

Randall S. Rieserer, Research Associate Professor, BME, will work with the Vanderbilt Institute for Integrative Biosystems Research and Education. He received his doctorate in integrative biology from the University of California, Berkeley, and his bachelor's degree in biology from the University of Kansas.

Douglas C. Schmidt, Professor, EECS, will specialize in developing middleware in the areas of computer science of programming languages and software engineering. Scheduled to arrive on campus in the spring semester 2003, he serves as Deputy Director of the Defense Advanced Research Projects Administration (DARPA) Information Technology Office and the program manager of several national programs in middleware. He was formerly associate professor with the University of California at Irvine, where he earned his doctoral and master's degrees in computer science. He earned both master's and bachelor's degrees in sociology from the College of William and Mary.

Leslie M. Shar, Research Associate Professor, CEE, will work on the department's biocomplexity project and teach biofluidics. She received her master's and doctoral degrees from Rutgers University and her bachelor's degree from the University of Virginia.

Ming Wang, Research Associate Professor, BME, has significant expertise in ophthalmology, optics, and tissue engineering and is chief scientific officer of EyeVU and director of the Wang Vision Institute. He obtained his M.D. degree from Harvard Medical School and his Ph.D. degree in laser spectroscopy and collision dynamics from the University of Maryland.

IN MEMORIAM

Bruce M. Bayer, Professor Emeritus, ME, died August 28, 2002, in Nashville. He graduated magna cum laude in 1935, earning the Founders Medal for the School of Engineering that year. He was a member of the Engineering faculty from 1945 to 1974. Professor Bayer recently established the Nancy and Bruce M. Bayer Honor Scholarship, which is awarded to an incoming freshman.

Planes, Geeks, and Potato Guns Highlight 2002 E-Week

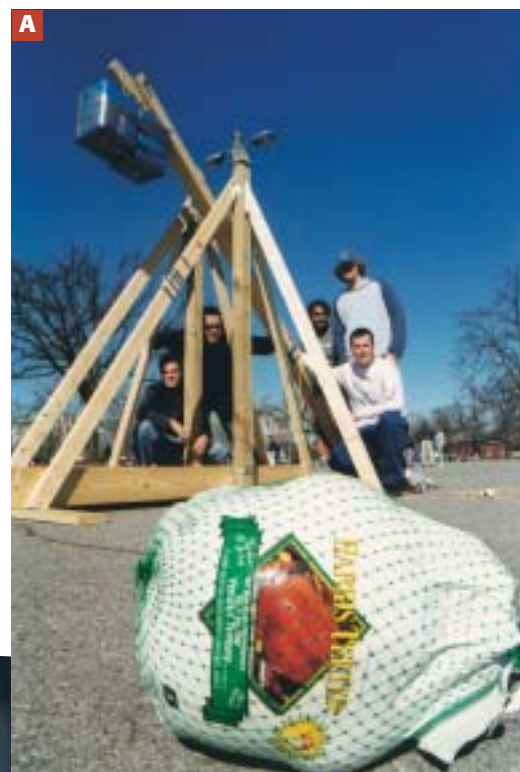
From creating a 10-step device that raises a miniature American flag to shooting potatoes from a "gun," Vanderbilt students spent National Engineers Week last February flexing their problem-solving muscles for the campus and the Nashville community. Such events gave the students a way to showcase principles they've learned in class in a creative and entertaining way.

The theme of the week of competitions and events was "Without Engineers the World Stops." Vanderbilt civil engineering alumnus Ed Clark, BE'76, CEO and president of FedEx Trade Networks, an independent subsidiary of FedEx, delivered the keynote speech.

Engineer's Week corporate sponsors included Dell Computer Corp., Coca-Cola, Halliburton, AeroStructures, FedEx, The Home Depot, and Smith, Seckman, & Reid consulting engineers.

A) Students built a trebuchet—a catapult whose design dates back to the Roman Empire—that launched objects such as a frozen turkey and a watermelon. **B, C)** The "Potato Gun" competition was sponsored by the Nashville Post of the Society of American Military Engineers. **D)** About 59 students raced to build computers from component parts in the "Fastest Geek" competition. Contestants had to boot their computer successfully, log onto a predetermined Web site and play audio through its speakers. **E)** The Saturday "E-Extravaganza Picnic" was open to the Nashville community. **F)** During the Rube Goldberg exhibition, named after the Pulitzer Prize-winning artist, students from Tau Beta Pi—the engineering honor society—built a device that raised a miniature American flag in 10 steps. The device illustrated how something as simple as raising a flag can be made complex if conventional problem solving is melded with imagination.

PHOTOS BY NEIL BRAKE



Engineering NEWS

VOLUME 43, NUMBER 2, 2002

ANTs Make Marine Air Operations a Picnic



The U.S. Marine Corps is using a new software system developed at Vanderbilt and the University of Southern California to streamline planning and reduce operational risk for its aircraft, including the Harrier AV8-B, above.

A highly decorated Marine Air Group has begun streamlining its planning and reducing operational risk with a new software system developed at Vanderbilt and the University of Southern California (USC).

The system, created by researchers at Vanderbilt's Institute for Software Sciences Institute (ISI), performs in minutes scheduling functions that used to require hours. The first operational schedule produced by the system was accepted for actual use on board a carrier in Japan in August.

The system was previously extensively tested by Marine Air Group 13 (MAG 13), both in MAG 13's base of operations in Yuma, Ariz., and on board aircraft carriers. MAG 13 was the home unit of such famous Marine pilots as WWII ace Pappy Boyington and astronaut John Glenn. MAG 13 aircraft saw action in the Gulf War and are aboard carriers supporting operations in Afghanistan.

The new system is based on a technology called ANT—Autonomous Negotiating Teamware—which has individual software modules that represent different concerns and goals involved in managing a combat air squadron. The modules communicate with each other, sharing their information, overruling or yielding according to a set of predetermined priorities. These structured exchanges of requests and counterproposals lead to agreements that become elements of a schedule.

"Creating schedules for a squadron involves balancing a huge number of factors," says Robert Neches, director of ISI's distributed scalable systems division and co-leader of the ISI team responsible for the operations sections of the software.

"Pilots want to get the maximum number of flying hours to maintain their ratings and extend their skills. The airspace has to be clear, suitable and acceptably safe for intended operations. Policies and commitments from higher

SEE PAGE TWO

World-class Nanoscientist, Imaging Expert Join Faculty

The School of Engineering has added two new distinguished scientists to the faculty this year: Peter T. Cummings, the first John R. Hall Professor of Chemical Engineering, and John C. Gore, the new Chancellor's Professor of Biomedical Engineering, Radiology and Radiological Sciences, Physics, Molecular Physiology and Biophysics.

Professor Cummings serves as Director of the Nanomaterials Theory Institute within the Center for Nanophase Materials Science at the Oak Ridge National Laboratory (ORNL). He is considered one of the top experts in the world in molecular simulation and computational nanoscience. He is also the editor of one of the leading journals on chemical thermodynamics, *Fluid-Phase Equilibria*. His research areas include materials science, bioengineering, and process design.

