

## Going Organic

Building Next Generation Electronic Devices

### **Alternative Transportation**

UCLA Partners on Hydrogen  
Fueling Station

### **Technology in the Classroom**

Automated Testing Tools for Teachers

### **Novel Energy Source for BioNano Devices**

Proton Pump Encapsulated in Sol Gel



As we welcome another class of incoming students, we reflect again on our responsibilities as educators and our larger responsibilities as engineers and scientists.

At UCLA, we have a compact with our graduates to ensure they are not only well prepared for their careers as engineers, but also as communicators, managers and as ethical members of society. In our fast-moving world, companies are looking for employees who are adaptable and comfortable operating outside their primary area of expertise. Our graduates, among the best and brightest in the world, are California's most valuable intellectual capital and the scientific leaders of tomorrow.

The work of engineers and computer scientists touch every aspect of our lives, in ways many of us never consciously notice. In this issue of *UCLA Engineer* you will read about the impact of our research on education; alternative, cleaner transportation solutions; and faster, more flexible organic memory devices.

You will also read about computer science professor Judea Pearl's seminal research on probability and causality, which has had a tremendous impact on many fields outside of engineering. From economics to philosophy to medicine his work has literally transformed the way people in these disciplines think about their world and their work.

We also have an obligation to our society. Earlier this year, the School hosted 25 high school computer science teachers for a weeklong seminar as part of the UCLA/LAUSD Advanced Placement Computer Institute. These teachers, as they return to the classroom this fall, will create advanced placement courses at their respective schools and they will reach hundreds of students, inspiring them to consider careers in technology.

Over the summer, a group of students from UCLA's chapter of Engineers Without Borders traveled to Thailand where they helped build a health clinic in a remote hillside village. They worked long days to provide the village and surrounding communities with a ten-room health clinic, the first of its kind in the area.

The university is a vital part of California's success, and I know our alumni and friends share our steadfast commitment to our mission of education, research and service. To fully meet our responsibilities, though, we must strengthen and form new partnerships to connect our School with our world.

Sincerely,

Vijay K. Dhir  
Dean

# UCLA Engineer

## Dean

Vijay K. Dhir

## Associate Deans

Stephen Jacobsen - Academic and Student Affairs

Gregory Pottie - Research and Physical Resources

Assistant Dean

Mary Okino - Chief Financial Officer

## Department Chairs

Carlo Montemagno - Bioengineering

Vasilios Manousiouthakis - Chemical Engineering

William W. G. Yeh - Civil and Environmental Engineering

Milos Ercegovic - Computer Science

Yahya Rahmat-Samii - Electrical Engineering

Mark Goorsky - Materials Science and Engineering

H. Thomas Hahn - Mechanical and Aerospace Engineering

*UCLA Engineer* is published twice a year by the Office of External Affairs in the UCLA Henry Samueli School of Engineering and Applied Science.

## UCLA Engineer Advisory Board

Vijay K. Dhir

H. Thomas Hahn

Vasilios Manousiouthakis

Carlo Montemagno

Gregory Pottie

## External Affairs Communications

Marlys Amundson

Christopher Sutton

## Office of External Affairs

6266 Boelter Hall, Los Angeles, CA 90095

310.206.0678

310.825.3966 (fax)

[www.engineer.ucla.edu](http://www.engineer.ucla.edu)

## Design

Vince Rini Design

## Cover Photo

Irene Fertik

## CALENDAR OF UPCOMING EVENTS

### Tuesday, October 12, 2004

Wireless Internet for the Mobile Enterprise Consortium  
RFID Forum  
Faculty Center, UCLA  
<http://www.wireless.ucla.edu/rfid/2004/>

### Friday, October 15, 2004

Center for Embedded Networked Sensing  
Second Annual Research Review  
Keynote Speaker: Vint Cerf  
Tom Bradley International Hall, UCLA  
<http://www.cens.ucla.edu/portal/events/2ndResearchReview.html>

### Friday, October 15, 2004

2004 UCLA Engineering Awards Dinner  
6:00 pm  
Marina Beach Marriott  
Marina Del Rey  
<http://www.engineeralum.ucla.edu/awards/dinner.asp>

### Monday, October 25, 2004

Electrical Engineering Research Review  
Covel Commons, UCLA  
<http://www.ee.ucla.edu/arr/>

### Friday, October 29, 2004

35th Anniversary of the Internet  
Northwest Campus Auditorium, UCLA  
<http://internetanniversary.cs.ucla.edu/>

### Friday, October 29 and Saturday, October 30, 2004

UCLA Parents' Weekend 2004  
UCLA Campus  
<http://www.parentswEEKend.ucla.edu/>

### Wednesday, November 3, 2005

UCLA / Raytheon Reception  
4:30 pm to 7:00 pm  
Raytheon Company Event Center

# C O N T E N T S

<b>Going Organic: Next Generation Electronic Devices</b>	<b>6</b>
<b>UCLA Partners on Hydrogen Fueling Station</b>	<b>8</b>
<b>Automated Testing Tools for Teachers</b>	<b>10</b>
<b>Novel Energy Source for BioNano Devices</b>	<b>12</b>
Calendar	1
Engineering News	2
Faculty News	14
In Memoriam	21
UCLA Engineering in the News	22
Recruiter's Column	23
Student News	24
Gifts to UCLA Engineering	27
Engineering Alumni	28
2003-04 Annual Report	30

## Chairman and Chief Executive Officer of HP Gives 2004 Engineering Commencement Address



Carly Fiorina, Chairman and CEO of HP

Carly Fiorina, chairman and chief executive officer of HP, delivered the commencement address to nearly 900 graduates and their families at the 2004 ceremonies for the UCLA Henry Samueli School of Engineering and Applied Science.

Fiorina joined HP, a leading global provider of computing and imaging solutions and services, in July 1999, and led the company's merger with Compaq, now recognized as the most successful high-tech merger in history. Prior to joining HP, Fiorina spent nearly 20 years at AT&T and Lucent Technologies, where she held a number of senior leadership positions.

"...Science and engineering and technology are the language of the 21st century. I honestly believe that for all the scientific advancements that we have

seen the past 100 years, we will look back on the 20th century as a warm up act for the era we are moving into now. From biomedicine to telecommunications to information technology to digital entertainment, we are moving into the main event of science and innovation and engineering, a time when these disciplines can change lives and solve fundamental problems that have plagued humanity for centuries...I see every day what technology, when combined with the aspirations and capabilities of talented people, can do to solve real human problems... the best part about it is that the people bringing this change aren't politicians or philanthropists or CEOs; they're computer scientists, and engineers..."

Fiorina's complete commencement address is available online at <http://www.hp.com/hpinfo/execteam/speeches/fiorina/ucla04.html>.

"Science and **engineering** and  
technology are *the* language  
of the **21st century.**"

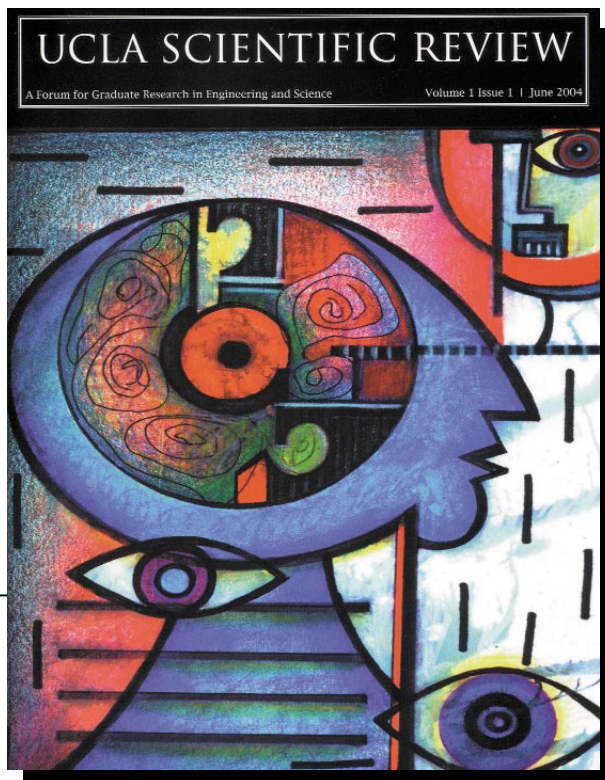


# Senior Gift

The Class of 2004 Senior Gift Committee raised nearly \$1,000 in gifts from graduating seniors. These funds, matched dollar-for-dollar by alumnus Richard Gay ('73, '73, '76), as well as an additional contribution from the UCLA Henry Samueli School of Engineering and Applied Science, will fund five scholarships of \$500 each in 2004-05.



Senior Gift Committee Chair Gigi Lau ('04) with Dean Vijay K. Dhir.



**UCLA Scientific Review** is a quarterly journal that covers research conducted by graduate students in the sciences and engineering. The journal is written and produced by UCLA science and engineering graduate students.

The first issue of UCLA Scientific Review is available online at <http://www.scientificreview.ucla.edu/>.

## UCLA Institute Aims to Promote Computer Science to Underrepresented Students

By Christopher Sutton



In an effort to increase enrollment in high school computer science classes, 25 teachers from the Los Angeles Unified School District (LAUSD) participated in a weeklong exchange with UCLA professors and researchers to find ways to better engage the interest of these students.

The exchange is part of the UCLA/LAUSD Advanced Placement Computer Science Institute, a partnership among the UCLA Henry Samueli School of Engineering and Applied Science, the Graduate School of Education & Information Studies, and LAUSD.

“In most Los Angeles communities, few African American, Latino and female youth are learning or even being introduced to computer science in a way that is meaningful to them,” said Jane Margolis, an associate researcher at UCLA and co-founder of the Institute. “Many of these youth are not exposed to any learning beyond the most basic ‘point and click’ user skills in the schools.”

The exchange provided teachers with professional training in the Java computer language to prepare them for next year’s advanced placement computer science classes, which will switch from focusing on the C++ language to Java.

The Institute also aimed to develop engaging, effective approaches to classroom teaching of computer science. University professors from UCLA and UC Irvine presented approaches for making computer science more exciting by showing their own research on computer graphics, brain mapping, network sensors and theatrical applications.

Vijay K. Dhir, dean of the School of Engineering and co-founder of the Institute, sees the partnership between UCLA and LAUSD as an essential way to increase student achievement in the sciences. “We are committed to increasing the pool of qualified high school students who can enter an engineering program at a top-tier university like UCLA,” Dhir said. “By increasing the capability of teachers to offer AP courses at their schools, we hope to provide more opportunities for students to take advanced courses in computer-related fields.”

The Institute grew from a series of conversations between Margolis and Dhir about how to improve the numbers of traditionally underrepresented students in engineering and the sciences.

Dhir saw the Institute as a potentially effective way of expanding educational opportunities for urban high school students within the engineering school and broadening the diversity of its student body. The Institute, Dhir said, is another means of raising interest in the world of advanced technology.

“We want young people to experience the exciting possibilities of creating technology,” Dhir said. “As a public university we have an obligation to help ensure that this knowledge is distributed

equitably, and our support of this computer science Institute is helping to achieve that.”

Margolis is the co-author of “Unlocking the Clubhouse: Women in Computing,” a book that summarizes her research concerning the recruitment and retention of women in computer science. She also leads a research project, funded by the National Science Foundation, investigating why so few African American, Latino and female students are studying computer science at the high school level. She has found that despite their enthusiasm for technology, these students are rarely shown the connection between their interests and computer science.

Only 15 of the 57 high schools in LAUSD offered computer science in 2003-04. LAUSD has pledged to introduce computer science at all of the 25 schools that sent a teacher to the Institute, nearly doubling the number of schools offering the curriculum this fall.

Two instructors provided Java training: Joanna Goode, a researcher from the Graduate School of Education and a former computer science teacher at Santa Monica High School, and David Smallberg, a computer science lecturer in the School of Engineering. Guest lecturers included: Petros Faloutsos, an assistant professor of computer science at UCLA; Jeffrey Burke, an assistant professor from UCLA’s School of Theater, Film & Television; and Sandra Irani, an associate professor of computer science at UC Irvine.

“We wanted to encourage the teachers to experiment in their classes,” Smallberg said. “Unlike other areas, like chemistry, where a mistake could blow up the lab, the worst that can happen in computer science is that you have to reboot.”



# 2004 UCLA Engineering Awards Dinner

**Friday, October 15, 2004**

**Reception - 6:00 pm**

**Dinner - 7:00 pm**

Marina Beach Marriott, Marina del Rey, California

Inquiries: 310/206-0678 or seasalum@ea.ucla.edu

Cost per person - \$250

Alumni rate - \$60

Corporate sponsorship - \$2,500 per table

## We are pleased to announce the 2004 UCLA Engineering Award recipients.

### Alumnus of the Year

Asad M. Madni BS '69, MS '72  
President, Chief Operating Officer and Director of BEI Technologies, Inc.

### Professional Achievement Award

Thomas A. Sabol MS '82, ENG '84, PhD '85  
President, Englekirk & Sabol Consulting Structural Engineers, Inc.

