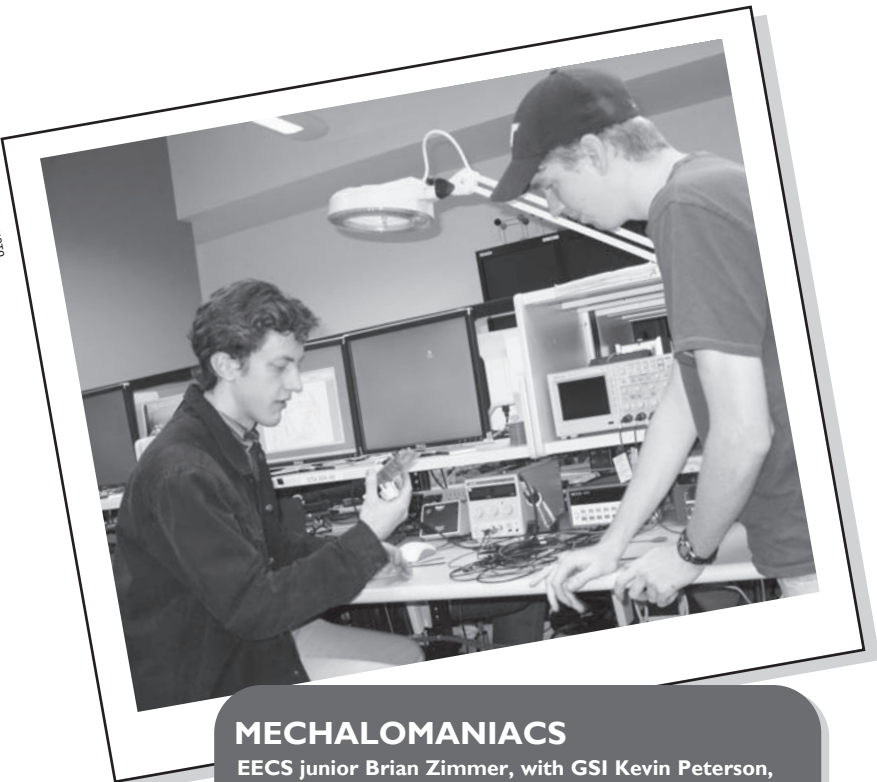


engineeringNews

FEBRUARY 15, 2008 VOL. 78, NO. 35



CELESTE ALTUS PHOTO

MECHALOMANIACS

EECS junior Brian Zimmer, with GSI Kevin Peterson, removes a chip from circuitry in EECS192, Mechatronics Design Lab, where students design and build robotic race cars. The class meets in Cory Hall's National Instruments Embedded Systems Lab, improved last year through a \$1.5 million N.I. grant. Mechatronics is one of several EE classes, like embedded systems and robotics, that offer a major design element.

From bugs to blood

Blood substitute emerges from *E. coli*



PHOTO COURTESY OF AUSTIN DAY

FINALISTS: The Berkeley iGEM team has some fun displaying the blood-substitute project Bactoblood, which won a gold prize at the MIT contest last fall.

A team of Cal undergraduates has demonstrated how genetically modified *E. coli* bacteria might be converted into a cheap and safe blood substitute. The engineered product, called "Bactoblood," addresses a

global shortage of human blood for transfusions, particularly in developing countries and emergency situations, the young developers say.

"Bactoblood is universally compatible, disease free and inexpensive, and you can reproduce it like crazy," explains Samantha Liang, a BioE junior involved in the recent interdisciplinary project. "I thought it was a really great idea."

So, apparently, did judges at the annual International Genetically Engineered Machine competition (iGEM) held last fall at MIT. Facing

Continued on page 2

POP QUIZ



What do you want to do before you graduate?



Johanes Ma
EECS senior

"Engineers are very busy. I haven't seen any games, so I want to go to a Cal game, as a student."



Kayte Fischer
BioE Ph.D. student

"I would like to study abroad, in India."



Michelle Vu
EMS freshman

"To lie on the grass whenever it's nice outside."



Michael Lin
BioE junior

"Move out of the dorms, attend a UCB symphony orchestra concert and befriend a professor."