Formerly Distinguished Professor of Chemical Engineering, Chemistry and Computer Science with the University of Tennessee and Distinguished Scientist with the ORNL Chemical Sciences Division, Cummings also currently serves as Distinguished Visiting Scientist at ORNL.

He received his bachelor's degree in mathematics from the University of Newcastle in Australia and his Ph.D. in mathematics from the University of Melbourne (Australia). Following post-doctoral appointments in the Department of Physics at the University of Guelph in Ontario, Canada, and the Departments of Chemistry and Mechanical Engineering at the State University of New York in Stony Brook, he joined the Department of Chemical Engineering at the University of Virginia in 1983.

He has received numerous awards for his research. Among these were the 1996 University of Virginia President and Board of Visitors Prize for Research in the Life Sciences, the 1998 Alpha Chi Sigma Award from the American Institute of Chemical Engineering for distinguished research, and the 1999 Lockheed-Martin Research Achievement Award for Sustained Research Accomplishment.

Gore Envisions World-Class Imaging Center

Professor John Gore has a clear vision for the new Vanderbilt University Institute of Imaging Science that he will direct. His goal is to make the new institute one of the top imaging research centers in the world.

Internationally recognized for his magnetic resonance imaging research, Gore recently moved to Vanderbilt from Yale University with a team of more than a dozen scientists.

The Institute of Imaging Science is a university-wide initiative that will bring together engineers and scientists whose interests range from the underlying physics of imaging techniques to the application of imaging tools to study the brain's inner workings. Professor Gore's joint primary appointments in the Schools of Engineering and Medicine reflect the trans-institutional scope of the new institute.



Peter T. Cummings

"It makes sense to create imaging centers that both foster the basic underlying science of medical imaging and encourage other investigators to use imaging as a research tool to address a wide range of questions," Gore said. "If we can organize the various imaging efforts and maintain scientific productivity, we already could challenge the very best places in the world."

Gore's appointment also affords opportunities for new educational initiatives, said Thomas R. Harris, Orrin H. Ingram Distinguished Professor and Chair of Biomedical Engineering. Professor Gore's team "will join with existing faculty members working in imaging to form a major teaching program in imaging science and engineering," Professor Harris said.

A major thrust of the institute will be research using functional magnetic resonance imaging (fMRI), which allows investigators to probe the working human brain. Researchers can examine activity in the brain as subjects see images, for example, or hear sounds, or feel pain.

At Yale, Gore directed the Nuclear Magnetic Resonance Research Center, one of the leading centers in the world for MRI research. In addition to using functional MRI to study the brain, Gore and his colleagues also examine the

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John C. Gore, the new Chancellor's University Professor, has moved to Vanderbilt from Yale University with a team of more than a dozen scientists.

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School of Engineering
Vanderbilt University
2201 West End Avenue
Nashville, TN 37235

Engineering NEWS

FACULTY NOTES

Mark D. Abkowitz, Professor, CEE, gave a presentation on "Tools for Distribution Risk Management" in August to the Hazardous Materials Transportation Safety: An Inter-Industry Workshop, in New Orleans. He organized and hosted a summit on "Environmental Risk Communication: What Is It and How Can It Work?" at Vanderbilt in March. He also gave presentations on "Development of a GIS-Based Spill Management Information System" at the Federal Region 4 Response Team Meeting in Nashville in May; and "Transportation Risk Management: A New Paradigm," at the Transportation Security Workshop in Knoxville in July. (please see related article, this page).

Prodyot K. Basu, Professor, CEE, co-authored "Optimization of an Internal Actuating System for the Enhancement of Wing Flutter Speed," presented to the Structures, Structural Dynamics, and Materials Conference held in April in Denver, Colo., by Eriks Jakobsens, Ph.D. student, CEE. Also in April, he presented "Dynamic Stability of Frames Under Prestress," co-authored by Eriks Jakobsens, to the 2002 Structural Stability Annual Stability Conference sponsored by North American Steel Construction Conference, in Seattle, Wash. At the same conference, he presented "Nonlinear Thermal Response of Steel Frames," co-authored by K. Chen. In August, he presented the keynote speech, "Multiphysics/Multiscale Modeling in Engineering Design," to the Second International Conference in Structural Engineering and Engineering Mechanics, held in Busan, Korea. While in Korea, he spoke to seminars held at Yeungnam University in Daegu and Hanyang University in Seoul.

Robert E. Bodenheimer, Assistant Professor, EECS, and **Greg Walker, Assistant Professor, ME**, participated in the invitation-only "Scientists Helping America" conference in March in Washington, D.C. They were among approximately 200 selected to attend the conference, hosted by the Defense Advanced Research Projects Agency, the United States Special Operations Command and the Naval Research Laboratory. The conference was held to showcase and stimulate new ideas for breakthrough technologies to benefit national defense and the national economy.

A.B. Bonds, Professor, EECS, BME, participated in a special symposium on visual processing presented to the 35th annual meeting of the Society for Mathematical Psychology, held at Miami University, Oxford, Ohio, in July. The topic of the presentation was "Spike Train Analysis Reveals Cooperation Between Cortical Neuron Pairs That Enhances Discrimination."

James H. Clarke, Professor of the Practice, CEE, chairs a work group on Contamination Containment and Control to help develop a Department of Energy-sponsored Science and Technology Roadmap for Long Term Environmental Stewardship at former nuclear weapons production facilities. He is also contributing to a new, state-of-the-practice text on Containment Technology through his work on a panel that is focusing on Barrier Damage and System Performance Prediction.

From the Dean



DAVID CRENSHAW

This has to be one of the most exciting fall semesters ever at the School of Engineering.

Our new building complex, which includes Featheringill Hall, Jacobs Hall, and the yet-unnamed west wing of the complex, is finally complete. Students are filling the classrooms and laboratories. The Adams Atrium in Featheringill Hall, which you can see live on our website at www.vuse.vanderbilt.edu, is bustling with activity, the patio outside flanked by beautiful landscaping. Just as we hoped, the building has become the hub of the School of Engineering community.

Not so obvious to the casual observer, but equally important to the School, is the influx of terrific new faculty members. In this issue of *Engineering News*, you'll read about the appointments of Peter T. Cummings as the John R. Hall Professor of Chemical Engineering and John C. Gore as the Chancellor's University Professor of Biomedical Engineering, Radiology and Radiological Sciences, Physics, Molecular Physiology and Biophysics, and the Director of the Vanderbilt University Institute of Imaging Science.

Professor Gore brings with him Associate Professor of Biomedical Engineering Adam Anderson and Assistant Professor of Biomedical Engineering Mark Does, who were part of his team at Yale University. The addition of Professors Gore, Anderson and Does brings additional strength to our considerable medical imaging capabilities and will foster even greater trans-institutional research and cooperation.

Similarly, Professor Cummings brings incredible expertise to the Chemical Engineering Department and is certain to provide a galvanizing influence on our strong research program in chemical engineering and materials science. Professor Cummings is one of the top recognized experts in the world in molecular simulation and computational nanoscience and nanoengineering.