### Engineering Alumni Association Service Award

William R. Goodin MS '71, PhD '75, ME '82  
Director, Short Course and Technical Management Programs, UCLA Extension

### Lifetime Contribution Award

H. John Orchard  
Professor Emeritus, Electrical Engineering

### Lockheed Martin Excellence in Teaching Award

Joseph DiStefano, III  
Professor, Computer Science

### Northrop Grumman Excellence in Teaching Award

Benjamin Wu  
Assistant Professor, Bioengineering

Glenn Reinman  
Assistant Professor, Computer Science

### Edward K. Rice Outstanding Student Awards

Doctoral - Nael H. El-Farra BS '98, PhD '04  
Chemical Engineering

Master's - Ani Nahapetian BS '02, MS '04  
Computer Science

Undergraduate - Scott Wright BS '04  
Electrical Engineering

## 35th Anniversary of the Internet



**Friday, October 29, 2004**

**8:00 am – 5:00 pm**

Northwest Campus Auditorium, UCLA

**The UCLA Henry Samueli School of Engineering and Applied Science – the birthplace of the Internet – will host a special forum commemorating its 35th anniversary.**

Join some of the Internet's early pioneers, as well as many of its rising stars in taking a closer look at how the Internet came to be what it is today, and what it will be like tomorrow.

**The Bright Side: Gorillas of the Internet**

**The Global Side: Impact Beyond Technology**

**The Young Side: The Indigenous Digital Generation**

**The Future Side: Pioneers and Visionaries**

To register, or for more information, visit <http://internetanniversary.cs.ucla.edu> or call Kim Dankner at 310-825-2939.





Professor Yang Yang (sitting) and research team members Ricky J. Tseng, Jun He, Jianyong Ouyang and Sheng-han Li.

# Going Organic:

## UCLA Materials Scientist Uses Semi-Conducting Polymers to Build Next Generation of Electronic Devices



Photos: Irene Fertik

BY CHRISTOPHER SUTTON

For more than ten years, researchers in academia and industry have been trying to build electronic devices from semi-conducting polymers like plastic – using organic materials to create components that are more flexible, cheaper and easier to manufacture than their silicon counterparts.

**Y**ang Yang, a materials science professor in the UCLA Henry Samueli School of Engineering and Applied Science, is one researcher whose work on organic transistors and printable conducting polymers has kept him on the front lines of this wide-ranging effort. Recently, his research has begun to bear fruit, resulting in a number of patents and a promising start-up Yang co-founded last year.

“I’m excited. I have never been personally involved in launching a start-up company, and the experience has been

very valuable,” said Yang. “In fact it has given me good lessons about the ‘real-world’ dynamics of technology development, and I’ve been able to pass this experience to the students I teach.”

When he joined UCLA in 1997, Yang began working on an organic plastic light-emitting device, which would light up when he passed a current through it.

“But devices like that have existed for at least 15 years,” said Yang, “so I began to concentrate on organic electronic memory devices with low cost, non-volatile memory.”

A lot of memory. Yang’s organic memory devices, which he began to work on four years ago, can store far more memory than flash memory devices on the market today. Flash memory in a typical USB device has a writing speed in sub-milliseconds, or one thousandth of a second. Yang’s device operates in nanoseconds, easily ten thousand times faster than traditional flash memory. This means that a digital camera, for example, could take pictures ten thousand times more quickly.

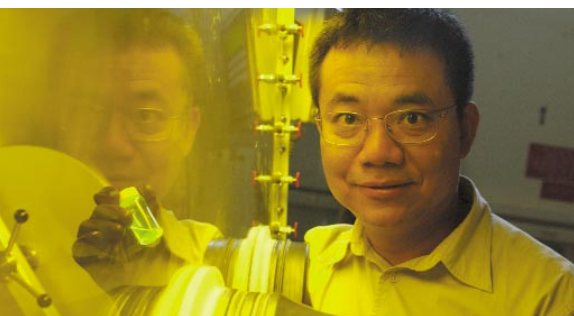
“Our memory devices greatly increase the speed of data storage, making it



possible for people to experience faster PDAs, cameras, even movie downloads, though they would still be limited by the speed of their Internet connection,” said Yang.

Yang builds his electronic devices with organic components that he fabricates using wet coating processes, such as a unique inkjet printing method that he invented. Patterns are transferred onto plastic substrates and printed just like newspapers are printed on a press, making Yang’s method an attractive alternative to the costlier manufacturing processes of silicon wafers in clean rooms.

“Lithography is used to produce silicon chips,” said Yang. “But lithography is expensive and with organic electronics, the lithography process is actually quite harmful to the materials used. Our process dissolves organic materials into a solvent that can be loaded into an inkjet printer, and printed to the plastic substrate to form a circuit or wire.”



Regular inkjet printing, while it provides the patterning capability for a polymer solution and is compatible with flexible substrates, produces polymer films composed of many small dots and pinholes, making them intrinsically non-uniform. Those pinholes prevent the fabrication of high-quality polymer electronic devices.

Yang’s revolutionary hybrid design combines an inkjet-printed layer with a uniform, spin-coated polymer layer. The uniform layer serves as a buffer to seal the pinholes, and the inkjet layer holds the desired pattern. The sandwich device structure is completed with a final electrode deposited on top. Any pattern can be designed on a computer and the

specifications loaded directly to the printer, eliminating the need for a clean room.

In 2003, Yang teamed up with Walter Mosher, chairman and chief technology officer of health-care product-maker Precision Dynamics Corporation to establish ORFID, a company that has built its technology platform based on inventions made in Yang’s lab.

In the summer of 2004, UCLA’s Office of Intellectual Property Administration licensed two patents to ORFID, which derives its name from organic radio frequency identification. The two patents relate to Yang’s hybrid inkjet printing technology and to the devices created from the printing method.

Yang serves as Chairman of ORFID’s Science and Engineering Advisory Board, and sits on the company’s board of directors.

Organic electronics hold several advantages over silicon-based technologies, including greater versatility – organic electronics are flexible, meaning they can be built into a greater array of products.

Yang offered one scenario to explain how flexibility can lead to some novel uses: “Being a parent, one thing I always worry about when I take my son to theme parks like Disneyland is that if I turn around, my child might walk away or become lost. If my child wore a wristband, much like the ones used in hospitals, equipped with tracking capability, I’d know my child’s location at all times.”

That tracking capability would be derived from radio frequency identification – RFID – chips that transmit information to handheld readers. This technology is already being used to find lost pets and some theme parks are experimenting with RFID bracelets for patrons who want to know where their children are at all times.

In fact, Yang’s organic electronic devices, and the low-cost method of printing the circuits and other components that make up those devices, will have a wide-ranging impact on the growth of RFID

technology and all the applications such technology make possible. For example, organic memory can be used in RFID technology to make inventory tracking of equipment or merchandise easier, faster and more likely error-free.

“Imagine you run a Wal-Mart store and you ask an employee to determine how many cans of tomato paste are left in stock,” posits Yang. “There will be errors as he counts every item, and even using a scanner it’s time-consuming, and the information will be outdated.”

But what if the cans of tomato paste themselves could report such information? “In ten minutes, the employee would know the inventory situation not only in the store but in the entire warehouse,” Yang said.

The same advantages could be realized in more dynamic environments, like aid shipments for humanitarian missions, or the movement of materiel for troops.

Another area being changed by organic electronics is full-color displays. Organic light-emitting devices (OLEDs) are beginning to replace liquid-crystal displays (LCDs) in laptops, in part because OLED displays emit brighter light and maintain viewing clarity from any angle. Other devices, such as cellular phones, game players and personal digital assistants, increasingly use OLED displays.

OLEDs can be printed onto flexible plastic foils rather than the more fragile, heavier glass surface upon which LCDs are deposited, and OLEDs offer better quality, crisper color and faster speed.

The materials and engineering advances emerging from Yang’s lab at UCLA, which currently has 21 students, are leading to the development of an entirely new class of organic semiconductor materials and RFID applications. As busy as the last year has been for Yang and his research team, even more exciting days may yet be ahead.

**The research group’s web site is <http://www.seas.ucla.edu/yylabs/>. For more information about ORFID, please visit <http://www.orfid.com/>.**



Professor William Van Vorst

## Hydrogen Fueling Station

# to be Built at UCLA

### Chemical Engineering Partners on Alternative Transportation Research

BY MARLYS AMUNDSON

**A team of chemical engineers in the UCLA Henry Samueli School of Engineering and Applied Science, led by chemical engineering professor and chair Vasiliios Manousiouthakis and professor William Van Vorst, will help design and build a hydrogen fueling station at UCLA as part of a larger feasibility study of hydrogen fuel cell vehicles and related infrastructure in the Southern California basin.**

**T**he fueling station is one piece of a collaborative project that will allow researchers to gain real-world experience with fuel cell vehicles and hydrogen producing technologies, address open questions on hydrogen production and fuel cell vehicle performance, acquire and analyze data related to hydrogen fueling infrastructure technologies, and educate the UCLA community and the Southern California public about this developing field.

Interest in hydrogen-fueled vehicles as an environmentally friendly alternative to traditional cars has been growing. Significant impetus to this interest has been provided by President George W. Bush's initiative making the develop-

ment of a hydrogen-fuel development and distribution system a national priority, and California Governor Arnold Schwarzenegger's proposal to establish a network of hydrogen fueling stations in California over the next six years.

"There has been a remarkable reduction in the amount of pollution generated by a single engine, but the ever-increasing number of fossil-fuel vehicles assures that air pollution is a continued threat to the public health," explained Van Vorst. "Hydrogen, particularly in combination with fuel cells, offers the only real possibility of pollution-free exhaust emissions."

UCLA's chemical engineering department will partner with DaimlerChrysler,

BP and the Department of Energy on the hydrogen project, building on Manousiouthakis' pioneering research in novel methods of hydrogen production and Van Vorst's seminal work in hydrogen-powered vehicles.

"Universities provide an ideal environment for reaching out to future generations of fuel cell vehicle drivers and familiarizing them with fuel cell technology," said DaimlerChrysler General Manager Wolfgang Weiss, who heads the fuel cell project in California. "DaimlerChrysler views this project as an excellent opportunity to establish both long-term collaboration in fields of fuel cell technology research, and stronger ties between industry and academia."

The fueling station, located on the edge of the UCLA campus, will be built and maintained by BP. The station will have limited production capacity, producing 15 kilograms of hydrogen per day, or enough to fill up three to five cars.

In addition to providing fuel for hydrogen-powered vehicles, the station at UCLA will serve as a real life pilot-plant for chemical engineering students, who will be exposed to a hydrogen production technology called reforming. The students will be able to collect and analyze data related to the performance of the hydrogen reforming and purification steps, and view live demonstrations of this real-world application of chemical engineering principles. These principles will be part of several chemical engineering courses on chemical reactor design, process separations, and computer-aided chemical process analysis and



Professor Vasilios Manousiouthakis

design. Additional courses will also be developed, covering fuel cell principles and their application to fuel cell powered vehicles, as well as laboratory classes exploring fuel cell characteristics and efficiency.

DaimlerChrysler will provide the UCLA team with a fuel cell vehicle - F-Cell - a Mercedes-Benz A-Class which is part of a 60 car fleet demonstration program in the US, Europe, Singapore and Japan. UCLA researchers will use the car to test new theories and technologies, and to educate the next generation of researchers who will help improve and reduce the cost of fuel cell vehicles.

Hydrogen cars are electric vehicles that generate their power by combining

hydrogen and oxygen inside a fuel cell. As hydrogen molecules enter the fuel cell, they pass through diffusion layers, and undergo surface catalytic reactions to become charged hydrogen ions. These ions then pass through a synthetic polymer membrane, called a proton exchange membrane, and react on the

**“Hydrogen, particularly in combination with fuel cells, offers the only real possibility of pollution-free exhaust emissions.”**

other side with oxygen from the air to form water, creating in the process an electric current that powers the car's electric engine. Unlike gasoline-powered vehicles, fuel cell vehicles emit only water as their exhaust. DaimlerChrysler currently has three types of fuel cell vehicles on the road, including passenger cars, city busses in Europe, Australia and China and delivery service vans in Germany and the US.

Traditional hydrocarbon-fueled vehicles release pollutants where the cars are in use, often in densely populated areas. Hydrogen fuel cells do not generate pollution at the point of energy delivery in the vehicle, making it possible to isolate pollution at the fuel-generation level. This opens the door for fuel production, and its potential pollution, to be located away from urban areas. Furthermore, pollutant generation during production can also be reduced or eliminated altogether through alternate hydrogen production methods. A high-temperature solar collector or hydroelectric dam, for instance, could be used to produce hydrogen without generating any pollution.

“Hydrogen is not a natural energy source, but a means of delivering energy,” noted Manousiouthakis. “You can use traditional resources, such as natural gas, oil or coal, or renewable resources, such as hydroelectric or solar power, to generate the hydrogen.”

Although hydrogen fuel cell vehicles are currently in operation, there are still a number of open issues for researchers in the field. UCLA researchers will be studying the impact of the quality and purity of the hydrogen on performance and fuel consumption, the effects of long-term operation on fuel cells, ways to remove heat from the vehicle's engine and alternate methods of hydrogen production.

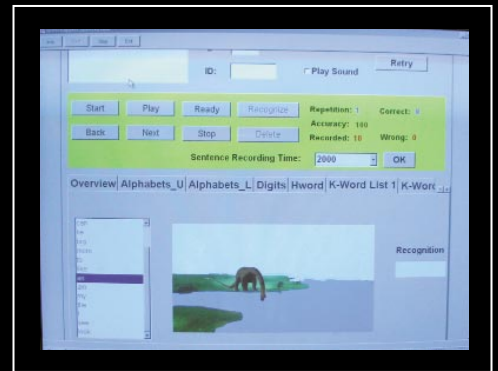
“We're especially interested in creating efficient means of hydrogen production through identification of novel thermochemical cycles for the thermal decomposition of water,” noted Manousiouthakis. “We have already identified several promising thermodynamically feasible cycles consisting of a series of reactions that decompose water into hydrogen and oxygen at lower temperatures.”

