within organizations,” notes environmental historian and internship director Edmund Russell. “While the goal is not to have our interns go into public policy careers per se,” he says—nevertheless flashing a grin at the thought of a U.Va. engineer as a future U.S. president—“we hope that as a result of the program, our interns will carry with them, whether into business, medicine or law, a knowledge of public policy-making that will benefit those careers.”

Turner, chief Democratic counsel for the House Committee on Science and a parent of an Engineering School alumnus, was aware that MIT students had been enjoying successful summer internships in D.C. He contacted then-Dean Richard Miksad about creating a parallel program for U.Va. engineering students. Turner now helps secure placements within the national—and international—science community in Washington, for about 10 students each year.

The program, which is fully funded by contributions to the Virginia Engineering Foundation Annual Fund, continues to thrive as the sophistication of the students, their placements, and the mentoring increases.

“We’re getting some very talented and interesting
students applying for the program. The agencies remember their previous U.Va. students, and nine out of 10 interns are getting their first choices,” Turner says with clear excitement. “Everybody is working for a mover and shaker in Washington.”

To prepare for their summer experience, all prospective U.Va. Washington interns enroll in STS 500, a graduate-level spring semester course taught by Russell. The course’s demanding academic focus reviews the U.S. government’s role in policy formation. Beginning with the American Revolution and the Constitution, students examine when, why, and how the federal government expanded its reach. At mid-semester their studies look at such early scientific agencies as the Department of Agriculture to trace the government’s growing engagement with science.

But it’s not all history-based. The course stresses the importance of following and reflecting on the latest developments in science and technology policy, with an expectation that class members will read a major newspaper like The Washington Post daily, and give weekly briefings to each other. Case studies of federal departments and agencies such as the National Science Foundation and the Department of Defense are followed by oral and written reports on the agencies where each student will intern and on current policy issues facing those agencies.

Russell, who wants his students to view him as a kind of “coach,” has planned a series of guest lectures, has asked students to start tracking their evolving ideas and questions about public policy in a journal, and has put in place processes for summer networking—all part of the Engineering School’s strategy to send off this group well-prepared to maximize their successes.

To catch up on a few past Washington Interns, see page 20 of “Class Notes.”

“We hope that as a result of the program, our interns will carry with them, whether into business, medicine or law, a knowledge of public policy-making that will benefit those careers.”
A SK U.VA. STUDENTS TO NAME THE BEST PLACE TO STUDY, AND ONE ANSWER may surprise you. A number of students will undoubtedly name the Science and Engineering Library housed in Clark Hall. Thanks to a three-year, $10 million renovation that was completed in Fall 2003, and a generous pledge from Mrs. Charles L. Brown, students have a top-notch space for research and study and the library has an endowment for its long-term success.

Built in 1932, Clark Hall was originally home to the University’s Law School. The building became the Science and Engineering Library in 1975, but by the 21st century it was badly in need of improvement. In planning the renovation, “we asked the students what they wanted,” said Carol R. Hunter, library director.

The library’s new features reflect what students requested. A large, sky-lit reading room with ample study space, group study rooms for collaborative projects, a state-of-the-art digital classroom, and wireless access throughout are just some of the improvements. The stacks are now fully accessible via a wide staircase and elevator, and the entire library is air-conditioned. The 1930s wood tables have been refurbished and repositioned for a laptop generation, and a working gas fireplace invites students to linger in the spacious reading room.

In 2004, Ann Lee Brown, widow of University alumnus and AT&T CEO and Chairman Charles L. Brown, pledged $5 million to honor her late husband with an endowment for the Science and Engineering Library. The facility was renamed the Charles L. Brown Science and Engineering Library in appreciation of her generous gift.

Mrs. Brown also gave $5 million to the Engineering School Department of Electrical and Computer Engineering. It was renamed the Charles L. Brown Department of Electrical and Computer Engineering in honor of Mr. Brown.

