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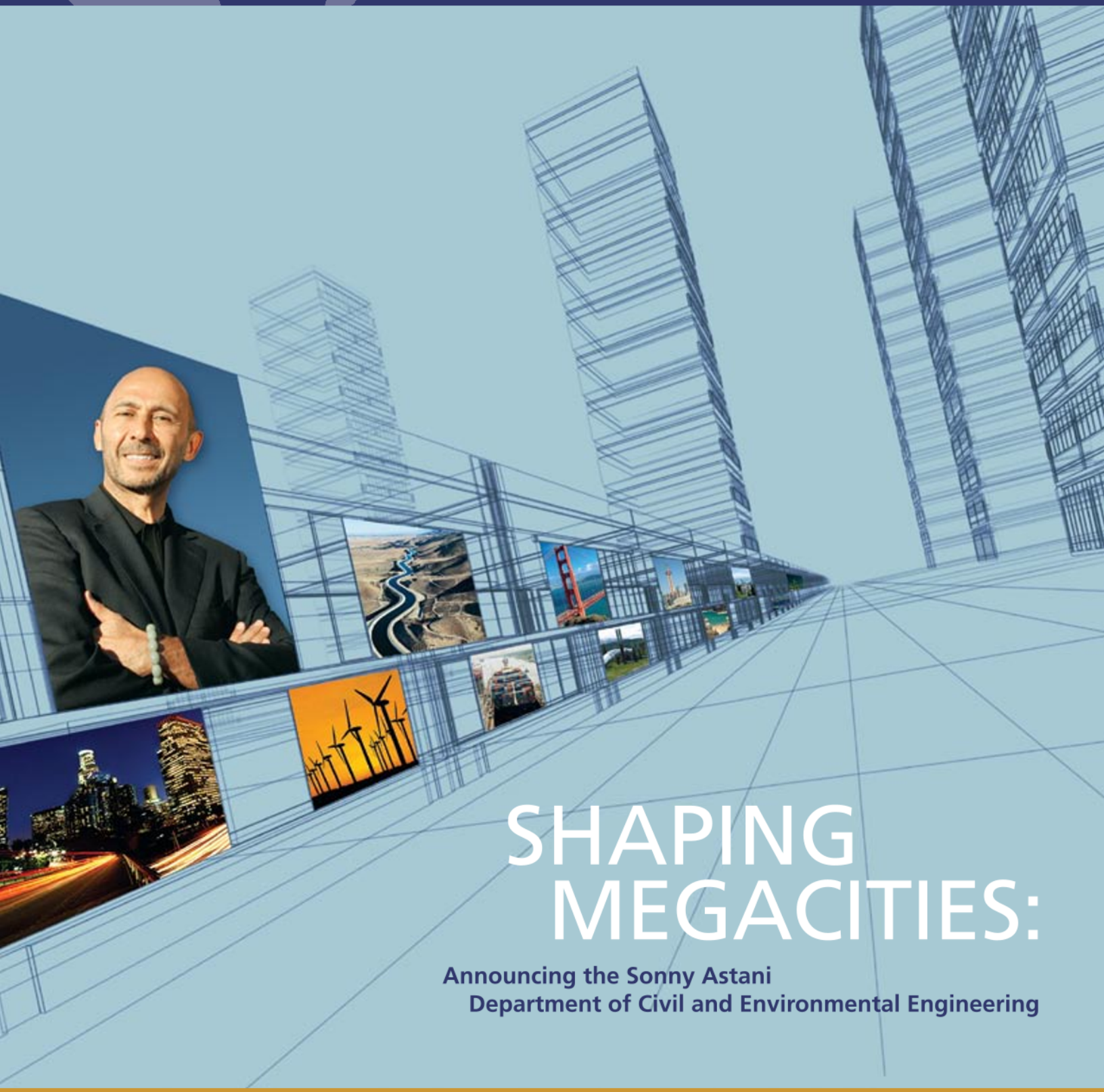

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What's In A Naming?

Two years ago this fall, we celebrated 100 years of USC engineering.

The anniversary was marked by a special gift from the Mork Family to name the Department of Chemical Engineering and Materials Science.

Last year, in a landmark gift, alumnus Ming Hsieh named the Department of Electrical Engineering with the largest gift ever to name an engineering department in the nation.

And this fall, Sonny Astani, another very special alumnus, made a strong statement of faith to another Viterbi engineering discipline, civil and environmental engineering; a statement that will position the newly endowed department as a leader in responding to new urban challenges, particularly in the emerging area of megacities.

Civil engineering is engineering's quintessential discipline. Throughout human history, civil engineers built structures that defied gravity, pleased the eye and the soul, and withstood the forces of nature. They devised materials that made the dreams of artists and architects come true. They constructed bridges and transportation networks to enable commerce and better human communication. And they created communities and cities. All the while, civil engineers strived to make daily life better—to improve livability.

> "**USC civil engineers** helped build Southern California—and the foundation of the Viterbi School of Engineering."

USC civil engineers helped build Southern California—and the foundation of the Viterbi School of Engineering.

With the rapid growth of human population has come a multitude of challenges for resources and the environment. Today, human activity affects the world in ways never before experienced: the air we breathe, the water we drink, the energy we consume, the waste we generate, and the atmosphere that surrounds us, whether in the microclimate of cities or the global climate itself.

Formidable challenges in environmental quality, environmental health and, increasingly, in sustainability, are now addressed head-on by civil and environmental engineers.

This year, for the first time in human history, the earth's population became more urban than rural. By 2030, 5 billion people, or 60 percent of humans, will call the city home. We live in the era of the megacity—metropolises of more than 10 million people. In 1950, only Tokyo and New York met that threshold. Today there are 20 such megacities, including Shanghai, Mexico City, Sao Paolo, Taipei, London, Mumbai, Jakarta, Istanbul—and Los Angeles.

But megacities present major challenges: complex infrastructure, congested transportation, environmental quality, and energy and water resources that the city must import, and which make it particularly vulnerable to adverse events, be they natural or human-driven catastrophes.

USC civil and environmental engineering aspires to be a leader in addressing these challenges. Our location at the heart of Los Angeles gives us the motivation, the credibility and the geographic relevance to become the flagship in this mission, not only in this country, but also in the world.

We are extremely fortunate that this aspiration has become possible with the help of visionary alumnus Sonny Astani.

Astani's thirst for discovery led him to a distant land—distant in geography and culture—from where he was born and raised, but close to his inner self. In a story that has been repeated before, here and across this country, Astani engineered innovations that transformed his chosen field.

And in a story that is repeated for the second year in a row in the Viterbi School, a former international student gives back to his alma mater, for the benefit of generations of students to come and for the world at large.

What's in a naming? Nothing less than the American ideal in generosity and in responding to the challenge.

Yannis C. Yortsos
Dean, USC Viterbi School of Engineering

Viterbi's Marathon Man

AFTER 60-PLUS YEARS AT USC, NEWLY RETIRED GEORGE CHILINGAR ISN'T SLOWING DOWN

Phil Channing

Midday on a lazy, warm fall day and the newly retired Professor George Chilingar is hard at work in his Windsor Square home. Spread across his dining room table are stacks of papers, text books, academic journals and sheets of carefully handwritten text.

"I'm in the process of writing three books and about 10 articles," says Chilingar. "I've written …" he pauses to think, "I've written 65 books. I love teaching and I want to share my knowledge."

His home is stuffed floor to ceiling with memorabilia from a USC career in engineering and science that stretches back 60 years. At USC, Chilingar has received the Teaching Excellence Award (1969), the Distinguished Service Award from Archimedes Circle (1974), the Distinguished Faculty Award (1976) and in 2007, the Academic Senate honored him with a Distinguished Faculty Service Award. In carefully arranged clutter, hanging from walls and occupying most available horizontal surfaces, are an astonishing number of "Gold Medals" and other honors from academic societies around the world, as well as commendations, proclamations and effusive expressions of gratitude from governments, companies and public figures. And he is very proud of them all.

The medals include the Lomonsov Gold Medal of Honor from the Russian Academy of Sciences, the White Elephant Medal from the King of Thailand, the Knight of Arts and Sciences Medal of Honor from Russia, the Highest Medal of Francisco Morazan from Honduras and the Rubén Darío Medal from Nicaragua. In 1993, he became the first American petroleum geologist to be elected to the 275-year-old Russian Academy of Sciences and he is currently the president of the Russian Academy of Natural Sciences, U.S. branch.

For 20 years, Chilingar has been the honorary consul of Honduras. Governments and parties have changed, but he remains the honorary consul. Not only that, but in 2004, he established an endowed fellowship for Honduran students studying environmental engineering.

There is a Chilingarian Oilfield in Iran, discovered when the Shah ruled that nation, and Chilingar—then Tchillingarian—was a consultant, but the oilfield continues to be called by its original name.

Chilingar was born in Tbilisi, Georgia, then part of the Soviet Union. His father was Armenian and his mother Russian. His childhood was spent trapped in Russia under the harsh, pre-World War II Stalin regime that did not allow emigration. When he finally got to Iran, he graduated first in his class, receiving special permission to take the final exam out of order because he was too young. Shortly thereafter, in 1944, he came to the United States aboard a Liberty Ship.

"We were chased by Japanese submarines," he says. "They attacked us twice. I think I was about 12 years old."

USC President Rufus von KleinSmid had to grant special permission for Chilingar to enroll as an undergraduate in petroleum engineering in 1945. "I was allowed to try one semester and earned all A's, except for a B in English," he says, laughing.

In 1949, he graduated magna cum laude with a B.S. in petroleum engineering, and a year later, received an M.S. He began working on his Ph.D., this time in geology, because "they told me the world was running out of oil."

But Chilingar wanted to learn to fly, so he joined the USC Air Force ROTC program. After successfully completing flight training he was transferred to Wright Patterson Air Force Base and put to work in the Petroleum and Chemicals Laboratories. "Because of my degrees, they thought I knew everything about petroleum products, which I didn't."

> "I love teaching and I want to share my knowledge."

He would eventually become chief of the laboratories. At that time, there had been a series of crashes involving F-100s. He determined that the jet fuel was forming soapy compounds that clogged the fuel filters. "We designed tests to prevent this," he said, holding up a commemorative model of the airplane that he received in gratitude from the Air Force Association.

It was in the Air Force that Chilingar first changed his name, after formally asking his father for permission. He said sergeants had a hard time pronouncing the "T" during basic training and he thought that caused them to always call on him first. So over the years, his name at birth, Tchillingarian, changed to Chilingarian, and eventually became Chilingar.

"Changing my name, however, did not help. I was always asked to do things first," he says about the Air Force. "I guess they just liked me."

After six years in the Air Force, Chilingar returned to USC in 1956 to complete his Ph.D. He was asked to stay on as an assistant professor of petroleum engineering and briefly became chair of the department in 1964-65. "But I decided that if I continued as chair, I wouldn't have the chance to write books."

A lifelong champion of Russian scientific literature, which he continues to believe is undervalued by American scientists and engineers, he donated 100 rare Russian books on petroleum engineering and geology to USC, and was written up for the contribution in *Pravda*. But during the Cold War, this was not a popular stance to take. "I was accused of being a Communist, when in fact, I'm a rotten capitalist!"

Much beloved by his students, Chilingar is proud of them and often sees potential in students that others miss. When a young undergraduate petroleum engineering major, John Mork (BSPE '70), was struggling, Chilingar took the latest book he had written and wrote "to my best student" on the inside front page. Mork became one of Chilingar's best students before graduating, and after graduating, went on to become CEO of Energy Corporation of America. In 2005, he named the Viterbi School's Mork Family Department of Chemical Engineering and Materials Science, which today is home to the Petroleum Engineering Program.

Mahmoud Al-Adasani (BSPE '58) has a similar story. Coming to USC from Kuwait to study petroleum engineering, he faced initial difficulties. At the end, however, "he did very well, graduated and became minister of petroleum of Kuwait," says Chilingar.

"Ahmad Al-Zamel (BSPE '62, MSPE '64), another of my students, became minister of petroleum of Saudi Arabia. And another student, Chengyu Fu (MSPE '86), really excelled when he was here, later becoming CEO of the China National Offshore Oil Corporation."

He also has warm feelings for colleagues, past and present.

"I knew Dean Robert Vivian and worked in his office when I was a student. There is a plaque on Vivian Hall with my name on it as one of the donors to the Vivian Chair. Dean (Alfred) Ingersoll was very effective and had good rapport with the faculty. He got Olin Hall for us, and I made a speech at his farewell," says Chilingar. "Zohrab Kaprielian did a lot for USC, and Len Silverman was very effective."

But he saves his highest praise for the final two deans.

"Max Nikias is Superman. He is the best thing that happened to USC since I've been here," he says. "And I've known Yannis Yortsos for many years. He is an outstanding dean, and I predict a great future for him." //

Provost, Viterbi Dean Elected to NAE

THREE OTHER DISTINGUISHED ENGINEERS IN THE VITERBI FAMILY ALSO RECEIVE ENGINEERING'S HIGHEST HONOR

USC Provost and Senior Vice President for Academic Affairs C. L. Max Nikias, and Viterbi School Dean of Engineering Yannis C. Yortsos, have both been elected to the National Academy of Engineering (NAE), the highest professional distinction that can be accorded to an engineer.

C.L. Max Nikias

Yannis C. Yortsos

Alexis Livanos

Wanda M. Austin

John C. Martin

"This is a great day for USC, for USC engineering and for two of USC's finest leaders, Provost Max Nikias and Dean Yannis Yortsos," said USC President Steven B. Sample. "National Academy memberships not only testify to the superb achievements of individual scholars, they also serve as indicators of excellence for an entire university. Their election to membership in the NAE is a credit to them both, but it is an honor to the entire USC community as well."

Nikias, an electrical engineer, was cited "for contributions to the development and diverse applications of adaptive signal processing, and for leadership in engineering education."

The citation for Yortsos, a chemical engineer, the Chester F. Dolley Professor of Petroleum Engineering and also the holder of the Zohrab Kaprielian Dean's Chair, reads: "For fundamental advances in fluid flow, transport, and reactions in porous media applied to the recovery of subsurface resources."

"It makes the entire USC community deeply proud to see Dean Yortsos elected to the NAE," said Nikias. "Dr. Yortsos has been a world-class researcher in chemical and petroleum engineering. And having worked alongside him for many years, I have seen first-hand his ability to lead those around him to new levels of excellence."

Also among the 65 new members elected to the NAE are Alexis Livanos, president of Northrop Grumman Space Technology, who is a member of the Viterbi School's Board of Councilors; Wanda M. Austin, president and CEO of the Aerospace Corporation, who received her Ph.D. in industrial and systems engineering from USC in 1988, and who is slated to deliver the Eberhardt Rechtin Lecture at the Viterbi School on September 25; and John C. Martin, president and CEO of Gilead Sciences Inc., who is the father of one of Yortsos' students.

Nikias became USC provost and senior vice president for academic affairs on June 1, 2005. He is USC's chief academic officer and the second-ranking officer under the president.

He has been on the USC Viterbi faculty since 1991, serving as dean of the USC Viterbi School of Engineering from 2001 to 2005. Before that, he was the founding director of the Integrated Media Systems Center and has been internationally recognized for pioneering research in digital communications and signal processing, digital media systems and biomedicine.

Nikias received a diploma from the National Technical University of Athens and earned an M.S. and Ph.D. from the State University of New York.

Yortsos succeeded Nikias as the dean of the Viterbi School. During their tenures as deans, the Viterbi School's graduate engineering program has been consistently ranked in the top ten in *U.S. News & World Report*.

Yortsos had served as senior associate dean for academic affairs and was chair of the USC Department of Chemical Engineering (now part of the Mork Family Department of Chemical Engineering and Materials Science) from 1991 to 1997.

Yortsos conducted an impressive overhaul of the undergraduate curriculum, and the school has enjoyed significant gains in student strength and in the quality of academic programs for undergraduates. He also presided over the merging of chemical engineering, which includes petroleum engineering, and materials science and has established the Klein Institute for Undergraduate Engineering Life (KIUEL).

Yortsos is well known for significant research in fields that include fluid flow, transport, and reaction in porous media, viscous flows in porous media geometries, phase change in porous media and applications to the recovery of subsurface fluids (oil recovery and soil remediation). He was actively involved in peer review of the Yucca Mountain Project for the disposal of high-level radioactive waste in Nye County, Nevada.

He earned a diploma in chemical engineering from the National Technical University in Athens, Greece, and his M.S. and Ph.D. degrees in chemical engineering from Caltech. //

Science Classes Take Flight

WHEN VITERBI UNDERGRADUATES AND KIDS COME TOGETHER, SPARKS FLY

After one of Tara Chklovski's "build-and-fly" workshops, a 12-year-old middle school student can explain what makes an airplane fly. And that's exactly what Chklovski wants every 12-year-old to know.

She and two of her Viterbi School student instructors—Emily Hedges and Kimberly Popp—are accomplishing that one workshop at a time.

Last semester, the threesome and other Viterbi School aerospace engineering majors conducted a series of science and engineering workshops for children at the 32nd Street/USC Magnet Center, the James A. Foshay Learning Center and St. Agnes Parish School. For the first time, these students gained an understanding of some pretty complicated—and intimidating—scientific principles. Concepts such as lift, buoyancy, stability and control, Newton's laws of motion, free-body diagrams and renewable energy, to name just a few.

They learned by experimenting, not reading.

"Experimentation is the key to the imagination," says Chklovski, a Viterbi School aerospace graduate student, who took a break from her Ph.D. studies to found Iridescent Learning, a nonprofit educational organization offering hands-on science and engineering workshops to local urban schools. Each workshop provides five hands-on lessons in a range of fields, such as aeronautics, optics, renewable energy, sailing and marine sciences. All of the lessons are aligned with California State Science Standards and draw on the expertise of science and engineering students from USC, UCLA, Caltech and Stanford University.

"The students were really excited about us being in their classroom and very engaged," said Hedges, a Viterbi School senior aerospace engineering major, who was in charge of planning the lessons last semester at 32nd Street School. "I love watching students learn and figure out new things. I definitely think they were benefiting."

Her co-instructor, Popp, a Viterbi School mechanical engineering major minoring in kinesiology, has already had a lot of experience with kids, coaching sports and helping her parents teach, but she says the kids "really became excited about learning" when she introduced a science experiment.