Bactoblood

Continued from page 1

more than 50 undergraduate teams from 19 countries, the Bactoblood squad was one of six finalists in the prestigious synthetic biology event.

Berkeley's entry was different from the others, says BioE junior David Tulga, another team member. "Our project was very competitive. It's really a complete system. Think of it as a computer. A lot of people at iGEM are building components, like a keyboard or a hard drive. We were trying to build the whole computer," Tulga explains.

The competition "really motivates a lot of people to get in the field," says John Dueber, a postdoctoral fellow at the California Institute for Quantitative Biosciences (QB3) and an adviser on the project. Bactoblood "sounds crazier than it actually is," he adds.

Despite its dreaded association with serious food poisoning, the *E. coli* used in the Bactoblood experiment was modified to remove its toxicity and help it live longer in the bloodstream. This was accomplished using a process developed by Chris Anderson, a recently appointed assistant professor of bioengineering at Berkeley.

To produce Bactoblood, the students killed the bacteria's DNA, creating what were essentially empty shells of protein. They inserted genes to produce hemoglobin, the protein in red blood cells that carries oxygen. When the substance turned red, the students knew hemoglobin was being manufactured and transporting oxygen. Further modifications were made so the bacteria could be freeze-dried to extend its shelf life.

The idea for Bactoblood was developed by Austin Day, a senior in chemical biology. The team included half a dozen undergraduates studying bioengineering, biochemistry and even anthropology, three high school students and graduate and faculty advisers.

Liang's assignment was to engineer the genetic "self-kill" switch that destroyed the bacteria's DNA to ensure it wouldn't reproduce in the bloodstream.

With the competition now behind them, work on Bactoblood is on hold. But the participants remain upbeat about its potential for commercialization, pointing to the substantial progress they made in just a few months of lab time. "It was like a full-time job," Liang says.

By Abby Cohn



http://parts.mit.edu/igem07/index.php/Berkeley_UC

SUDOKU

Enter digits from 1 to 9 into the blank spaces. Every row must contain one of each digit. So must every column, as must every 3x3 square. The answer will appear in the next issue. Below is the answer to last issue's puzzle.

1	4	7	3	2	9	6	8	5
6	3	5	7	8	1	9	4	2
9	2	8	5	4	6	3	7	1
7	8	9	6	3	2	5	1	4
3	1	6	4	5	8	2	9	7
2	5	4	1	9	7	8	3	6
5	7	2	9	1	3	4	6	8
4	9	1	8	6	5	7	2	3
8	6	3	2	7	4	1	5	9

			7	6		3	5	
		7	3	9				
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	6	1		5				
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				2	5	9		
1	2		9	3				

Puzzle by websudoku.com

East meets West

IAESTE offers international engineering internships

Imagine working in a lab for your day job, then spending your weekends visiting ancient villages and beach islands.

ME senior Kavon Hooshidar did just that when he took a summer internship at Hong Kong Polytechnic University (HKPU) through the International Association for the Exchange of Students for Technical Experience (IAESTE).

The San Carlos native graduates in May and wanted to spend his summers as an upperclassman doing research, so he found a summer internship through IAESTE. By using the mid-year break to intern, he was able to stay on track academically and see the world as well.

"I saw this as a great way to travel abroad and not get behind in school," Hooshidar says.

The 21-year-old senior worked under the guidance of an HKPU professor on a nanomaterials project.

"It was very materials-science based," Hooshidar says. The project goal was to test the mechanical properties of copper that had been modified to reduce the surface grain size to the nanometer scale.

Hooshidar interned with 40 other college students, mostly from Europe, who worked in other HKPU departments. They stayed in the dorms and traveled together on the weekends.

"We took many trips to every section of Hong Kong, from ancient villages, to authentic Hong Kong restaurants ... to playing ping pong and racquetball and snooker, to barbecues on the beach, to amusement parks, to hiking trails," he recalls. "We did as many things as possible. It was like extensive tourism."

IAESTE is an international network that coordinates on-the-job training for students in the fields of engineering, math and the sciences. Since its inception in 1948, IAESTE United States has linked students with employers in more than 70 countries.