4th Year Students Build A Launcher

Scott Barker (ECE) worked with undergraduate students this semester on a project involving the optimization of an electromagnetic launcher. The project began at the end of Spring semester 2004 and was later funded by the Army Research Lab, which allowed the team to purchase the supplies needed to build the launcher. They successfully designed, built and tested their initial launcher design and are now in the process of designing their next iteration. “This project highlights the tremendous quality of students that we have here at U.Va.,” Barker said.
MARKUS WEISNER DOES NOT APPEAR TO BE A STUDENT who has a lot of time for nonacademic pursuits.

This 24-year-old engineering student, now in his sixth year at the Engineering School, has had a remarkably busy and varied student experience thus far. While maintaining an outstanding record of academic achievement, he has studied abroad at the Universität Konstanz, conducted research in Germany for Daimler Chrysler, and received both the Harry S. Truman and George J. Mitchell scholarships.

But Weisner’s U.Va. experience has been about more than learning a profession. “Even in my first year, I was looking around for something to get involved in, something that would engage me in the larger community,” he said.

Professor Deborah Johnson, chair of the Department of Science, Technology and Society, said this worldview typifies U.Va. Engineering School students and reflects the kind of education they receive here. “Our students are interested in the social context of engineering. They’re receptive to the idea that engineering isn’t just about artifacts and material things—it’s about the interplay of objects with social behavior and practices, with social relationships and institutions.”

Like many U.Va. students, Weisner started by volunteering at Madison House, where he
tutored math and science and also worked with the Adaptive Ski Program. By 2001, however, he found himself looking for something that would engage him on a number of levels—professional, societal and emotional. His search ended when he joined the Charlottesville Volunteer Fire Company.

“Firefighting is such a unique form of public service,” he says. “There’s the physical aspect, which I enjoy, but it’s so much more than that. I get involved with people at a stressful time in their lives and have a chance to make a difference.”

According to Professor Johnson, the most successful engineers are those who both understand the world and use their engineering expertise to help change it. For Weisner, this means not only learning to be a good firefighter, but also finding ways to make firefighting better.

For example, his working with “irons”—a firefighter’s primary entry tools—gave him firsthand insight into the frustrations of using inefficiently designed equipment. His solution? Design something better.

Through his STS 315 course, Weisner helped engineer a design improvement to the existing irons, and then started a company called Fire Hardware LLC. “We’ve now applied for a grant from the National Collegiate Inventors and Innovators Alliance,” he says, “and if we get it we plan to further develop our design.”

For some engineering students, the desire to reach out to the larger community has led to a cross-cultural experience. Third-year Sophie Johnson spent last summer in Juarez, Mexico, with five other students, including Emily Babbitt and Anna Sofranko, under the auspices of the U.Va. chapter of Engineering Students Without Borders. This program places students in impoverished regions of the world to work on socially, environmentally, and economically sustainable projects. The U.Va. chapter tackled a project in South Africa; and one in Nicaragua, focused on constructing new facilities for the Veracruz community bakery, has been approved for this year.

In Juarez, Johnson’s work focused on alleviating some of the problems caused by the lack of a sanitation infrastructure. “We worked on the idea of using dehydrating toilets as a way to prevent water contamination in the area, giving people a practical way to deal with waste. We researched manufacturing possibilities and built a bathroom with a dehydrating toilet for one local family.”

I LEARNED that it’s not possible to come up with a technological innovation in Virginia and simply bring it to Mexico or anywhere else.

“Emily Babbitt (right) teaching school
Anna Sofranko (right) teaching school

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Anna Sofranko (right) teaching school

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Anna Sofranko (right) teaching school
The project’s technical challenges are not the ones Johnson tends to talk about. When asked, she’s more likely to speak of the need for cultural respect and understanding. “I learned that it’s not possible to come up with a technological innovation in Virginia and simply bring it to Mexico or anywhere else,” she says. “Solutions have to be developed with the people in the community. It takes a lot of time, and training and communications are so important.”