Daniel Calvo and Matthew Miller—fellow Viterbi School aerospace seniors—taught aeronautics to sixth graders at St. Agnes Parish School, while Adriel Carreno and Jennarae Lee taught students at Foshay Learning Center about renewable energy. All of the Viterbi aerospace seniors were enrolled in a directed research class (AME 490), led by Chklovski, and earned credit toward their degrees for conducting the workshops.

Chklovski offered her first workshop in July 2006, at Eagle Rock Elementary School, after deciding that she could make a difference in the lives of young students by sparking their interest in learning about the physical universe. Growing up in India, she developed an early interest in education from her parents, who still run two kindergarten-through-eighth-grade schools in north India.

"I love to find things out, and I thought I could motivate other people, especially children, to develop a love for science and engineering by showing them how much fun it is to experiment," says Chklovski, who earned an undergraduate physics degree at St. Stephen's College in Delhi, then a master's degree in aerospace engineering in 2004 from Boston University. "So I just merged those two interests—my physics work and my interest in teaching—and went out into the community with hands-on science programs. And Iridescent was born." //

Biomedical Engineering Society Honors Alfred E. Mann

Biomedical Engineering Society President **Shu Chien**, right, honored USC Trustee **Alfred E. Mann** with the Distinguished Lecturer Award at the fall BME Conference, held in 2007 in Los Angeles. Mann, who is also a member of the Viterbi School Board of Councilors, delivered the plenary lecture, titled "Creating a Successful Medical Device Enterprise." The USC Viterbi School was a sponsor of the Biomedical Engineering Society meeting, with several faculty playing key roles. They included Professor **Kirk Shung**, conference chair; **Michael Khoo**, professor and chair of BME, who was a technical program chair; Professor **David D'Argenio**, industrial liaison chair; and **Jesse Yen**, an assistant professor and student activities coordinator. //

Trans-Pacific Partnership

FIRST GROUP OF SUMMER INTERNS FROM TSINGHUA UNIVERSITY HOPES TO RETURN AS GRADUATE STUDENTS

Eight undergraduate students from Tsinghua University, China's top engineering school, completed a six-week research internship last summer with faculty and graduate students at the USC Viterbi School, the first since a new partnership between the schools was established.

"These eight individuals are the first to walk across the bridge of partnership between the two schools," says Viterbi School Dean Yannis C. Yortsos. "We hope to see this program grow and develop ever stronger ties between two excellent engineering schools."

The strategic partnership was initiated in May 2007 by Yortsos and Dean Jiangu Sun, of Tsinghua's School of Information Systems and Technology. The agreement called for student and faculty exchanges, as well as collaboration in research and education topics of mutual interest.

Funding for the Tsinghua-Viterbi partnership was provided by Feng Deng (MSCE'93), who received an undergraduate engineering degree from Tsinghua and a graduate degree from USC, and had a sparkling career in Silicon Valley. After working for Intel and Juniper Networks, he founded Netscreen Technologies. Deng then returned to China to co-found Northern Light Venture Capital with three Chinese partners. The company invests in and develops emerging Chinese technology-based companies. Deng's vision is to send China's best undergraduate engineers to USC to expose them to the Viterbi School's world-class research.

Viterbi School Senior Associate Dean for Strategic Initiatives Cauligi Raghavendra and Margie Berti, associate dean for doctoral programs, coordinated the program. At a celebratory luncheon held at the end of the summer, the students provided feedback on both their research efforts and their experiences, offering universal praise for the opportunity to fully integrate with the school's research laboratory teams, including participating in actual research projects. Many expressed hope that they could return to USC as graduate students.

Xiaoguang Wang and Sheng Wang joined Professor C. C. Jay Kuo's Media Communications Lab, analyzing and improving the Wiimote controller for Nintendo's Wii game console.

"We studied the Wii video-game machine," says Xiaoguang. "It is easier to control than the X-Box. We learned a lot about various ways to achieve human-machine interfaces, including the use of movement and acceleration sensors and infra-red sensors."

"I spent a lot of time reading about Wii and then thinking about how it works," Sheng adds. "I learned a lot about how Wiimote control data can be used." He says that he appreciated the help of Naco Chiang, the senior doctoral student in Kuo's lab, and that he enjoyed using the USC gym at the Lyon Center.

Yuankai Ge and Dong Li worked with Bhaskar Krishnamachari, assistant professor of electrical engineering and holder of the Cayley MacDonald Early Career Chair, on signal transmissions for embedded sensor systems.

"Yuankai and Dong were amazing in how quickly they learned to do something entirely new. Working hard, they were able to accomplish in a little over four weeks what may take other students as much as a semester," says Krishnamachari. "They leave my group with useful software and documentation that will help us greatly in our future research."

Raghavendra said that this first summer of Tsinghua research internships at USC was intended to be a starting point for an ongoing program.

"We hope these interns will go back to Tsinghua and tell others about their experiences. We look forward to receiving additional Tsinghua students and faculty," he says. "And sending USC students there." //

Pegasus Soars on NSF Wings

VITERBI TEAM TO IMPROVE AUTOMATED WORKFLOW SYSTEM

Ewa Deelman's Information Sciences Institute (ISI) team will use its share of a three-year, $1.7 million National Science Foundation (NSF) grant to improve the usability and breadth of support of its automated task organization and execution system. The grant was issued by NSF's Office of Cyberinfrastructure.

"We're now in a position to work with more communities and more users, including those using Open Science Grid and TeraGrid, to bring Pegasus technologies to their computing work," says Deelman.

Pegasus allows researchers to translate complex computational tasks into workflows that link and manage ensembles of dependent tasks and related data files.

"Pegasus automatically chains dependent tasks together, so that a single scientist can complete complex computations that once required many people," explains Deelman. "It compiles not only software and data, but also the expertise of the people who developed the software." //

Meet Mr. and Ms. USC

ORDER OF THE TORCH CHOOSES TWO STUDENTS FROM THE VITERBI SCHOOL TO REPRESENT GRADUATING SENIORS

Reed Doucette

Althea Lyman

USC's Viterbi School of Engineering will leave its mark on campus history in a new way this year. For the first time, two accomplished engineering seniors have won the titles of "Mr. and Ms. USC" from the USC undergraduate student body's exclusive Order of the Torch.

Reed Doucette, who majors in mechanical engineering, and Althea Lyman, who majors in biomedical engineering, were selected from 12 members of the Order at the campus's lively CONQUEST pep rally, held two days before USC's football victory over cross-town rival UCLA.

"I was really excited to be selected," says Doucette, who is also a new 2008 Rhodes Scholar. "I think it will be a lot of fun to work with other students around campus and to participate in some activities that I probably wouldn't have an opportunity to participate in otherwise."

"I think it's great," adds Lyman, who is an ARCS Scholar, a supplemental student instructor for general chemistry and a very energetic Viterbi student ambassador.

Lyman, who wants to practice medicine someday, is active in a number of other campus activities, such as *Discover USC*, *Explore USC* and the Merit Research Program.

As Mr. and Ms. USC, Doucette and Lyman will serve as ambassadors for the USC undergraduate student body at academic and athletic events throughout the year.

Membership in the Order of the Torch is one of the highest accolades a USC student can receive and is awarded to students "who exemplify all of the unique attributes of USC—academics, athletics, Trojan spirit and leadership," says Heather Larabee, director of USC Campus Activities.

Mr. and Ms. USC candidates were asked to deliver a talk about what they had learned in four years of undergraduate life at USC, "... kind of like a letter to our freshman selves about the USC experience," Doucette explains, and then to offer tips to entering freshmen on things to do and to stay away from to improve the campus experience.

Doucette says he talked about "doing a good job in school" and taking studies seriously right from the start, "because if you don't, you'll fall behind." He also talked about meeting new people, exploring new activities and "never being afraid to try something new."

Doucette, who has a 3.97 grade-point average, will spend the next two years studying for a master's degree in engineering science at Oxford University as a Rhodes Scholar. The 6'5" athlete also played small forward on the Trojans men's basketball team until the end of his junior year.

Lyman, a member of the National Society of Black Engineers and the senior honor society, Mortar Board, said her advice to incoming freshmen was "take some risks ... and go in with an attitude that you can master it all, because that's what really pushed me to succeed."

Lyman has accepted a two-year position with *Teach for America*, a federal program that places college graduates in teacher-training jobs in low-income school districts throughout the country, so that they can gain valuable experience and earn a teaching credential. After graduating in May 2008, Lyman hopes to teach high school chemistry in New York City. //

Jonathan Lasch Named Al Mann Institute Director

Jonathan G. Lasch is the new director at the Alfred Mann Institute. Lasch, who came from Convergent Ventures, an early-stage venture-investment and development company, brings more than 25 years of experience in science and technology development and evaluation in the fields of biomedical instruments and systems, biotechnology, chemistry and materials science. He will use his experience to expand AMI's programs to develop technologies that improve human health and the practice of medicine.

Lasch has served as chairman of the board and CEO of ORFID Corp., a director of Encode Bio, Inc., and was the founding CEO and member of the board of directors of Neurion Pharmaceuticals, Inc., all Convergent Ventures portfolio companies. He has held leadership positions at two Caltech spinoffs: Materia (materials science) and Cyrano Sciences (chemical sensor technology). He was also director of research and biotechnology for PPG Industries.

Previously, Lasch served as vice president of technology development for The Scripps Research Institute, the largest nonprofit biomedical research institute in the United States. At Scripps, he and his team worked closely with the faculty to move new technologies into development pipelines, in companies ranging from local start-ups to large multinational corporations within the pharmaceutical, biotechnology and medical devices industries. He also helped to initiate and manage numerous academic-industrial collaborative relationships and efforts, both on campus and in other locations.

Lasch succeeds the late Peter Staudhammer, who became the institute's director in April 2003 and helped build its portfolio of biomedical technologies. //

Viterbi Masters Scholarships

FIFTEEN EXCEPTIONAL STUDENTS RECEIVE FIRST ROUND OF MERIT AWARDS

The first batch of Viterbi School masters scholars have their grants and are ready to start their studies.

The program is a set of merit-based scholarships; all full-time, on-campus engineering master's degree candidates who are U.S. citizens are eligible. But the program is also aimed at encouraging diversity. The basic grant remits tuition for six graduate units, three units in each of two successive semesters. Fifteen graduate students from the whole spectrum of engineering disciplines received the awards.

"These are exceptional candidates, and we are delighted to be able to help them achieve their career goals," says Viterbi School Associate Dean for Master's and Professional Programs Kelly Goulis.

In addition to tuition remission, three outstanding masters scholars are also receiving cash awards.

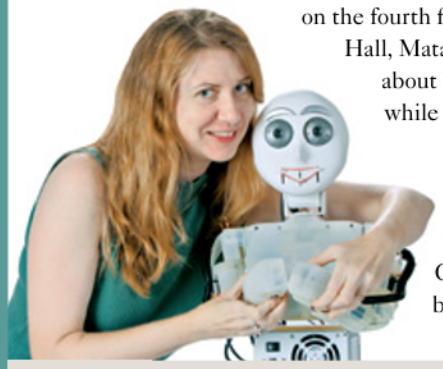
The winners include two recipients of $3,000 Computer Science masters scholarships: **Darren Earl** (U-Georgia) and **Yuan Wang** (U-Minnesota); and one recipient of a $1,000 Hammond scholarship, **Jolene Muñoz** (U-Oklahoma), who is majoring in environmental engineering.

The other scholars include: **Hokchi Chiu** (Northeastern); **Philip Crandon** (Macalester College); **Neil Desai** (UCLA); **Andrew Fynaardt** (UC Irvine); **Wesley Hoekman** (Calvin); **Michael Kristian** (U-Washington); **Aryan Moassessi** (UCI); **Brian Myhre** (U-Wyoming); **Singh Rahul** (U-Florida); **Steven Sutherland** (R.I.T.); and **Justin Wang** (R.P.I.) //

Robotics for Everyone

A NEW BOOK BY COMPUTER SCIENTIST MAJA MATARIC BRINGS ROBOTICS DOWN TO EARTH

The new book is *A Robotics Primer*, published by MIT Press in fall 2007. The author is MIT alumna (Ph.D. '94) Maja Matarić, professor of computer science and senior associate dean for research in the Viterbi School. She has a joint appointment in the USC College Department of Neuroscience and is director of the Center for Robotics and Embedded Systems.



In her robotics research lab on the fourth floor of Tutor Hall, Matarić spoke about her book while a wheeled robot "Create," built by the IRobot Corporation, buzzed across

> "I really wanted to make robotics accessible to everyone who is interested."

"I wrote this book for several reasons," says Matarić, "but mostly because I really want to make robotics accessible to everyone who is interested. Right now, there are a lot of popular books that don't teach the fundamentals of robotics, and there are a lot of textbooks at the college level that are not really understandable to people in, say, K-12 education, teachers, hobbyists and others.

"I wanted to fill that gap," she says. "To write a book that's fun to read for just about anybody who wants to get started in robotics. Now, for example, you have robots in the home, like the Roomba vacuum cleaner, which has sold more than 2 million and is based on 'Create'," she continues, pointing to the robot buzzing around the floor. "My book tells you how you can program a computer like the Create, or any other robot."

The book includes chapters on the origins of robots; where the word "robot" comes from; what defines a robot; and what the main parts are that make something automated like a robot rather than, say, a machine, a computer or a thermostat.

"We talk about sensors in robots and how they relate to sensors in people or animals," she says. "The book also talks about actuators, what makes the robot move, what lets it do some work or makes it helpful."

The book also covers learning and artificial intelligence. How do robots improve what they know and get better at helping people? The question isn't simple; in fact, it takes several chapters to explain all the different ways in which the robot can figure out where it is and how it can get to where it wants to go.

Matarić isn't out to scare off readers, though. Rather, her main objective was to bring robotics down to an understandable level and invite readers to explore the field further.

"The final chapter is on future directions, where robots will go, where should they go, and what kinds of things should they be able to do for people in the future," she says. "The message is, anybody and everybody can get involved in robotics. This isn't robotics for dummies; this is robotics for everyone." //

Masterminding Communications

ANNENBERG FELLOWS PROGRAM FUNDS GRADUATE STUDENTS FROM THREE SCHOOLS

One thing quickly becomes clear after spending just a few minutes with members of the inaugural class of USC Annenberg Fellows, who were introduced at a reception in the fall of 2007. They represent the breadth of USC's strength in communications-related disciplines.

To electrical engineering graduate student Satish Vedantam, communications research means using math and information theory to create new algorithms that could one day improve cell-phone reception.

Communications Ph.D. student Inna Arzumanova plans to investigate how the form and content of new media—from digital storytelling to blogs and online advertising—influence traditional forms of literature and art.

Meanwhile, MFA student Arthur Baum, who studies production in cinematic arts, is interested in an entirely different area of communication—how to improve the integrity of sound reproduced in movie theaters, televisions, headphones and other portable devices.

Vedantam, Arzumanova and Baum are three of the 103 graduate students from the USC Annenberg School for Communication, the USC School of Cinematic Arts and the USC Viterbi School of Engineering named to the first cohort of Annenberg Fellows.

USC Provost C. L. Max Nikias announced the new, $4 million USC Annenberg Graduate Fellowship Program as part of a reconfiguration of the USC Annenberg Center for Communication in March 2007. With funding from the Annenberg Foundation, the program is designed to create an elite cadre of world-class graduate students involved in cutting-edge communication and digital media research.

At a fall reception, Jean Morrison, vice provost for graduate programs, who oversees the program, greeted the fellows and called the fellowships a key part of the university's push to build the "best graduate programs in the nation."

Viterbi faculty, Annenberg Fellows, left to right: Professor Urbashi Mitra, Satish Vedantam, Ozgun Bursalioglu, Marcus Urie, Professor Keith Chugg and Professor Giuseppe Caire.

"The Annenberg Fellows will conduct communications-related research, advance bold new ideas in the communication arena and produce innovative creative works," Morrison said. "They will constitute an internationally recognized and highly regarded group of research scholars and creative practitioners. We are delighted to launch this program and to accelerate the university's leadership role in cross-disciplinary communications-related graduate research and education."

Dean Yannis C. Yortsos praised Nikias' decision to convert the Annenberg endowment into funds for graduate students. "Innovation comes largely from our graduate students, (so it is) critical that we support them," he said.

The 2007–08 class of fellows includes 34 Ph.D. and M.A. students from USC Annenberg; 40 Ph.D., M.A. and MFA students from cinematic arts; and 29 Ph.D. students from USC Viterbi. //

Days of Thunder

Stan Settles, IBM Professor and director of the USC Viterbi School of Engineering's Systems Architecting and Engineering Program, recently hit 206 miles per hour in his Trojan Thunder race car at Utah's famous Bonneville Salt Flats Speedway. By 2009, he wants to qualify for the exclusive 200 MPH Club by beating out the current record-holder, who has clocked 274 mph. Competition in different classes is based on engine size. Settles rebuilt Trojan Thunder's engine with the help of two Viterbi School engineers, but wants to develop a new undergraduate-level independent-study course to let students in systems architecting design the new engine from start to finish. //

Photo courtesy of Mark Gerkin/MG Photo/Graphic

New Hope for Macular Degeneration

BIOMEDICAL ENGINEERS CREATE NEW VISUAL DISPLAYS TO HELP THOSE WITH RETINAL DISEASES

An interdisciplinary team of biomedical researchers from the USC Viterbi School, USC College and the Keck School of Medicine at USC has received a $6 million Bioengineering Research Partnership grant from the National Institutes of Health (NIH) to design visual aids for millions of older adults who suffer from significant vision loss.

The USC team, led by Norberto Grzywacz, professor of biomedical engineering in the Viterbi School and director of the USC Center for Vision Science and Technology, will join other researchers from Harvard Medical School and the University of Houston School of Optometry to address low-vision problems caused by neural pathologies affecting the retina. Many of these vision problems are prevalent in older adults and cannot be fully corrected with ordinary lenses, medical treatment or surgery.

"Aging, injuries and diseases can all cause low vision, but the leading causes among older adults and the elderly are impairments such as age-related macular degeneration (AMD)," says Grzywacz, principal investigator on the five-year project, who also directs the USC Neuroscience Graduate Program. "Our dream is to build devices like intelligent glasses or intelligent television displays that can improve people's lives."

AMD gradually destroys the central vision of the eye and an individual's ability to see fine detail. AMD patients quite often lose their ability to read, recognize faces and drive.

The NIH project will concentrate on designing visual displays to help these people, who have lost their central vision and must rely on peripheral vision to see.