PHOTO COURTESY OF KAVON HOOSHIDAR

PICTURESQUE SUMMER: IAESTE interns relax under a Hong Kong pagoda.



www.iaesteunitedstates.org

< announcements >



Get the complete College calendar at www.coe.berkeley.edu/events.

Engineers' Week is here!

By the time you read this Berkeley will be in the throes of Engineers' Week, the annual celebration of engineering, February 19 through 22! All kinds of events are planned for E-Week 2008, including daily barbecues at the Campanile esplanade, tabling at Bechtel, info sessions, receptions and other nighttime activities. Be sure to be there to meet your fellow classmates and celebrate the joys of being an engineer!

Give to the Senior Gift Campaign

The 2008 Engineering Senior Gift Campaign is now in full swing! The goal is to break all past records and achieve a 50 percent participation rate. Give any amount and receive a special appreciation gift. Give \$35 or more and receive a Berkeley Engineering license plate frame. Get more details online at www.coe.berkeley.edu/giving/seniorgift or visit the Senior Gift Campaign table at the Campanile esplanade during E-Week.

Roberts leads CEE grad seminar

The next CEE graduate seminar, "High Reliability Organizations," is scheduled for 5 to 6 p.m. Wednesday, February 20, in 212 O'Brien Hall. Karlene Roberts, a professor in the Haas School of Business, is leading the seminar. For information on other upcoming sessions, visit their website at www.ce.berkeley.edu/seminars/index.php?type=epm. The series runs through May 7.

Those aren't freshmen

Several Berkeley Engineering societies have teamed up to present Engineering for Kids day, 9:30 a.m. to 3 p.m. Saturday, February 23. Students from fourth to sixth grade will be on campus for a multitude of hands-on activities designed to present engineering principles. For more information, email Eng4Kids@gmail.com.



< professor minute >

WITH EECS PROFESSOR VIVEK SUBRAMANIAN

Subramanian received his B.S. in electrical engineering from Louisiana State University in 1994 and his M.S. and Ph.D. in electrical engineering from Stanford University in 1996 and 1998, respectively. He cofounded Matrix Semiconductor in 1998, then in 2000 joined the EECS faculty, where he is currently an associate professor. He is also a founding technical advisor of Kovio, Inc. Subramanian has authored or coauthored more than 100 research publications and patents and won the NSF Career award.

What first inspired you to go into engineering?

I've always been a tinkerer. When I was young, I liked taking stuff apart and trying to put it back together. My typical birthday presents lasted about two hours before they were destroyed. Around age 12 or 13, my parents gave me an electronics kit and that was pretty much it. I knew I wanted to be an electrical engineer.

To date, what has been the most memorable moment in your career?

I was working in industry at this startup we'd

founded. We were working on a new type of memory. I remember the first time we got the whole memory to work, we knew then we'd be able raise money and make a product. It was a really nice feeling.

If you had a few extra hours, what would you do with them?

I'm a woodworker. I have a fully set-up workshop and build contemporary art pieces and furniture. It's important to me to be able to work with my hands. Woodworking keeps me sane!

What should students do to ensure a successful career?

Our tendency as engineers is to run new experiments rather than think about the results we've already achieved. But I'd

encourage students to look carefully at what they've already done, whether it's a homework set or an experiment, and think about it. You'll learn more in taking the time to analyze those results.

What are you currently reading?

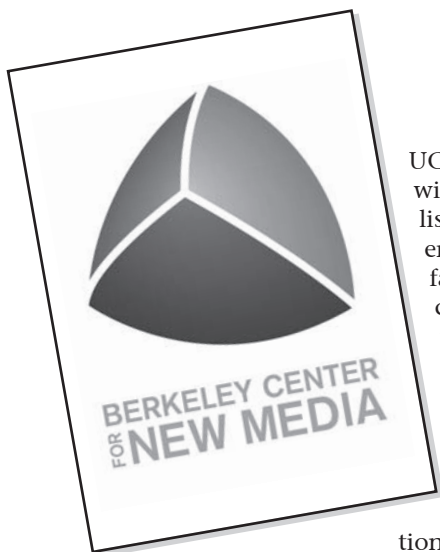
I just finished *The Kite Runner* by Khaled Hosseini. It was phenomenal, one of the best books I've read in the last few months.