New facilities, new faculty, and new freshmen—and this year's freshman class will be making history by breaking in our new TransIT wireless/wired laptop program. During orientation, freshmen received their Dell laptop computers, each one specially configured with the software the freshmen need to participate in our integrated instructional environment. The TransIT program harnesses the power of online, coordinated lessons and exercises as well as proven instructional technology. Students are able to access the TransIT resources through wireless communications throughout the School facilities, in their dormitories, and in several other buildings across campus.

Engineers have a well-earned reputation for constantly striving to make things work better. That nicely sums up what we're doing here at the School of Engineering at Vanderbilt. We're taking a great School and re-engineering it in every way—facilities, faculty, instructional approach, and research productivity—to continue to make it even better.

The spirit of engineering is alive and thriving here at Vanderbilt University.

Abkowitz Appointed to Nuclear Waste Review Board

President George W. Bush has appointed Professor of Civil and Environmental Engineering Mark D. Abkowitz to a four-year term on the Nuclear Waste Technical Review Board (NWTB). He will advise the board on transportation issues.

The NWTB reviews the Department of Energy's activities related to the disposal of spent nuclear fuel and high-level radioactive waste.

Professor Abkowitz will be the only member of the 11-member board with expertise in transportation of nuclear waste, an area that will become increasing-



Mark D. Abkowitz

ly important as the shipment of spent nuclear fuel and high-level radioactive waste intensifies. He also brings expertise in risk management and information technology to the board.

"With the recent Senate vote on Yucca Mountain, there is much work to be done as the repository development process moves forward," Professor Abkowitz says. "Ensuring safe, secure and efficient transportation will be an important part of this process."

According to the NWTB Web site, members are "eminent in a field of science or engineering—including environmental and social sciences—and are selected solely on the basis of distinguished service." Recommendations are made to the President by the National Academy of Sciences.

A member of the engineering faculty for 15 years, Professor Abkowitz also directs the Vanderbilt Center for Environmental Management Studies.

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ANTS continued from page one

command have to be satisfied. And the weather changes."

Gábor Karsai, Associate Professor in Vanderbilt's Department of Electrical Engineering and Computer Science, led the software team responsible for modules covering supply and maintenance issues, aircraft preparation, and ground equipment. Other Vanderbilt researchers involved were project co-leader Professor Benoit Dawant; Technical Lead Christopher P. Buskirk; Gabor Szokoli, Research Instructor in Electrical Engineering and Computer Science; ISIS Staff Engineer Himanshu Neema; and graduate students Jonathan Sprinkle and Karlim Suwanmongkol (please see "Nobel Laureates" article, page 4).

A novel feature of the new system is that it simultaneously balances tricky maintenance requirements against operational demands. It considers resource constraints, such as how many mechanics are available, and risk factors, such as the additional stress of performing many complex procedures simultaneously.

"It takes an experienced operations scheduler as much as six hours per day—and lots of time for a maintenance controller as well—to create daily schedules that balance all [the] variables," says retired Marine Corps Col. Russ Currer, a Harrier pilot, Joint Strike Fighter Program expert, and former commander of MAG-13, who was a key consultant for the researchers. "This software lets them do the job in four minutes."

The new system doesn't schedule operations until alternatives have been reviewed and approved by a human manager. "The operations commander is able to easily investigate possible variations," explained ISI scientist and project co-leader Pedro Szekely. For example, a commander might want pilots to fly at least 15 hours a week. Other factors could make this difficult, while a 10 hour-a-week parameter might result in too much downtime.

The system can help the commander/schedulers perceive choke points, places where everything is held up by one factor, and find ways around the difficulty, said Szekely.

According to Neches, many non-military planning tasks requiring complex coordination of numerous variables could use similar software systems. Commercial air, trucking or package-delivery operations are obvious examples.



Gábor Karsai, Associate Professor of Electrical Engineering and Computer Science, led the software team responsible for modules covering supply and maintenance issues, aircraft preparation, and ground equipment.

—Eric Mankin (USC)

Vanderbilt Engineers Part of National Effort to Link Real, Digital Worlds

The Vanderbilt School of Engineering is one of three select institutions to receive National Science Foundation (NSF) funding to develop a faster, more reliable and more realistic approach to harnessing computers and mechanical systems.

Mechanical systems with computer components use "embedded computing," which means that computers control all or part of the mechanical system's functioning. Examples of this ubiquitous software range from digital alarm clocks to automobile cruise-control features.

The NSF is contributing \$13 million to a multi-institutional team, including Vanderbilt, UC Berkeley, and the University of Memphis, to develop the foundations of embedded software.

"Computing has a rapidly increasing role as a vital component of physical systems around us, such as cars, airplanes, and mobile phones," says Janos Sztipanovits, E. Bronson Ingram Distinguished Professor of Engineering, Professor of Electrical Engineering and Computer Science, and principal investigator of the Vanderbilt project. "In fact, these embedded computing systems represent over 98 percent of all computer applications."

The researchers say that current methods of software engineering are not adequately meeting the needs of today's embedded software systems, which already run aircrafts' flight control and navigational systems and will take on increasingly vital roles in automobiles.

"The so-called 'drive-by-wire' steering system that will replace the automobile's steering column with digital controls is one example of the type of embedded system we can expect in the near future," says Gábor Karsai, Associate Professor of Electrical Engineering and Computer Engineering. "We already have 'drive-by-wire' systems in experimental cars."

According to Professor Karsai, the problem with embedded systems is that the computerized equipment must be prepared to function adequately in real time, facing physical constraints, and meeting physical demands. "Physical processes are highly complex, and it is not obvious how they mesh with computational processes," he points out.

"Walking, for example, is a highly complex activity that requires many months of practice from a fast-learning infant with a lot of energy and time to devote to the effort. We humans tend to take these complexities in stride, but expressing them in a computer language that is understood by human programmers, and then to control machines with that software, requires a tremendously refined level of analysis and modeling."

In order to make computers practical partners in controlling physical reality, software has to be as reliable as human operators. When it's time to put on the brakes, for example, there is no time for a computer to reboot if it freezes.

Engineers are looking for ways to make embedded systems that not only can do the job, but also can do it reliably and cost-effectively.

The primary purpose of the project is to develop the science and an engineering approach that will achieve efficiency and reliability in coordinating different computerized controls and in making sure that they can smoothly operate physical systems.

A major component of the new engineering approach is

Vanderbilt-developed Model-Integrated Computing, pioneered by Professor Sztipanovits, director of the Institute for Software Integrated Systems (ISIS). Model-Integrated Computing is based on the systematic use of models in the analysis and design of software programs for a system and the automatic generation of computer code to implement operations and ensure reliability.

The project also includes a strong educational component that promises to reap long-term rewards in better-trained engineers and programmers. The NSF award will support the creation of a Summer Internship Program in Hybrid and Embedded Software Research (SIPHER), headed by Professor Sztipanovits.