Research in hydrogen-powered vehicles has a long history at UCLA. In the early 1970s, a group of students working under the direction of the late professor Al Bush, converted a car to hydrogen fuel usage, and placed first in a national Urban Vehicle Design Contest. Under Van Vorst, graduate work with hydrogen as an internal combustion engine fuel continued throughout the 1970s and '80s. Van Vorst regards the successful conversion of a vehicle to operate with liquid hydrogen as a noteworthy development in the field.

The UCLA team will interest younger students in this developing technology through educational events on campus and in the community, including talks on how hydrogen fuel cells work and demonstrations of the hydrogen fuel car.

**For additional information on Professor Manousiouthakis' research, please visit <http://www.seas.ucla.edu/~vasilios/>.**





TBALL members (from left): Eva Baker, Margaret Heritage, Abeer Alwan, Markus Iseli, Christy Boscardin, Xiaodong Cui and Hong You.

# UCLA Researchers Develop New Testing Tools *for* Teachers

*Automated System Enables Consistency, Fairness in Scoring*

BY MARLYS AMUNDSON

**Preschool and elementary teachers at several Los Angeles area schools may soon have more time available for teaching, while still meeting national and state-mandated educational priorities.**

Experts in engineering and education at UCLA and other universities are developing a child-friendly testing system that measures and analyzes children's reading and pronunciation skills over time. They are working closely with elementary school teachers in the community to design an effective assessment system.

"The increased emphasis on testing at the national and state level is leading to

less time in the classroom for teaching," said education professor Eva Baker. "Our proposed system will significantly reduce the amount of time teachers need to spend giving tests, allowing them to focus on what they do best."

Baker and electrical engineering professor Abeer Alwan are leading efforts to meet the growing demand for early testing of reading and pronunciation

skills through an automated assessment system. Their initial efforts will focus on five- to eight-year-old native speakers of American English and non-native speakers of Mexican backgrounds.

"To date, no one has tracked the development of early speech in this group of non-native English speakers," explained Alwan, a member of the UCLA Henry Samueli School of Engineering and



Applied Science faculty. “And yet more than 60 percent of the students in some Los Angeles schools are native speakers of Spanish.”

The Technologically Based Assessment of Language and Literacy project (or TBALL) will allow researchers to tackle several fundamental research issues. For instance, the project’s acoustic and pronunciation modeling algorithms must address not only variability in speech from child to child, but also for a single child over time. It is also more difficult for computers to recognize children’s speech because of their different acoustic characteristics, including higher pitch and resonant frequencies.

The team is devising age-appropriate ways of displaying information to capture a child’s attention and elicit responses. They are also determining what criteria are appropriate to use in scoring the children.

“We’re trying to make a system that brings together fair and accurate testing of children,” explained Baker, director of the Center for the Study of Evaluation. “It’s very different with young children – they have associations that aren’t always clear and they are not consistent in how they see words.”

TBALL builds on a rich history of collaborative activities between engineering and education at UCLA, including improved curriculum feedback mechanisms, the Smart Kindergarten project, and the UCLA/LAUSD Computer Science Institute. The project will draw on the expertise of researchers in electrical engineering, computer science, and education at UCLA; electrical engineering, linguistics and neuroscience at the University of Southern California; and education at UC Berkeley.

UCLA’s Center for the Study of Evaluation is well known for development of scientifically based evaluation and testing techniques, and for promoting the accurate use of technology for improved decision making.

**“Our proposed system will significantly reduce the amount of time teachers need to spend giving tests, allowing them to focus on what they do best.”**

“Currently, a teacher has a series of flash cards or a testing sheet and shows the child an image or word and asks him or her to say it aloud,” explained Alwan. “Then he manually scores the child’s pronunciation. There is little consistency in scoring from teacher to teacher, and the test offers only minimal assessment of a child’s skill level.”

The TBALL team hopes to create consistency in scoring pronunciation, fluency and comprehension levels across classrooms through their automated system. Information derived from the project will also aid educators in determining which teaching methods are most effective with children of varying backgrounds.

“We have a team of advisors in education and linguistics who are helping us determine appropriate scoring criteria,” noted Alwan. “For instance, in some dialects there is no distinction between b and v in Spanish, so the question becomes, ‘Is it an error or an acceptable pronunciation?’”

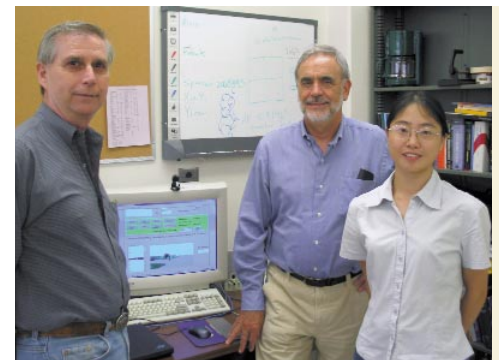
At UCLA, Alwan is heading efforts in automatic speech recognition and acoustic analysis.

As part of the project, computer science professors Richard Muntz and Carlo Zaniolo are building a longitudinal database that will help teachers track a student’s progress throughout the year and over a multi-year period. The novel database will also support query-based data mining, generating new types and amounts of information and providing critical feedback to educators. This data will help researchers determine if there are early predictors for later performance in reading.

Participants in the project include professors Shrikanth Narayanan and Elaine Anderson at USC, David Pearson at UC Berkeley, and Alison Bailey, Christy Boscardin, and Margaret Heritage at UCLA’s Center for Research on Evaluation, Standards and Student Testing. Patti Price serves as a consultant on the project.

In addition to its impact on testing standards, TBALL also will serve as a vehicle to train graduate and postdoctoral students, as well as elementary school teachers in new interdisciplinary research areas of technological and educational interest.

The TBALL team will receive more than \$3 million under a collaborative research grant from the National Science Foundation to support their research. They have also secured Research Experience for Teachers supplements from the NSF to support teacher training. If the platform proves successful, the team plans to create parallel tracks for math and science assessment.



TBALL members (from left): Richard Muntz, Carlo Zaniolo and Yirong Yang.

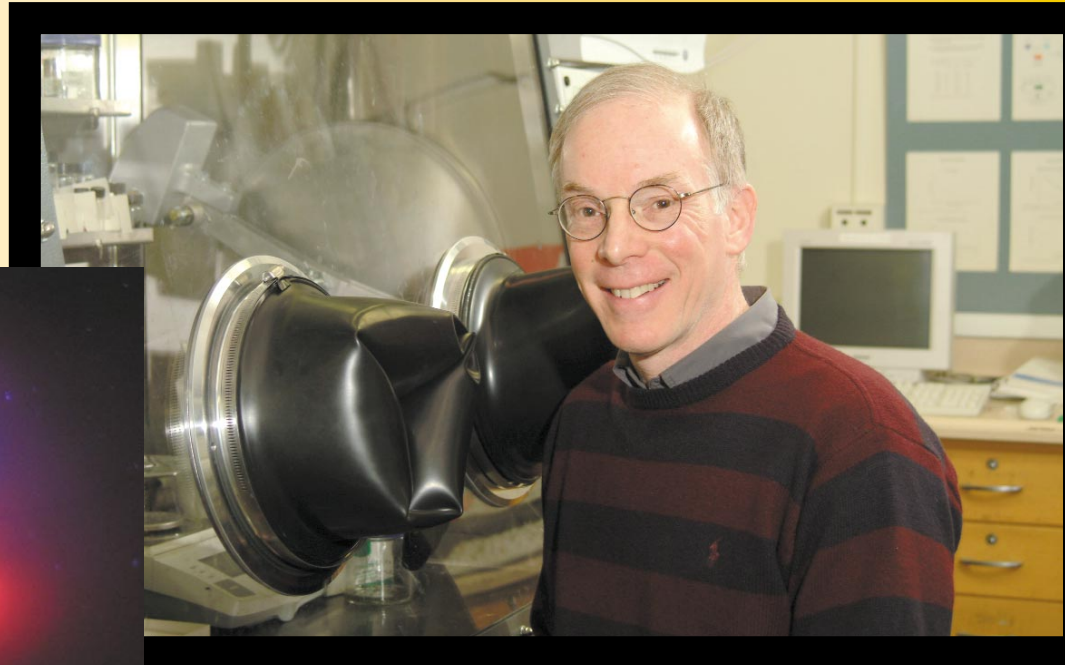
“Our number one priority is to meet the needs of both the teachers and the children,” said Alwan. “It’s something, though, that can only happen through the coming together of technology and education.”

**For additional information on the project, please visit <http://diana.icsl.ucla.edu/Tball/>.**

# Engineers Create Novel Energy Source for BioNano Devices

## Proton Pump Encapsulated in Sol Gel

BY MARLYS AMUNDSON



Professor Bruce Dunn

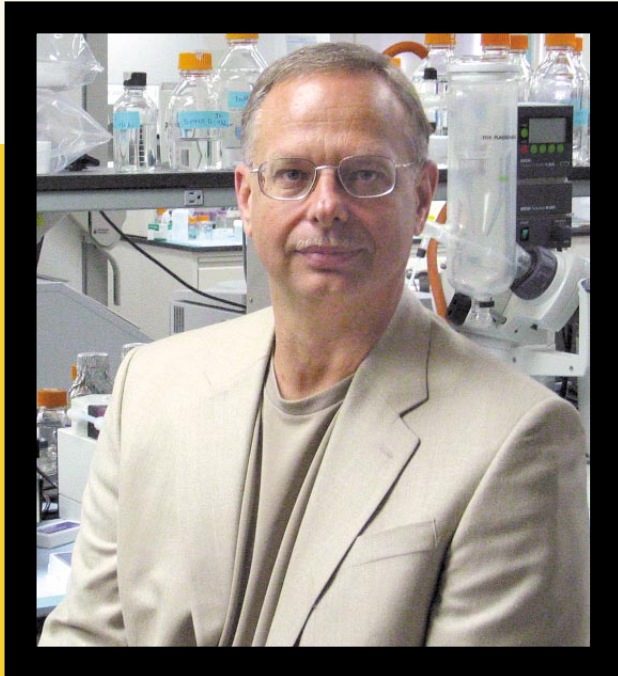
Materials science and engineering professor Bruce Dunn and bioengineering professor and chair Carlo Montemagno are combining their expertise in sol gel materials and nanoscale engineered devices to create a new type of solid material that generates protons when light shines on it. The material is a critical element in developing complex biological nanomanufactured systems.

“This technology will enable a lot of things when it’s complete,” said Montemagno. “We’re engineering living systems and need to be able to provide energy of the right type, the right size scale and in the right concentrations.”

Researchers in the UCLA Henry Samueli School of Engineering and Applied Science are encapsulating bacteriorhodopsin, which converts light into chemical energy, into a sol gel matrix. This new material will have the consistency of a soft contact lens.

“Bacteriorhodopsin is well known as a proton pump,” noted Dunn. “When light shines on it, protons are sent from one side of a membrane to the other.”

Dunn’s and Montemagno’s research groups are using this proton pumping



Professor Carlo Montemagno

mechanism in a variety of energy-related applications, including the generation of ATP.

Dunn, who holds the Nippon Sheet Glass Chair in Materials Science, has been creating biological-based materials since the early 1990s when he began collaborating with UCLA chemistry professor Jeff Zink to encapsulate various molecules in sol gel matrices.

Sol gel has the same chemical make-up as glass - silicon dioxide - and the same optical properties. Unlike glass, though, sol gel is porous and can be made at low temperatures. This property allows researchers to enclose, in a three-dimensional network, biological molecules which would otherwise decompose at high temperatures. The biological material may be nanosized, like proteins, but the sol gel material can be scaled in size for specific uses.

“We can encapsulate a wide variety of proteins and control the material’s chemical properties,” said Dunn. “The proteins are stabilized in the matrix, but retain and exhibit their natural properties.”

The new bacteriorhodopsin sol gel material serves as an innovative new energy source.

“Our work at the nanoscale is like building a new type of car,” explained Montemagno. “You first decide how you’re going to fuel it, which is ATP in our case, then you determine how you can provide the right type of fuel for the system.”

Dunn’s encapsulation method also allows researchers across UCLA to partner on a range of “designer” sensors for specific targets. For instance, in a collaborative project with researchers in the David Geffen School of Medicine, they have created an optical sensor to detect glutamate, a major excitatory neurotransmitter in the central nervous system.

In a project funded by NASA, Dunn’s lab is developing a sensor that measures cortisol levels for use in long-term space flights. Current methods of measuring cortisol levels, a hormone secreted in

times of stress, are liquid based and cannot be used easily in zero gravity conditions. A sol gel sensor system would enable astronauts to measure their cortisol levels on-orbit, as part of a health monitoring protocol during space flight.

“There are a number of projects underway that merge multiple technologies,” said Montemagno. “Together, we’re transforming wet technologies to solid state technologies.”