"We plan to use some of the techniques of computer vision and computational neuroscience to build visual displays that will enhance certain parts of an image enough so that a person with AMD will be better able to digest the visual information," Grzywacz says. "We aren't concerned with the optics of the eye in low vision—that can be corrected with glasses or surgery. Rather, our preoccupation is with the nervous system and the way in which the brain processes information."

Other Viterbi School faculty on the project include: Gérard Medioni, a professor of computer science who will work with DXO Labs to modify region-specific contrast enhancement displays; Bartlett Mel, associate professor of biomedical engineering, who will work on spatial contrast displays, which are designed to improve other types of vision loss; Zhong-Lin Lu of the Viterbi School and USC College, who specializes in motion perception and perceptual learning; and AMD specialist Mark Humayun, a biomedical engineer and physician who holds joint appointments in the Viterbi School of Engineering and the Keck School of Medicine at USC. //

> "**Our dream** is to build devices like intelligent glasses or intelligent television displays that can improve people's lives."

Normal vision

Age-related macular degeneration

Visit our website for the latest Viterbi news:

viterbi.usc.edu

WISE New Faculty

USC WOMEN IN SCIENCE AND ENGINEERING (WISE) WILL INCLUDE THREE NEW VITERBI PROFESSORS

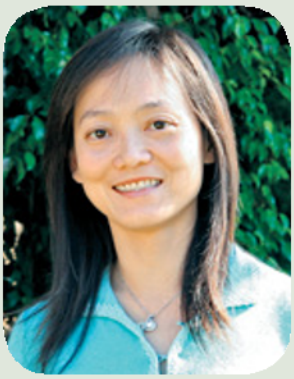
Michelle Lynn Povinelli is an optics/photonics specialist studying light propagation in nanostructured materials. Currently, she is working on the problem of "slow light," which involves the design of tiny devices that could trap light pulses and hold them for a while before releasing them. These devices could be useful for optical communications, such as fiber-optic networks, which are used to deliver Internet traffic.

"We are delighted to have Michelle onboard in electrical engineering," says P. Daniel Dapkus, electrophysics chair of the Ming Hsieh Department of Electrical Engineering. "She will be pursuing research at the cutting edge of nano-device technology, with an emphasis on applications at the intersection of optics, biomedicine and information science."

Povinelli, who had been a postdoctoral researcher at Stanford, says researchers have achieved some impressive results in slow light in atomic gasses, but the systems they have developed are bulky and don't work at the wavelength range used for optical communications.

"I am trying to design microfabricated, 'on-chip' devices, which means nano-devices built on a silicon chip similar to a computer chip, that are more practical for engineering applications, using nanofabrication techniques," she says.

The photonics scholar did her undergraduate work in physics at the University of Chicago, then worked abroad one summer as a researcher at the University of Kyushu, in Japan, and later as a Churchill Scholar at the University of Cambridge, in England. She continued her graduate work in optics and photonics at the Massachusetts Institute of Technology, earning a Ph.D. in physics in 2004.



The Daniel J. Epstein Department of Industrial and Systems Engineering welcomed **Shinyi Wu**, who specializes in health-care systems analysis. Formerly at the RAND Corp., Wu was principal investigator on a project to analyze the cost-effectiveness of physical activity intervention programs in the treatment and prevention of cancer.

"Shinyi has focused her professional career on identifying and applying fundamental industrial engineering tools and techniques to solve important process-improvement problems associated with the health-care industry," says Epstein Department Chair James E. Moore, II. "Her appointment in our department is representative of an emerging focus on health-care applications that speaks directly to USC's strategic objectives. We couldn't wait for her to join us."

Wu did her undergraduate work at Chung Yuan Christian University in Taiwan, earning a bachelor of science degree in industrial engineering in 1992. She went on to the University of Wisconsin, Madison, where she earned a Ph.D. in 2000 in industrial systems, with an emphasis on health-care systems. She joined the RAND Corp. in 1999 and, most recently was an engineer in the Health Program & Technology and Applied Sciences Group, and associate director of RAND's Roybal Center for Health Policy Simulation.

Recently, Wu was honored by RAND for "outstanding contributions to furthering RAND's mission of improving policy and decision-making through research and analysis."

Andrea Hodge joined the Department of Aerospace and Mechanical Engineering in the fall, after working as a research scientist at Lawrence Livermore National Laboratory. While at Lawrence Livermore, she mentored Reed Doucette, a senior mechanical engineer in the department and a new USC Rhodes Scholar for 2008. Her interests lie in nanomechanics, nanocrystalline materials processing, high-temperature mechanics, thin and thick film coatings, biomaterials mechanics and foam processing.

Aerospace and Mechanical Engineering Department Chair Michael Kassner says "the Viterbi School of Engineering is very fortunate to have successfully recruited Andrea. She was heavily recruited by many top-tier universities, but she chose USC because of the very favorable professional environment. Already, Andrea has had unusual success in many of her research endeavors."

Hodge is a member of the Materials Science Society. During her tenure at Lawrence Livermore, she was a chair for the 2006 Biological Materials Science Symposium.

She earned her Ph.D. in 2002 in materials science and engineering from Northwestern University. //

IIT Students Savor Summer Research

Fourteen junior engineering students from the Indian Institute of Technology (IIT) in Kharagpur spent a memorable eight weeks at USC last summer as part of the Viterbi School's summer research program with IIT Kharagpur. The group was the largest so far, and students worked enthusiastically on research projects ranging from mechanical engineering, biomedical engineering and petroleum engineering to civil engineering, computer science and electrical engineering. "Here I got the chance to learn the art of research," says **Srimoyee Bhattacharya**, a biotechnology and chemical engineering major at IIT. "This is great exposure for us, a glimpse of the great research going on at the best laboratories in the world," adds **Sakya Sarkar**, a major in biotechnology and biochemical engineering. Over the last three years, the summer research program has become very successful and serves as a model for other research and exchange collaborations. The ultimate goal is to encourage these gifted students to return to the Viterbi School for their Ph.D. work, says **Cauligi Raghavendra**, senior associate dean for strategic initiatives. //

Eye on Education

NEW DIVISION WILL EVALUATE UNDERGRADUATE- AND MASTER-LEVEL CURRICULA

Dean Yannis C. Yortsos announced the formation of a new entity last fall—the Division of Engineering Education—which will address undergraduate- and master-level engineering education across all departments with an eye toward redefining it.

In his memorandum announcing the new division, Yortsos said, "Voices from prominent engineering and scientific bodies, including the National Academies, have urged renewed attention on the importance of engineering and its paramount role in incubating innovation and economic growth. They have also challenged the academic establishment to respond to the new global reality, by promoting and implementing new curricula and educational practices to form a new engineer."

Yortsos described the new brand of engineer as one who:

- Combines analytical and mathematical skills with creativity and synthesis—a balanced blend of left- and right-brain skills;
- Is capable of solving complex technical problems for the benefit of society;
- Can innovate and understands how to transfer new technology to the marketplace;
- Leads, across disciplines and across the globe, and who understands the human element, human history and human culture.

"The quality of Viterbi students choosing to study engineering has been rising dramatically," he said. "Since 2000, the average SAT scores (Math and Critical Reading/Verbal) of entering freshman have risen 76 points, and in the process, Viterbi has also helped raise the university average."

Yortsos said it was important to challenge, retain and prepare these talented students for a highly competitive global marketplace that puts a premium on rapidly extracting an economic advantage from technological innovations.

Master degree programs are also changing. Most students are seeking a professional degree, often in new technological areas that didn't exist when they were undergraduates, or in programs that reach into other disciplines, such as business or law. The new division will address the effectiveness of current M.S. curricula to professional development.

Cauligi "Raghu" Raghavendra, senior associate dean for strategic initiatives, will lead the new division. //

Five Named to Chairs

TWO SENIOR, THREE JUNIOR FACULTY BECOME ENDOWED CHAIR HOLDERS

Dean Yannis Yortos has announced the appointment of five outstanding members of the faculty to endowed chairs. Two of the appointments went to senior faculty, and three to exceptionally promising junior members.

Professors **Joe Qin** and **Don Zhang** will hold the newly created Fluor Professorship in Process Engineering and the Marshall Professorship in Engineering Technology chairs, respectively.

Qin, an expert in control systems in chemical engineering, joined USC in the fall of 2007 as a professor in the Mork Family Department of Chemical Engineering and Materials Science, with joint appointments in the Ming Hsieh Department of Electrical Engineering and the Daniel J. Epstein Department of Industrial and Systems Engineering. He is a recipient of the National Science Foundation CAREER Award, the DuPont Young Professor Award, a Halliburton/Brown & Root Young Faculty Excellence Award, an NSF-China Outstanding Young Investigator Award, and an IFAC Best Paper Prize for a model predictive control survey paper published in *Control Engineering Practice*. Prior to joining USC, he was an associate chair and holder of the Paul D. and Betty Robertson Meek and American Petrofina Foundation Centennial Professorship in Chemical Engineering at the University of Texas, Austin.

Zhang, who also joined the Viterbi School in fall of 2007, is a professor in the Sonny Astani Department of Civil and Environmental Engineering and holds a joint appointment in the Mork Family Department of Chemical Engineering and Materials Science. Previously, he was a senior scientist and team leader at Los Alamos National Laboratory. He held the Miller Chair at the Mewbourne School of Petroleum and Geological Engineering at the University of Oklahoma from 2004 to 2007. Zhang has also served as Chang Jiang (guest chair) Professor at Nanjing University and was the founding associate dean at the College of Engineering at Peking University in China.

He is an expert in stochastic partial differential equations and their applications to hydrology, reservoir simulation and the sequestration of carbon dioxide in geological formations as a viable option for mitigating greenhouse gas effects.

Yortsos also announced the appointment of three exceptional young faculty members—**David Kempe** of computer science, **Ellis Meng** of biomedical engineering, and **Hossein Hashemi** of electrical engineering—to endowed early career chairs.


Joe Qin


Don Zhang


David Kempe


Ellis Meng


Hossein Hashemi

Kempe, who was named to the Robert G. and Mary G. Lane Early Career Chair, has distinguished himself in computer science theory and the design and analysis of algorithms, with a particular emphasis on social networks, distributed network algorithms, and game theoretic and pricing questions. He was the recipient of a 2006 National Science Foundation Early Career Award for his work to model and algorithmically address ways of minimizing or maximizing the spread of network epidemics, such as computer viruses. He is also a recipient of the Viterbi School Junior Research Award and, with computer science colleague Sven Koenig, is one of the organizers of the USC Programming Contest, an ongoing effort to identify and support programming talent for competition in Association for Computing Machinery (ACM) contests.

Meng, who has done outstanding work in bioMEMS fabrication at the Viterbi School's Biomimetic Microelectronic Systems NSF Engineering Research Center, has been named to the Viterbi Early Career Chair. She has done novel work with polymer-based bioMEMS, and has developed tiny microchannel networks that integrate pumps, valves and sensors into spaces smaller than a fingertip. These devices may be used to understand the complex pathways in the brain or allow physicians to implant devices that can monitor a patient's medications.

Hossein Hashemi, who was named to the Gordon S. Marshall Early Career Chair, works in the field of radio frequency integrated circuits and systems. He was the co-recipient of the *IEEE Journal of Solid-State Circuits* 2004 Best Paper Award, and recipient of the IEEE International Solid State Circuits Symposium Lewis Winner Award for Outstanding Paper in 2007. Hashemi currently serves as an associate editor of the *IEEE Transactions on Circuits and Systems-Part I: Regular Papers*, and has been an associate editor of the *IEEE Transactions on Circuits and Systems—Part II: Express Briefs*.

"These early career chair awards recognize and support research that has distinguished young faculty and could lead to significant advances in their respective fields," Yortsos noted. //

AAAS Honors USC Leaders

PROVOST C.L. MAX NIKIAS AND VITERBI SCHOOL SENIOR ASSOCIATE DEAN MAJA MATARIC NAMED FELLOWS

USC Provost **C.L. "Max" Nikias** and Viterbi School Senior Associate Dean for Research **Maja Matarić** were among five scholars named fellows of the American Association for the Advancement of Science in recognition of their outstanding contributions to science and engineering.

Nikias and Matarić, along with USC researchers Douglas Capone and Howard Taylor of USC College, and Jean Shih of the USC School of Pharmacy, were among 471 scientists honored at the Fellows Forum of the 2008 AAAS Annual Meeting in Boston, Mass., in February.

Nikias, who joined USC's faculty in 1991, served as director of the Integrated Media Systems Center (IMSC) until he became dean of the school in 2001. He served as dean until 2005, when he was named USC Provost. AAAS recognized him "for distinguished contributions to the field of signal processing and interactive media techniques, and for leadership in engineering education."

Nikias is internationally recognized for his research on digital communications and signal processing, digital media systems and biomedicine. His innovations and patents in signal processing have been adopted by the U.S. Navy in sonar, radar and mobile communication systems. His innovative interdisciplinary curricula in signal-processing systems have been used by the Department of Defense to train more than 2,500 scientists and engineers.

C.L. "Max" Nikias

Maja Matarić

In addition to inventing key methods for reducing signal interference in high-noise environments, Nikias crossed disciplines with several publications and patents in medical research, including methods for the detection and classification of myocardial ischemia.

Matarić, professor of computer science and neuroscience, was honored "for research in robotics, service to K-12 education and as president of the Academic Senate and senior associate dean for research (at the USC Viterbi School)." Her Interaction Lab conducts research aimed at giving robots the ability to help people through individual interaction, such as caregiving, and as part of human-robot teams for applications such as habitat monitoring or emergency response.

Matarić, author of *A Robotics Primer* (M.I.T. Press, 2007), is also committed to educational outreach and university service. With USC Neighborhood Outreach program support and collaborations with K-12 teachers, she and her students are developing hands-on robotics curricula for students at all levels. She is serving as the immediate past president of the USC Academic Senate and as a member of the University Strategic Planning Committee. //

Keynotes Bring Key Scholars to Campus

GRODINS AND RECHTIN LECTURES CONTINUE TO DRAW BIG CROWDS

Featured speaker Louis Martin Vega (center) with Epstein Dept. Chair James Moore, II (left) and Dean Yannis Yortsos (right).

The Viterbi School's Keynote Lecture series, hosted by each of the school's departments and divisions, continues to bring eminent scholars to campus to discuss research at the intersection of many emerging disciplines.

The Fred S. Grodins Lecture, sponsored by the Biomedical Engineering Department, featured **Douglas Lauffenburger** of MIT, the Uncas and Helen Whitaker Professor of Bioengineering and director of MIT's Biological Engineering Division, who addressed "Bioengineering and Systems Biology: A Promising Intersection for Bioscience and Biotechnology."

The Eberhardt Rechtin Lecture, sponsored by the Daniel J. Epstein Department of Industrial and Systems Engineering, featured **Louis Martin Vega**, dean of the College of Engineering at North Carolina State University and president-elect of the Institute of Industrial Engineers. Professor Vega addressed new directions in manufacturing, logistics, distribution, operations management and production and service systems.

Upcoming lectures include the Albert Dorman Lecture, sponsored by the Sonny Astani Department of Civil and Environmental Engineering, and the Hsien K. Cheng Lecture, sponsored by the Astronautics and Space Technology Division.

Engineering Freshman Return Rates on the Rise

NEW ACADEMIC, SOCIAL AND CREATIVE PROGRAMS ARE HELPING STUDENTS GET THEIR FOOTING IN ENGINEERING

Freshman return rates are on the rise at the Viterbi School, thanks to a number of new undergraduate programs designed to help new students transition to college life successfully.

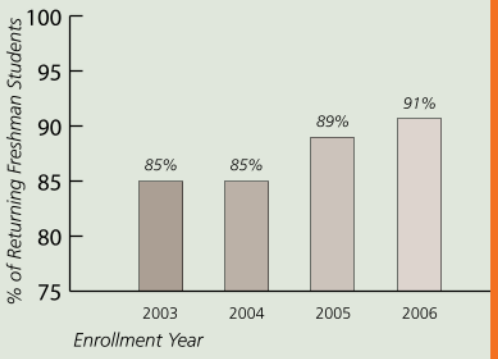
The return rates of freshmen to engineering—those starting in engineering and returning to the same major the following year as sophomores—climbed from 85 percent in Fall 2004 to 91 percent in 2006.

"A gain of six points in three years is a remarkable feat," said Viterbi School Dean Yannis C. Yortsos. "Keeping these high-quality students in engineering helps us in multiple ways, and makes teaching a true pleasure, as many of our faculty have realized."

The success has been attributed to a number of innovative new programs.

The Freshmen Year Excellence (FYE) program was implemented in fall 2006 to assist Viterbi students with the transition to college life. FYE includes the Freshmen Academy Program, which has flourished and now serves as a model for the entire university. FYE also offers students advisement and support services through the Viterbi Admission and Student Affairs Office, including one-on-one advisement, as well as programs such as Spotlight, which provides freshmen engineering students the opportunity to visit with department representatives and explore various engineering majors.

The Klein Institute for Undergraduate Engineering Life (KIUEL) is also proving to be a great student resource. Through programs geared toward leadership development, cross-disciplinary activities, service-learning and globalization, students have access to opportunities that create a holistic student life experience and produce well-rounded engineers. KIUEL Showcase, a week-long program dedicated to highlighting the artistic talents of Viterbi students, is a prime example. More than 125 of the school's diverse student population participated in the first annual event in spring 2007.



The Viterbi School's Women in Engineering Office (WIE) and the Center for Engineering Diversity (CED) have also played an important role in female and underrepresented student retention. The missions of these programs are to create a community of support for all engineering students—female, underrepresented and those advocating for these populations—and promote success in the field of engineering. Consequently, the female undergraduate student population is on the rise, with a school-average enrollment of 25 percent. //

Illumin Illuminates Madrid's Metro

Madrid's Metro stands out as one of the world's most ingeniously designed public transportation systems. In a city that transports more than 565 million passengers each year, that is a feat to behold, and a model transportation system for other cities. Writing in the November 2007 online issue of *Illumin*, Viterbi student, author and associate editor Brian Lobo describes seven key characteristics that make Madrid's Metro one of the safest, most efficient and most reliable mass-transit systems in the world. *Illumin* is an award-winning interactive publication, written and edited by USC students, and dedicated to exploring the science and technology behind inventions that we take for granted in everyday life.

http://illumin.usc.edu/

$100 Oil Means It's Time for the Sputnik Treatment

ENERGY WOES SET INCENTIVE TO LET SCIENCE COME TO THE RESCUE

HOUSTON CHRONICLE

***This op-ed by USC Viterbi Dean Yannis C. Yortsos appeared in the November 22, 2007 edition of the* Houston Chronicle.**

Energy has emerged as a chief player in the grand economic and societal drama of our age. In silent movie style, energy is the onrushing train crashing through the $100 per barrel barrier, with the public as the hapless victim tied to the tracks, strapped by the forces of partisan politics.