Professor Johnson concurs. “At the most profound level, technologies are systems of people and things, directed at accomplishing particular tasks. In order for a system to work, all the components—including the people involved—have to function effectively together. At SEAS, we provide the kind of education that students will need both to make things and to bring people together. That includes training in teamwork, ethics and communication.”

Closer to home, third-year systems engineering student Dan Laufer, working through his fraternity, Phi Gamma Delta, found communication to be a critical skill when he chaired the Run Across Virginia. This fundraising event, which involves the running of a football between Charlottesville and Blacksburg before the Virginia Tech–U.Va. game, required the participation of students, businesses, media, police, and even Gov. Mark Warner’s office. Over the past two years, the Run had raised a total of $66,000 for the Jimmy V Foundation, which supports cancer research.

Some people might not see the Run as an engineering project, but for Laufer the connection is obvious. “I chose systems engineering because it prepares us to do many things,” he says. “We’re taught to take a
macro view, and to break down a complicated system into its individual components. This was exactly what we had to do with the Run.”

The effort to develop SEAS students’ communications skills begins early. For example, in STS 101, which introduces the profession and its role in society, each student has to make a presentation on an aspect of engineering. Last semester, Professor Joanne McGrath Cohoon challenged her class to present their projects to students at Charlottesville’s Jouett Middle School—an audience of 11- to 13-year-olds.

“This extra-credit assignment meant they had to thoughtfully reframe their presentations for a unique, nontechnical audience—something they will often have to do in their professional lives,” says McGrath Cohoon.

The project was a great success. McGrath Cohoon reports that her students learned valuable lessons about communicating and representing their profession, and that the middle school students learned about occupational fields they were unlikely to have heard of prior to the visit. She adds: “Both groups learned that being an engineer means more than just having a toolbox of technical skills.”

This fall, Markus Weisner will be heading to Trinity College in Dublin on the Mitchell Scholarship, where he will study for a Master of Science degree in fire safety engineering. As for his future, he hasn’t decided whether to go into public life, stay in firefighting, or pursue some interesting combination of the two.

Dan Laufer is also thinking about running for public office, while Sophie Johnson hopes to focus on environmental work.

Whether their futures take them around the corner or around the world, these and other SEAS students will embark on their professional lives prepared to take on a wide range of challenges, both social and technological. Thanks to the broadly focused educational experience they’ve had at the University of Virginia, they’re destined to be leaders in any field they choose.

... To offer to the local community, the Commonwealth of Virginia, and the nation the various kinds of public service and intellectual and cultural activities which are consonant with the purposes of the University.

—University of Virginia Statement of Purpose and Goals
The great thing about an engineering degree from U.Va. is the number of doors it opens. While many SEAS graduates go on to successful careers as professional engineers and researchers, others enter the business world, where the knowledge, analytical methods, and communication and leadership skills gained on Grounds provide a unique advantage.

Engineering School graduates have gone on to assume posts at a number of businesses that affect the lives of hundreds of millions of people around the world. Consider the accomplishments of David Kettler (ECE ’67, ’70, ’71). Kettler was vice president for science and technology and chief architect for BellSouth, where he was responsible for the entire Bell South research and development activity and spearheaded the industrywide consortium that helped create standards for DSL technology.

Or John Muleta (SIE ’86, Law/Darden ’93), bureau chief for the Wireless Telecommunications Bureau at the Federal Communications Commission. Muleta is responsible for all FCC domestic wireless
communications programs and policies, including cell phones, paging, personal communications services, public safety, and other commercial and private radio services.

In fact, some SEAS engineering graduates never planned to practice engineering. Chip Owen (ME ’79, Darden ’84) came to U.Va. intending to take his engineering background and go into business. Today, he is the executive vice president and chief operating officer for Equity Office, the nation’s largest publicly held office building owner and manager.