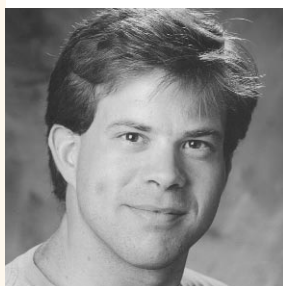
**For additional information on Dunn’s research, please visit <http://www.seas.ucla.edu/ms/faculty1/dunn.html>. For more on Montemagno’s research, please visit <http://www.bioeng.ucla.edu/Facultyresearch/montemagno.html>.**

**“We’re engineering living systems and need to be able to provide energy of the right type, the right size scale and in the right concentrations.”**

## Seven New Faculty Join UCLA Engineering

Talented faculty are the core of any university. Their work in the research labs not only impacts our every day lives, but they also attract and educate the brightest and most promising students. This year, School successfully recruited new faculty members in each of its seven departments - gifted educators and engineers who will enhance the School's reputation for excellence in the years to come.

### Bioengineering



**Timothy Deming** – Professor  
PhD – University of California, Berkeley, 1993

Timothy Deming's research interests include polymer and materials synthesis, with an emphasis on the application of chemical principles, as well as the use of biological precedents and strategies for the design of new materials. He is also focused on new, practical chemical routes for the synthesis of biological and biomimetic materials, which are of interest as they can be prepared from renewable resources, are bio-compatible and biodegradable, and often possess excellent physical properties.

Prior to joining UCLA, Deming held joint appointments in the Materials and Chemistry Departments at UC Santa Barbara. He received the Materials Research Society Young Investigator Award in 2003.

### Chemical Engineering



**Tatiana Segura** – Assistant Professor  
PhD – Northwestern University, 2004

Tatiana Segura will join UCLA's chemical engineering faculty in 2006. She is currently a postdoctoral fellow at the Swiss Federal Institute of Technology Lausanne in Switzerland.

Segura's research focus is in the area of novel gene delivery strategies for tissue engineering applications. One area of interest involves the immobilization of DNA complexes to cell-binding surfaces to enhance gene transfer by reducing mass transfer limitations while providing greater spatial control over where gene delivery occurs.

### Civil and Environmental Engineering



**Eric M.V. Hoek** – Assistant Professor  
PhD – Yale University, 2002

Eric Hoek's fundamental research interest is in physicochemical and colloidal processes in aqueous environmental systems. His research group is currently focused on developing novel membrane materials and processes to minimize surface fouling phenomena and improve treated water quality in desalination and water reuse applications. He is a Henry Samueli School of Engineering and Applied Science Fellow.

Previously, Hoek was an assistant professor of chemical and environmental engineering in the Bourns College of Engineering at UC Riverside. He also worked as an engineer for Merck and Co., Inc. and for Contech Construction Products Inc., and has been a consultant for DCI Environmental Services since 1996.



## Computer Science



**Amit Sahai** – Associate Professor  
PhD – Massachusetts Institute of Technology, 2000

Amit Sahai's primary research focus is the foundations of cryptography. He is also interested in other areas of theoretical computer science, including the fundamental problems related to security, complexity theory, algorithms, learning theory and the theory of error-correcting codes.

Prior to joining UCLA, Sahai was an assistant professor of computer science at Princeton University. He received an Alfred P. Sloan Foundation Research Fellowship in computer science in 2002.

## Electrical Engineering

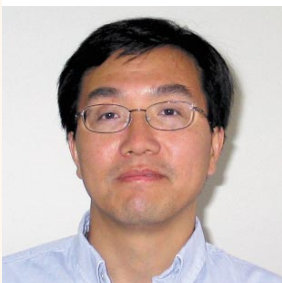


**Sudhakar Pamarti** – Assistant Professor  
PhD - University of California, San Diego, 2003

Sudhakar Pamarti is interested in highly integrated implementations of wireless and wireline communication systems. He focuses on developing, applying, and analyzing techniques from digital signal processing and communication theory to enhance the performance and lower the cost and power consumption of these systems.

Pamarti was a senior member of the Memory Interface Division technical staff at Rambus Inc. before joining UCLA. While there, he designed circuits and systems for multi-Gb/s chip-to-chip I/O interfaces, and developed enabling techniques for future I/O demands.

## Materials Science and Engineering



**Qibing Pei** – Professor  
PhD – Chinese Academy of Sciences, 1990

Qibing Pei's research interests include synthesis of new electronic polymers, nanostructured solar cells, and electroelastomers with large electrically-induced strain. He applies molecular design and nanoscale engineering to the discovery of new polymers with novel electronic or mechanical properties.

Before joining UCLA, Pei was a senior research engineer at SRI. Earlier in his career, he was senior chemist at UNIAX Corporation, which later became DuPont Display. He has worked on a variety of electronic polymers and devices including polymer light emitting diodes, polymer light emitting electrochemical cells, electroactive polymer artificial muscles and biologically-inspired robots.

## Mechanical and Aerospace Engineering



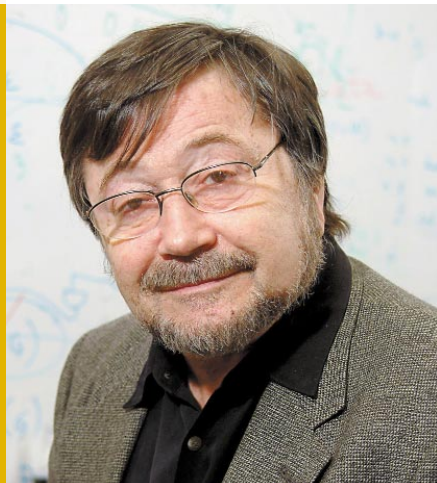
**Emilio Frazzoli** – Assistant Professor  
PhD – Massachusetts Institute of Technology, 2001

Emilio Frazzoli's current research interests include algorithmic, computational and geometric approaches to the design and development of decision and control architectures for complex networked and autonomous systems in aerospace and other domains. Application areas include distributed cooperative control of multiple vehicle systems over wireless networks, guidance and control of agile vehicles, high-confidence software engineering for high-performance dynamical systems and verification of hybrid systems.

Prior to joining UCLA, Frazzoli was a member of the Aeronautical and Astronautical Engineering Department of the University of Illinois, Urbana-Champaign. Before pursuing his doctorate, Frazzoli served as an officer in the Italian Navy, and was a flight dynamics specialist in the spacecraft control center of Telespazio (Rome, Italy).

## A Profile of Judea Pearl – Computer Science Pioneer, Visionary

By Marlys Amundson



Professor Judea Pearl

A friendly, unassuming man, computer science professor Judea Pearl seems more willing to talk about his special coffee than his seminal contributions to artificial intelligence and computer science. And yet his research not only revolutionized artificial intelligence, but has also had an enormous impact on many areas outside of computer science.

“Judea Pearl is one of the giants in the field of artificial intelligence,” commented UCLA computer science professor Richard Korf. “He’s not one of the founders, but his contributions to the field are on par with theirs.”

The influence of Pearl’s research extends well beyond computer science, which is relatively rare in this age of specialization. His theories have fundamentally changed the way experts in disciplines as diverse as philosophy, medicine, statistics, epidemiology and psychology think about their work.

“Judea Pearl is one of the most remarkable people we have in the School,” said Milos Ercegovac, chair of the computer science department. “He is widely

known for his pioneering scientific contributions to the field of artificial intelligence in the areas of probabilistic and causal reasoning.”

Since the early days of the field, researchers in artificial intelligence have used classical logic as a foundation for commonsense reasoning – as a way to teach computers to think the way humans do. The use of classical logic, however, has encountered some key difficulties, and there was a major wave of attempts in the early 1980s to address them by providing more refined logical formalisms, such as non-monotonic logic. Pearl, on the other hand, took a different approach where he proposed probability as a foundation for commonsense reasoning, and established a workable framework.

“The research, which was conducted over a period of several years at UCLA, caught everyone by surprise,” explained computer science professor Adnan Darwiche. “The theories and methods laid out by Judea Pearl spread rapidly through the community, and his formalization of commonsense reasoning has become the basis for modern courses on the subject.”

Pearl helped shape the theory and practice of knowledge-based systems, and his book, *Probabilistic Reasoning in Intelligent Systems*, published in 1988, remains one of the most influential in the field. His theoretical framework and algorithms based on probability theory are the basis for models that account for uncertainty in real-world systems.

His early work on search algorithms advanced the field through his rigorous analysis of the power behind heuristic knowledge and problem-solving strategies. Pearl’s research in this area and reputation were a major factor in Korf’s decision to join the faculty at UCLA.

“The computer science department has been fortunate to have Judea as a long-time member. Everyone who interacts with him feels privileged to have him around,” noted Ercegovac. “He’s made it possible for artificial intelligence to truly flourish at UCLA.”

More recently, Pearl has turned his interest to causality – an area many viewed as controversial and non-scientific. Pearl has demonstrated that causality can be mathematically defined and applied to many areas of research. The mathematical methods developed by Pearl also allow scientists to prove that certain desired conclusions cannot be derived from the available data and assumptions – similar to solving two equations with three unknowns.

“Causality is primarily useful in areas where you contemplate change – areas such as statistics, medicine, economics or law,” explained Pearl. “In probability there are good mathematical notations to calculate the consequences of seeing. From causality come solid, mathematical models to calculate the consequences of doing.”

Pearl speaks teasingly of statisticians’ unwillingness to accept causality as a valid system, but it has proven useful to experts in many related disciplines that rely on statistical models. In just the last six months, Pearl’s book *Causality: Models, Reasoning and Inference* was cited more than 300 times by other researchers.

“Judea is extremely intuitive,” Darwiche said. “I learned from him to apply both intuition and common sense to problems. To be successful in artificial intelligence, one must complement formalism with intuition, and I do find this to be one of Judea’s main strengths.”

*Reed Hutchinson, UCLA Photographic Services*

Pearl's research has been recognized by his peers around the world. Earlier this year, he was one of two researchers who received the 2003 Allen Newell Award from the Association for Computing Machinery. Pearl was honored for his seminal contributions to artificial intelligence and for "demonstrating the remarkable influence that computer science and artificial intelligence can have on other sciences, on practical tools and on human thought."

In 1995, Pearl was elected to the National Academy of Engineering for developing the foundations for reasoning under uncertainty, and he is one of the few recipients of the International Joint Conference on Artificial Intelligence Award for Research Excellence. The IJCAI honored Pearl for his "fundamental work on heuristic search, reasoning under uncertainty, and causality." And in 2001, the London School of Economics and Political Science presented him with the Lakatos Award, which honors outstanding contributions to the philosophy of Science, to honor the impact of his book on causality.

He received his BS in electrical engineering from the Technion in Israel in 1960. After moving to the United States, he finished his master's degree in physics at Rutgers University in 1965 and a PhD in electrical engineering from the Polytechnic Institute of Brooklyn in the same year.

Before joining the computer science faculty at UCLA in 1970, he enjoyed a successful career in physics and engineering. Pearl worked at the RCA Research Laboratories on superconductive parametric and storage devices and at Electronic Memories on advanced memory systems.

"Judea has always been very single-minded in focusing on his research – sort

of the classic researcher at a university," noted Korf, who first collaborated with Pearl while an assistant professor at Columbia University. "All else was a distraction."

"Pearl is a very inspiring person. He's very passionate about what he does and very dedicated to truth," said Darwiche, who has been motivated by Pearl's example. "It takes that kind of passion to make breakthroughs like Judea has done."

That focus and drive have recently shifted to problems outside of artificial intelligence. In 2002, Pearl and his wife

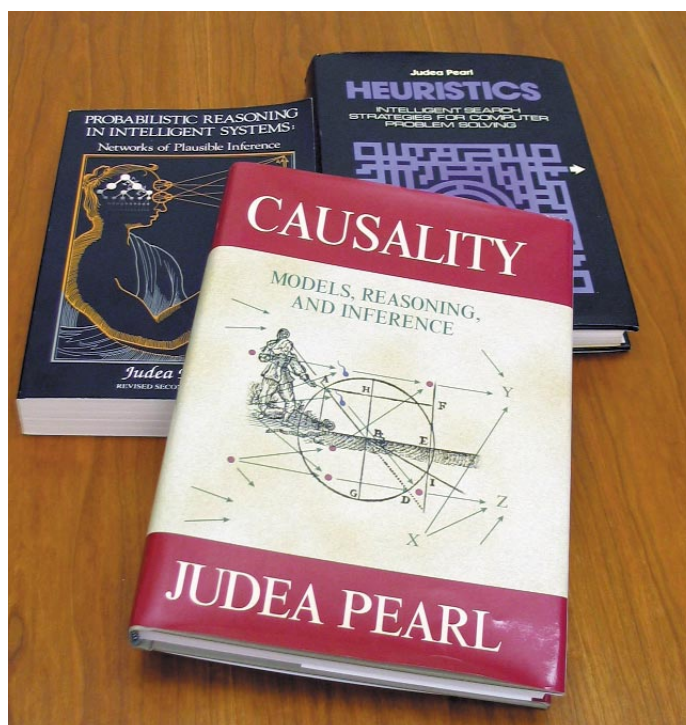
established the Daniel Pearl Foundation ([www.danielpearl.org](http://www.danielpearl.org)) to honor the memory and life of their son. The Foundation's mission is to promote cross-cultural understanding through journalism, music, and innovative communications.

"On a personal level, Judea showed remarkable strength during a difficult time," added Ercegovac, "and he has a genuine interest in improving the world through true understanding."