I have a hero in mind: Let science and technology come to the rescue. To the extent that politics is about the process by which a society allocates resources, energy is inevitably a political affair. Yet the least productive aspects of politics—grandstanding, wishful thinking and the reduction of sophisticated concepts to T-shirt slogans—have the most direct implications for whether we pursue policies that meet the needs of the society that we aspire to be. The stakes could not be higher on the issue of energy, not only for this country, but also for the world.

In a welcome sign, Congress recently handled energy in a refreshingly high-minded way when it took up a bill to create ARPA-E, the Advanced Research Projects Agency-Energy, in the Department of Energy, modeled after the highly successful DARPA of the Department of Defense. DARPA, established as a bold American response to the Sputnik launch 50 years ago this year, nurtured revolutionary advances in science and technology in the defense, and by extension, the civilian arenas.

We need this type of holistic approach. The scientific community, through the voice of the National Academies, has staunchly supported ARPA-E. While key members of Congress have listened thus far, we can only hope that the bill becomes a reality. Stewardship and cultivation of our energy resources, with the protection of the planet as a paramount objective, is a scientific challenge of the highest order.

Science can't solve all our energy-related problems, but without good science we have no hope at all. We urgently need an objective, holistic approach. Energy exists in a multiplicity of forms: as mechanical motion of wind and water (kinetic energy), relative altitude (gravitational potential energy), and most important economically, through matter's thermal and chemical states (internal energy).

A key issue involving the capturing, converting and utilizing of energy is inefficiency. We waste between 30 percent and 40 percent of the global energy ow. Worse, byproducts, ranging from CO2 to nuclear waste, also have increasingly serious side effects. Gross inefficiencies of this type are typical of process not optimized.

When energy sources were cheap and population densities were low, we could slide. But we live in an increasingly energy-hungry world, of increased population density, looming environmental concerns, and with the threatening specter of a dramatic slowdown or even an arrest of economic global growth.

And we can do much better. We now have the tools to achieve the innovations needed. The breathtaking advances in information technology in the recent decade and the continuous unlocking of mysteries at the nano- and biomolecular scales promise unprecedented discoveries that will lead to a much needed "high-tech"- ization of the energy field. These tools can be in our hands in a few short years if we will just invest the effort and investment to create and apply them.

It is not just how, though, it is where. Solving the energy challenge cannot be decoupled from intensely addressing one specific energy landscape: that of megacities. Within the span of this generation, urban population is estimated to double. The air, water, energy, pollution and recent fire problems of Los Angeles, for example, are daily reminders of this growing paradigm. A holistic energy research agenda is a critical element in mitigating the problems of dense urban environments.

Obviously, my university could benefit from increased energy research funding, as would many other research institutions. But I deeply believe that investing in this research is the right thing to do: It is our best alternative; it is the right thing to do.

Fifty years after Sputnik, we have again the opportunity to create a social consensus that unties energy from the train tracks. That is the first step towards a happy ending of the energy conundrum. //

Speaking Up, With Confidence

ACTOR ALAN ALDA SHARES SOME TIPS WITH VITERBI ENGINEERING STUDENTS ON THE ART OF PUBLIC SPEAKING

All semblance of composure "went out the window" when Andrew Bagwell, a sophomore majoring in industrial and systems engineering, got up in front of actor Alan Alda and science reporter K.C. Cole to give a three-minute presentation on the merits of his field.

He was nervous. Self-conscious. Uneasy. And like millions of people in business and academia, he just wanted to hurry up and finish so that he could sit down. Two-and-a-half hours later, Bagwell and 12 other Viterbi School leadership students were confident, focused on the audience and speaking like pros.

"I was hesitant at first, but Alan Alda's sincere desire to teach us what he knew about communication really showed through and made us all feel comfortable," Bagwell said. "His encouraging words made me stop thinking about how silly I might be looking and focus on getting inside another person's head."

Ben Vatterott, a junior majoring in mechanical engineering, had a similar experience.

"My worst fear going into the workshop was stumbling over pre-rehearsed lines and phrases," he said. "Throughout the seminar, Mr. Alda emphasized that memorizing what we planned to present was never a good idea; rather, we should focus on thoroughly understanding the material and our audience—the rest would come naturally. By the end of the day, I felt I was beginning to grasp the truth of this."

In a unique blend of engineering and improvisational theater, Viterbi students learned one of the essential ingredients of effective public speaking: to focus on the audience and not on yourself.

Alda, best known for his starring role in the hit television series "M*A*S*H," is passionate about communicating science. As host of the PBS series *Scientific American Frontiers*, he was on campus in January for a special Vision and Voices talk, entitled "Science, Art and Society." But at the suggestion of Maja Matarić, senior associate dean for research at the Viterbi School, he jumped at the chance to coach the students on improvisational techniques that have helped actors and comedians overcome stage fright.

The students were from all academic levels and a variety of majors. They were chosen for their leadership potential, said Stephen Bucher, director of the Viterbi School's Engineering Writing Program, which organized the workshop along with the Klein Institute for Undergraduate Engineering Life (KIUEL).

First, they were asked to present brief talks about an engineering topic of their choice. Alda and Cole, a professor of journalism in the Annenberg School for Communication, critiqued the presentations. Then the group broke into two hours of improvisational exercises. The techniques were often "hilarious," Bagwell said, and ranged from "playing invisible tug-of-war to mirroring another student, both physically and verbally." They were intended to help the students relax and get over any feelings of embarrassment so that they could experiment creatively with public speaking.

It worked. Alda said he was "moved" by the transformation in the students' presentations the second time around. Even the students were surprised!

Said Vatterott, "To me, working on technical communication with an experienced actor was an invaluable experience, and I believe most engineers in leadership positions would feel the same way."

But would he recommend it to others?

"Absolutely." //

Faculty Accolades

VITERBI PROFESSORIAL AWARDS AND ACHIEVEMENTS

USC President **Steven B. Sample** and Provost **C.L. Max Nikias** have earned IEEE's 2008 Founders Medal and Simon Ramo Medal, respectively.

Sample, an electrical engineer, was honored for his "outstanding contributions in the leadership, planning and administration of affairs of great value to the electrical and electronics engineering profession." The IEEE cited his "leadership in higher education and the engineering profession" as well as his "pioneering contributions to consumer electronics."

Steven B. Sample

C.L. Max Nikias

Andrew J. Viterbi

John O'Brien

Nikias, former dean of the Viterbi School and a fellow of the IEEE since 1991, received the organization's 2008 Simon Ramo Medal for significant achievement in systems engineering and systems science or technical leadership in a major innovative engineering project. Nikias' citation emphasized his outstanding leadership and pioneering contributions to integrated media systems for the entertainment industry.

Andrew J. Viterbi, the legendary engineer, academician and entrepreneur who gave the school his name, added another world-class award to his imposing list of honors.

Viterbi, the USC Presidential Professor of Engineering, is the inaugural winner (along with Irwin Jacobs, his co-founding partner at Qualcomm) of the James Clerk Maxwell Award, a joint prize of the IEEE and the Royal Society of Edinburgh. The Maxwell Award is given "for groundbreaking contributions with an exceptional impact on the development of electronics and electrical engineering." His Royal Highness, the Duke of Edinburgh, presented the award to Viterbi.

John O'Brien, a professor in the Ming Hsieh Department of Electrical Engineering, who is also senior associate dean for academic affairs, was elected a Fellow of the Optical Society of America for his contributions to the understanding and development of photonic crystal devices and technology. Fellowship in the OSA is limited to 10 percent of the membership of the 91-year-old organization. O'Brien was also designated a Distinguished Lecturer of the IEEE Lasers & Electro-Optics Society this year. His research interests are in nanophotonics and photonic crystal devices.

Satwindar Sadhal of the Aerospace and Mechanical Engineering Department was named the 2007 winner of the James Harry Potter Gold Medal of the American Society of Mechanical Engineers. The Potter Medal is awarded for "eminent achievement or distinguished service in the science of thermodynamics in mechanical engineering."

Sadhal was cited "for advancing the fundamental thermodynamics of phase change and interfacial phenomena with seminal research on heat-mass transfer via droplets and bubbles and their uid dynamics in natural and industrial systems, and for lasting contributions to mechanical engineering through teaching and archival literature."

Jerry Mendel of the Ming Hsieh Department of Electrical Engineering has received the 2008 Fuzzy Systems Pioneer Award from the IEEE Computational Intelligence Society.

C.C. Jay Kuo, of the Ming Hsieh Department of Electrical Engineering, and **Stefan Schaal** of Computer Science were recipients of research grants from the Okawa Foundation, extending the Viterbi School's long-running success in obtaining those foundation grants.

Iraj Ershaghi, a professor in the Mork Family Department of Chemical Engineering and Materials Science, added the Society of Petroleum Engineers' Western North America Reservoir Description and Dynamics Award to his many honors.

Najmedin Meshkati of the Sonny Astani Department of Civil and Environmental Engineering and the Daniel J. Epstein Department of

Satwindar Sadhal

Jerry Mendel

C.C. Jay Kuo

Stefan Schaal

Iraj Ershaghi


Najmedin Meshkati


James Moore, II


Amy Rechenmacher


Barry Boehm


Elaine Chew


Jesse Yen


Yong Chen

Industrial and Systems Engineering won the Human Factors and Ergonomics Society's Oliver Keith Hansen Outreach Award for his work on the human factors of complex technological systems and for his efforts to enhance public awareness of critical human factors issues.

James Moore, II, chair of the Daniel J. Epstein Department of Industrial and Systems Engineering, was elected to the leadership of the Council of Industrial Engineering Academic Department Heads. Moore assumes the presidency of the council in May 2008.

Amy Rechenmacher, an assistant professor in the Sonny Astani Department of Civil and Environmental Engineering, has won a highly competitive National Science Foundation Faculty Early Career Development (CAREER) award for her work in granular behavior and geotechnical engineering applications.

The $400,000 award will support Rechenmacher's research over a five-year period beginning July 1, 2008. The award, among the highest of honors for young faculty members, supports early career development for teacher-scholars whose research shows promise. Rechenmacher is the fifth civil engineer in the Sonny Astani Department to receive an NSF career award.

"Amy's research addresses one of the top unanswered questions in science: how does granular material behave?" said Jean-Pierre Bardet, chair of the Sonny Astani Department of Civil and Environmental Engineering. "That question touches on some of the most fundamental science and engineering problems in this field, such as building and improving our infrastructure, improving our ability to predict earthquakes, and better understanding other seismic events. We're very excited that she's received support to advance her research in this field."

Rechenmacher, who studies the mechanics of granular flows, won the CAREER award for her proposal, "CAREER: The Kinematics of Localized Failure and Flow in Granular Materials." The research will address the behavior of local flows in three contexts: in shear bands, or fractures, that appear in dense sands and cause them to slip or collapse; in fault gouges, which are crushed and ground-up rock produced by friction between the two sides when a fault moves; and in the laboratory, where researchers image dense granular flows in an attempt to understand the thermodynamics.

The grant will allow researchers to image granular flows of real materials in three dimensions for the first time.

Professor **Barry Boehm** of Computer Science earned some enviable recognition. A special symposium was named for him at the 29th International Conference on Software Engineering; Northrop Grumman hosted a dedicated symposium on his contributions to software engineering; and a special Barry Boehm track was held during the annual Conference on Software Engineering Education and Training.

Elaine Chew of the Daniel J. Epstein Department of Industrial and Systems Engineering was selected as a Radcliffe Fellow by Harvard University.

Jesse Yen of the Biomedical Engineering Department won a Coulter Foundation Early Career Award for his work in developing novel ultrasound transducers that can image tissue in three dimensions.

Yong Chen, who joined the Daniel J. Epstein Department of Industrial and Systems Engineering last year, won the Outstanding Young Manufacturing Engineer Award from the Society of Manufacturing Engineering in recognition of his innovative work in rapid prototyping. //

Distinguished Professor Sol Golomb

Solomon W. Golomb became a Distinguished Professor of Electrical Engineering and Mathematics for his unparalleled accomplishments over the years. Dean Yortsos called him "one of the greatest living American scientists," and congratulated him for bringing such renown to the Viterbi School. Golomb has been a University Professor since 1993 and received the USC Presidential Medallion in 1985. Among his many honors and awards, Golomb received the Claude E. Shannon Award, the highest honor in communications theory, for profound contributions in the field of information theory.

Honduras H_2O

La Estanzuela, Honduras, may not be top on many students' lists of places to spend spring break, but it was for members of the Viterbi School's Engineers Without Borders. Students Nate Houk, Kyle Siegal, Chris Roth, Alex John, Liana Ching, Gina Erazo, Allie Anderson, Lucy Hoag and Meghan Gray traveled to the remote town in March 2007 to create a blueprint for piped-in water and a new water-sanitation plant. They surveyed, measured and tested the water supply, then decided that they could harness the energy from a nearby waterfall to pump clean water to a storage tank near La Estanzuela. The project involves building 2 kilometers of pipeline, chlorinating the contaminated water and connecting homes that are not currently hooked up to the existing water-distribution system. That will take more trips to Honduras, but there's no shortage of engineering students eager to go. If you'd like to sponsor a student's trip to Honduras in 2008, please contact Jacquelin Reed, EWB-USC treasurer, at jacquelin.reed@usc.edu. Please see page 44 for more information on this important humanitarian effort. //


USC

Keeping the Bad Guys Guessing

VITERBI SOFTWARE GOES ON THE ANTI-TERROR BEAT AT LAX

If you are ever stopped and searched by LAX security, you might blame Praveen Paruchuri's doctoral thesis. Last summer, security officials at Los Angeles Airport began using a system developed by Viterbi School computer scientists that makes their security operations harder for the bad guys to predict and defeat.

Praveen Paruchuri

Milind Tambe, professor of computer science and a specialist in artificial intelligence, led a team, including Paruchuri, that's applying game-theory insights to systematically make it difficult for observers to find patterns or regularities in LAX vehicle-security routines. Each time a button is pressed, their software package produces an unpredictable security schedule that has the same overall coverage as conventional scheduling.

"To interrupt or deter a terrorist plot in the surveillance phase is the safest and most efficient manner to protect the airport," says James Butts, director of law enforcement for Los Angeles airports, including LAX, Van Nuys, Palmdale and Ontario. "This program and technology directly addresses thwarting potential adversaries at the earliest stages of planning."

The initial impetus for the project came from Erroll Southers, a former FBI special agent who serves as an associate director for the Department of Homeland Security-funded Center for Risk and Economic Analysis of Terrorism Events (CREATE). Southers ascertained that the checkpoint situation at the airport was vulnerable.

> "This program and technology directly addresses thwarting potential adversaries at the earliest stages of planning."

The mathematical heart of the USC system, called ARMOR, is Paruchuri's thesis, which addressed the built-in strategic advantage enjoyed by terrorists. The police force may have a host of individual agents working over a large area, but they are trying to counter an unknown number of opposition agents who have unlimited time.

"The police have to commit to a policy, while their adversaries may observe and exploit the policy committed to," he wrote. The police also face different types of adversaries who pose different threats—smugglers as opposed to terrorists, for example.

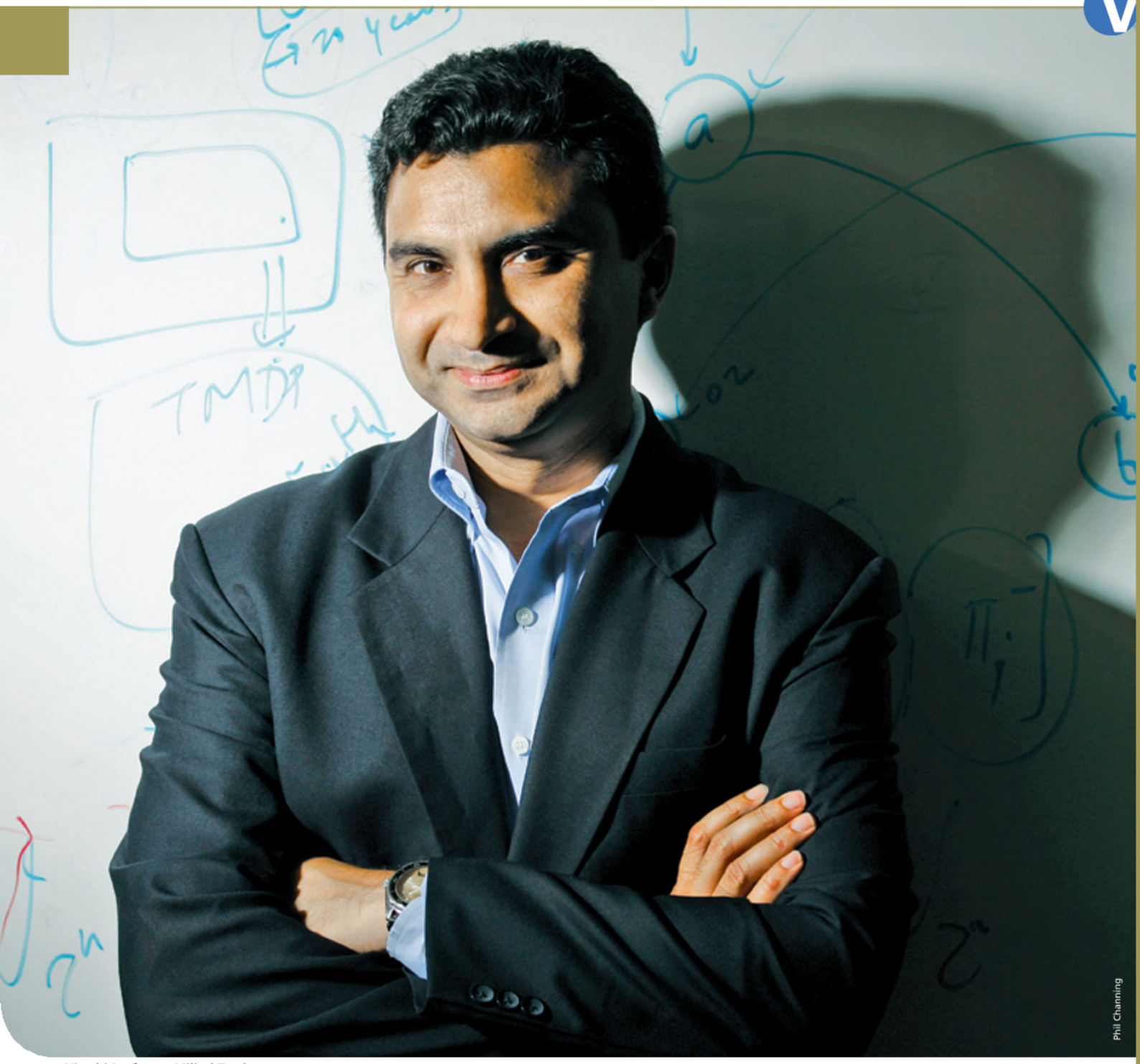
The thesis, "Keeping the Adversary Guessing: Agent Security by Policy Randomization," builds on a mathematical business strategy, developed for commerce, in which one company in a competitive environment, because of its size and prominence, has to essentially 'play first.' This is known formally by "Bayesian-Stackelberg game."