Understanding Technology

Because many successful businesses these days employ new technology in their business systems and production processes, or develop and distribute new technology to their customers, it’s a distinct advantage to know how something works. Muleta maintains that he draws on his engineering background virtually every day. “Having a component-level understanding of engineering is a huge benefit,” he says. “My ramp-up time for new technology is rapid.”

Chip Owen concurs. “A thousand of my employees at Equity Office are operating engineers,” he remarks. “Although I’ve never torn down a chiller myself, at least I understand the issues when I talk to them about it.”

Being able to refer to basic engineering principles is also the source of the mobility Engineering School graduates often experience in the business world. During her 23 years at IBM, Scottie Ginn (EE ’80) has held posts in a variety of different technical areas, including process development and chip design. Currently, she’s vice president of operations for the Systems Development Group, where her responsibilities include everything from strategy to finances to hardware development. “Being able to move from one field to another and quickly master the intricacies is exactly what’s required for success in a large company,” she says.

Thinking Like an Engineer—and Beyond

The kind of analytical, logical thinking that forms the fundamentals of engineering transfers quite well to business. “You learn the art of decision-making at U.Va.,” the FCC’s Muleta notes. “We were taught how to break down complex systems into their components and put them together. This approach is ingrained in the way I work. I don’t even think about it.”

At Merck & Co. Inc., Michael King (ChE ’76) finds the Engineering School’s emphasis on process similarly useful. As senior vice president for the science and technology group in manufacturing, King can’t afford to be stymied by complexity. When faced with a new challenge, his approach is straightforward: “I listen, gather the data I need to understand the scope of the problem, develop potential hypotheses, test them, and take the most likely path forward.” Such an analytical approach, he points out, is equally useful when applied to organizational as well as technical issues.

Many U.Va. graduates also cite the importance of being able to take courses elsewhere at the University as critical to their success in business. Communications expert Kettler took courses in economics, foreign affairs, German, philosophy, and
sociology and drew on the perspectives he gained to interact more effectively with nonengineers worldwide. “This kind of experience also helps you think more creatively about technical issues,” he says.

Loria Yeadon (ECE ’85), CEO of Honeywell Intellectual Properties, believes the broad-based education that is the hallmark of the Engineering School has helped her see engineering in context. “In my humanities courses, I gained a sense of how technology and life intersect,” she says. “This is a critical insight if you are to handle real-world projects successfully and in a morally and ethically responsible way.”

Yeadon, formerly the chief intellectual property litigation counsel for Honeywell International and now team leader of IP licensing and enforcement strategy for the company, also credits the Engineering School for sharpening her communications skills. “I make many presentations around the world, often speaking before people with different legal, technical, business, and cultural backgrounds,” she says. “I need to communicate clearly with them all in a way that builds relationships and achieves Honeywell’s objectives.”

**Leading and Managing Others**

As any U.Va. graduate will tell you, there is more to the University experience than just the course work, important as that is. The University places a premium on nurturing individual initiative and leadership, two areas that are critical to business success.

Entrepreneur Eric Tumperi (ME ’83) was active in Trigon and served as managing and then executive editor of *Corks & Curls*, the University yearbook. “I learned quite early what was needed to recruit and manage a 200-person staff and produce a 700-page yearbook under budget and on schedule,” he says.

Tumperi has put these skills to good use. As co-founder, president and COO of Enterpulse, he developed an extremely successful Internet-based trade show management system that includes online registration, exhibitor directory, floor-plan management, and e-commerce capabilities for exhibitors and attendees. Currently, he is chairman and CEO of his second start-up, AnyTransactions, which has developed a voice verification system for probation offenders.

For Jay D. Miller (BME ’87), the collegial atmosphere he found at U.Va., paired with an outstanding technical education, provided excellent preparation for his role as CEO of Vital Images. This fast-growing biotech company produces enterprisewide advanced visualization and analysis software solutions that significantly increase the productivity of radiologists reading CT, MR, and PET scans. At U.Va, Miller was impressed with the importance of hiring people who work well together in teams. “U.Va. is a very social environment,” he says. “I learned how much can be accomplished when people work closely together.”