For more on Professor Judea Pearl's research, please visit <http://www.cs.ucla.edu/~judea/>.

## "Judea Pearl is one of the most remarkable people we have in the School."

Milos Ercegovac



## Professor Mark Goorsky Appointed Chair of Materials Science and Engineering

By Christopher Sutton



Professor Mark Goorsky

Professor Mark Goorsky has been named Chair of the materials science and engineering department in the Henry Samueli School of Engineering and Applied Science. Goorsky, who joined the UCLA faculty in 1991, replaced the outgoing chair, professor King-Ning Tu, on July 1.

“It has been extremely rewarding to serve as Chair of this department,” said Tu. “Under Mark’s leadership, I’m confident our department will continue to excel in its mission of teaching, research and service.”

Goorsky has been vice chair of undergraduate programs for the department since 1995. He also heads the electronic materials research group, which studies defects in solid state electronic materials and their effect on devices made from those materials. Goorsky will continue to lead the group, which this fall will have ten graduate students and four undergraduate students.

Goorsky leads a department that is showing signs of growth. A new faculty member has been recruited, and joint

appointments have resulted in dynamic cross-disciplinary relationships with other UCLA departments, including chemistry, mathematics and mechanical and aerospace engineering. In the latest U.S. News and World Report rankings, the department was ranked 23rd (among public universities it ranked 14th). The department was unranked a year ago.

“If you look at the people we have, the awards we earn and the collaborative environment we’re creating, you can see we have a strong department,” said Goorsky. “The challenge is to take it further, and we’re poised to do so. Dean Dhir has given us the green light to grow the department and recruit exceptional people, and it will be exciting to guide that process.”

Goorsky has long been an advocate of outreach to promote hands-on science learning among pre-college students. In 1997, he founded the Grassroots Science Program to encourage young people to pursue careers in research.

**“Under Mark’s leadership, I’m confident our department will continue to excel in its mission of teaching, research and service.”**

“We go to fifth and sixth grade classrooms in the area,” said Goorsky. “Once you get students interested at that age level, they really get into it. They’re smart enough to make connections between the things they see every day and the things we show them during our classroom visits.”

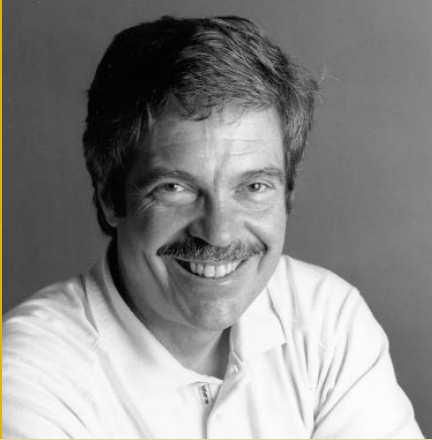
Goorsky earned his B.S. in materials science and engineering from Northwestern University, and his Ph.D. from MIT. Originally from the town of Niles, Illinois, near Chicago, he now resides in Valencia with his wife and three children.

King-Ning Tu



## Alan C. Kay Receives Three Major Scientific Honors in 2004

By Christopher Sutton



Professor Alan C. Kay

Alan C. Kay, an adjunct professor of computer science at UCLA whose work in the 1960s and 1970s opened the door for the personal computing revolution, received three major scientific awards this year – the Kyoto Prize, the Turing Award and the Charles Stark Draper Prize.

Kay joined the computer science department in the UCLA Henry Samueli School of Engineering and Applied Science in 2002, and teaches a Transpacific Interactive Distance Education (TIDE) course on user-interfaces and end-user scripting as learning environments for children. Using technology developed by UCLA's Center for Digital Innovation, TIDE courses are taught simultaneously at UCLA and Kyoto University in Japan.

“Dr. Kay’s tremendous contributions to the field of computing and education deserve this exceptional acclaim,” said Milos Ercegovac, professor and chair of UCLA’s computer science department. “It has been truly inspiring for our faculty and students to have such a renowned computer scientist in our midst.”

The Kyoto Prize is an international award given by the Inamori Foundation to people who have contributed significantly to the scientific, cultural and spiritual betterment of mankind. Kay was honored for “creating the concept of personal computing and contributing to its realization.”

Kay received the 2003 Turing Award, considered the “Nobel Prize of Computing,” from the Association for Computing Machinery for his breakthrough concepts on personal computing and for leading the team that invented Smalltalk, the first complete dynamic object-oriented programming language.

He was awarded the National Academy of Engineering’s 2004 Charles Stark Draper Prize along with three colleagues for their work at Xerox’s Palo Alto Research Center in the 1970s. The team, credited with creating the first practical networked personal computer, included Kay, Robert W. Taylor, Butler W. Lampson and Charles P. Thacker.

While at Xerox in the early 1970s, Kay led efforts to develop perhaps the most significant leap in human-computer interactivity, the graphical user interface (GUI). Kay designed the GUI to use icons as graphical representations of computing functions – the folders, menus and overlapping windows – based on his research into the processes of learning and creativity.

Kay’s abiding interest in children and education led him to use Smalltalk as a tool for teaching computing concepts at the elementary level. Kay found that children learned better if touch, images and symbols are combined with plain text. Today, he is President of Viewpoints Research Institute, a non-profit organization dedicated to children and learning that he founded in 2001.

As a student at the University of Utah, Kay invented dynamic object-oriented programming, and was a member of the university research team that developed continuous tone 3D graphics for the Advanced Research Projects Agency (ARPA).

While participating in several design committees for the fledgling ARPANET project, Kay came to know UCLA computer science professor Leonard Kleinrock, who created the basic principles of packet switching, the technology underpinning the Internet and still used today.

“Alan’s contributions to personal computing have been revolutionary and continue to have an impact today,” said Kleinrock. “The recognition he has received [this year] shows how influential his insights have turned out to be.”

**“It has been truly inspiring for our faculty  
and students to have such a renowned  
computer scientist in our midst.”**

Milos Ercegovac

## UCLA Engineering Professor Jonathan Stewart Receives Fulbright Award



Jonathan P. Stewart

Civil and environmental engineering associate professor Jonathan P. Stewart will travel to Italy early next year as part of the 2004–2005 Fulbright Scholar Program. Stewart will spend four months lecturing at the Department of Structural and Geotechnical Engineering at the University of Rome, La Sapienza. During his lectureship, Stewart intends to familiarize Italian colleagues and their graduate students with the state-of-the-art practices and technologies associated with Performance-Based Earthquake Engineering.

“Italy is a very competitive location for the Fulbright, but of all the European countries, Italy is perhaps the most seismically active, and there is a high level of seismic research being conducted,” noted Stewart. “For the most part, researchers in California have not had formal interactions with our colleagues in Italy, so this is a good opportunity for an exchange of ideas and information.”

Italy contains several regions of high seismicity that has given rise to an active local community of earthquake engineers and seismologists. However, collaboration between U.S. and Italian researchers has been sparse compared with interactions with researchers from other countries of high seismicity such as Japan, Taiwan and New Zealand. During his Fulbright, Stewart plans to share information about activities underway in California’s earthquake community with Italian researchers through lectures at La Sapienza and other universities outside of Rome.

Sponsored by the U.S. Department of State’s Bureau of Educational and Cultural Affairs, the Fulbright Program has been the U.S. government’s flagship program in international educational exchange since 1946. The U.S. Fulbright Scholar Program sends scholars and professionals each year to more than 140 countries, where they lecture or undertake research in a wide variety of academic and professional fields.

**“Italy is a very competitive location for the Fulbright, but of all the European countries, Italy is perhaps the most seismically active, and there is a high level of seismic research being conducted.”**

Jonathan P. Stewart

## UCLA Engineering Loses Two Valued Members of the Faculty

The UCLA Henry Samueli School of Engineering and Applied Science lost two emeriti faculty this year, Thomas A. Rogers and H. J. Orchard. Both men made significant contributions to the School, and will be greatly missed by their families, friends and colleagues.

Rogers, a member of the founding engineering faculty at UCLA, died at his home in Morro Bay on May 13, 2004 of natural causes. He was 98.

After earning his PhD in electrical engineering at UC Berkeley, Rogers worked as an instructor in electrical engineering from 1933 to 1938 before resigning to work at Shell Oil Company and Lockheed. He returned to the University of California as a supervisor in the Engineering, Science, Management War Training Program in 1944.

In 1945, Rogers joined Dean L.M.K. Boelter to build the Unified Engineering program at UCLA. He was promoted to Professor in 1950, and in 1953 was appointed as Assistant Dean for Graduate Studies.

Before his retirement in 1970, Rogers developed undergraduate, graduate and extension courses and laboratories for the emerging fields of servomechanism, analogue computers and digital controlled machine tools. He also organized innovative off-campus graduate programs that were offered in San Diego, Orange County, Los Alamos Laboratories in New Mexico and Sacramento.

He pursued his hobbies with passion, among them model railroads, oenology and computers. Rogers is dearly remembered for his sense of humor, his intelligence and generosity.

His wife of 54 years, Marcia Tikiob, preceded him in death. Rogers is survived

by his two children, Peter Rogers of Hesperia and Robin Young of El Segundo, two grandchildren and two great-grandchildren.

H. J. Orchard, an authority on filter design and network theory, died June 23, 2004 at his home in Santa Monica of respiratory failure. He was 82.

Orchard was born and educated in England. He received his B.Sc. from the University of London in 1946 and his M.Sc. from the same institution in 1951. From 1942 to 1961, he was a lecturer with the engineering department of the British Post Office, where he taught at their Central Training School in Cambridge, England. He also worked on network design problems in their London-based research laboratories.

In 1961, Orchard immigrated to the United States and became a consultant on network design to San Carlos-based GTE Lenkurt, Inc., where he was head of the Networks and Mathematics Group until joining UCLA in 1970.

He became a member of the UCLA faculty in 1970, when he joined the electrical engineering department as a full professor. Orchard retired in 1991 after a long and distinguished career of research, teaching and university service. He was particularly committed to the electrical engineering department and a significant contributor to the circuits and systems community of researchers. He also served as Vice Chair of Graduate Affairs for nearly a decade.

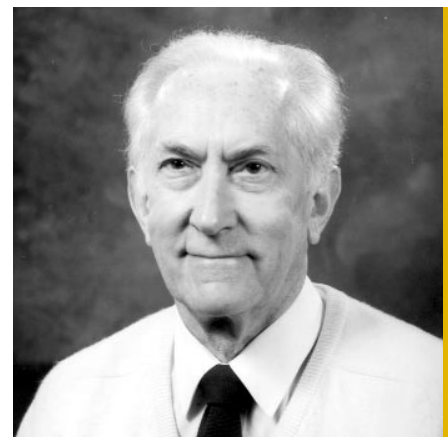
Orchard continued to work after his retirement from his office in the School of Engineering. In 2003, he received the Technical Achievement Award from the IEEE Circuits and Systems Society, which honors a person for his outstanding technical contributions over a period of years. The citation recognized Orchard for “a sustained record of

seminal publications in the field of filter design for more than half a century that have contributed theoretical breakthroughs, new design techniques and practical advancements.”

At the time of his passing, Orchard was being considered for the UCLA Engineering Alumni Association’s Lifetime Contribution Award. The School of Engineering will bestow the award to him posthumously at the 2004 Engineering Awards Dinner on October 15.

Orchard was highly regarded among colleagues and students as an accomplished teacher. He is also remembered as a skilled administrator with high standards and a sense of fairness.

Orchard is survived by his wife Marietta, son Richard and grandson Nicholas. The family would appreciate donations to the UCLA Foundation to support the H.J. Orchard Memorial Fellowship. This fellowship will aid an electrical engineering graduate student. Donations and inquiries can be made to 6266 Boelter Hall, Box 951600, Los Angeles, CA, 90095-1600, or call (310) 206-0678.



Professor Emeritus H.J. Orchard

# Top 12 Media Hits 2003-04

“Casting the Wireless Sensor Net,” **MIT Technology Review**, featuring computer science professor Deborah Estrin and electrical engineering professors Bill Kaiser and Greg Pottie. (July 1, 2003)

---

“PopSci’s 2nd Annual Brilliant 10,” **Popular Science Magazine**, featuring computer science professor Deborah Estrin. (September 2003)

“[Estrin joins] a tiny cohort of the larger community of researchers doing the work that will reveal – and, by revealing, change – our world.”

---

Unsolved History, **The Discovery Channel**, featuring civil and environmental engineering professors Jonathan Stewart and John Wallace. (September 3, 2003)

---

Discovery, **BBC News World Edition**, featuring mechanical and aerospace engineering professor C.J. Kim. (October 8, 2003)

---

“Nanotechnology – Small Things for Big Changes,” **Los Angeles Times**, featuring electrical engineering professor Eli Yablonovitch. (November 23, 2003)

---

“Buried Measure,” **San Diego Union Tribune**, featuring computer science professor Deborah Estrin. (November 26, 2004)

“Embedded networks help make sense of nature, life and the world.”

---

“Talking to Bacteria,” **Nature**, featuring chemical engineering professor James Liao. (February 12, 2004)

“[This] achievement brings us one step closer to turning cells into tiny robots that we can control...”

---

“Sorting E-Mail Friends from Foes,” **Nature**, featuring electrical engineering professor Vwani Roychowdhury. (February 16, 2004)

“A simple and easily implemented scheme for combating e-mail spam has been devised ... [that] turns the spammers’ weapon on themselves.”