Paruchuri used artificial intelligent agent techniques, in which computer programs play individual, cooperative roles in problem solving. By simplifying assumptions, he created a computable algorithm for making the right first move, and it was the best algorithm yet for solving this particular class of problems.

Sarit Kraus, a professor of computer science at Bar-Ilan University in Ramat Gan, Israel, contributed to Paruchuri's work, as did Fernando Ordoñez, assistant professor of systems engineering. Other graduate students who were involved included Janusz Marecki, James Pita, Christopher Portway and Jonathan Pearce.

Last April, Paruchuri presented the work at LAX "to a room full of police officers, and it was very deeply appreciated," says Tambe. "We then had a few meetings, visited with LAX and saw checkpoints in operation. Based on the inputs they provided, we refined our system, and then did some initial program demonstrations for them in July. In August, we suggested that we start implementing our outputs, and they agreed."

Tambe says the researchers tailored the basic system directly to the needs of LAX police, based upon their inputs. "I am overwhelmed by the goodwill and spirit of collaboration of LAX police," he says. "I am really glad that they are willing to take on new technology."



Viterbi Professor Milind Tambe

"I liked the concept," says Butts, "I approved of us being part of it. This randomization technique allows us to maximize the impact of our deployment."

CREATE's Southers emphasized that the office of Mayor Antonio Villaraigosa took a direct interest in cooperation between the city, the airport and CREATE in finding security solutions. ARMOR can take the entire system, including resources available (officers, K9 units, work and break hours) and create a completely randomized schedule that will cover as completely as a conventional one, but will baffle efforts to predict it.

Paruchuri is the second of Tambe's five 2007 Ph.D. graduates to have his work used in homeland security applications. Nathan Schurr's doctoral dissertation was the basis of a simulation system to use as a training tool for fire department emergency responders. //

Repairing Human Hands

BIOMEDICAL ENGINEERING PROFESSOR FRANCISCO VALERO-CUEVAS IS STUDYING THE BIOMECHANICS OF DEXTERITY

Using your iPod, waving goodbye, using your mouse to scroll down the length of this article. We take these seemingly simple hand functions for granted, blissfully unaware of the complicated system of neurons, muscles, bones and tendons at play in the simplest of gestures.

Francisco Valero-Cuevas is working to understand the biological, neurological and mechanical features of the human hand that make it possible to hold a fork, crack an egg or crumple a piece of paper. With joint appointments in the Viterbi School's Department of Biomedical Engineering and the School of Dentistry's Division of Biokinesiology and Physical Therapy, he has a unique opportunity to investigate this complex system from the engineering, neuroscience and clinical perspectives.

"You look at the hand and you think, 'Five fingers, what could be more straightforward?'" Valero-Cuevas says. "But really we don't understand well what a hand is biomechanically, how it is controlled neurologically, how disease impairs it and how treatment can best restore its function. It is difficult to know how each of its 30-plus muscles contributes to everyday functions like using your cell phone."

Valero-Cuevas came to USC from the Sibley School of Mechanical and Aerospace Engineering at Cornell University, where he and his team were engaged in projects funded by the National Institutes of Health, the Whitaker Foundation and the National Science Foundation.

By understanding the principles behind dexterous manipulation, he hopes his research will help those who have lost the use of their hands, by guiding rehabilitation and helping to develop the next generation of prosthetics.

"As an analogy, I ask people to imagine going through life wearing boxing gloves. If you can grasp things in only the grossest of ways without fine manipulation, life is pretty difficult," he says. "Yet millions of people worldwide go through life without the full use of their hands. Diseases that affect the hand tend to disproportionately degrade quality of life."

Robotic and lifelike artificial limbs have been around for decades, he says, but they still lag behind their biological counterparts. "Surprisingly, the hook remains one of the more useful prosthetics."

Valero-Cuevas hopes to apply his research directly to clinical populations, working with engineers and clinicians who are developing prosthetics to mimic the look and dexterity of our own hands.

"In the end, our hands have a special significance to us," he said. "We use them when we talk, we paint them with ruby-red polish and adorn them with rings and bracelets.

"The hands have always been a part of the anatomy tied closely to personal identity," Valero-Cuevas added. "We are nothing if not tool users. We interface with the world through our hands." //

Chip Shots

HOSSEIN HASHEMI'S RADAR CHIPS ARE ON THE BRINK OF COMMERCIAL SUCCESS

They could help cars avoid collisions, create higher-capacity local area networks or find victims trapped in rubble. But by any measure, Hossein Hashemi's new radar chips seem to be a winner.

In 2007, Hashemi, an assistant professor in the Viterbi School's Ming Hsieh Department of Electrical Engineering and holder of the Gordon S. Marshall Early Career Chair, unveiled two new radar chips that detect and generate radio signals at the Institute of Electrical and Electronics Engineers (IEEE) International Solid-State Circuits Conference in San Francisco, where they received the Lewis Winner Award for best paper.

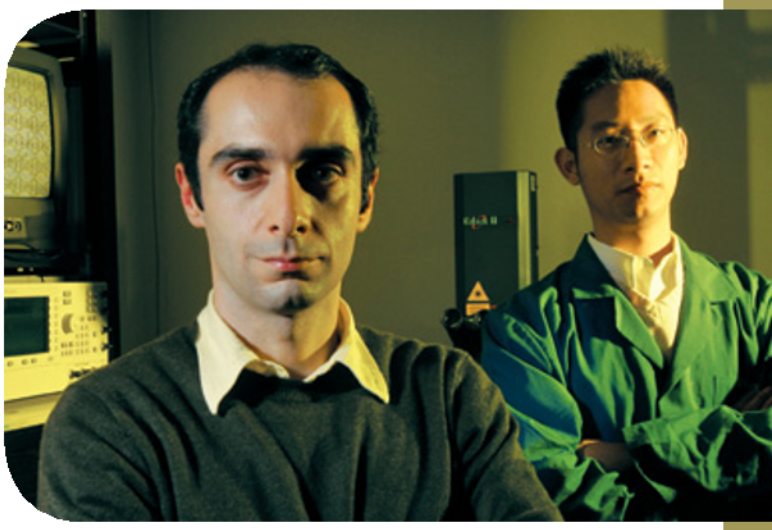
The chips are similar to those used in cell phones and other wireless devices, but they can accurately focus precise radio beams in specific directions. They also do the reverse-detecting and accurately determining the direction of incoming signals. And unlike other high-performance chips with these functions, the USC designs use an ordinary complementary metal-oxide semiconductor (CMOS) silicon base, which would allow them to be made in standard chip foundries, greatly reducing their cost.

Hashemi has one chip operating in the 24-gigahertz range with an ingenious architecture that combines the functionality of multiple coherent transmitters-receivers, or transceivers, making it considerably more compact than previous arrays.

This chip has attracted the attention of General Motors for possible use as automobile radar. Ten such devices could be installed in a car for a little more than $100—less than a tenth of what single devices currently used for car self-parking and blind-spot detection systems cost. Hashemi's chips could not only guide parking and detect other vehicles, but also pedestrians. Hashemi believes the same chip could be used to create local area networks with far greater capacity than existing units.

> "...the application most intensely pursued for the chip is 'biometric radar.' This kind of radar would allow rescuers to see through rubble and detect victims trapped underneath."

Support for the 24-gigahertz chip design came from the Charles Lee Powell Foundation and the National Science Foundation.



Phil Channing

Professor Hossein Hashemi and graduate student Ta-Shun Chu

The second radar chip, which is also based on a low-cost CMOS design, detects and transmits "ultrawideband" radio signals. These are low-intensity signals spread across a wide spectrum, emitted in a pattern of very short bursts. Hashemi says that the chip's compact beam-forming chip architecture allows it to process the echo picked up by the chip's receiver function and analyze it for spatial (directional), temporal and frequency data, and generate detailed information.

The ultrawideband radio bursts travel through solid objects, so the application most intensely pursued for the chip is "biometric radar." This kind of radar would allow rescuers to see through rubble and detect victims trapped underneath. It could distinguish the living from the dead by picking up the minute movements of their chests caused by breathing and heartbeat.

In clinical settings, similar devices could monitor patients who have severe burns and cannot endure any contact at all. This chip has attracted interest both from industry and government, with funding from Boeing Phantom Works, the National Science Foundation and the Office of Naval Research.

Hashemi's group is collaborating with Anthony Levi, professor of electrical engineering in the Hsieh Department, SAIC, and Lifewave Inc., who are working to integrate the chips into systems.

He says that most of the work on both chips was done by graduate students. In both cases, the students came from disciplines outside of chip design and approached the problem with new eyes and from entirely new points of attack.

The prizewinning automobile radar chip, he says, was mainly the creation of Krishnswarmy. The wideband biometric radar chip was the inspiration of Ta-Shun Chu, while Jonathan Roderick designed one of its building blocks. (Chu presented a more sophisticated version of the chip early this year). //

Distributing the Power Wealth

FOR OPTIMAL RESULTS IN SENSOR NETWORKS, SOMETIMES YOU SPEND MOST ON THE WORST SENSOR, AND SOMETIMES ALL ON THE BEST

Phil Channing

At a concert, a gaggle of people spread throughout a vast audience area is armed with portable microphones that can send the sound to only one place, though they can also receive and relay sound from other microphones. Far away, a central desk is trying to reproduce the music as clearly as possible.

A new paper by communication theorists from the Viterbi School explores an electronic version of this situation in the context of sensor networks. These sensor networks are schools of interconnected sensor units, each of which is capable of gathering data and sending it on to other sensors or to a central data point. The sensors can also relay the measurements of neighboring sensors.

According to the authors, Urbashi Mitra, a professor in the Ming Hsieh Department of Electrical Engineering, and graduate student Gautam Thatte, the solution is a curious blend.

"If your measurements are really good, give all your power to the sensor with the best channel," says Mitra. "As the measurement quality degrades, you start allocating more power to sensors that have worse channels.

"But if my measurements are rather poor, I need to listen to all of them, so I want to give more resources to ones that have less power. In the first case, the winner gets everything. In the second, I give the most to the one who has the least, because I need everyone to participate."

The central node to which the individual sensors are reporting makes the decisions, and the key to this decision-making is the limited amount of power available for reporting from sensor networks. Allocation of power is the subject of intensive research as sensor networks grow in importance, performing numerous tasks, military and civilian, that range from environmental monitoring to intrusion alarms.

Such networks have highly limited power available to be used both for data gathering (sensing) and for communication. Communication typically takes the lion's share of the budget—up to 70 percent—but the universal goal in such sensor networks is to minimize that figure.

Coincident and part of the process of power distribution is the selection of a route for sending the signals back to the central processor. The title of the paper, "Sensor Selection and Power Allocation for Distributed Estimation in Sensor Networks: Beyond the Star Topology," summarizes the choice. "The well-analyzed 'star topology' has all sensors reporting directly to a single 'fusion center,' where the data is analyzed. But many other routes are possible, including ones in which sensors relay data from one to another, like racers handing off a baton, to get it to the fusion center; or a modified branch-and-tree relay in which one sensor receives a group of three, four or five batons to pass along to the center.

"These different architectures imply different strategies for passing along the data—the branch-and-tree architectures demand a straight 'most-for-the least' strategy, while the many relay systems demand a modified one."

Mitra gives credit to Thatte for developing a number of interesting theoretical analyses in the paper.

Exact solutions are not always easy to find, says Mitra. "However, we have developed some bounds for which closed-form solutions exist. When we compare the overall sensing accuracy of the network using the approximated power allocation, we are very close to optimal." //

Today, USC engineering takes the next step in shaping tomorrow's megacities.

Presenting the Sonny Astani Department Of Civil And Environmental Engineering. Endowed with the largest naming gift for a civil engineering department, it is poised to meet the challenges of megacities and those who live in them.

Sonny Astani:

- Builder in Los Angeles for 25 years and the largest real estate developer in downtown.
- Philanthropist supporting facilities for the homeless.
- USC Alumnus with an MS ('78) in Industrial and Systems Engineering.
- Recipient of the Mark A. Stevens Distinguished Alumni Award from the USC Viterbi School.

USC Viterbi School of Engineering:

- Consistently ranks in the top 10 on the *U.S. News & World Report's* list of graduate engineering programs.
- Home of the Information Sciences Institute, one of the incubators of the Internet.
- One of only four engineering schools to have two currently active National Science Foundation Engineering Research Centers.
- Awarded the First Department of Homeland Security Center of Excellence (CREATE) and a Transportation Center from the U.S. Department of Transportation (METRANS).
- Faculty includes 30 members of the National Academy of Engineering, four winners of the Shannon Award, one Turing Prize winner and more than 40 recipients of national junior faculty career awards.
- Home of the Distance Education Network, the nation's leading graduate engineering e-learning program.

USC
UNIVERSITY OF SOUTHERN CALIFORNIA

Less traffic. More space. Cleaner air and water. A greener environment.These are just some of society's fundamental needs addressed daily by civil and environmental engineers. Now, with the creation of the Sonny Astani Department of Civil and Environmental Engineering, we strengthen our resolve to make the world a better place to live today, and tomorrow. Sonny Astani's commitment to harmonious development, and his pivotal role in the ongoing downtown Los Angeles renaissance is precisely the kind of thinking megacities will need in the coming years. And precisely the kind USC is committed to providing.

http://viterbi.usc.edu

USC **Viterbi**
School of Engineering

THE AGE

OF THE MEGACITY

Introducing the Newly Named Sonny Astani Department of Civil and Environmental Engineering

The 21st century is not just the Information Age. It is also the Age of the Megacity. And the Viterbi School is poised to be part of it, thanks to a historic gift from Los Angeles visionary Sonny Astani.*

It is no coincidence that the profession of civil engineering shares its root with the word "civilization," both deriving from a Latin word for city, "civitas." The story of civilization is the story of cities, of large numbers of people living together on relatively small plots of land, of their need for resources, waste disposal, structures that don't fall down and transportation systems.

The advance of civil engineering technology has enabled cities to grow from gatherings of thousands to hundreds of thousands to, now, "megacities" of tens of millions of people.

*See accompanying story.

“Our location at the heart of Los Angeles gives us the motivation, the credibility and the geographic relevance to become the flagship in this mission, not only in this country, but also in the world.”

Jean-Pierre Bardet

Mihran Agbabian and Carter Wellford

“Megacities are more than just large cities—they are the key nodes of the world,” says Dean Yannis C. Yortsos in announcing the Astani gift. “They are financial and global command centers. Today, one-fifth of the world’s GDP is generated in the 10 economically most important megacities. They are a new, dynamic organism, with unparalleled complexity, but also with immense vitality.

“A city like Los Angeles is a magnet for businessmen, entrepreneurs, professionals, artists and writers—a place where creative people congregate and great universities flourish. A city like ours is a center of commerce, an economic driver of an entire region. Most importantly, it is a nursery for ideas and innovation.”

But the very success of megacities has created a dilemma. The problems civil engineers have historically addressed with great success have grown both more complicated and more urgent.

Megacities are pushing the limits of habitability around the world—the urban problems of water supply, energy supply, transportation, pollution, waste disposal and disaster preparedness have been amplified to unprecedented proportions. And residents of Los Angeles (or New York, Shanghai, Tokyo, Mexico City or any of the other 15 megacities with 10 million-plus urban areas) are only too aware of these issues.

In 2007, for the first time in human history, more people lived in cities than in rural areas. At the Viterbi

MORE THAN 100 YEARS OF CIVIL AND ENVIRONMENTAL ENGINEERING AT USC

1914
Student Surveyors

1908
USC awards its first-ever professional engineering degree – in Civil Engineering

1922
First woman to receive a USC engineering degree was awarded a B.S. in Civil Engineering

1879–1880 USC founded

1906
First reference to engineering in any USC catalog; and first semester of Civil Engineering degree program in the catalog

1911
Leslie McClellen receives CE degree; goes on to become chief engineer, U.S. Bureau of Reclamation

1910
First B.S. in Civil Engineering is awarded

Charles Lawrence hired to administer the Civil Engineering Program, then part of the College of Liberal Arts

School, civil and environmental engineering faculty are focusing on this challenge, backed by the Astani naming gift.

Megacities exacerbate risk, produce congestion and environmental stresses, present interconnectedness at an unprecedented scale and strain resources, which they must import. For millennia, engineers have dealt with all these various issues separately and independently. But in today's complex urban environments, these issues must be dealt with in a combined, holistic fashion, with the impacts of each element considered in the context of all the others.

Jean-Pierre Bardet, chairman of Civil and Environmental Engineering, who has succeeded long-term chairman **Carter Wellford**, notes that this new vision brought together areas that had previously worked separately, such as transportation, pollution, energy, water-supply waste disposal, disaster planning and even crime, into a unified whole. The key words, he says, are resiliency, interdependency and sustainability.

These elements were already in place at the school: USC, says Bardet, has nurtured more than a century of civil engineering study and practice, and is now well-positioned to "plant the flag of megacities" here.

1958
George E. Brandow and Roy G. Johnston from the cover of *Engineering News Record* in the first building built over the old height limit in Los Angeles.