Underpinning this all is the University’s honor system. As David Kettler points out, at a time when business ethics have received considerable scrutiny, the tradition of honor that students experience at U.Va. makes a real difference.
“IT WAS A NATURAL FIT for us to work together and share our knowledge and equipment and resources.”

Throughout the years, he and Shiflet have won several million dollars in grants for their investigations into novel materials. Early on they received a grant from the Office of the Vice Provost for Research (Gene Block, at that time.) “That academic enhancement grant from within the University kept us going before the big government funding came,” Poon recalls.

As a result of years of collaborative work, the research team discovered a nonmagnetic amorphous material that is three times stronger than conventional steel and has superior anticorrosion properties.

A future variation of this material, called DARVA-Glass 101, could be used for making ship hulls, lighter automobiles, tall buildings, corrosion-resistant coatings, surgical instruments and recreational equipment. The scientists say commercial use of the wear-resistant material could be available within three to five years.

The material, made of steel alloys that possess a randomized arrangement of atoms—thus “amorphous” steel—was discovered by modifying an earlier version of amorphous steel known as DARVA-Glass 1, first reported by Poon and Shiflet at the Fall 2002 meeting of the Materials Research Society. This past spring they reported on the more advanced
DARVA-Glass 101 in the *Journal of Materials Research*. A variety of popular newspapers and magazines that covered the discovery have touted the material as the next big thing in steel. *Scientific American* magazine recently named Poon and Shiflet to its annual list of the top 50 outstanding research leaders in science and technology for the year.

“Amorphous steel can potentially revolutionize the steel industry,” Poon says.

The Defense Department is particularly interested. The project is sponsored by the Defense Advanced Research Projects Agency, the military’s research arm that supports investigations into seemingly futuristic materials and technologies that have very real potential for applicability in the relatively near future.

According to Poon and Shiflet, researchers have been making amorphous steel in very small quantities for years, but have had great difficulty “scaling up” the material to sizes large enough for practical use. But these two have succeeded in producing large-size amorphous steel samples that can be further scaled up in industrial labs for mass production. They achieved this by adding a small dose of a rare earth element—yttrium—to create DARVA-Glass 101.

The “glass” in the material’s name refers to the frozen liquid structure of the material, somewhat similar to glass that is a liquid made solid by rapid cooling. But DARVA-Glass 101 is an aluminum-based metal composite frozen to a solid state by rapid cooling.

The team is continually varying the recipe for its materials by adding a pinch of this element, a dash of that, and by trying different heating temperatures and cooling rates. They are always tweaking the product, “trying to fool nature,” as Shiflet puts it—always seeking to come up with something better and stronger.

Most of the lab work is done by co-investigator Vijayabarathi Ponnambalam, a U.Va. materials physicist. During the last two years, the team produced more than 100 variations of their material on the journey toward the creation of DARVA-Glass 101.

“The problem with making a high-tech material is that, while nature gives you something, it also takes something away,” Shiflet explains. “We have been able to achieve great strength and nonmagnetic properties for the material, but it is still somewhat brittle.”

“Discovery is going on all the time,” Poon says. “We need to toughen the material more. We can always make it better.”

But discovery is not done randomly. The research team continually revises its strategies based on new knowledge gained and what they think may happen if they try something else—perhaps something outrageous.

Unlike previous variations of amorphous steel, DARVA-Glass 101 can be produced in sizable quantities, and it can be machined as well as manipulated like a plastic. It can be squeezed, compressed, flattened and shaped,” Poon said.

The material is of interest to the Navy for making nonmagnetic ship hulls, particularly for submarines, which are detectable by the magnetic field of their hulls. The amorphous steel that the U.Va. team is refining also may be useful for producing lighter but harder armor-piercing projectiles. The publicly traded company Liquidmetal Technologies owns an exclusive license to the amorphous steel invented by the U.Va. scientists.
What Are They Doing Now?