---

“‘Smart Dust’ is Way Cool,” **U.S. News & World Report**, featuring computer science professor Deborah Estrin. (February 16, 2004)

“Thanks to this new technology, many scientists are getting the chance to observe what was previously unobservable.”

---

Daily Planet, **The Science Channel**, featuring electrical engineering professor Bill Kaiser. (March 3, 2004)

---

“Big Idea in Mini-Robotics,” **Los Angeles Times**, featuring bioengineering professor Carlo Montemagno. (March 15, 2004)

“...a key stumbling block [to miniaturizing medical devices] is finding a way of shrinking the power source... The newly minted machines in Carlo Montemagno’s UCLA lab may overcome this formidable hurdle.”

---

Beyond Invention: Artificial Intelligence, **The Discovery Channel**, featuring computer science professor Petros Faloutsos. (April 8, 2004)

---





**Munir M. Sindir**

Director of Advanced Analysis & Deputy Boeing Executive Focal to UCLA

<http://www.boeing.com>

**Why does Boeing choose to recruit engineering and computer science graduates from UCLA?**

Boeing is interested in recruiting engineering and computer science graduates from top universities across the globe. UCLA is one of the Boeing Enterprise Level Schools that meets the highest criteria in the quality of education and training offered, innovative research performed, and the large and diverse population of the student body.



**What do you see as the strengths of UCLA's graduates in engineering and computer science?**

High student body academic standards, exposure to cutting edge research and novel ideas, a good grasp of the engineering and computer science fundamentals, good written and oral communication skills, project experience and ability to function in a team environment, good leadership skills, and the value placed on diversity.

**How do employees who are alumni of UCLA compare to your other employees?**

It's difficult to compare, because when you're hiring top talent from a university like UCLA, Stanford or MIT, the caliber of the individual is very high across the board. There are currently 18 UCLA engineering alumni in leadership roles at Boeing.

**How many students from UCLA's Henry Samueli School of Engineering and Applied Science has Boeing hired in the last three years?**

Boeing has hired 137 UCLA engineering graduates.

**What types of positions have these graduates been hired to fill?**

They have filled positions in electrical engineering, material processes, optics, physics, mechanical engineering, software and system engineering, and testing.

**What other aspects of Boeing's relationship with UCLA are important to the company?**

Participation in research projects as an industrial partner, access to the IP base of the University, working relationships with faculty, staff, and students, UCLA's support of the Boeing Learning Together program, the development of new courses and programs of specific interest to Boeing, and distance learning opportunities and off-campus courses.

## UCLA Computer Science Students Part of DARPA Grand Challenge

By Marlys Amundson



Pete Reich

The Golem Group, 2004

Last March, just outside of Barstow, California, a series of driverless vehicles set out for Las Vegas. One after another, though, they came to a halt, and the \$1 million prize for the Grand Challenge went unclaimed.

Sponsored by the Defense Advanced Research Projects Agency, the Grand Challenge was a race among autonomous robotic ground vehicles along a preset on- and off-road course. The competition drew attention and generated new approaches to technological issues related to autonomous vehicles.

The Golem Group, whose car traveled 5.2 miles, included two UCLA computer science graduate students who designed and assembled the vehicle's vision system. Jason Meltzer was with the team from its inception and Eagle Jones joined the group a few months prior to the race.

"We were very pleased with our race results," noted Meltzer. "Especially when you consider how much less we spent than the other teams. Our total budget was under \$35,000 and one team spent more than \$3 million."

The DARPA Grand Challenge tested the ingenuity of groups from universities and corporations, as well as independent teams who conceived and built autonomous ground vehicles designed to complete the rugged 150-mile course. The rules required that all vehicles be able to perceive terrain features, ground conditions, obstacles and other Challenge vehicles, and intelligently control their speed and direction to avoid them without human control of any kind.

Of the 104 teams that applied, only 15 vehicles qualified for the race. Of those, two withdrew prior to the beginning of the race and four others were unable to make it out of the starting area. The Golem Group was one of only four teams that completed more than five miles of the course, and none reached the eight-mile mark.

Richard Mason, the Golem Group's leader, assembled a group of Caltech alumni and Aerospace Corporation employees to design and build their vehicle. He asked Meltzer, who is part of UCLA's Vision Lab, to head up the car's vision system. Jones, another member of the Vision Lab, assisted with the associated sensors and coding.

The Golem Group's vision system consisted of several cameras – both video and infrared – mounted on the vehicle. By gathering data on objects around the car and calculating the distance as measured by each camera and the radar system, the car was able to determine the location and size of fixed and moving objects around it. This information was relayed to the autonomous driving system, which then decided the vehicle's course.

In June, DARPA announced plans for a second race in October 2005, doubling

the prize to \$2 million. Meltzer and the Golem Group hope to capitalize on their positive results in the first race and secure additional funding from sponsors for the new race.

Additional faculty and students from UCLA will be actively involved in designing and building the vision system for the Golem Group's new vehicle. Graduate students in computer science professor Stefano Soatto's Vision Lab will design and equip the vision systems for at least one, and possibly two vehicles, working on them simultaneously. Other Golem Group members will work on the mechanical and control aspects – determining how the vehicle moves and assembling the physical parts of the vehicle.

"Last year I was their vision expert although I was only a second-year graduate student," explained Meltzer. "Next year we'll have more people involved, allowing us to try a more cutting-edge approach. We're also interested in providing opportunities for undergraduates in computer science and other fields to be involved in the project."

As they did in the first race, the team plans to retrofit a commercially available vehicle with actuators and the necessary electronics to enable it to run autonomously. They hope to use more advanced artificial intelligence, though, especially in the vision system.

"The Golem Team gave me an opportunity to apply what I've learned and to be involved in a potentially important competition with interesting and intelligent people," said Meltzer. "This year we'll have time to conduct more research, and create new knowledge that can be applied to the vehicle."

For more information on the Grand Challenge or UCLA's Vision Lab, please visit <http://www.darpa.mil/grandchallenge/> and <http://www.vision.cs.ucla.edu/>.

## UCLA Engineering Students Travel to Thailand to Build Health Clinic

By Christopher Sutton



UCLA Engineering students (from left): Jonathan Hogstad, Philip Wegge, Regina Quan, Lisa Jambusaria, Ismael Nawfal and Diego Rosso.

In the remote hill tribe settlement of Samli, Thailand, access to health care has always been very limited. The nearest doctor is miles away, and the villagers have little or no transportation to reach medical facilities in the regional capital. People with a life threatening illness would travel up to a week to reach a treatment center.

But this August, the village of Samli opened its own health clinic, thanks to the efforts of a team of students, including six from the UCLA Henry Samueli School of Engineering and Applied Science.

The students were part of a joint effort by UCLA, Columbia University and the University of Maryland to build a ten-room health clinic, staffed by a live-in doctor, complete with examination rooms, a lab, pharmacy, overnight room and living quarters.

The six students from UCLA - Jonathan Hogstad, Lisa Jambusaria, Ismael Nawfal, Regina Quan, Diego Rosso and Philip Wegge - arrived in Samli in late June, after a grueling 24-hour journey that

included three flights and a long drive through jungle mountain terrain.

“I didn’t know what to expect,” said Hogstad, who graduated this year with a mechanical engineering degree, “but the people we met really went above and beyond to take us in and show us who they were, to open up to us.”

The village of Samli is populated by the Lisu people, ethnic Chinese migrants who came from across the Burmese border. The village has a population of about 150 people, making it the largest settlement in the region and the only one with electricity and a phone.

The students are members of the UCLA chapter of Engineers Without Borders USA (EWB-USA). Established in 2000, EWB-USA is a non-profit organization that implements environmentally and economically sustainable engineering projects in developing areas of the world.

The UCLA Chapter of EWB was founded in 2002, and has roughly a dozen active members. Wegge, an environmental engineering Master’s student, has been chapter president since 2003.

“As an engineering student I felt I needed something more than just classroom work,” said Wegge. “I wanted the hands-on experience, and more importantly, I wanted to help communities that are less fortunate than ours.”

For their project in Thailand, the UCLA students were supported by contributions from the host community, a grant from General Motors and UCLA engineering alumnus Richard Gay, who has been a long-time supporter of student projects.

Columbia University students traveled to Thailand in May to construct the

frame and roof of the clinic before the UCLA students arrived to finish the inside of the hospital, including the electrical plant, plumbing and water lines, insulation, ventilation, siding and interior walls.

Each day, two professional engineers assigned the students tasks according to a master construction plan, and local workers assisted with digging and other jobs. For some of the students, the work was a new experience.

“There were people who had never touched a tool and others who had building experience, although everybody showed a large ease with the tools,” said Rosso, an environmental engineering graduate student, who gained experience in plumbing and carpentry from working with his father on the family home in Italy. “They learned right away how to use them and be independent. It was remarkable.”

Throughout the life of the project, everyone was keenly aware that their efforts had to be in service to the Thai villagers, and that any engineering solution had to match local customs.

“We had to understand what these people need,” said Rosso. “We could not just go in and say, ‘you have a problem and we know how to fix it because we are engineers.’ That’s not the way it works.”

The UCLA chapter of Engineers Without Borders is planning a trip next year to Tibet.

For more information, visit the chapter’s web site at <http://www.seas.ucla.edu/ewb/>.

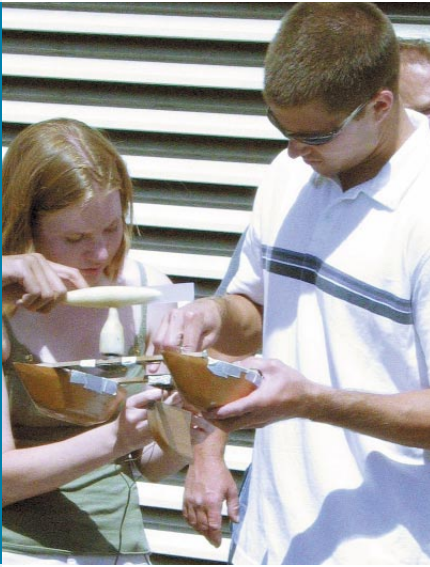
For more on their work in Samli, please visit <http://www.engineer.ucla.edu/stories/2004/ewb.htm>.

*Photo courtesy of UCLA Engineers Without Borders*



## Senior Design Course Challenges Student's Skills

By Marlys Amundson



Members of the Revolution team make adjustments to their boat between races.

Anyone looking out onto the Engineering IV patio at the end of Spring Quarter would have seen an unusual sight. A crowd of students and onlookers gathered around a 16-foot tank of water to watch three unique boats racing across the pool. The competition was part of a mechanical and aerospace engineering senior design class, and included two timed runs by each team's boat, as well as a head-to-head race.

Mechanical and aerospace engineering professor Pirouz Kavehpour, who joined UCLA last year, restructured the course this year. "The class, as it was taught previously, was fairly open-ended," explained Kavehpour. "Students were asked to design and test shapes relevant to their fields. I wanted to give them an interesting task with deadlines."

Each team was asked to design and build a boat no more than two feet wide and a foot in length. The craft had to include

a mock radar tower that rose at least three inches above deck, and an observation pod beneath the boat. Within each team were three groups: one working on the boat's hull, another on the propulsion system and a third on the radar tower. Kavehpour appointed students as project manager and systems manager in each group.

The project managers set the schedule and made sure the finished product would meet all the specifications laid out by Kavehpour. They also were on hand to provide a fresh set of eyes to any problems that arose.

"It's sometimes easier to see a problem or solution if you're coming from an outside view," said Kristan Klinghoffer, the project manager for the Black Marlin group.

The systems managers ensured that each team's design groups were working in sync and that a change to one aspect of the boat was relayed and considered by all members of the team. They were also responsible for evaluating ideas and limiting the amount of risk the group would take in its design.

The most challenging requirement posed by Kavehpour was that the boats, which had to be self-propelled, could not be powered by electricity, eliminating traditional power sources such as batteries.

The three teams settled on three different methods of propulsion. The Black Marlin propulsion team led by Matthew Tharp explored several options, ultimately choosing carbon dioxide (CO<sub>2</sub>) as their source of power for the engine.

"We needed a source that would be relatively light, efficient and able to power the boat across the tank,"

explained Tharp. "We discarded springs and rubber bands, and tested rocket fuel but decided it was perhaps too easy."

Team S.S.L.A. used compressed CO<sub>2</sub> for propulsion of their craft. The Revolution group, which was not getting enough torque from their Stirling engine, switched to an Estes rocket, commonly used in model rockets, for propulsion two days prior to the race.

As part of the course requirements, Kavehpour asked each team to submit a design report after four weeks and a testing report in the eighth week that compared results to date with their initial theories. These reports offered the students a chance to develop their teamwork skills, and to gain a full understanding of their boats' systems. Although learning to work in larger groups presented a challenge initially, many of the students in the course ultimately welcomed the opportunity to apply both their practical sense and theories learned while at UCLA to designing and building a working boat under rigorous constraints.





## Engineering Parent's Gift Will Help Upgrade Instructional Laboratories

By Marlys Amundson



Kevin Hall (left) with his son.

**K**evin Hall, father of a third-year aerospace engineering student at UCLA, has made a five-year commitment in the mechanical and aerospace engineering department. Hall has pledged \$20,000 per year in appreciated securities to support the department's teaching laboratories.