1936
George E. Brandow, later co-founder of Brandow & Johnston received CE degree.

1928–1945 Robert Fox, Chair, Civil Engineering Department

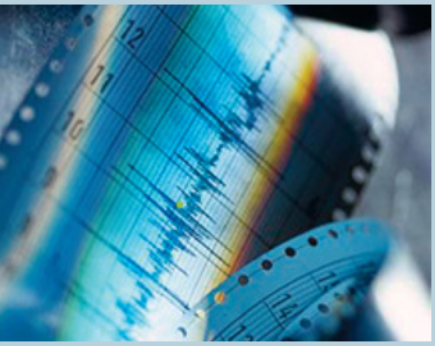
1945–1961 David M. Wilson, Chair, Civil Engineering Department

1928
College of Engineering and the Civil Engineering Department are founded

1944
Foundation for Cross-Connection Control and Hydraulic Research founded

1924
ASCE Student Chapter and Chi Epsilon (CE honor society) are formed

1958
David M. Wilson Associates, Civil Engineering's alumni support group, founded



A feature inherent to megacities is the potential for catastrophic losses in the case of natural disasters. Earthquakes are one such risk, threatening megacities such as Tokyo and Los Angeles. Historically, the range of Viterbi expertise in this context has been impressive. In structural engineering, USC civil engineers worked and continue to work on numerous approaches to urban issues, with great success. **Mihran "Mike" Agbabian** carried out basic research on forces and materials, a body of work that earned him membership in the National Academy of Engineering. **Sami Masri** was an early proponent of a novel approach to the problem of making buildings quake-safe—creating structures that could react to earthquakes. These techniques were incorporated into buildings in Japan and at USC. On campus, Kaprielian Hall is built on structures meant to absorb impact and allow the building to move—to bend without breaking.

Yan Xiao and **James Anderson** specialize in the study of materials and methods to quake-proof buildings. In the wake of the 1994 Northridge earthquake, both were deeply involved in post-mortem analysis of what went wrong, including ways to test buildings for damage and testing of components designed for use in freeway repair to insure soundness.

Structures rest on the ground, and studies of how earthquakes can affect the various soils, as well as the structures of the sands, clay, earth and rock, are critical. Bardet is an expert on the phenomenon of liquefaction, when shaking turns moist sandy soils into soup that buildings sink into. **Geoff Martin** is an expert on how

1966
First Ph.D. awarded by the Civil Engineering Department

1962–1969 Robert Merz, Chair, Civil Engineering Department

1971–1973 Frank Bowerman, Chair, Civil and Environmental Engineering Department

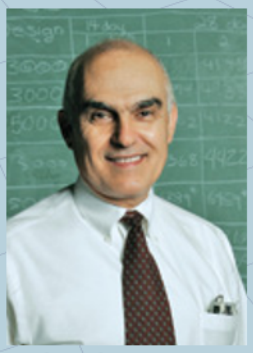
1969–1971 Glen Foy, Acting Chair, Civil Engineering Department

1973–1982 Vic Weingarten, Chair, Civil and

1962
Degree to Albert A. Dorman, later founding chairman, AECOM Technology Corp

1970
Environmental Engineering Program founded from the CE Sanitary Engineering activity; graduate degrees only. Frank Bowerman, Director


Roger Ghanem and Amy Rechenmacher


Sami Masri


Hank Koffman


James E. Moore II

to secure buildings and other structures to the soil in earthquake-prone environments. **Amy Rechenmacher**, a recent NSF Early Career Award winner, contributes additional expertise in the area. And **Hank Koffman** directs one of civil engineering's fastest growing areas: construction management. He is studying organizational ways to make building structures faster, cheaper and more efficient.

Mihailo Trifunac and his colleagues **Vincent Lee** and **Dave Wong** in the Strong Motion Earthquake Engineering group, operate the Los Angeles and Vicinity Strong Motion Network, which has contributed valuable data for numerous engineering and seismological studies. The group also maintains and develops equipment and processing methods for ambient vibration testing of full-scale structures.

Seismic studies are greatly aided by new computer tools. Grid computing techniques co-created by the USC Information Sciences Institute were incorporated into the NEESGrid network. This network creates both large-scale simulations of major quakes centered at possible geographical points, and also creates composite systems, combining real and virtual elements that can test structures for quake resistance. ISI's **Carl Kesselman** and Bardet were co-principal investigators on one NEESGrid study; **Erik Johnson** is also researching in the field.

Additional potential natural dangers to certain coastal megacities are posed by tsunamis, the huge waves generated by undersea quakes or landslides. Systematic studies of these waves, both theoretical and in the field, have been pioneered by **Costas Synolakis,** whose Tsunami Research Center, arguably one of the best in the world, became an internationally trusted center of information after the 2004 Indian Ocean disasters.

Transportation and congestion is a critical megacity issue. **Petros Ioannou** of the Ming Hsieh Department co-directs METRANS, funded by the U.S. Department of Transportation, with the aim of fostering high-quality research to solve pressing urban transportation problems. **James E. Moore, II**, who has an appointment in the Astani Department, in addition to chairing the Epstein Department, has long researched thorny urban transportation issues. And **Najmedin Meshkati** is an authority in ways of dealing with all forms of risk, from sources natural and human. This expertise will be brought to bear in addressing megacity problems.

1977
Geraldine Knatz, today Executive Director Los Angeles Harbor, earns graduate degree

Undergraduate CE–Building Science (Architectural Engineering) program established

1990
Moved to Kaprielian Hall: New labs for structures, geotechnical, concrete, seismology, dynamics, hydromechanics

1982–1984 Don Hudson, Chair, Civil and Environmental Engineering Department

Environmental Engineering Department

1984–1992 Mihran Agbabian, Chair of Civil and Environmental Engineering Department

1991
Undergraduate Environmental Engineering degree program established

1989
Undergraduate CE–Environmental Engineering degree program established

Minor in Environmental Engineering established

The dense urban concentration of megacities creates new environmental problems, associated with consumption, transportation and utilization of resources. Viterbi experts are pioneering new methodologies. **Constantinos Sioutas** has carried out, by far, the most detailed and accurate measurements of soot and dust pollution in the Los Angeles area at the USC Southern California Particle Center, filling a major gap in knowledge about conditions. By enabling medical researchers to look for medical correlations to pollution levels, Sioutas is undergirding the important discipline of environmental health. **Ronald Henry** has long been an expert in air quality. **Joe Devinny** used bacteria to get rid of noxious vapors from wastewater, and his work estimating costs for storm-drain water treatment last year won him an award from the Los Angeles Regional Water Quality Control Board. A team led by **Mike Pirbazari** developed ways to clean up water contaminated by gasoline and other pollutants. **Teh Fu Yen** has pioneered an innovative multiagent process using bacteria, fungi and other methods to clean up highly dangerous toxic waste.

Energy, water and other resources issues are of equally critical dimension in a megacity context. **Don Zhang**, who recently joined the Viterbi School, specializes in modeling and the study of the complex movement and changes in groundwater, as well as the potential of geological formations as holding places for carbon dioxide and other greenhouse gases. Carbon sequestration is of key and immediate concern to the use


Najmedin Meshkati


Costas Synolakis


Constantinos Sioutas


Joe Devinny


Geoff Martin


Don Zhang

1995
CEE teams up with contracter C.C. Myers to strengthen freeways to make them more quake-safe.

1993
Center for Research in Environmental Science, Policy, and Engineering (CRESPE) founded with the USC College and The Chemical Engineering Department

1997
Founding of International Institute for Innovative Risk Reduction Research for Civil Infrastructure Systems

Minor in Construction Planning and Management established

1992–1996 Geoff Martin, Chair, Civil and Environmental Engineering Department

1996–2006 L. Carter Wellford, Chair, Civil and Environmental Engineering Department

1992
Master of Construction Management (MCM) program founded

1994
Association of General Contractors (AGC) Student Chapter formed

1998
Master of Engineering in Computer-aided Engineering established

of fossil fuels. A collaboration with the Mork Family Department Petroleum Engineering faculty **Kristian Jessen** and **Iraj Ershaghi** is being launched to bring needed new insights and provide answers to these critical questions. **J.J. Lee** is devoting his research to water resources.

And, the task of trying to bring the insights of all these areas together to better understand the impact of growth is critical. **Roger Ghanem**, who has been highly influential in spreading the megacities focus in the department, is an internationally known expert in modeling—creating mathematical representations of complex, interconnected systems.

That story is turning over a new chapter—one that the Viterbi School is ready to help write.

"USC civil and environmental engineering aspires to be in the lead in addressing these challenges," said Yortsos. "Our location at the heart of Los Angeles gives us the motivation, the credibility and the geographic relevance to become the flagship in this mission, not only in this country, but also in the world." //

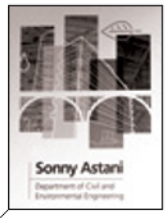
2000
Master of Engineering in Environmental Quality Management established

2001
Master of Engineering in Structural Design established

2004
Indian Ocean tsunami created worldwide exposure—1 million hits for the Tsunami research center website

2005–2006 100th Anniversary of Engineering at USC

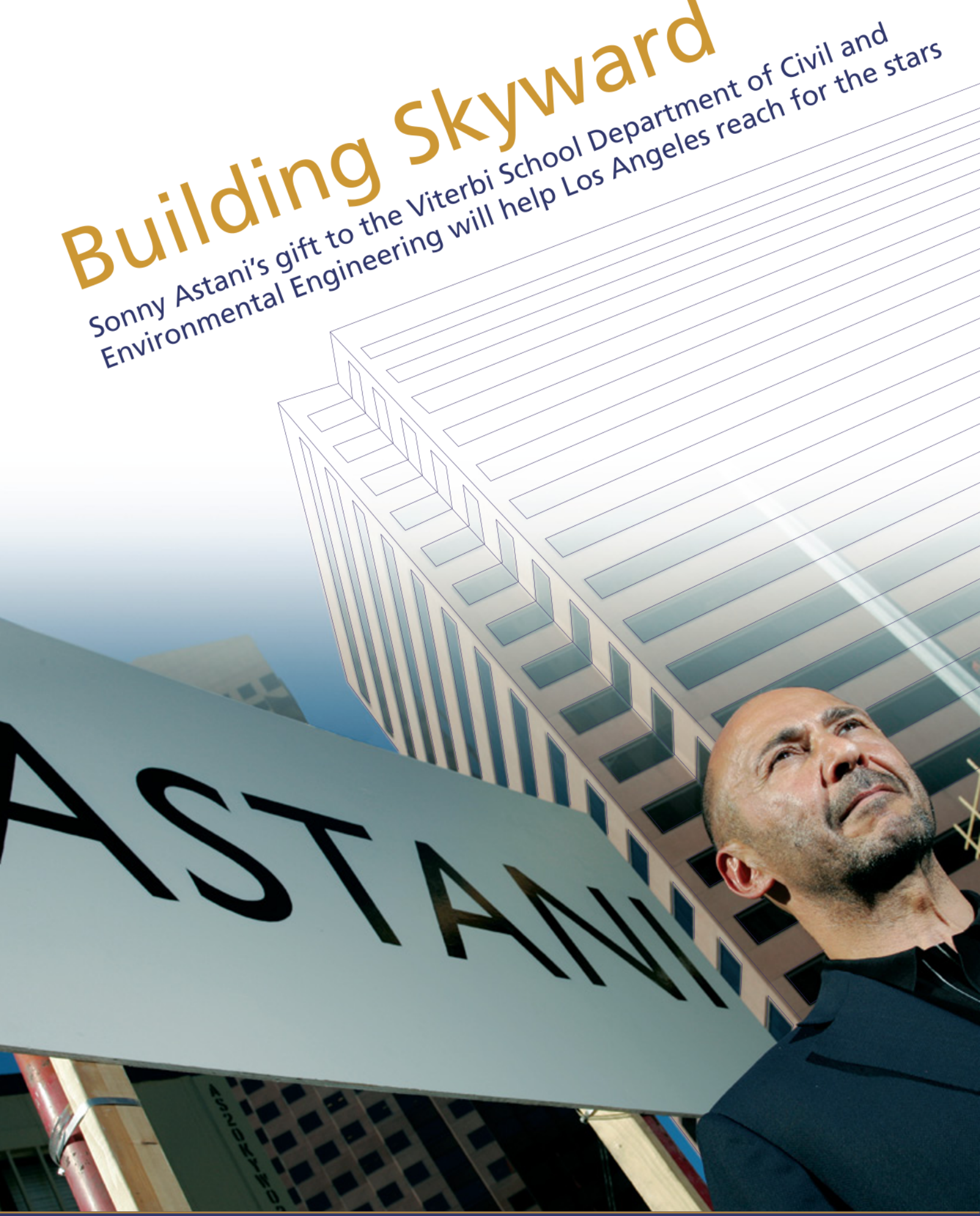
2006–Present Jean-Pierre Bardet, Chair, Civil and Environmental Engineering Department



2007
USC Sonny Astani Department of Civil and Environmental Engineering

Building Skyward

Sonny Astani's gift to the Viterbi School Department of Civil and Environmental Engineering will help Los Angeles reach for the stars



Phil Channing

When Hassan Astani, better known in Los Angeles real-estate circles as "Sonny" Astani, looks across an indigo skyline of sparkling lights, blinking traffic signals and softly lit high rises, he thinks about civil engineering and what it brings to urban life. He believes a lifestyle transformation is taking hold in cities like this all across the globe. It isn't obvious to the casual eye, but slowly and assuredly, as urban areas expand to support more and more people, residents are beginning to favor the convenience of high-rise living, proximity to work and public transportation over commutes and spacious backyards.

"It all begins and ends with civil engineering," the Beverly Hills real-estate developer and Viterbi School alumnus (MSISE '78) says. "Look back to the seven ancient wonders of the world and you will find the beginnings of civil engineering. These ancient engineers carved out the greatest cities of the world from nothing. They've left their mark on our roads, our bridges, infrastructure, architecture and sense of place in the world. I can't think of a more important profession in the history of civilization or to the sustainability of our cities in the future."

To demonstrate his conviction, and fulfill a desire to give back to his alma mater, Astani made a $17 million gift to name the Viterbi School's Civil and Environmental Engineering Department. The department will now be called the Sonny Astani Department of Civil and Environmental Engineering, and take its place as the fourth-named department in the Viterbi School of Engineering.

"Sonny Astani is a remarkable Trojan who is transforming Los Angeles," says USC President Steven B. Sample. "He understands the crucial role civil and environmental engineers must play as more and more people live in cities. We are deeply grateful at USC, not only for his exceptional gift, but also for his majestic vision of urban life."

Yannis C. Yortsos, dean of the Viterbi School of Engineering, expresses his gratitude for Astani's gift. "Sonny is known for his environmentally creative architecture and his philanthropic work to help people and improve neighborhoods. He shares our belief that civil and environmental engineers are the key to making the world's burgeoning megacities highly functional, healthful and inspiring places to live."

At a campus celebration to name the department, Yortsos noted that Astani's gift goes to that branch of engineering that is closest to people's lives. "Civil engineers provide homes, water, sanitation, bridges, tunnels, roads and civil infrastructure. And environmental engineering expertise is critical to safeguarding the environment.

"By 2030, almost 5 billion people, or 60 percent of the entire world, will live in cities," Yortsos says. "This raises huge challenges for civil and environmental engineers, particularly in the context of megacities. Civil and environmental engineering are the major forces for improving and enhancing cities and urban centers around the world."

Astani's perspective on urban life comes from his own world travels

and his enthusiasm for large cities. New York, Chicago, Tokyo, Shanghai, Mumbai, London and Los Angeles are his favorites. But he considers himself a "joyful participant" of Los Angeles, having been a part of this city's growth and development over the last 30 years. An engineer by training, Astani says the profession will take center stage in this trend toward megacities in the 21st century.

"As we move toward larger and taller cities, we will have to find enterprising solutions to complex infrastructure, pollution and energy problems," he says. "That will take imagination and a very forward-looking civil and environmental engineering program."

The Man Behind the Gift

Astani is chairman of Astani Enterprises, Inc., one of the largest niche real-estate development companies in Los Angeles today, with investments valued at more than $1 billion. His firm owns or operates approximately 4,000 apartment units and lofts in the city and is currently building 2,000 condos and lofts in downtown L.A. These include three major residential projects, featuring iconic residential towers and lofts: the Concerto, a mixed-use, twin-tower complex standing 32 stories tall, with 27,000 square feet of shops, restaurants and spas; the 38-story Grand project; and Vero, located at 1234 Wilshire Blvd.

Astani serves on the Executive Committee of the Central City Association, on the Board of Councilors of the USC Viterbi School of Engineering, and USC's Lusk Center for Real Estate Development. He is also a board member of the Pacific Council for International Affairs.

His roots go back to Mashhad, Iran, one of the largest and holiest Persian cities. The oldest of four siblings, Astani was born into a military family in 1953, living in barracks the first four years of his life. Mashhad was the

seat of commerce and industry in the Khorasan Province, located 500 miles (800 kilometers) east of Tehran. In 1957, Astani's family moved to Tehran, where he was educated.

"In Iran, if you wanted to have a successful future, you either became an engineer or a doctor," Astani says. "You have to decide very early on, because one career means you take a lot of math, the other a lot of biology. It's really difficult to get into the good universities in Iran, so you have to start very early, just like in India and China today. From the fourth grade, while everyone else was outside playing soccer, I was studying math."

From a young age, his dream had always been "to become an engineer with some higher degree from the United States." But that meant he had to get into Sharif University of Technology, which has a high-quality engineering program, then stay afloat through a rigorous four-year curriculum.

"Nine out of 10 people flunked the college entrance exam because it was very difficult. Throughout high school, you had nightmares of flunking this exam, and they only administered it once a year," Astani says.

Love at First Sight

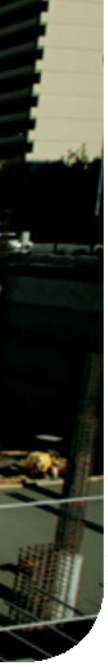
That exam had a "deep impact" on Astani's psyche, but he passed nevertheless and earned an undergraduate degree in engineering. In 1975, he applied to a handful of universities in the United States, getting the nod from all of them. He decided to visit a friend in L.A. and see the USC campus. When Astani arrived, "It was love at first sight."

"I was coming from the middle of winter in Iran, wearing three layers of clothing, and everyone here was dressed in shorts and T-shirts. Everything was so new," he said, smiling. "My friend took me to the USC campus, where there was a concert in the Commons area, and I got so caught up in it."