Catching up With Science and Technology Policy Washington, D.C., Interns

Ginger Moored ('02)
At age 20, as an aerospace engineering major from Elkton, Va., Ginger Moored was one of the first Science and Technology Policy Washington, D.C., interns. During her internship with the U.S. State Department, she researched civilian space travel, summarizing potential issues of a prospective space travel industry: Are there going to be ownership rights? Jurisdiction issues? Will new laws be needed?

Following graduation, Moored returned to D.C. to teach high school physics with Teach for America. “Every day I’d see how much poverty affected my students,” she recalls, reflecting on her ongoing interest in social inequalities.

Her education—especially the internship—reinforced her belief that “policy serves as a vehicle for change.” She’s now enrolled in a two-year master’s degree program in public policy at Princeton University, and hopes to work in urban community development.

Natalie Giannelli ('04)
Working in Sen. Hillary Clinton’s office during her 2002 Washington Internship, the Westchester County (N.Y.) native was one of about 30 other interns there, largely liberal arts majors. Working on energy and policy issues, her engineering studies gave her a distinctive problem-solving mind-set, a don’t-just-talk-about-it attitude that pushed her to create a briefing book about an upcoming bill.

Giannelli describes the personal energy she gained about what was possible for her to accomplish as an engineer: “It just blew my whole outlook wide open. I saw how desperately in need of technological skills the whole world is—and not just in the laboratories.”

Currently at MarketBridge Consulting, developing business strategies for Fortune 500 companies, Giannelli is excited to be back in Washington, and she continues to revisit friends in Clinton’s office. The internship, she notes, “was not just a lasting memory, but is still an active part of my life.”

1950s
Stan Lanford (CE '55), retired president of Lanford Brothers, a highway and bridge-construction company in Roanoke, Va., was elected to membership in the Raven Society in the 2004 Fall Election.

1960s
David P. Hines (EE '68) is manager of information technology for the Supreme Court of Virginia.

1970s
Phillip M. Chambless Sr. (ME/BME '77) is a radiological physicist. He is president and co-owner of Phoenix Technology Consulting in Roswell, Ga. His son Phillip M. Chambless Jr. will graduate in May 2005 with a degree in systems engineering.

Barry S. Evans (ME '73), after working for 20 years with leading-edge technology at Raytheon Missile Systems Company in Tucson, Ariz., as a senior principal mechanical engineer, is taking full retirement to focus on completing his top 100 goals in life. He expresses his thanks to all those who contributed to his experiences and growth at U.Va., especially his advisor, Dr. J. Taylor Beard.

1980s
such as assessing, classifying, and evaluating a watershed; using GIS models for watershed assessment; and effectively planning for future use and demands.

Elyse Nicole McKenney, the daughter of John C. McKenney (EE ’80) and Lori Jones McKenney (EE ’82), is a first-year engineering student.

John W. Via III (ChE ’84) is director of manufacturing of Alcon Manufacturing’s ASPEX plant in Fort Worth, Texas. He also is an adjunct professor at Texas Christian University, where he teaches an undergraduate course on issues in engineering design, and at Southern Methodist University (SMU), where he teaches a graduate course in engineering management. He serves on the advisory board of the chemical engineering department at Lamar University, and recently completed a two-year term on the associate advisory board at the Cox School of Business at SMU.

John E. Daugherty (ChE ’89) was promoted to director of engineering for the FEOL Product Group of Lam Research Corp., leading maker of plasma etch systems for the semiconductor fabrication industry.

1990s

Adam P. Burden (EE ’92) is a partner with Accenture.

Kirsten Oleson (CE ’96) is on leave from her job as an environmental engineer at the World Bank to pursue a Ph.D. at Stanford University’s Interdisciplinary Program in Environment and Resources. Her research centers on the environmental linkages of macroeconomic reforms.