"Engineering education without practical application makes for a very hard transition to a real job, both to pick a product area of interest and to be immediately useful to employers," noted Hall. "Updated, flexible laboratory environments are a key companion to theoretical and practical engineering education and problem solving."

The department has four main teaching laboratories that support classes ranging from the principles of mechanical engineering to computer-aided design (CAD) to aerodynamics to manufacturing. Hall's annual gift will help the

department to substantially improve the quality of the labs, including doubling the available computers in the CAD laboratory and key hardware and software upgrades.

"We were very pleasantly surprised to have a parent make this type of commitment to the department," said H. Thomas Hahn, chair of the department and a professor in the UCLA Henry Samueli School of Engineering and Applied Science. "Kevin's gift gives us the encouragement to move forward with planned improvements to the teaching labs, and we cannot thank him enough for his generosity."

Hall received his BS ('81) and MS ('82) in electrical engineering from Purdue and Stanford – his wife also has an electrical engineering degree from Purdue – and an MBA ('88) from Stanford.

"I came to the Silicon Valley from the Midwest for the excitement of leading edge technology – and better weather and fruit," Hall joked.

After completing his master's degree, Hall worked as an engineer for a year before moving into product marketing for an emerging technology start-up. He transitioned into venture capital work after receiving his MBA, first at Norwest Venture Partners, then at his own company, Crescent Venture Investors.

Over the course of his career, Hall learned "to be patient with personal career growth, but also to find an engineering environment with talented, mentoring, progressive leaders and coworkers that will allow you to work clever and hard."

Hall, who received a scholarship for graduate school from his national fraternal-

nity, has also made gifts to support engineering labs at Purdue, and Stanford MBAs who pursue careers in the non-profit world.

Of his gift to UCLA, Hall explained that he wanted to "support his son's decision to pursue aeronautical engineering and the School that will launch his career."

If you would like to know how you can make a difference in the UCLA Henry Samueli School of Engineering and Applied Science, please visit <http://www.engineer.ucla.edu/giving/>.

## UCLA / Northrop Grumman

# Reception



Nearly 150 UCLA alumni attended a reception hosted at Northrop Grumman's Redondo Beach location in April. Attendees had a chance to catch up with fellow Bruins and hear from Vijay Dhir, dean of UCLA Engineering; Bruce Willison, dean of the UCLA Anderson School; Wes Bush, Northrop Grumman Corporate Vice President and President of Northrop Grumman Space Technology; and Dick Croxall, Vice President for Mission Assurance and Chief Engineer of Northrop Grumman Space Technology.

(from left): Bruce Willison, Wes Bush, Vijay K. Dhir, and Dick Croxall.

## Young Alumni Reunion



Attendees at UCLA Engineering's Young Alumni Reception.

Engineering graduates from 1994-2003 gathered at a reception hosted by Dean Vijay Dhir prior to the UCLA Young Alumni Reunion party in May. Attendees caught up with former classmates, and had the opportunity to talk with Dean Dhir and Engineering Alumni Association President Bob Green at the party.

## 1960s

**Frederick W. Wright** ('67) recently retired after 15 years of public service in municipal government, where he was finance director and city treasurer of three cities in California, most recently Vallejo. After graduation, he was employed for more than seven years at Lockheed Missiles and Space Company in Sunnyvale, California, culminating in his developing the multibillion dollar US Navy budget for the Trident Submarine-based Weapon System.

**Michael A. Russell** ('68) was named chief financial officer at American Technology Corporation. He has over 20 years experience as a senior financial executive, and has held senior financial management positions in both private and public technology companies.

**Ronald Sugar** ('68, MS '69, PhD '71), president and CEO of Northrop Grumman Corporation, received the Jacoby Award from the UCLA Dashew International Center for Students and Scholars, honoring his exceptional contributions to humanity and commitment to enhancing international understanding.

## 1970s

**Vikram Budhraj** (MS '70) was named to the Board of Directors for American Superconductor Corporation. He is president of Electric Power Group, LLC, a Pasadena, California-based consulting firm he founded in 2000 to provide management and strategic consulting services to the electric power industry.

**Mark Kushner** ('76) will become dean of Iowa State University's College of Engineering, effective January 1, 2005. He will also hold the James L. and Katherine S. Melsa Professorship.

## 1980s

**Sally Ann McInerney** (MS '84, PhD '87) was named head of the department of aerospace engineering and mechanics at the University of Alabama's College of Engineering. She is the first female department head in the College's history.

**Edmond Mesrobian** ('82, MS '86, PhD '92) was appointed vice president and chief technology officer at Real Networks, where he will be responsible for leading efforts to define, build and operate the media service application platform. In addition, as the CTO, he is responsible for leading technology strategy and initiatives across the company.

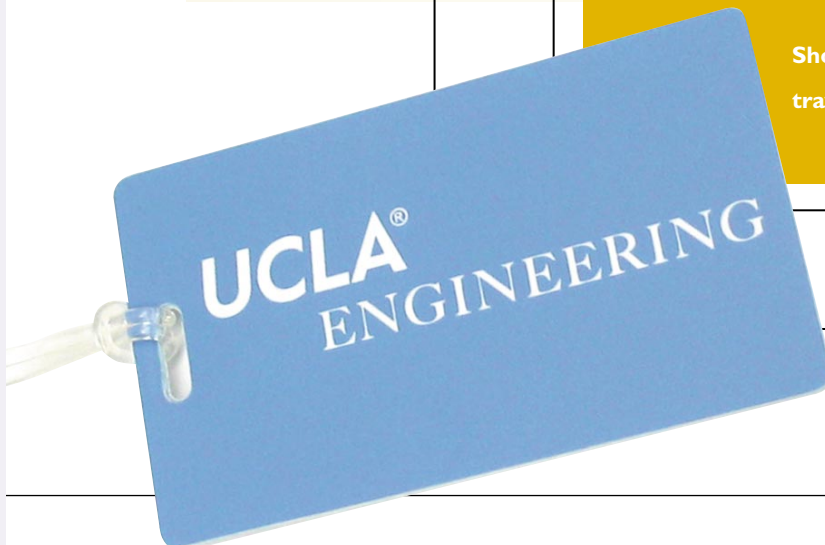
Share your personal and professional milestones with classmates and friends – send us your news electronically at [www.engineer.ucla.edu/alumni/alumnews.html](http://www.engineer.ucla.edu/alumni/alumnews.html).

## Stay Connected!

and keep us up to date...

We want to know what our alumni are doing! Send us your business card, and we will laminate it onto a UCLA Engineering luggage tag and send it back to you.

Show your pride in UCLA Engineering as you travel around the world!



## 2003-04 UCLA Henry Samueli School of Engineering and Applied Science

The UCLA Henry Samueli School of Engineering and Applied Science is continuing to expand and strengthen our research and educational programs. Accordingly, the School's US News & World Report ranking rose to 16th overall and 10th among public universities.

Despite continued cuts in state funding to the UC system, the School has renewed its commitment to providing access to well-qualified students who will become California's future intellectual capital. Over the last four years, total engineering enrollment has increased by six percent at UCLA.

In addition, the School has successfully recruited 21 new faculty in the last two years, educators and researchers who are at the top of their respective fields. They come to UCLA from other universities and from industry, and bring with them innovative new ideas and approaches.

To meet the needs of our new faculty and students, the School began construction of a replacement building for one half of Engineering I earlier this year. When completed, the new facility will provide more than 60,000 assignable square feet for modern research labs, seminar rooms and office space.

In 2003-04, our faculty brought in more than \$80 million in gifts, contracts and grants to fund thriving research activities across the School. Their work will touch every aspect of our lives – from advances in wireless communications to improved health care to organic semiconductors.

<b>Full-time Faculty</b>	146
<b>PhD Students to Faculty Ratio</b>	5.12:1
<b>Enrollment (2003-04)</b>	
Undergraduate	2,625
Graduate	1,491
Total	4,116
<b>Degrees conferred (2004)</b>	
Undergraduate	667
Master's	316
PhD	118

### Publications

In 2003-04, UCLA engineering faculty published more than eight books, 60 chapters, 540 journal articles and 650 articles in conference proceedings.

### Editorships

In 2003-04, UCLA engineering faculty held 34 editorships at professional journals and 26 associate editorships.

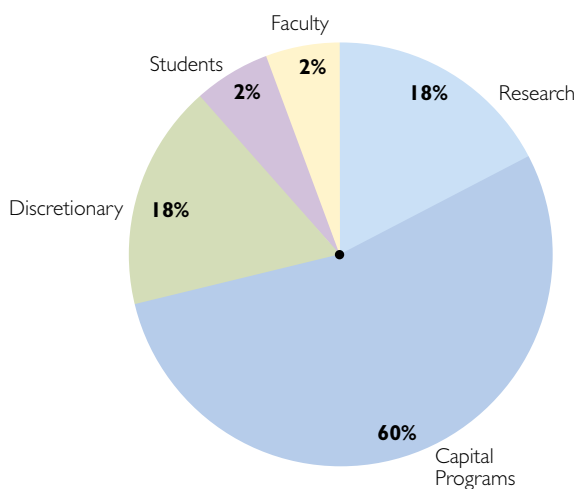
### Keynotes

Six faculty presented keynote addresses at major professional conferences during the 2003-04 academic year.

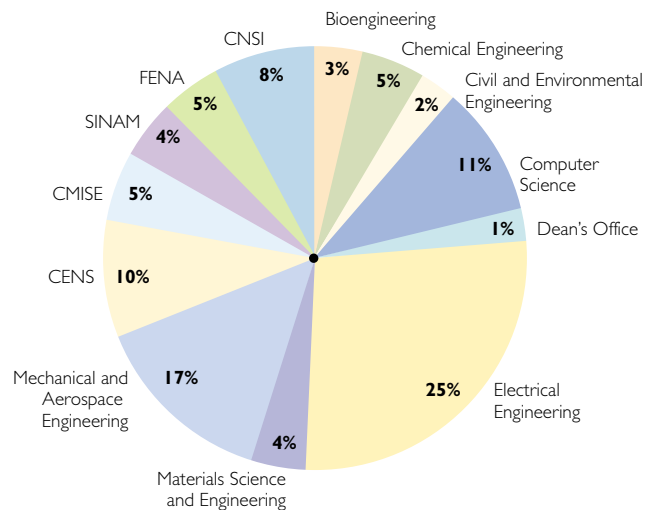
**Gifts to the School** \$18,152,781

**Contracts and Grants** \$78,738,841

**GIFTS TO THE SCHOOL BY DESIGNATED PURPOSE**



**CONTRACTS AND GRANTS**





## Recognizing Excellence in Research and Education

## 2003-04 Faculty Awards and Honors

The Acoustical Society of America (ASA), the leading scientific and engineering society in Acoustics and a member of the American Institute of Physics, has elected electrical engineering professor **Abeer Alwan** as a Fellow for her contributions to research in speech production and perception and applications to speech technology.

Electrical engineering professor **A.V. Balakrishnan** received an honorary doctoral degree from the West University of Timisoara, located in Romania, for his seminal contributions to the analysis and design of control systems.

**Greg P. Carman**, professor of mechanical and aerospace engineering, has been invited to speak at the National Academy of Engineering Forum 10th Annual Frontiers of Engineering Symposium, Sept. 9-11. He was also named the recipient of the 2004 American Society of Mechanical Engineers Adaptive Structures and Material Systems Prize in honor of his contributions to smart materials and structures.

Computer science assistant professor **Junghoo "John" Cho** received an NSF CAREER Award to develop a scientific foundation for archiving the history and evolution of the Web: tracking changes, storing multiple versions of Web pages, and providing the stored pages to users through an easy-to-access interface.

Chemical engineering associate professor **Panagiotis D. Christofides** has been selected to receive the 2004 Donald P. Eckman Award, given by the American Automatic Control Council for his pioneering contributions to analysis and control of nonlinear distributed parameter systems, accompanied by creative applications to advanced materials processing, particulate processes and fluid dynamic systems.

Chemical engineering professor **Yoram Cohen** was appointed to the International Scientific Advisory Committee of the Stephen and Nancy Grand Water Research Institute at the Technion in Israel.



**Vijay K. Dhir**, dean of the UCLA Henry Samueli School of Engineering and Applied Science and professor of mechanical and aerospace engineering, received an alumni leadership award from his alma mater, the Indian Institute of Technology in Kanpur, India. He was also inducted into the University of Kentucky's Engineering Hall of Distinction.

Computer science professor **Joseph DiStefano, III** received the 2004 Lockheed Martin Excellence in Teaching Award. DiStefano was chosen for his role in developing two graduate programs: biomedical systems (now systems biology) and bio-cybernetics, as well as his efforts to develop and sustain the cybernetics interdepartmental undergraduate degree.

**Milos Ercegovac**, professor and chair of UCLA's computer science department, was elected a foreign member of the Serbian Academy of Sciences and Arts. The Belgrade-based Academy is the most eminent scientific and art institution in Serbia and dates back to 1886. Ercegovac is a specialist in digital arithmetic, digital design, and computer system architecture.

Computer science professor **Deborah Estrin** was elected a Fellow of the Institute of Electrical and Electronics Engineers for her innovations in scalable network protocols and sensor network research.

**Sheldon Friedlander**, Parsons Professor of Chemical Engineering, has received the ETH Stodola Medal from the Swiss Federal Institute of Technology in Zurich. Friedlander was selected by the Institute's

Department of Mechanical and Process Engineering to receive the award for his work in the field of aerosol engineering, or the science and technology of fine particles in gases, with applications to air pollution and advanced materials.