What is one thing you would like to learn how to do?

I used to scuba dive so I'd like to get back into it and get formally qualified.

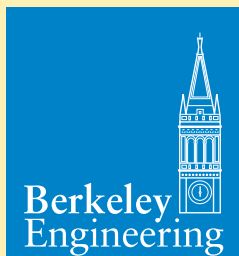
If you would like us to profile your favorite professor, please email his or her name to engnews@berkeley.edu.

< of note >



UC Berkeley will establish the first endowed faculty chair at the Berkeley Center for New Media with a donation of \$1.6 million from craigslist, one of the world's most popular websites. The donation will support research, symposia and lectures. It will be matched with \$1.5 million from the William and Flora Hewlett Foundation for a total of \$3.1 million. The craigslist donation establishes the Center for New Media as a major research center, said Chancellor Robert J. Birgeneau.

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www.coe.berkeley.edu/engnews/index.html

Published biweekly on Fridays during the academic year by the Engineering Marketing and Communications Office, College of Engineering, University of California, Berkeley.

Copy deadline is 4:00 p.m. on the Monday preceding publication.

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Legos and kids still fit

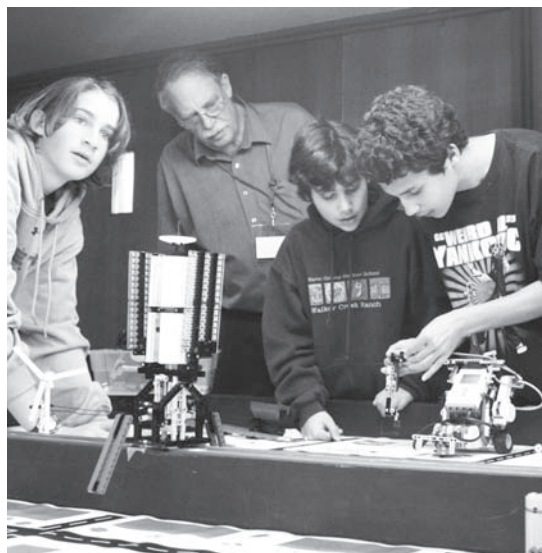
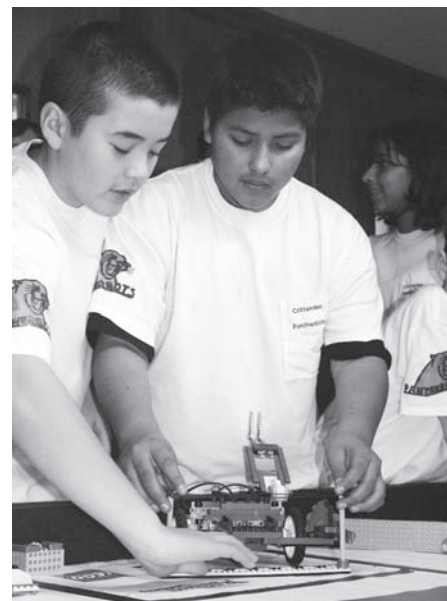
Robot-building contest held on Berkeley campus

PHOTOS COURTESY OF WEST COUNTY ROBOTICS



Berkeley Engineering student group West County Robotics partnered with ME honor society Pi Tau Sigma in December to present the seventh annual FIRST Lego tournament. The competition is sponsored by Dean Kamen's international charity, For Inspiration and Recognition of Science and Technology (FIRST), and Lego, manufacturer of the timeless children's building blocks. Kamen, known for the Segway human transporter and other inventions, founded FIRST in 1989.

Sixteen teams of kids from grades four to eight used Lego



Mindstorms kits and programming software to build autonomously controlled Lego robots that could complete a series of missions based on a global theme: This year was about energy conservation.

This was the first time that the tournament has taken place on the Berkeley campus. The engineering students served as hosts.