Janis Price-Green (ChE ’96) recently graduated from the Medical College of Virginia and started residency training in OB/Gyn at Boston Medical Center. She and John Green (Sys ’96) married in August. He is currently enrolled in a dual-degree program at Kennedy Government School and Harvard Business School.

Kelly McClenathan Nelson (ME ’97) and Douglas Nelson (Aero ’97) had their first child, a son, in June. She is a biomedical engineer at the National Institutes of Health, and he is a senior aerospace engineer at Orbital Sciences Corp.

2000s

David A. Britz (ME ’02) is studying for a Ph.D. at the University of Oxford. He and his colleagues have succeeded in making the world’s smallest test tube, as certified by Guinness World Records. He minored in Materials Science and was a recipient of the Harrison Undergraduate Research Award.

Seeking Distinguished Alumni

The Virginia Engineering Foundation is seeking nominations for alumni worthy of recognition for the 2005 Distinguished Alumni Award. Consideration will be given to alumni who, through career and service, have brought recognition to U.Va. and to themselves as individuals.

To nominate alumni for consideration, please send e-mail to George Cahen: glc@virginia.edu. Include a brief reason for the nomination.
Jill Tietjen—Looking Beyond Dilbert: Life Outside the Cubicles

Jeanne Siler

Following the November 17 lecture co-sponsored by the Engineering School and the University of Virginia’s Women’s Center, an engineering student in the audience noted that she is working harder academically than friends in the College of Arts and Sciences. She asked speaker Jill Tietjen (Applied Math ’76) what she should tell those who ask, “Why do it?”

Tietjen, a former national president of the Society of Women Engineers, told the young woman that she should tell her friends it’s because of engineers that people can ride safely in planes. Because of engineers, people have reliable lighting and heating for class.

“There is value that comes from the work that engineers do,” declared the engineer and author. As for the extra work, the 2004 Distinguished Alumna of Tau Beta Pi told her audience, “There will be a payoff. You will make a difference in the world.”

Tietjen believes that engineering is suffering from an image problem stemming partially from the rise of the environmental movement in the 1960s and Earth Day celebrations of all things natural over things technical and humanmade.

“But I have a reconstructed knee,” she said. “That’s not just medicine, you know? There’s a lot of engineering in that. The screws weren’t made by doctors; they were made by engineers.”

Tietjen’s own thesis at U.Va. had to do with the mechanical strength of dissolvable sutures. “There are a lot of fascinating things that engineers do,” she emphasized, always trying to counter the popularized image of an engineer as a Dilbert type: a solitary, lonely, undervalued worker in a cubicle. “I have personally never worked in a cubicle,” she stated firmly. Since graduating as one of six women in her engineering class, she has worked in the electrical utility industry, been an independent engineering consultant, served as an expert witness, earned an MBA, and become a motivational speaker on behalf of women in science and engineering.

In order to help remedy the engineering public-relations problem, Tietjen encourages fellow engineers—men and women—to become more visible in the community: “For example, run for school board, for city council. Run for Congress. Don’t just join professional organizations. Join the Rotary Clubs, the Lion’s Clubs. This is how engineers become real to others.”

She laments the dearth of positive role models for scientists and engineers, noting how the medical and legal practices are celebrated in shows like “ER” and “L.A. Law.” Citing estimates that three-quarters of the country’s women and half the men don’t even know what engineers do, Tietjen points out that it’s also why many parents don’t direct their children to engineering careers. Consider that among those same men and women are our children’s schoolteachers, and the problem is compounded.

“I have a friend who owns a company that makes equipment that cleans water. That gives her great satisfaction,” says Tietjen, noting that Americans enjoy long life expectancies in large part because of clean water. When engineers take technology skills to developing countries to improve water systems, she says, an important outcome is that “little girls no longer have to carry water for their families. They can go to school. They can become literate. That’s how engineers add value to life.”
1940s

Commander Charles T. Sizer Sr., USN (Ret.) (Engr Und ’40) of Fernandina Beach, Fla., died in October 2004.