Electrical engineering assistant professor **Lei He** received an NSF CAREER Award to develop an interconnect-centric layout design methodology that incorporates on-chip inductance.

Mechanical and aerospace engineering professor **Chih-Ming Ho** has been appointed to the advisory board of the ASME Nanotechnology Institute, which is dedicated to advancing the art, science and practice of nanotechnology.

Electrical engineering professor **Tatsuo Itoh** has been selected to serve as a distinguished lecturer of the IEEE Microwave Theory and Techniques Society.

Electrical engineering professor **Bahram Jalali** was elected a Fellow of the Institute of Electrical and Electronics Engineers for his contributions to the application of time-frequency techniques in microwave photonics.

Civil and environmental engineering assistant professor **Jennifer Jay** received an NSF CAREER Award to study mercury methylation in sulfate-reducing biofilms.

Bioengineering assistant professor **Daniel Kamei** won the prestigious Kimmel Scholar Award given by the Sidney Kimmel Foundation for Cancer Research, which will support his research on analyzing cellular processes to improve existing cancer therapies.

The American Institute of Aeronautics and Astronautics (AIAA), the world's leading professional society in the broad areas of aeronautics and astronautics, elected mechanical and aerospace engineering professor **Ann Karagozian** as a Fellow. She also received the UCLA Staff Assembly's Faculty/Staff Partnership Award, which recognizes those faculty who actively develop and encourage faculty/staff partnerships.

**Alan C. Kay**, an adjunct professor of computer science at UCLA and a senior fellow at HP labs, was awarded the 2003 Turing Award from the Association for Computing Machinery. It is considered the “Nobel Prize of Computing.” He also received the Charles Stark Draper Prize with three colleagues for their 1970s work at Xerox’s Palo Alto Research Center in creating the first practical networked personal computer, and the Kyoto Prize from the Inamori Foundation for “creating the concept of personal computing and contributing to its realization.”



Mechanical and aerospace engineering professor **Adrienne Lavine** was elected Academic Senate Vice Chair/Chair-Elect of the UCLA Academic Senate. She will hold this position for one year, then serve as Chair of the Academic Senate the following year. The Academic Senate Chair leads the campus-wide Academic Senate and serves as the conduit between the faculty and the administration.

Electrical engineering professor **Jia-Ming Liu** was elected as a Fellow of the American Physical Society “for (his) contributions to ultrafast nonlinear optical processes and nonlinear dynamics of lasers.”

Civil and environmental engineering assistant professor **Steven Margulis** received an NSF CAREER Award to investigate regional land-atmosphere interactions in order to ultimately better understand and model weather and climate processes. He also received a NASA New Investigator in Earth Science Award to monitor cold land processes and the significant role they play in the climate system.

**Carlo Montemagno**, professor and chair of bioengineering, received the Feynman Prize in Nanotechnology (Experimental) for “his pioneering research into methods of integrating single molecule biological motors with nano-scale silicon devices, which opens up new possibilities for nanomachines.”

**Jens Palsberg**, computer science professor, received an Okawa Foundation Research Grant to support his research in resource-aware compilation. The Okawa Foundation promotes study and analysis in the fields of information and telecommunications.

Computer science professor **Judea Pearl** has been honored by the Association for Computing Machinery and the American Association for Artificial Intelligence with the 2003 ACM/AAAI Allen Newell Award, which recognizes Pearl’s significant contributions to artificial intelligence and its applications, building a firm mathematical and theoretical foundation through groundbreaking work in heuristic search, reasoning under uncertainty, constraint processing, non-monotonic reasoning and causal modeling.

Electrical engineering chair and professor **Yahya Rahmat-Samii** has received the prestigious NASA Certificate of Recognition Award and cash prize for “the creative development of a scientific contribution which has been determined to be of significant value in the advancement of the aerospace technology program of NASA.”

**Glenn Reinman**, computer science assistant professor, received a 2004 Northrop Grumman Excellence in Teaching Award for his innovative class presentations and curricula, including a design cycle trade-offs requirement; taking time after class to provide students with advanced supplementary course materials; and developing a two-part series of graduate courses covering advanced topics in microprocessors architecture.

Electrical engineering professor **Henry Samuelli**, who is also co-founder and chairman of Broadcom Corporation, was elected a Fellow of the American Academy of Arts and Sciences.

Electrical engineering professor **Ali H. Sayed** received the prestigious 2003 Kuwait Prize for Basic Sciences for his extensive research contributions in the area of adaptive systems, including a publication record of over 200

articles and four books. The Kuwait Prize is one of the highest honors given in Kuwait for intellectual achievement. Sayed also was named a Distinguished Lecturer for the IEEE Signal Processing Society for the year 2005. The Distinguished Lecturer Program enables chapters to invite individuals who are well known educators, authors and researchers in the fields of signal processing to lecture at chapter meetings.

Computer science associate professor **Stefano Soatto** is an Associate Editor of the IEEE Transactions on Pattern Analysis and Machine Intelligence, and a member of the Editorial Board of the International Journal of Computer Vision. He will serve as the Program Chair of the IEEE International Conference on Computer Vision and Pattern Recognition in 2005.

Civil and environmental engineering associate professor **Jonathan P. Stewart** will travel to Italy early next year as part of the 2004-2005 J. William Fulbright Scholarship program. Stewart will spend four months lecturing at the Department of Structural and Geotechnical Engineering at the University of Rome “La Sapienza.”

Mechanical and aerospace engineering professor **Tsu-Chin Tsao** received his department’s Henry Samuelli Outstanding Teaching Award.

**King-Ning Tu**, professor of materials science and engineering, was selected in June as a recipient of the Founder’s Award 2003 “Ions at Caltech, 1967-76,” for his contributions to scientific advancement on the subjects of ion implantation, silicide formation, and solid phase epitaxy in microelectronic devices. He also received the 2004 Taiwan Semiconductor Manufacturing Company (TSMC) Lectureship Award.

Bioengineering assistant professor **Ben Wu** received a 2004 Northrop Grumman Excellence in Teaching Award in recognition of his role in developing the new bioengineering undergraduate curriculum, which includes 20 new innovative courses; his work as the Biomedical Engineering Society’s faculty advisor; and his numerous contributions to the department. He was also elected to the Academy of Prosthodontics, the oldest and most prestigious professional organization in the field of prosthodontics. There are only 71 active fellows and 11 associate fellows in this elite academy.

## Best Papers

Chemical engineering students **Dong Ni**, **Yiming Lou**, **Lin Sha**, and **Sandy Lao** and associate professors **Panagiotis D. Christofides** and **Jane P. Chang** received the 2003 O. Hugo Schuck Best (Application) Paper Award, one of the most prestigious and competitive Best Paper awards in the field of automatic control, for "A Method for Real-Time Control of Thin Film Composition Using OES and XPS."

Of the ten Gold Graduate Student Awards made in April 2004 at the Materials Research Society meeting, two of the winners - **Adamos Dalis** and **Ragesh Puthenkivilakam** - were from UCLA, the only institution with more than one honoree. Dalis works with chemical engineering professor **Sheldon Friedlander** and Puthenkivilakam works with chemical engineering associate professor **Jane Chang**.

Materials science professor **Mark Goorsky's** student **Calin Miclaus** won the best student paper/presentation award at the U.S. Workshop on the Physics and Chemistry of II-VI Materials for "Wafer Bonding of (211) Cd<sub>0.96</sub>Zn<sub>0.04</sub>Te on (001) Silicon."

Mechanical and aerospace engineering professor **Ann Karagozian's** student **Sevan Megerian** won first place at the AIAA Region VI Student Conference (graduate division) for "Evolution of Shear Layer Instabilities in the Transverse Jet" in April 2004.

The International Society of Optical Engineering awarded the best paper award of 2003-04 to mechanical and aerospace engineering professor **Ajit Mal**, **Frank Shih** and **Sauvik Banerjee** for "Acoustic Emission Waveforms in Composite Laminates under Low-velocity Impact." (Mal also won this award in 2002-03.) Mal also received a 2003 NDE Best Paper award for "Health Monitoring of Composite Structures Subject to Impact Damage."

**Jahoon Kim** and electrical engineering professor **Yahya Rahmat-Samii** won the best paper award at the 2003 Antenna Measurements Techniques Association meeting held in November 2003 for "Implanted Antennas Inside a Human Body: Characterization and Performance Evaluation."

**Dr. Paolo Favaro**, a postdoctoral researcher in the UCLA Vision Laboratory, and computer science associate professor **Stefano Soatto**

won the Outstanding Poster Award at the IEEE International Conference on Computer Vision and Pattern Recognition 2004.

**Daniel Cremers**, a computer science post-doctoral researcher in associate professor **Stefano Soatto's** Vision Lab, received the Best Paper of the Year 2003 from the Pattern Recognition Society for "Shape Statistics in Kernel Space for Variational Image Segmentation," Cremers, Kohlberger, Schnoerr.

Civil and environmental engineering professor and chair **William Yeh's** student **Brent Thomas** received an Outstanding Student Paper Award from the Hydrology Section of the American Geophysical Union at the AGU fall meeting in December 2003 for "Identification of Complex Reactive Transport Processes in Groundwater Modeling."

## 2003-04 Patents

Electrical engineering professor **Bahran Jalali** was jointly awarded a patent for a method and apparatus for arbitrary waveform generation using photonics.

**Jack W. Judy**, electrical engineer professor, was jointly awarded a patent for a method and apparatus for ex vivo and in vivo cellular electroporation of gene, protein or drug therapy.

Electrical engineering professors **William Kaiser** and **Gregory Pottie** were jointly awarded a patent for a method for collecting data using compact internetworked wireless integrated network sensors (WINS).

**Carlo Montemagno**, bioengineering professor and chair, was jointly awarded a patent for a nanosyringe array and method.

**Majid Sarrafzadeh**, computer science professor, was jointly awarded a patent for a method and system for progressive clock tree or mesh construction concurrently with physical design.

Electrical engineering professor **John D. Villasenor** was jointly awarded patents for error resilient video coding using reversible variable length codes, adaptive multiplexing/demultiplexing method and multiplexer/demultiplexer therefor, and video CODEC method in error resilient mode and apparatus therefor.

**Ya-Hong Xie**, materials science and engineering professor, was awarded a patent for an approach for reducing dislocation density in GaN and related alloy crystalline thin films.

## Alumni Academic Appointments

**Debjyoti Banerjee PhD '99** (Mechanical Engineering) Texas A&M

**Eli Bozorgzadeh PhD '03** (Computer Science) University of California, Irvine

**Fang-Chung Chen PhD '03** (Institute of Electro-Optical Engineering) National Chiao-Tung University

**Nael El Farra PhD '04** (Chemical Engineering) University of California, Davis

**Shih-Kang Fan PhD '03** (Institute of Nanotechnology) National Chiao Tung University, Taiwan

**Deepak Ganesan PhD '04** (Department of Computer Science) University of Massachusetts, Amherst

**Joonwon Kim PhD '03** (Mechanical Engineering) Pohang University of Science and Technology, South Korea

**Yen-Wen Lu PhD '04** (Mechanical and Aerospace Engineering) Rutgers University

**Haiyun Luo PhD '04** (Computer Science) University of Illinois at Urbana-Champaign

**Murali Mani PhD '03** (Computer Science) Worcester Polytechnic Institute

**Dan Massey PhD '01** (Computer Science) Colorado State University

**Seda Memik PhD '03** (Electrical and Computer Engineering) Northwestern University

**Lan Wang PhD '04** (Computer Science) University of Memphis

**Daniel H. Whang PhD '01** (Civil Engineering) University of Auckland, New Zealand

**Jiong Yang PhD '99** (Electrical Engineering and Computer Science) Case Western Reserve University

- ABOUT THE SCHOOL ▶
- ACADEMIC AND STUDENT AFFAIRS ▶
- ADMISSIONS ▶
- DEPARTMENTS ▶
- PEOPLE ▶
- NEWS ▶
- RESEARCH ▶
- CORPORATE RELATIONS ▶
- ENGINEERING ALUMNI ASSOCIATION ▶
- GIVING TO UCLA ENGINEERING ▶
- UPCOMING EVENTS ▶



IN THE NEWS

- >> UCLA Engineers Vibrate Abandoned Building in "Shake Test"
- >> Engineering Senior Gift Established to Support Scholarships this Fall
- >> Quantum Computing, Secure Communications Closer to Reality; UCLA Scientists Control a Single Electron's Spin

UPCOMING EVENTS

- >> October 9, 2004  
2004 UCLA Engineering Tailgate
- >> October 15, 2004  
Center for Embedded Networked Sensing Second Annual Research Review
- >> October 15, 2004  
2004 Engineering Awards Dinner

HOME

SITE MAP

FEEDBACK

COPYRIGHT 2004 UCLA

The UCLA Henry Samueli School of Engineering and Applied Science Web site has an entirely new look, more content and expanded features. Visit the redesigned site at <http://www.engineer.ucla.edu> to see how we've changed!

<http://www.engineer.ucla.edu>

Office of External Affairs

UCLA Henry Samueli School of Engineering and Applied Science  
 6266 Boelter Hall, Box 951600  
 Los Angeles, California 90095-1600

Non Profit Organization  
 US POSTAGE  
**PAID**  
 UCLA