"The research is expected to have a profound impact on how we train students in several engineering disciplines," says Sztipanovits. "We will experiment with new forms of student involvement in research and training via the SIPHER program, which will provide funding for students of underrepresented groups and their teachers to interact with researchers at Berkeley and Vanderbilt."



DENISE NIVINSKY/INTEGRATED SYSTEMS

Some of the top technology researchers in the country met at Vanderbilt in December 2001 to map out a strategy to strengthen U.S. leadership in information technology. Addressing the group was Janos Sztipanovits, E. Bronson Ingram Distinguished Professor of Engineering, who spearheaded the NSF-sponsored workshop. Participants included Doug Schmidt, left, Professor of Electrical Engineering and Computer Science at Vanderbilt, and other information technology experts from government and industry.

The award will also support significant revisions to the undergraduate curriculum at participating institutions by introducing crossover courses for majors in computer science and electrical engineering. The researchers expect to include new elective courses relating to embedded systems design over the next three to four years.

In the near term, the project will focus on the development of reusable, inter-operating open-source software that supports embedded systems. Future applications could include anti-terrorism technologies, aircraft and vehicle electronics, and autonomous robots. Other applications that stand to benefit involve the use of sensor networks to monitor a building's seismic health or a home's energy consumption.

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DENSO Helps Fund New Turbojet Engine Facility

A.V. Anilkumar, Research Associate Professor of Mechanical Engineering, second from left, explains features of the mini-turbojet engine to executives from DENSO. The engine is used to teach a variety of theoretical classes in jet propulsion. It is part of the new Vanderbilt Turbojet Engine Facility, which opened in February 2002 through the generosity of the DENSO North America Foundation. DENSO is a leading global supplier of advanced technology systems, and components.



ANVILKUMAR

Jimmy L. Davidson, Professor, EECS, delivered an invited paper, "Diamond Microelectromechanical Structures," to CIMTEC, the 10th International Ceramics Congress and 3rd Forum on New Materials, held in July in Florence, Italy. He also presented "Characterization of High Temperature Diamond MEMS" to HITEC, the International High Temperature Electronics Conference for electronic devices and integrated circuits designed to tolerate temperatures higher than the existing military requirement of 125 degrees C, held June 2-5, in Albuquerque, N.M.

Daniel M. Fleetwood, Associate Dean for Research, Professor, EECS, was elected Vice Chair of the executive committee of the Forum on Industrial and Applied Physics, the largest section of the American Physical Society. He was also reappointed to the IEEE Fellows Committee.

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Kenneth F. Galloway, dean
(615) 322-0720
kfg@vuse.vanderbilt.edu

Art Overholser, senior associate dean
(615) 343-3773
knowles.a.overholser@vanderbilt.edu

Daniel M. Fleetwood, associate dean
(615) 322-1507
dan.fleetwood@vanderbilt.edu

Katy Brandt, associate dean for administration
(615) 322-2763
kay.m.brandt@vanderbilt.edu

Vivian Cooper-Capps, information officer
(615) 343-6314
vivian.l.cooper-capps@vanderbilt.edu

David M. Bass, associate dean for development and alumni relations
(615) 343-8872
david.m.bass@vanderbilt.edu

Shawn Briggs, associate director of development and alumni relations
(615) 343-3015
shawn.briggs@vanderbilt.edu

Shane Youngblood, associate director of development and alumni relations
(615) 343-3136
shane.youngblood@vanderbilt.edu

Laurie Parker and Joanne Beckham, BA'62, Co-editors

Please send news items and changes of address to:
Joanne Beckham
(615) 322-0237
joanne.beckham@vanderbilt.edu
VU Station B 357703, 2301 Vanderbilt Place,
Nashville, TN 37235-7703
Fax: (615) 343-8547

Keith A. Wood, designer

Judy K. Orr, BA'82,
director of creative services

Joanne Beckham • Vivian Cooper-Capps • David Cranshaw, BA'87 • Julia Hegblom • Kenneth F. Galloway, BA'62 • Lew Harris, BA'68 • Peyton Hope • Eric Mankin (USC) • Laurie Parker • David Salisbury, contributors

Anthony J. Spence, E'75, executive director for alumni communications and publications
(615) 322-2601
tony.spence@vanderbilt.edu

Visit the School of Engineering on the Web:
www.vuse.vanderbilt.edu

Vanderbilt University Alumni Publications on the Web:
www.vanderbilt.edu/alumni/publications

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CAMPUS NEWS

Vanderbilt Hosts International Risk and Reliability Workshop

It might sound a little abstract—reliability. But it's no abstraction when astronauts' lives depend on the reliability of the complex set of equipment that takes them into and sustains them in space. Or, closer to home, when a driver slams on the brakes and prays that her minivan will withstand the upcoming crash with the SUV that just pulled out in front of her.

Cost and complexity are the two chief forces driving the

international risk and reliability engineering movement, a movement in which Vanderbilt is a leader through its Integrative Graduate Education, Research and Training (IGERT) initiative. IGERT is the first graduate training program in the world to study and develop multidisciplinary mathematical approaches to assessing and managing risk and reliability.

As part of its outreach efforts, the program hosted the "Reliability & Risk Computational Methods: Setting a National Research Agenda" workshop in May 2002. Dozens of risk and reliability specialists from universities, corporations, and government agencies attended, reviewing the state of the art in reliability methodology, discussing the problems associated with the methods, and outlining directions for the future.

The workshop proved to be a success not only in gathering leading reliability experts to discuss their field, but also in allying the Vanderbilt program more closely with the needs of business and industry in solving engineering reliability problems.

"Our relationship with business, industry and government is integral to the success of our program," says Sankaran Mahadevan, Professor of Civil and Environmental Engineering, and Director of Vanderbilt's year-old Multidisciplinary Training in Reliability and Risk Engineering and Management Program. VE



Learning at the Feet of Giants Vanderbilt Students Attend Meeting of Nobel Laureates

Jonathan Sprinkle spent a week last summer doing something most graduate students only dream about—attending the 52nd Nobel Laureates meeting in Lindau, Germany.

Sprinkle, a Ph.D. candidate in electrical engineering (EE) and an IBM Fellow, was one of the first two Vanderbilt graduate students ever invited to attend. Laura Swafford, a graduate student in chemistry, also attended the gathering, which was held the first week in July.

Sprinkle was one of 10 outstanding researchers nationwide and the first Vanderbilt engineering student to be chosen by the Oak Ridge Associated Universities (ORAU) to attend the illustrious gathering. There he rubbed shoulders with the likes of chemists Paul Boyer and Harold Kroto and physicist Rudolf Mössbauer.

While that was an exceptional experience, Sprinkle says he learned the most from his fellow student participants, particularly those from Germany and Austria.

"We talked about what it was like to be a student in a university in our respective countries," Sprinkle said. "There are a lot of similarities, but most European research isn't as application-oriented as that in the U.S. A lot of pure research projects in Europe could last as long as 10 years."

One of the things that impressed him most about the meeting, Sprinkle said, was the laureates' ideas about the future direction of science and the education of young researchers "who will change the world."