Astani entered the master's degree program in industrial and systems engineering in 1976, breezing through the course work in two years. One of his classes, Engineering Economics, taught by professor emeritus Gerald Fleischer, introduced him to the world of finance and investments, and changed his life.

"That was the very first course I ever took that taught me about compounding and net present values. It was very enlightening," he says. "It gave me ideas about my career, about investments, and I became a fan of Warren Buffett, the best investor of our time."

In 1978 he finished his degree, but the Iranian revolution changed his plans to return home. His mother convinced him to stay in Los Angeles and work, at least temporarily, until things settled down. He landed a job at Gould-Brown Boveri in Downey, Calif., a German company that built electrical poles, performing time-and-motion studies on the factory floor, but disliked the work.



Phil Channing

Astani stands over Concerto, a two-tower high rise at 9th and Figueroa.

He concluded that engineers were underappreciated and decided to pursue a real-estate license instead, then began showing houses for a prominent Westside brokerage house. But he grew bored quickly.

"I had that engineer's big picture perspective about real estate, that it was a system with many different parts," Astani says. "I wanted to do it all—build, own and operate—not just sell property to others."

From Seller to Developer

He began to educate himself about property acquisition and development, driving through the neighborhoods and riffling through the property and zoning maps in City Hall, copying city plans by hand. Then, on the advice of another real-estate agent in his office, he partnered with one of his engineering friends to begin buying apartment complexes: first a seven-unit building in West L.A., then a 20-unit building in Hollywood, and then a 40-unit building in Hancock Park. In a span of five years, his company built 40 apartment buildings in West L.A., Hancock Park, Hollywood and Korea Town.

As his wealth increased, he bought out the company that employed him, Lambert Smith Hampton. He partnered with his brother, Marco, two years his junior, as the builder, and later, his two other siblings, Fay and Shane.

But the market took a nosedive in the early '90s and "real estate just wasn't happening," Astani says. He had six apartments under construction and little money coming in, which left him near financial ruin. Ironically, during those difficult times, he met his future wife, Jo, an artist from Korea, who made her home in a loft in the downtown artists' community, where he had been scouting for property acquisitions.

Astani was forced to start thinking outside of the box.

"I changed my mind-set from being a broker to being a developer," he says, "and began talking to banks about taking over foreclosed properties."

The banks were skeptical at first, but eventually took him on. Big overseas investors in Hong Kong, Singapore and Indonesia partnered with Astani to develop and manage condominium projects all over Los Angeles.

By 1999, Astani Enterprises was a unique, multifaceted firm with investments in 2,000 apartment units across the city.

'City Chic' Renaissance

Astani realized a "city chic" residential renaissance was under way. He got serious about downtown acquisitions, and within a year, had purchased three significant development sites totaling 8 acres for $80 million.

"I had been eyeing downtown L.A. for a long time because things were going on there," Astani says. "Downtown was so depressed at that time, but in 2003, the city passed this obscure 'adaptive reuse law,' so that you could buy these big, beautiful, empty buildings at $20 a foot and turn them into anything you wanted. Realtors were turning them into lofts and studios and renting them very inexpensively. That's when I thought something was going to take off in Los Angeles. The Staples Center was just opening, and the Disney Concert Hall was under construction.

"Part of my excitement about Los Angeles is the whole concept of the Figueroa Corridor, which could span the University Park campus, Los Angeles Memorial Coliseum, Exposition Park, Galen Center, the Staples Center, Disney Hall and Our Lady of Angels Cathedral," Astani says. "It could be one continuous corridor of arts, entertainment, music, education, theater, and a global venue for sporting events. It can be the perfect place for USC students and attract people from all over the world."

All the right circumstances seem to be converging now to make that happen. USC's "Visions and Voices" initiative is bringing world-class art, literature and theater to campus and the surrounding environs; Astani's residential high-rises—known for their contemporary sophistication and environmental aesthetics—have already transformed Los Angeles, adding an "organic" quality to the city. Astani says L.A.'s next challenge is "to find its voice skyward."

Sonny and Jo Astani reside in the Pacific Palisades, where they live in a Richard Neutra-designed home with their three children. His brothers, sister, mother, cousins and his wife's relatives all live close by, and when combined, represent 10 nations and "a lot of lively, multilingual get-togethers." In his free time, Astani enjoys the martial arts, and holds a second-degree black belt. He also cycles, swims and travels the world. Jo is an accomplished equestrienne. //

"I had that engineer's big picture perspective about real estate, that it was a system with many different parts. I wanted to do it all—build, own and operate..."

ALUMNI NEWS

VITERBI ALUMNI RELATIONS

Your membership in the Trojan Family does not end at graduation. The USC Viterbi School's Office of Alumni Relations is here to build and sustain your connection to USC, to the Viterbi School and to your fellow Trojan Engineers—a connection that is truly lifelong and worldwide.

You are part of a distinguished group of more than 35,000 Viterbi School alumni. We hope you take advantage of the many opportunities to build connections with this group through volunteering, guest lecturing, career mentoring and supporting the school. Alumni also stay connected to the engineering community through our online database, lifetime email forwarding, networking and attending annual events such as Homecoming and the Viterbi Awards.

Stay Connected

We rely on your accurate mailing and emailing addresses to ensure you receive our many publications and invitations to special events. Please update your information online at http://viterbi.usc.edu/alumni or by contacting the VSoE Office of Alumni Relations at (213) 821-2424.

2008 Viterbi Awards

You are invited to join us for the 2008 Viterbi Awards.

When: Thursday, May 8, 2008
Where: Regent Beverly Wilshire Hotel
Time: 6:00 pm—Reception
7:00 pm—Dinner and Program

This year, the Viterbi School will be honoring:

- Simon Ramo, PhD – *Lifetime Achievement Award*
- Patrick Soon-Shiong, MD – *Epstein Management Award*
- Katherine Crothall, PhD – *Stevens Distinguished Alumni Award*

For more information please call **213-821-2424** or visit **viterbi.usc.edu/awards**.

Viterbi *Awards*

Bay Area Weekender

The Viterbi School made its annual trip to Northern California for this year's Bay Area Weekender—*Engineering Beer*. This year's event was held in Berkeley at the Pyramid Alehouse. More than 100 alumni, parents and friends of the Viterbi School gathered for appetizers and a special tasting of Pyramid ales. Guests were treated to a private tour of the alehouse and learned more about the production and engineering of beer.

Hollywood Bowl

On August 31, the Viterbi School hosted its 5th annual "Evening at the Hollywood Bowl." Prior to the concert more than 100 alumni and friends of the school gathered at the Bowl's museum garden for a reception and dinner. Prof. Jim Moore, chair of the Viterbi School's Daniel J. Epstein Department of Industrial and Systems Engineering, gave a special presentation before guests enjoyed the "Tchaikovsky Spectacular," with a special appearance by the Trojan Marching Band.

Global Conference

At a special reception in Tokyo, Dean Yannis Yortsos, Cauligi Raghavendra, and Katherine Aschieris are joined by (in alphabetical order) Apoorua Bhatt, John and Irene Bou, Eric (BSEE '93) and Amy Fung, Yasuyoshi Hayashi (BSME '98), Danny Huang, Shigekazu Kato (MSME '79), Elliot Taniguchi (MSEE '05), Mike Wang (BSEE '90, MSEE '91), Hisatoshi Yamada (MSISE '91), and Hiroko Yarimoto (BSCSCI '94).

The USC Global Conference, held in Tokyo in late October 2007, turned out to be one of the largest gatherings of USC alumni, friends and faculty outside of the United States. Held at the Tokyo Hilton, the event drew more than 500 registrants from the United States, Europe and Asia. The conference was organized to bring experts together to discuss key issues and challenges facing the Asia Pacific region in four major areas: how to adapt to an aging society; interactive digital entertainment; entrepreneurship and innovation; and challenges facing Pacific Rim societies.

USC Homecoming

More than 400 alumni, friends and their families came back to USC on November 3 for the annual Viterbi School Homecoming picnic. Before watching the Trojans defeat the Oregon State Beavers, guests mingled with fellow alumni and friends while enjoying delicious barbecue and drinks. The popular raffle was a success, as always, with one lucky guest taking home a signed Matt Leinart football jersey.

Jack Haggenmiller (BSEE '88) and his son Michael show their Trojan pride at the annual Homecoming picnic.

Professor Hank Koffman (BSCE '61), center, enjoys the Homecoming picnic with members of the Civil Engineering class of 1961 and their families.

Volunteer Opportunities

ENGINEERS WITHOUT BORDERS NEEDS YOUR HELP

The USC Chapter of Engineers Without Borders has taken on the significant task of creating sustainable systems for two Honduras communities. Both villages share a single water source—a river 1 kilometer away—which provides drinking, cooking, and bathing water. This river is contaminated by livestock and wild animals, making it unsuitable for consumption.

A successful assessment trip to the village of La Estanzuela last March allowed the students to design the project. It will include: pumping the water from an upstream, uncontaminated source; building nearly two kilometers of pipeline; filtering and chlorinating the water; and connecting homes to the water distribution system.

They will travel to the village of Corral de Piedras this spring to assess project needs for that community.

The USC chapter is taking donations to fund the anticipated $30,800 project cost for these important humanitarian efforts. Gifts of all sizes are appreciated…and tax deductible!

To make your donation, contact Jacquelin Reed at **jacquelin.reed@usc.edu** or call **(949) 436-1983**. Visit the Chapter's website at www.ewb-usc.org to learn more about the project.

See pages 22 and 23 for a photo essay on the students' March 2007 visit to La Estanzuela.

VITERBI INTERNATIONAL REPRESENTATIVES

The Viterbi School is going global. In addition to searching for Viterbi Alumni worldwide, we are looking for international alumni leaders in major cities to represent the Viterbi School of Engineering in various regions. Help us engage and connect Viterbi Alumni, plan events and programs in your area and keep the connection with the Viterbi School.

VITERBI SCHOOL CLASS CORRESPONDENTS

The Viterbi School of Engineering is looking for special "Class Correspondents" (one from each graduating year) to act as the key liaison between fellow alumni graduates and the Viterbi School. These representatives will work closely with the Viterbi School alumni office to involve their class in signature events and programs, and will help our office keep the connection with alumni by alerting us to classmates' career paths, marriages, births and other exciting life news!

If you are interested in serving or recommend someone as an **International Representative** or a **Class Correspondent**, please contact the VSoE Alumni Office at **viterbi.alumni@usc.edu** or call **(213) 821-2424**.

THE VITERBI SOCIETY

Trojan engineers have a long and proud history of supporting future classes of engineering students. You can continue this important legacy by joining the Viterbi Society, the premier academic support group for the USC Viterbi School of Engineering.

As a Viterbi Society member, you will have many opportunities to enjoy your lifelong connection to the Trojan Family. You will also enjoy the member privileges and courtesies reserved exclusively for Viterbi Society members. Most importantly, you will be investing in the future of the Viterbi School, while surrounding yourself with alumni and friends who, like you, care deeply about engineering excellence and innovation at USC.

For more information and a list of membership benefits, contact us at **(213) 740-2502** or **viterbi.giving@usc.edu**.

INTERNATIONAL ALUMNI

Where in the world are our international alumni? Can you help us find these fellow engineers? You can e-mail us names, spread the word to your friends and family and update your information online. To help, please contact us: VSoE Office of Alumni Relations at **(213) 821-2424** or online at **viterbi.usc.edu/alumni/**.

Women in Engineering

The *Women in Engineering (WIE) Office* offers professional, academic and social services to the women of the Viterbi School. The goal of the Viterbi WIE Office is to recognize the unique challenges that female engineering students face and provide resources and overall support that will address these challenges and allow our female students to find personal and professional success during their Viterbi career and beyond.

VITERBI WOMAN OF THE WEEK

Viterbi's Woman of the Week series highlights one outstanding female engineer—student, faculty member or alumna—each week to the entire Viterbi community. We encourage all alumnae to nominate a current undergraduate student, fellow alumna, or yourself! To nominate a Viterbi Woman of the Week, click the "vWow" link on our website at **viterbi.usc.edu/wie/**.

WIE CONNECTIONS

The *WIE Connections Mentoring Program* pairs current female engineering undergraduates with a Viterbi alumna or a female faculty member. If you are interested in serving as a mentor for one of our outstanding Viterbi women, e-mail **wie.viterbi@usc.edu** or click on the "Mentorship" link on our website at **viterbi.usc.edu/wie/**.

Viterbi Career Services

UNDERGRADUATE CAREER CONFERENCE
Saturday, September 27, 2008

The Engineering Career Conference is offered each fall to undergraduate engineers. This one-day event, coordinated by Viterbi Career Services and the Center for Engineering Diversity, brings alumni and industry representatives on campus to present workshops on various career-related topics, conduct mock interviews and provide resume critiques. The Conference provides students with valuable skills and strategies that they can apply to the job-search process and is entirely dependent on corporate sponsorship and volunteers.

If you are interested in becoming involved with the Career Conference, or would like further information on becoming an event sponsor, please contact Viterbi Career Services at **(213) 740-9677** or **viterbi.careers@usc.edu**.

FALL 2008 ENGINEERING CAREER FAIR
Thursday, October 9, 2008

The Engineering Career Fair provides an excellent opportunity to increase your company's visibility among our top engineering students. We offer two tech-only fairs each year in October and February. The Engineering Career Fair is attended by 100-plus top engineering employers and about 1,700 to 2,200 of our students. Register at **viterbi.usc.edu/careers** to qualify for early registration!

Visit our website today
to update your information:
viterbi.usc.edu/alumni

Engineering Me

MY NAME:
David Lane, Viterbi School Board of Councilors

HOME: San Francisco Bay Area, California

DEGREE: BSEE 1981

JOB TITLE: General Partner, ONSET Ventures

LIFELONG DREAM:
To leave the world a better place

FAVORITE VITERBI PROF: Dr. Willard Rusch

BOOK I'M READING: Bible

ON MY IPOD: '60s,'70s and early '80s music

WORDS TO LIVE BY: Truth; treat others as you would have them treat you

ENGINEERING HEROS: The legendary entrepreneurs who built Silicon Valley, such as Gordon Moore of Intel

NEXT TRIP: Galapagos Islands

BEST TIME OF DAY: Early morning

FAVORITE GADGET: Blackberry with GPS

BEST USC MEMORY: Engineering classes in the morning, playing on USC baseball team in the afternoons

TOUGHEST ENGINEERING CLASS: Electromagnetics

NUMBER ONE URL: www.onset.com

NUMBER OF TROJANS IN MY LIFE: Too few in the Bay Area

PROUDEST MOMENT: Watching a miracle as my children were born

BIGGEST CHALLENGE: Learning to walk after paralysis

INSPIRATION: My father and mother

Me...Engineered

Class Notes

Viterbi Class Notes are a great way to catch up with your former classmates. If you want to share exciting news and photos with the USC Viterbi community, visit **viterbi.usc.edu/alumni/classnotes** and fill us in.

80 *Michael Deitchman,* (MSSM '80) has been inducted into the University of Maryland Department of Aerospace Engineering Academy of Distinguished Alumni and has been awarded the prestigious Glenn L. Martin Medal for outstanding achievement in aerospace engineering. Deitchman was appointed to the Senior Executive Service on Sept. 9, 2001, and is currently the deputy chief of Naval Research, Naval Air Warfare and Weapons Science and Technology Department at the Office of Naval Research, responsible for the Navy's aircraft, air and surface weapons technology programs. His naval career spans more than 36 years, starting as an engineering student trainee from the University of Maryland Co-operative Education program in Feb. 1971. After graduating in 1973 with a bachelor of science in aerospace engineering, Deitchman returned to the Naval Air Test Center as a senior flight-test engineer for the Marine Corps AV-8 aircraft. His career has included positions of chief engineer for the Navy's E-2C aircraft, F/A-18 deputy program manager, head of the Naval Air Systems Command Shipboard Suitability Test and Evaluation Division and Office of Naval Research Strike Technology division head. Deitchman has a master of science degree in Systems Management of RDT&E from USC, completed graduate study in aerospace engineering at Pennsylvania State University and is a graduate of the U.S. Naval Test Pilot School test project engineering curriculum. He is the recipient of the Department of the Navy's Meritorious and Superior Civilian Service Awards.

83 *Capt. Stephen Beckvonpeccoz* (BSISE '83) is a naval aviator and graduate of NROTC USC and has been undergoing attaché training in the Washington, D.C., area. He and his family will report this summer to the U.S. Embassy in Berlin, where he will serve as naval attaché to Germany.

85 *Charles Belk* (BSEE '85) recently launched Charles Belk Management (www.charlesbelk.com, www.myspace.com/charlesbelk), a Los Angeles-based artist brand-awareness and management agency. He previously served as VP, User Marketing for JuiceCaster, a New York/Los Angeles-based unified Web and mobile social networking application company, and as VP, Interactive Promotions for Hothouse Inc, an Atlanta-based promotional marketing agency. Charles was also recently elected to the Board of Directors of the USC Black Alumni Association and delivered the keynote address for the Viterbi School of Engineering Center for Engineering Diversity's 2007 Awards Banquet

86 *Steve Palar* (BSPTE '86) is working for Chevron Thailand as a petroleum engineer and has been living in Bangkok, Thailand, since 2004. He is married to *Hsiang Lun Tai* (BSCE '87) and has two children. His oldest child is an incoming USC freshman.

VITERBI ONLINE EDUCATION

For 35 years, the Viterbi School's innovative Distance Education Network (DEN) has enabled thousands of engineers to earn their M.S. degree from USC without setting foot on campus. With just a high-speed Internet connection, students throughout the country can view the same courses as our on-campus students. More than 30 M.S. programs are available entirely online—visit **www.den.usc.edu** to see how to get started this spring semester.

VITERBI CAREER SERVICES

If you are interested in becoming involved in hiring current Viterbi Engineers, or would like to know where to start for Alumni Career Services, please visit: viterbi.usc.edu/careers/alumni/.