Joseph C. Addington Jr. (ME ’48) of Virginia Beach, Va., died in November 2004.


1950s


Jerome A. “Jerry” Isear (EE ’51) of Salisbury, Md., died in March 2004. He was a Navy veteran, worked in sales for Union Carbide and Dresser Wayne, and later in the concrete business with Pocahontas Inc. of Salisbury, where he was instrumental in developing new concrete products and processes. He was the owner of Cavalier Energy Co. and served in many leadership roles in the National Oil Fuel Institute. He also helped establish the Salisbury School.


Willie E. King (Engr ’52) of Portsmouth, Va., died in April 2004. He served in the U.S. Navy during World War II and retired from the Norfolk Naval Shipyard after 41 years as an architect in the design division.

Cecil G. Haney (Engr Und ’55) of Midlothian, Va., died in February 2005.

1970s

Cheryl L. Tropf (Applied Math ’72) of Highland, Md., died in March 2004. She was an accountant and former physicist at the Johns Hopkins Applied Physics Lab. She was a member of Phi Beta Kappa and was a congressional science fellow with the Senate’s Commerce, Science and Transportation Committee. She was later hired by the Nuclear Regulatory Commission and managed nuclear power plants. She was former chair of the Howard County Commission for Women and was named businesswoman of the year in 1988 by the Howard County chapter of the American Business Women’s Association.

2000s

Chyler Ebersold (Engr Sci ’05) of Charlottesville, Va., died in January 2005.

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Virginia Engineering / Spring 2005 / 23
WHEN I ARRIVED AT THE UNIVERSITY IN FALL 1975, I knew little of what would await me as an incoming student. While I had an underlying interest in math and science, my decision to enroll in an engineering program was largely based on the advice of my father, who was an engineer with the Department of Energy.

During my early years at the Engineering School, I quickly came to understand the meaning of "applied science" and its application to real-world issues. I also found that problem-solving was never easy, and that to be successful, one needed to weave together the traits of creativity, discipline and hard work. These traits, developed during my years at the Engineering School, have served me well throughout my business career.

I elected to major in Mechanical Engineering due to my interest in energy systems and their application. While the course work was challenging and enjoyable, I enjoyed most the dialogue with the professors who freely shared their real-world experiences about the application of their course material in industry, government and research. Two professors were especially excellent in this regard: Tim Scott in his Instrumentation Lab course and Taylor Beard in his Heat Transfer course. Both these professors were gifted in helping young engineering students see the practical applications of their course work.

Upon completing my undergraduate studies, I enrolled in the Engineering School’s graduate engineering program. It was during my time as an upper-class and graduate engineering student that I began to develop an interest in the commercial application of science and technology. I clearly understood the application of what was taught at the Engineering School, but I wondered further how these ideas make their way from laboratory to consumer.

Upon completion of my graduate engineering studies, I enrolled at the Colgate Darden Graduate School of Business Administration at the University. It was at the Darden School where I focused on Finance and Operations studies.

Over the ensuing 20 years, my career has focused on the commercial application of energy systems. Today, I am president and chief executive officer of Tractebel North America, a broad-based downstream energy company operating in the U.S., Canada and Mexico. Our businesses include liquefied natural gas importation and sale, electric power generation, energy trading, gas distribution and retail electricity sales. My formative years at the Engineering School were important to me, not only for the broad-based course work that ultimately stimulated my interest in energy systems, but also for reinforcing those traits to which I attribute much of my career success, namely creativity, discipline and hard work.

The Engineering School was instrumental both in my education and in shaping me as a business leader. In support of those who follow me at the Engineering School, I am a long-time contributor to the Virginia Engineering Foundation and have recently provided initial funding for the Business Minor program. It is through this program that I hope future engineers will gain exposure to the field of business administration and further develop their skills as business leaders in engineering-related fields.

—William Utt (ME ’79, ’80)
President and CEO, Tractebel North America Inc.
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