"Many of the [Nobel] prize winners said it was important to make young people work on hard problems. They also said, 'It is important to teach students the questions to ask, but not only that, what do you do with the answers?'"

Each year since 1951, Nobel Prize winners in chemistry, physics, physiology, and medicine have met in Lindau to have open and informal meetings with more than 400 students and young researchers from around the world. This year's meeting focused on chemistry, but students from a variety of fields were invited to attend. Sprinkle was one of only a few engineers invited to the meeting. Most of the sessions were in English with translations into German and other languages, because, Sprinkle said,



Sprinkle and Swafford

"English really is the international language of science."

Sprinkle was nominated by Gábor Karsai, Associate Professor of Electrical Engineering and Associate Professor of Computer Engineering, for his outstanding research in computer modeling. His research has applications outside the realm of computer science, in areas such as data management in the human genome sequencing project.

An Eagle Scout, Sprinkle left his East Tennessee home in Piney Flats in the fall of 1994 to attend Tennessee Tech University after winning a competitive academic scholarship. He graduated cum laude in 1999 with B.S. degrees in electrical engineering and computer engineering. While at Tennessee Tech, he served as student body president and was a member of the honor societies Tau Beta Pi, Omicron Delta Kappa, and Mortarboard.

Sprinkle enrolled in the fast-track M.S. degree program in EE at Vanderbilt that fall, earning his master's degree in 2000 with a 4.0 grade point average. He anticipates receiving his Ph.D. in EE in 2003 and hopes to teach engineering at the college level. To prepare for his teaching career, he is serving as a Master Teaching Fellow in the Vanderbilt Center for Teaching this year.

Engineering School Among US News Top 50

The School of Engineering ranked among the top 50 in the Spring 2002 *U.S. News & World Report's* listing of the nation's leading graduate schools of engineering, with a ranking of 46.

"Only seven engineering schools in the Southeast made the top 50," said Dean Kenneth F. Galloway. "We are very pleased to be one of them."

Each year the magazine ranks schools of business, education, engineering, law, and medicine. Other disciplines are ranked periodically.



Tomlinson Fort, Centennial Professor of Chemical Engineering and Professor of Interdisciplinary Materials Science, Emeritus, retired from Vanderbilt at the end of the 2001-2002 academic year. Professor Fort joined the Vanderbilt faculty in 1989 as Centennial Professor and chair of the Department of Chemical Engineering. In 1990, he received an additional appointment as Professor of Materials Science and Engineering. His term as department chair ended in 1996. Since then, he has concentrated on teaching and research.

Kenneth F. Galloway, Dean, Professor, EECS, was elected to his second three-year term on the Administrative Committee of the IEEE Electron Devices Society. He also serves as chairman of the Meetings Committee of the EDS, which is involved in issues related to the physics, theory, and phenomena of electron and ion devices. Dean Galloway was also appointed to a three-year term as a member of the ASEE Engineering Deans Council Public Policy Committee.

Dennis G. Hall, Associate Provost, Professor, EECS, has been elected to serve a three-year term on the Board of Directors of Oak Ridge Associated Universities (ORAU). ORAU manages the Oak Ridge Institute for Science and Education for the U.S. Department of Energy and administers the Graduate Research Fellowship Program for the National Science Foundation.

William H. Hofmeister, Research Associate Professor, Materials Science and Engineering, presented the keynote invited lecture, "Thermal Imaging of Solidification," to the "Imaging of Dynamic Processes" symposium at the Metallurgical Society annual meeting in Seattle, Wash., in February.

Kazuhiko Kawamura, Professor, EECS, and Director of the Center for Intelligent Systems, organized a Special Panel Session on Humanoid Robots in May during the International Conference on Robotics and Automation in Washington, D.C.

Eugene J. LeBoeuf, Assistant Professor, CEE, delivered the keynote address, "Thermodynamic Properties of Soil- and Sediment-Derived Natural Organic Materials," at the 20th Anniversary Conference of the International Humic Substances Society, in Boston, Mass., in July.

Sankaran Mahadevan, Professor, CEE, organized the first national conference held by Vanderbilt's new multi-disciplinary doctoral program in engineering risk and reliability assessment and management [please see related article on this page]. He also presented "Probabilistic Simulation of Engine Blade Creep-Fatigue Life," co-authored by H. Mao and D. Ghiocel, to the Structures, Structural Dynamics and Materials Conference held in April in Denver, Colo.

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physical and physiological factors that affect the magnetic resonance signal from tissues, seeking ways to improve the technology.

Gore's team has just been awarded a \$4 million Bioengineering Research Partnership grant from the National Institutes of Health.

Professor Gore received his Ph.D. in physics from the University of London, followed by postdoctoral research and a position at Hammersmith Hospital and Royal Postgraduate Medical School, London. He joined Yale University in 1982, where he also founded and chaired the Biomedical Engineering Program.

He is a Fellow of the American Institute of Medical and Biological Engineers, the International Society of Magnetic Resonance in Medicine, the Society for Magnetic Resonance Imaging, and the Institute of Physics (UK). He is editor-in-chief of the journal, *Magnetic Resonance Imaging*. VE

Dream (Works) Job

Computer Science Students Design Careers in Computer Animation

Christina de Juan sits in front of her computer screen, holding a stylus in her long, graceful fingers. She traces the outline of a two-dimensional (2-D) figure in six different poses on the screen, then saves wire-frame shapes of the figure as the individual key frames. Using mathematical algorithms and the software package Maya to interpolate between the key frames, she causes the figure to leap across the screen. Her goal is to develop software that will make it easier and more cost effective to use computers to produce visually compelling animated films.

"I'd like to make it possible to produce films with the stunning graphics of 'Dinosaur' but at a much lower cost," she says.

De Juan is one of three computer science doctoral students—all women—working on creating animation software under the tutelage of Assistant Professor Bobby Bodenheimer, who joined the Vanderbilt faculty in 2000. After earning his Ph.D. in electrical engineering at the California Institute of Technology, Professor Bodenheimer also worked with the Microsoft graphics research group and the Georgia Tech Animation Lab. Christina's fellow students include Jing Wang

sidary PDI—the popular "Shrek."

"At DreamWorks, I worked on developing a software program to assist in the animation of three-dimensional (3-D) characters for an upcoming feature film," de Juan says. The working title of that film, which is scheduled for release in a year or two, is "Sinbad: Legend of the Seven Seas."

Animation Fascination

As a high school student in Orlando, Fla., de Juan would fill the margins of her textbooks with cartoon characters that moved when she flipped the pages.

"I've always been fascinated by animation," she recalls, "especially traditional animated films produced by Warner Brothers and Disney." "Sleeping Beauty," she says, is one of her favorites.

In classic animated films, every frame was drawn by hand. That process is very expensive, so filmmakers have recently turned to computer animation to produce the time-consuming details in their films.

In 1982 "Tron," a MAGI production, was the first full-length movie to employ computer animation extensively. In 1986,

Pixar's "Luxor Jr." was the first computer-animated film to be nominated for an Academy Award. In 1988, another Pixar animation, "Tin Toy," was the first to win an Academy Award. The very popular "Toy Story," produced by Pixar/Disney in 1995, was the first full-length, fully computer-generated 3-D animation.