Or visit the Career Services Office:

3710 S. McClintock Avenue
Ronald Tutor Hall (RTH) 218
Los Angeles, CA 90089-2900
Phone (213) 740-9677
Fax (213) 740-9586
viterbi.careers@usc.edu

94 *Thomas Murray Ferrier* (MSSM '94), son of the late Dr. Paul and Elizabeth Ferrier Jr. of La Cañada/Flintridge, announced his marriage to Ann Felicia Rosen, daughter of Jack Rosen, Esq., of Highland Park, Ill., and Lova Andros of Glenview, Ill. The couple was married on January 13, 2007, at The San Diego Wild Animal Park. Ferrier, a Trojan and third-generation Californian, has strong family ties with USC: Dr. Paul A. Ferrier Sr., MD, started USC's Urology Department; Dr. Paul A. Ferrier Jr., MD, a urologist who taught at USC; Dr. James A. Ferrier, MD, an orthopedic surgeon who did his internship in surgery at USC; and Dr. Genevieve E. Ferrier, MD, a pediatrician who completed her residency at Childrens Hospital, an affiliate of the Keck School of Medicine at USC. Ferrier received a bachelor's degree in chemistry from Occidental College, a master's degree in business administration from Thunderbird School of Global Management and a master of science degree in materials science from USC. He is director of marketing at James R. Hughes Insurance & Financial and is a competitive sailor in

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Calendar of Events

VITERBI EVENTS

We look forward to seeing you at Viterbi School events, where you will join fellow alumni and friends who share a passion for USC engineering. We have a fun and diverse schedule, so make plans now to join us at one or more of the following:

Viterbi Awards
May 8, 2008
6:30 p.m. Reception
7:30 p.m. Dinner and Program
Regent Beverly Wilshire
Beverly Hills, California

USC Commencement
May 16, 2008

MAIN UNIVERSITY CEREMONY
9:00 a.m.
Alumni Park

VITERBI SCHOOL UNDERGRADUATE CEREMONY
10:30 a.m. (immediately following the Main Ceremony)
Archimedes Plaza/Engineering Quad
Reception to immediately follow

VITERBI SCHOOL MASTER'S AND PH.D. CEREMONY
2:30 p.m.
USC Galen Center
Reception to immediately follow

VSoE India Alumni Tour
August 2008
TBD

Engineering Career Conference*
Saturday, September 27, 2008
USC Campus

Fall Engineering Career Fair*
Thursday, October 9, 2008
USC Campus

Viterbi Class Reunion Reception 2008
October 31, 2008
TBD

USC Homecoming 2008 — Annual Viterbi Reunion Picnic
November 1, 2008
USC Campus

Viterbi Bay Area Alumni Reception
November 14, 2008
Silicon Valley, California

Regional Networking Events
Ongoing
Los Angeles, Orange County, San Diego, San Francisco

*These student events have an alumni component—see volunteer section on page 44 for more information.

REUNION 2008: SAVE THE DATE OCTOBER 31 – NOVEMBER 1, 2008

WELCOME BACK:

Class of 2003 (5th Year Reunion)
Class of 1998 (10th Year Reunion)
Class of 1983 (25th Year Reunion)
Class of 1958 (50th Year Reunion)
All Half-century Trojans

Come back to USC and celebrate your engineering days with fellow classmates for Homecoming Weekend. Join us for a Friday evening of festivities followed by the Annual Viterbi School Homecoming Picnic the next day before the football game. More details to come.

Engineering Me

MY NAME: Roger Kou

HOME: Taipei, Taiwan

DEGREE: BSCI 1994

JOB TITLE:
Business Development Manager

LIFELONG DREAM:
Traveling around the world!

FAVORITE VITERBI PROF:
Dr. Peter Danzig

BOOK I'M READING:
Mr. Ambassador: Warrior for Peace

ON MY IPOD: Lisa Ono

WORDS TO LIVE BY:
"It's almost impossible to dislike me because I do nothing." — Jack Paar

ENGINEERING HERO: Reynold "Rey" Johnson and Dr. Simon Ramo

NEXT TRIP: Visiting family and friends in Southern California

BEST TIME OF DAY: 7 to 7:30 a.m.

FAVORITE GADGET: Bose noise-cancellation headset

BEST USC MEMORY: Answering UNIX questions in UCC and SAL

TOUGHEST ENGINEERING CLASS: Claire Bono's compiler class!

NUMBER ONE URL: http://gmail.com

NUMBER OF TROJANS IN MY LIFE: Many!!!

PROUDEST MOMENT: Seeing my students graduating!!!

BIGGEST CHALLENGE: Spending more quality time with family

INSPIRATION: Seeing how education makes a difference in people's lives

Me...Engineered

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the Star Class. Ann Ferrier received a bachelor's degree in geology and economics from the University of Colorado and a masters in business administration from Thunderbird School of Global Management. She is a business development executive at the Canadian Consulate General and is an active hunter/jumper equestrian. The couple honeymooned in Cabo San Lucas and La Paz, Mexico.

98 *Armando Santana* (BSCSCI '98) has been working on creating magic for Walt Disney Imagineering's Research & Development group, the R&D arm of the Walt Disney Company. He recently helped to launch a new business called Adventures by Disney, a guided vacation experience. He is currently responsible for mobile initiatives and other new media projects and was recently promoted to principal technical staff. He keeps busy with family life, his wife and two very active kids, ages 6 and 4.

00 *Darren Shou* (BSCSCI '00) worked in management for Microsoft after graduation and is currently a senior manager at Symantec Research Labs in Santa Monica, Calif., while also serving on the boards of several organizations. //

Engineering Me

MY NAME: Johnna Shay Dalby

HOME:
Orange County, California

DEGREE:
B.S. Civil Engineering 1998 & MCM 2003

JOB TITLE:
Project Manager

LIFELONG DREAM:
Sail around the world

FAVORITE VITERBI PROF: Doc Wong

BOOK I'M READING: *The Memory Keeper's Daughter* by Kim Edwards

ON MY IPOD: Todd Snider

WORDS TO LIVE BY: "Life is too short not to make the best and the most of everything that comes your way every day." — Sasha Azevedo

ENGINEERING HERO: My grandfather

NEXT TRIP: Australia and New Zealand

BEST TIME OF DAY: Morning

FAVORITE GADGET: DVR

BEST USC MEMORY: SF Weekender '94

TOUGHEST ENGINEERING CLASS: Physics

NUMBER ONE URL: www.abcpilates.com

NUMBER OF TROJANS IN MY LIFE: Too many to count

PROUDEST MOMENT: Taking a chance on a new career in a new city

BIGGEST CHALLENGE: My biggest challenge was my proudest moment (see above)

INSPIRATION: Family and Friends

Me...Engineered

In Memoriam

Benjamin Lane (BSME '50) passed away after a brief illness with pancreatic cancer on Sept. 21, 2007, in San Diego. Lane was born on April 27, 1916, in St. Louis. Following his passion for flying, he worked in the nascent airplane industry in St. Louis and in 1937, joined the Abraham Lincoln Brigade in Spain, fighting until 1939. Lane returned to Los Angeles, where he married his wife of 68 years, Sylvia Eisenberg, on Sept. 2, 1939. He served in the Army Air Force in World War II, and after the war, graduated with a degree in mechanical engineering from USC in 1950. While attending USC, he competed for the track team and became accomplished with the javelin. During this period, Lane also became a die-hard fan of the USC Trojan Football team and held season tickets for more than 50 years. His first job out of USC was working at Cleveland Crane, where one of his noteworthy engineering accomplishments was designing the tracks for rides in Disneyland, including the Peter Pan ride, the Jungle Boat ride and the Mark Twain Steamboat ride. These rides all opened in 1955 and have been enjoyed by children from all over the world. Lane migrated into the health-care field in the 1960s, managing health-care and nursing-home facilities for more than 30 years, and was elected a fellow in the American College of Nursing Home Administrators. He was instrumental in developing a role for nurse practitioners and other allied health professionals in working with mental health and elderly patients in both in-patient and outpatient facilities. Lane was active in scouting in Whittier, Calif., and helped run the Air Explorer Troop 939A for several years. Accompanied by Sylvia, he

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H.K. Cheng

Viterbi School faculty, staff and friends paid tribute to Distinguished Professor Emeritus H.K. Cheng at a campus memorial service held Nov. 5, 2007, in Town and Gown.

Those attending Cheng's memorial service included his family, from left to right, Anita Cheng, niece; Chris Cheng, nephew; Alice Cheng, cousin-in-law; Stella Karuwin, sister; and Linda Cheng, daughter.

Though retired for the last 14 years, Cheng remained a familiar face on campus, and continued to frequent the Aerospace and Mechanical Engineering Department, conducting funded research until he was sidelined by illness. A 42-year veteran of USC, Cheng was a member of the National Academy of Engineering (NAE), the American Institute of Aeronautics and Astronautics (AIAA), and a fellow of the American Physical Society (APS).

"USC and the Viterbi School have lost a brilliant scholar and a wonderful colleague," Viterbi School Dean Yannis C. Yortsos said at the campus eulogy. "He will be missed greatly."

Cheng, an early contributor to USC's reputation for research excellence in ight aerodynamics, published a landmark paper in 1963 on hypersonic ow that was crucial to the design of ultra-high-speed aircraft. He also did significant work in theoretical and computational uid mechanics, ight hypersonics, geophysical uid mechanics, bio- uid dynamics, the hydrodynamics of swimming propulsion and the effects of sonic booms on oceans.

"In addition to his scientific achievements, H. K. was one of the most pleasant and helpful colleagues I have ever had," noted Ron Blackwelder, professor of aerospace and mechanical engineering.

Born in China, Cheng received a B.S. degree in aeronautical engineering from Chiao-Tung University in 1947. He next attended Cornell, earning an M.S and a Ph.D. in aeronautical engineering in 1950 and 1952, respectively.

He worked for several years as a research aerodynamicist for Bell Aircraft Corporation before returning as a researcher to Cornell. After a year as a visiting lecturer at Stanford, he became a special lecturer at the Graduate Department of Aerospace Studies at USC in 1964. By the following year, he was a full professor in USC's Department of Aerospace Engineering. Cheng retired in 1994, but maintained close ties with USC and his colleagues there.

Last year, the Viterbi School's Astronautics and Space Technology Division named its annual keynote lecture for Cheng. //

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traveled to almost every continent and made friends wherever they went. He leaves behind a legacy of love and admiration for the scores of people whose lives he touched and befriended with his kind Midwestern way. He is survived by his wife, Sylvia; his children, Leonard Lane of Corona del Mar, Calif., Reese Lane of Burbank, Calif., and Nancy Lane of Hillsborough, Calif.; their spouses, Christel Lane and Fred Tileston; his grandchildren, Reid, Trevor, and Michael; and their spouses, Paige, Jake and Veronica; and his great-grandchildren, Alex, Julia, Sophia and Max.

Rodney Lawrence Hewitt

(MAOM '69), a 35-year resident of Redondo Beach, Calif., passed away peacefully in his home on Sept. 16, 2007, at the age of 79. Hewitt was born in Pittsburgh on July 9, 1928. He is survived by his son, Erich (Ute); daughter, Stephanie; and four grandchildren, Raquel, Colette, Jeremy and Michelle. A graduate of O.C.S. in 1952, he completed Officers Electronics School at Ft. Monmouth, N.J., and served in Germany as technical liaison officer to the German Signal Corps., with an honorable discharge in 1953. He was also a graduate of the University of Maryland (B.S.), University of North Dakota and USC (M.S.). He worked in the aerospace industry for 38 years, doing field engineering, training and technical assistance to support domestic and foreign airborne radar systems. After retirement, he focused on his passion, ham radio (KM6KU). His voice will be missed over the airwaves. Many will remember him as the master of ceremonies at the annual Alpine Village Oktoberfest, which he hosted for the past 15 years. He was respected and will be dearly missed. To send the family a message, share a memory or view the online video tribute, please visit www.LAfuneral.com. //

Peter Staudhammer, 1934-2008, who led a breathtaking variety of interdisciplinary scientific and engineering projects in both commercial and academic realms, passed away January 14 after losing his battle with cancer.

Staudhammer was the former vice president and chief technical officer of TRW, the former director and chief operating officer of the Alfred E. Mann Institute for Biomedical Engineering at USC, a member of the USC Viterbi School of Engineering's Board of Councilors and a research professor in the Department of Biomedical Engineering.

"Pete Staudhammer was an extraordinary engineer and a wonderful colleague and friend," said Yannis C. Yortsos, dean of the USC Viterbi School. "His experience and leadership helped speed the process of technology transfer from the lab to the marketplace. More importantly, he helped catalyze new technology development in the school and in the biomedical engineering area."

At TRW Staudhammer was the chief engineer and one of the principal architects of the lunar descent engine for NASA's historic Apollo missions to the Moon, including the successful rescue of Apollo 13, which was accomplished with the lunar lander.

"Pete Staudhammer was an engineer's engineer—a broadly competent engineer both highly analytical and innovative," said Simon Ramo, co-founder of TRW. "He was such a nice man. Everyone—young engineers and senior experts—would come to consult him, as did all of the top executives. He will be greatly missed."

In 42 years at TRW he performed original research and development on rocket engine combustion, space-borne instrumentation, solid state electronics, thermonuclear fusion, high energy lasers and automotive systems. He managed development of classified systems used today in national defense and was responsible for TRW corporate technology transfer that led to successful product lines. Among these was automotive electric steering with sales of over $1 billion per year.

He pioneered hydrazine-fueled rocket engines, now a standard of spacecraft propulsion and developed space instruments for the exploration of Venus, Mars, Jupiter and Saturn. The most notable of these was the Viking Biology Experiment, the first such instrument to search for life on Mars.

Under his leadership TRW's Central Research Laboratories created an ionized plasma-based isotope separation process to separate palladium isotopes for prostate cancer therapy; applied gallium arsenide technology for GHz communications; and developed megawatt-class continuous-wave chemical lasers.

When he retired as TRW's chief technical officer and vice president for science and technology in 2002, he had been overseeing the efforts of 17,000 engineers and scientists worldwide.

He next served as director and chief operating officer of USC's Mann Institute from 2003 until 2007 when ill health forced him to resign.

"Peter was a very competent and very human person whose last years were devoted in large part to trying to make a difference in this world," said Alfred Mann. "He was an effective leader at the Al Mann Institute and a great friend to all of us."

Staudhammer continued to act as an industry consultant for Northrop Grumman, the U.S. Department of Energy and was a member of General Motors Corporate Technical Advisory Committee. Early in his career, before going to TRW, he performed fundamental research in the combustion characteristics of rocket fuels at JPL.

Staudhammer was a member of the National Academy of Engineering where he was cited for "fundamental contributions to space systems, plasma and microwave processes, instrumentation and its application to commercial systems." He chaired or served on several of that organization's committees.

He was a member of the President's National Security Telecommunications Advisory Committee, the Magnetic Fusion Advisory Committee to the Secretary of Energy and served on numerous National Research Council committees. He was a member and/or chair of industrial advisory committees to engineering schools at UCLA, UC-San Diego, UC-Riverside, University of Michigan, Case Western Reserve University and USC.

Staudhammer earned his BS, in electrical engineering in 1955 and an MS in 1956 and his PhD in chemical engineering in 1957, all at UCLA. UCLA's engineering school honored him as Alumnus of the Year in 1992 while UC-Riverside named him Industrialist of the Year in 2004. Among many honors from NASA, he received the Distinguished Public Service Medal in 2002.

He was devoted follower of opera serving on the board of the Palm Springs Opera Guild.

A resident of La Quinta, he is survived by his wife Marie; three daughters, Christina, Julia Headon and Debra; three stepchildren, Jennifer Vorster, Hillary Gilman and Steven Gilman; and six grandchildren. //

Q&A

Q&A with Larry Redekopp

Larry Redekopp is a professor of aerospace and mechanical engineering and has won numerous teaching awards.

What do you think about teaching engineering?

Teaching is at the heart of a university's mission, its core purpose. If research is not propagated through teaching, it is of little value. There may be some who undervalue teaching, but I have never felt undervalued as a teacher.

Teaching requires a deliberate, conscientious effort if you're to be good at it. But that's true of anything. We all have to work at what we do—that's why we call it "work."

How do you approach the students?

It really doesn't cost much to be friendly, so I try to approach all students as fellow learners. There is a merging of analytical and intuitive skills in engineering, so some students are more analytical than intuitive, and some the opposite. As a teacher, you have to pull both groups along, encouraging the slower learners while keeping the sharp ones interested. You have to strike a balance, and achieving that balance is one of the arts of teaching.

Are you teaching undergraduates any differently today than when you started?

Yes and no. We teach many engineering classes the same way they were taught when I was a student, and even before that. With the advance of science and technology, engineers need to be trained at a higher scientific level today. Thirty years ago, a B.S. graduate could rise up to a significant position in a company. Today, a higher level of scientific knowledge is needed as the demands for technical decision-making increase. So while the content of technical training required in a B.S. degree hasn't changed very much, the depth and scope of the knowledge base has.

How about the Masters Program?

The goal of all education is to make an individual a self-learner. The M.S. takes you further along this path than the B.S. There are really two different groups of M.S. students. Most see it as a terminal degree, while others see it as a stepping stone to a Ph.D. This distinction is becoming more important because the demands placed on the latter group must be greater if they are to become the highest level of self-learners.

Can you comment on the quality of the Viterbi students?

Today, we have a more uniform level of high-caliber students than I remember back in the 1980s. We had some really outstanding students then, but I can recall that I never really challenged some in my freshman class. They aced everything. Today, that high caliber student is prevalent across the board. At least, that is my experience, as I have returned to teach the same freshman class again.

What are some of your ideas that push the envelope?

I'd like to see the Viterbi School offer a B.A. in engineering where some aspects of the engineering requirements are minimized in favor of a core body of nonscience/engineering training. I'd favor having those students go through the key lab and senior design courses, so they would see engineering through to its goal. But in this technological age, engineering could perform a broader cultural service by producing technically trained journalists, etc.

I'd like to see a more immersive approach to teaching certain subjects. For example, introductory calculus and physics could be combined. We presently send students to one part of campus to learn math and to another to learn physics. I believe a student's engagement in these subjects would be richer if the calculus needed to solve physical problems was developed and learned in context.

Tell us about your surfing wave.

If you want to ride a wave, you have to catch the front side of it. I use this as a metaphor for a student's involvement in a course. Every student has the ability to successfully complete the course (i.e., to ride the wave all the way to the beach). We've admitted them with the confidence that they can succeed—if they will just stay on the front face of the wave (i.e., keep up with their work). But, if they neglect their homework for a week or two, thinking they can catch up later, they're going to lose the wave. The wave will hit the beach—that's final exams—and they'll still be out there in deep water. //

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