While computer animation is cost-effective, Professor Bodenheimer says, there are trade-offs. The quality of the animation can be poor, and problems arise when two-dimensional figures drawn by artists are merged with computer-generated three-dimensional elements such as backgrounds, minor characters, and other objects.

"There's a gap—a digital divide—between the world of computers and the world of traditional art and animators," he says. "Several artists have tried—some successfully—to bridge that gap, but both sides will have to work to eliminate it."

Mentoring Opens Doors

De Juan wasn't dreaming of a career in filmmaking when she elected to earn a B.A. in philosophy and a B.S. in computer science from the University of Central Florida in 1999. "I knew computers were going to pervade most aspects of our lives, and I wanted to feel comfortable with them," she recalls.

Then an opportunity arose to participate in a mentoring program for women majoring in computer science, sponsored by the Computing Research Association. The program paired de Juan with Professor Jessica Hodgins, who was working in computer animation at Georgia Tech. That experience inspired de Juan to pursue her master's degree in computer science at Georgia Tech and her Ph.D. at Vanderbilt.

De Juan's research is aimed at finding a seamless way to join two-dimensional and three-dimensional elements.

"Research really motivates me," she says. "I have several ideas on how to improve animation, how to blend 2-D and 3-D figures seamlessly. I also like the fact that I get to be creative and also use my technical skills."

De Juan's future could include research and teaching at the college level, but first she wants to try for a career in filmmaking. In the interim, she is working on designing a software program that will speed up the process of generating animated sequences and help the artists create both stunning graphics and cost-effective animated films. VE



Computer science student Christina DeJuan works to develop visually compelling animated films under Assistant Professor Bobby Bodenheimer's tutelage.

from Jilin, China, and Leah Elizabeth "Betsy" Williams from Inverness, Mississippi.

De Juan, who holds the Harold Stirling Vanderbilt Graduate Scholarship and the IBM Research Scholarship, is interested in character and data-driven animation. After completing her Ph.D., she hopes to pursue a career making animated films. Last summer, she made progress toward that goal by gaining an internship with DreamWorks SKG, producers of the animated films "Spirit: Stallion of the Cimarron" and—through their sub-

Exemplary Faculty, Staff Members Receive Awards

Dean Kenneth F. Galloway recognized several engineering faculty and staff members for exemplary research, teaching, and professional service during the 2002 academic year. He presented the awards during a ceremony held in May at the recently completed Featheringill Hall.

- John R. Veillette, Associate Dean for Preparatory Academics and Recruitment, Director of PAVE, and Associate Professor of the Practice of Civil Engineering, received the Edward J. White Engineering Faculty Award for Excellence in Service.
- The School of Engineering Award for Excellence in Teaching went to G. Kane Jennings, Assistant Professor of Chemical Engineering, for his contributions to undergraduate and graduate instruction.
- Lloyd W. Massengill, Professor of Electrical Engineering, received the School Award for Faculty Research. He was selected for the award by the Vanderbilt Engineering Research Council for "Heavy-Ion-Induced Breakdown in Ultra-Thin Gate Oxides and High-K Dielectrics," an article he co-wrote with colleagues at Vanderbilt, Sandia National Laboratories and North Carolina State University. The paper was published in the journal *IEEE Transactions on Nuclear Science* and won the Meritorious Paper Award for the 2001 Institute of Electrical and Electronics Engineers (IEEE) Nuclear and Space Radiation Effects Conference.
- Margarita Talavera, administrative assistant in the Department of Chemical Engineering, received the School Award for Professionalism in Staff Service for exceptional service to the faculty and staff.

Richard Alan Peters II, Associate Professor, EECS, served on the Special Panel Session on Humanoid Robots in May during the International Conference on Robotics and Automation in Washington, D.C. He worked this summer as a faculty fellow at NASA Johnson Space Center in Houston on the Robonaut project, which uses a short-term memory structure that he devised. In June, he gave a NASA seminar presentation, "Bootstrapping Intelligent Behavior: The Development of Natural Intelligence by an Electro-Mechanical Agent."

Robert W. Pitz, Professor and Chair, ME, gave invited lectures at the United Nations International Center for Science and High Technology (ICS) training course on "Laser Diagnostics of Combustion Processes" at the National Institute of Laser Enhanced Sciences (NILES), Cairo University, Giza, in June. His presentations were titled "The Raman Scattering Technique" and "Laser-Induced Fluorescence, Rayleigh Scattering, and Combination Techniques." The course is designed to promote science and high technology to students from underdeveloped nations.

Bridget R. Rogers, Assistant Professor, CHE, chaired the American Vacuum Society conference, "Surface Analysis '02," at the 24th Annual Symposium on Applied Surface Analysis. The conference, held in May at Vanderbilt, explored state-of-the-art techniques in the analysis of semiconductors, glasses, catalysts, metals, ceramics, polymers, thin films, and biological materials.

Nilanjan Sarkar, Assistant Professor, ME, EECS, is a guest editor of the IEEE/ASME Transactions on Mechatronics section on "Advances in Robot Dynamics and Control." He is also an associate editor for the IEEE Transactions on Robotics and Automation.

Ronald D. Schrimpf, Professor, EECS, presented "A Multidisciplinary Approach to Modeling & Testing Microelectronic Materials & Devices," co-authored by Daniel M. Fleetwood, Professor, EECS, and Sokrates T. Pantelides, Professor of Physics, to the National Space and Missile Materials Symposium in Colorado Springs in June.

Richard G. Shiavi, Professor, BME, made a presentation at the Annual Conference of the American Society for Engineering Education of a paper he co-authored with Arthur J. Brodersen, Professor and Chair, EECS; "Study of Suitability of Studio Model for Introductory Computing." The conference was held in June in Montreal. He also made a presentation of "Analysis of Vocal Tract Characteristics for Near-term Suicidal Risk Assessment," co-authored by Asli Ozdas; M.K. Silverman, Adjunct Assistant Professor, BME; S.E. Silverman, Adjunct Assistant Professor, BME; and D. Mitchell Wilkes, Associate Professor, EECS, to the Fourth International Workshop on Biosignal Interpretation in Como, Italy, in June.

Ahearn Delivers Parker Lecture



John F. Ahearn, left, Chair of the National Research Council Board on Radioactive Waste Management, spoke to the School of Engineering about the status, issues, and global impact of nuclear power during a presentation in April. His talk was sponsored by the Department of Civil and Environmental Engineering Frank L. Parker Distinguished Lecture Series. Professor Parker, right, met with the speaker after the lecture.

Karthik K. Srinivasan, Assistant Professor, CEE, and Malcolm E. Baird, Research Professor, CEE, gave presentations with Mark D. Abkowitz, Professor, CEE, to "Transportation Security in the 21st Century, A Web Symposium," sponsored by the Southeastern Transportation Center.

L. Roy Xu, Assistant Professor, CEE, presented "Impact Damage Visualization of Composite/Sandwich Structures Using High-Speed Optical Diagnostics" and "Influence of Interfacial Mechanical Properties on the Impact Behaviors of Multi-Layered Materials," both co-authored by A.R. Rosakis, to the 43rd 1AA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference in Denver, Colo., in April.

AWARDS

Kenneth F. Galloway, Dean, Professor, EECS, received the "Radiation Effects Award" at the IEEE Nuclear and Space Radiation Effects Conference in Phoenix in July, for "technical contributions and leadership that have enhanced the understanding of radiation effects in semiconductor devices, for meritorious service to the radiation-effects community, and for promotion of radiation effects education."

Thomas R. Harris, Professor, BME, BE, Medicine, received the Harvie Branscomb Distinguished Professor Award during the spring Faculty Assembly in April. This University-wide award is given annually to a faculty member who furthers Vanderbilt's aims through scholarship, teaching, and service to students, colleagues, the University, and society.

Sankaran Mahadevan, Professor, CEE, received the international 2002 Distinguished Probabilistic Methods Educator Award from the Society of Automotive Engineers, which is given to the person considered to have made outstanding contributions to the field of risk and probabilistic analysis methods. (please see "Risk and Reliability" story, page 4).

Lori Troxel, Assistant Professor, CEE, received the Vanderbilt Chi Epsilon civil engineering honor society award for excellence in teaching and service to students. She was the first to receive what is planned to be an annual award to honor the civil and environmental engineering faculty member who best exemplifies excellence in teaching and outstanding contributions to student service.

John R. Veillette, Associate Dean, Associate Professor, CEE, was named Vanderbilt's 2001-02 Student Organization Adviser of the Year. He was nominated by three student organizations.

A Different Kind of Star

When he was a mere rocket scientist, everyone called him Dan. Now he's Daniel. Daniel Graves with three syllables. The rocket scientist has turned actor, and "Daniel has a nicer ring," he says. The transition has taken him on a wild ride.

The 47-year-old Nashville native graduated from Vanderbilt University's School of Engineering in 1976 with a degree in electrical engineering, and took a job with then-President Ronald Reagan's Strategic Defense Initiative, better known as the "Star Wars" program. He was immediately dispatched to Europe for an eight-month project that took him to major cities in Britain, France, and Germany. But Graves soon realized he wanted to hear no more about "American cities targeted for the first wave of Russian missile strikes." He transferred to NASA, where he designed computer systems for the space shuttle program. Those who followed NASA launches might have seen him on television at Mission Control. Graves would have been the slender guy with reddish curls poking from under his headphones as he conversed across space with the astronauts. "It was way techno-cool," he comments. Yet there was something missing.

"I have always craved both right-brained and left-brained activities," he says. His work was primarily left-brained scientific and logical. Right-brained is more emotional and creative.

He brought balance back by seeking right-brained hobbies: rock climbing, whitewater kayaking, cave exploring, hang gliding, and skydiving. He's racked up 2,000-plus skydives with a passel of national championship titles to show for it.

"Life has been good," Graves says. "adventure around every corner." He credits that good life to the parents who nurtured and encouraged him, and to Vanderbilt University, where he acquired the tools and the drive to succeed.

"The Vanderbilt years were the toughest years of my life," he says. "All blood, sweat, and tears. No matter how hard I worked, I couldn't make straight As. It was humbling and painful," he says. "I had a hard time coming to terms with it." But Vanderbilt's engineering faculty convinced him that an occasional "B" or "C" would not deny him a happy, successful life. "I realized I didn't have to be the best, so long as I *did* my best."

At NASA, Graves enrolled in a Masters of Business Administration program, earning his MBA from the Florida Institute of Technology, Huntsville campus. A series of rapid promotions dressed him in three-piece suits, but also placed him in an untenable situation. "I had employees whining to me because somebody else had a bigger office or a better desk. It was a lot of aggravation." He transferred.

Then in 1990, out of the blue, a coworker suggested Graves audition for a little theater production of "Elephant Man." "Well, why not?" he thought. His reading won him a starring role as Dr. Franklin Treves, attending physician to the deformed "elephant man." In the Hollywood version, Oscar-winner Anthony Hopkins portrayed Treves. Graves was undaunted. "It felt so right. I gained confidence with every performance. And I loved it. I absolutely loved it." His audience did, too.

He found an agent, joined the Screen Actors Guild and was soon traipsing around the Southeast trying out for bit parts and TV commercials. Perhaps due to his unique, quizzical, whimsical quality and his dogged persistence. "Sometimes I got hired," he says. When offered a \$75-a-day, three-month job in Atlanta as an extra in a Civil War movie, he didn't flinch. "It wasn't even a speaking part," he says, "but I figured it was an opportunity to learn about movie-making." He took a leave of absence and took the job.

When his eight-year marriage fell apart, the tug of Hollywood proved too strong to resist. "I was 40 years old," he says. "I had sense enough to know I needed a good day job." He embarked on yet another career: programming medical records systems out of his new Studio City apartment.

His pursuit of acting has been moderately successful. He's appeared in two movies and numerous TV shows: "The Drew Carey Show," "Martial Law," "The Fighting Fitzgeralds," "The District," and "Judging Amy." Graves attended his 25th Vanderbilt reunion last year with his new wife, Ilene. That 25-year interval has provided perspective: "I finally understand what this university did for me, how it molded me, taught me more than a skill. It gave me a full, rounded education that could take me anywhere. And I'm having the time of my life."

—Julia Hegalson



Daniel and Ilene Graves

Cashin Named to Board of Trust

Sheryll D. Cashin, BE'84, a professor of law at Georgetown University, has been named to the Vanderbilt University Board of Trust. She joins fellow Vanderbilt engineering graduates serving as current trustees: Monroe Carell Jr., BE'59; Dennis Bottorff, BE'66; Bill Featheringill, BE'64; John R. Hall, BE'55; and Hall Hardaway, BE'57.

As a Vanderbilt undergraduate, Cashin was a Harold Stirling Vanderbilt Scholar. She continued her studies at Oxford University and Harvard Law School where she served as editor of the *Harvard Law Review*. After graduating from law school, she worked as a law clerk for the late Supreme Court Justice Thurgood Marshall.

Cashin was Director for Community Empowerment under then-Vice President Al Gore from 1995 to 1996. She also worked on the staff of the National Economic Council at the White House.

In addition to her teaching duties at Georgetown, Cashin writes about politics, government, and the urban poor. She is the author of numerous journal articles and a book, "Drifting Apart: How Wealth and Race Segregation are Reshaping the American Dream."

A member of the Vanderbilt Alumni Association, Cashin received the Walter R. Murray Jr. Distinguished Alumna Award from the Association of Vanderbilt Black Alumni in 2000.

VUSE alumni who have served on the University's Board of Trust in the past include Lawrence A. Wilson, BE'57, and John Willard Johnson, BE'68.



Sheryll D. Cashin



ALMOJEL RECEIVES FOUNDER'S MEDAL

The School of Engineering awarded 288 bachelor's degrees at Commencement ceremonies in May. In addition, 74 students received master's degrees and 34, Ph.D. degrees. Ibrahim Almojel of Riyadh, Saudi Arabia, left, shakes hands with Chancellor Gordon Gee upon receiving the Founder's Medal in the School of Engineering. Almojel earned a B.E. degree with a double major in electrical engineering and mathematics and a minor in computer science. He also received the 2002 Tomas M. Weser Award, which recognizes an outstanding international student who has contributed to Vanderbilt's intellectual and cultural communities. He is currently pursuing a doctorate in electrical engineering at Stanford University.

Renaissance Man

Student Finds Fulfillment Solving International Technology Problems

Like many other people his age, Vanderbilt engineering major Madani Adjali knows more about computers than most of his parents' friends. And—just like many of his peers—Adjali is happy to pitch in whenever they have a need. But his parents' friends are not like most, and Adjali is not like most technologically savvy youth. Most of his parents' friends work at the United Nations headquarters in New York City. And Adjali brought with him to Vanderbilt a world of experience that would have been difficult to match in any other setting.

The son of an Algerian father and a Norwegian mother, Adjali was born in New York and grew up in the international world of the United Nations, a self-styled "UN brat." Although neither of his parents works directly for the UN, Adjali's father serves as a foreign affairs consultant to diplomats, primarily from African nations and the Organization of African Unity. His mother works for the United Methodist Church, serving as a liaison between a number of religious organizations and the UN.

Since high school, Adjali has worked as a computer consultant for many of his father's international contacts. Last summer, he parlayed that early experience into a job as a junior technical associate in the information systems and technology office of the UN Development Program (UNDP). One of the UN's oldest and largest agencies, the UNDP works to carry out UN mandates, such as cutting world poverty in half by 2015.

A junior with a major in engineering science and a minor in management technology, Adjali welcomed the opportunity to use both his administrative and technical knowledge and skills. "It also made me feel like I was doing something worthwhile, that it's not just about money." Frequent interactions with private companies like Cisco Systems, Microsoft, and Dell,

Adjali says, created "a happy medium between working in the public and private sectors."

Growing up, Adjali shared his father's interest in computers and found himself in a position to help his high school—the United Nations International School—integrate technology into its classrooms. Then the calls started to trickle in. "An ambassador or a member of a mission would mention a computer problem in casual conversation, and my dad would say, 'Oh, my son could probably help you with that.'" Adjali recalls. At first it was small repairs. And then...

The permanent mission of Algeria to

proved a great learning experience over the course of the next four years. It also led to other jobs.

Word of Adjali's talents spread, and he split afternoons and weekends between homework and projects from the mission of the Cote d'Ivoire (Ivory Coast) and others. Even after he had left for college, they still called. The mission of Togo contacted him during his first winter break from Vanderbilt to see if he could set up a full network and Internet access in three days. He did. He just didn't sleep much.

"What I really enjoy is interacting with the people," Adjali says, smiling, dismissing any notion of traditional computer-geekiness. "I also do a little bit of teaching at the same time."

Those values—plus his love of new challenges—played large roles in his choice of Vanderbilt.

"The professors are always throwing in new things, and I like that," he notes. "Also, I love the fact that you can earn a great engineering degree within a liberal arts setting."

Adjali has channeled his love of teaching into being a "V-squared" mentor, showing freshmen the ropes. He has also worked in the school's media center, drawing from his consulting experiences. And he's managed to sneak in a little film editing at Vanderbilt, too.

As a freshman, he received the John T.

and Lizzie Allen Gill Award. And last spring, his fellow students unanimously elected Adjali president of the student-run Engineering Council.

With such varied interests and experiences, it's hard to predict just where the next few years will find Adjali. As for a future career, he's keeping an open mind.

"I'm still very open to where I might end up down the line," he notes, "but for the moment, the UN job has supported my ethics and my morals and the way I think things should be in the world. It's also been a lot of fun."



Madani Adjali, left, admires the humorous tee-shirt held by Ed Clark, BE'76, president and CEO of FedEx Trade Networks, an independent subsidiary of FedEx. Clark delivered the keynote address for Engineering Week in February 2002. Adjali, a junior who heads the Engineering Council, coordinated the week's events.

the UN had purchased a building about five years earlier and had stopped halfway into their project of setting up a large computer network. Wires dangled haphazardly, leading nowhere, and obsolete terminals sat in unopened boxes throughout the building. Adjali got the call. He assessed the situation and dug in, overseeing the complete implementation of a modern and—critically—secure data network. Along the way, he navigated hurdles presented by the need to coordinate software written in English for users speaking Arabic or French. It wasn't easy, but it

NEW FACULTY

Julie A. Adams, Research Assistant Professor, EECS, will conduct research on mobile robots with the Center for Intelligent Systems. She was assistant professor at the Rochester Institute of Technology prior to joining Vanderbilt and received her doctoral and master's degrees in computer and information science from the University of Pennsylvania. She earned bachelor's degrees in accounting and computer science from Siena College in New York.

Adam W. Anderson, Associate Professor, BME, was associate professor of diagnostic radiology and applied physics at Yale University prior to joining Vanderbilt. Widely recognized in the magnetic resonance imaging community for his contributions to MRI theory and practice, he obtained his doctoral and master's degrees in physics from Yale University and his bachelor's degree in philosophy and physics from Williams College.

Mark D. Does, Assistant Professor, BME, comes to Vanderbilt from Yale University, where he was assistant professor of diagnostic radiology with the School of Medicine. He served as a post-doctoral associate at Yale after receiving his doctorate in biomedical engineering from the University of Alberta, where he also obtained his master's and bachelor's degrees in electrical engineering.

Xenofon Koutsoukos, Assistant Professor, EECS, works in the area of design of diagnostic programs for electromechanical systems. After receiving his Ph.D. from the University of Notre Dame, he was a member of the research staff at the Xerox Palo Alto Research Center. He will conduct research with the Vanderbilt Institute for Software Integrated Systems. He earned a master's degree in both applied mathematics and electrical engineering and his bachelor's degree from the National Technical University of Athens in Greece.

Eduardo A. Lima, Research Associate Professor, BME, will work with the Vanderbilt Institute for Integrative Biosystems Research and Education. A post-doctoral fellow at Instituto de Matematica Pura e Aplicada in Brazil prior to joining Vanderbilt, he earned his doctoral, master's, and baccalaureate degrees in electrical engineering from the Pontificia Universidade Catolica do Rio de Janeiro.

Sandeep Neema, Research Assistant Professor, EECS, will continue to conduct research within the Institute for Software Integrated Systems, where he served as Research Scientist. He received his doctorate in electrical engineering from Vanderbilt, his master's degree in electrical engineering from Utah State University, and his bachelor's degree from the Indian Institute of Technology.

Sandor Palfy, Research Instructor, EECS, will conduct research with the Institute for Software Integrated Systems. Formerly with Compaq Computer Hungary Ltd., he earned his master's degree in electrical engineering from the Budapest University of Technology and Economics.