

engineeringNews

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ANDREW MA PHOTO



SHE'S READY TO RUMBLE

DOZER SKILLS: CEE senior Charlotte Wong receives instruction on how to drive a Caterpillar D4H bulldozer from operator Joe Shryock. Wong then drove the 22,000-pound machine solo. She and fellow students from CE 177, Foundation Engineering Design, were on a voluntary field trip earlier this semester with CEE guest lecturer Richard Short to try their hand at operating earthwork equipment. "I want them to know what this equipment feels like, the horsepower of it, so it's not abstract terminology," says Short.

Driven to win

A look back at how Cal recaptured the Natcar title

RACHEL SHAFER PHOTO



FASTER AND SMARTER: From left, Larry Van Pham Ly, Trung Tran and Ashik Manandhar display their winning car.

When teammates phoned Ashik Manandhar (B.S.'08 EECS) from Davis last May to report how their car did in its race, they delivered bad news.

They had designed the small-scale electric car to drive itself around a preset, wired path that curves, jogs horizontally and loops back on itself. This was Natcar, a yearly competition between 20 or so college teams that race their autonomous radio-controlled cars for the fastest time, a contest sponsored by National Semiconductor and hosted at UC Davis.

It was May 23, the final day of competition, and the pressure was on. Berkeley's teams were jockeying for first, gunning to capture the title

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POP QUIZ



You know you're an engineering major when...



Stanley Luk, BioE junior
"You just pulled an all-nighter."



Elysha Anderson, CEE grad student
"You relate health insurance to operating systems."



Angel Lam, IEOR sophomore
"People ask you what your major is, you tell them, and they go, 'Why?'"



Andrew Dussault, MSE freshman
"You see Hearst Mining Circle more than four times per day."

Driven to win

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after ceding it to UC Davis in 2007. (Prior to that, Berkeley had won five years in a row.) The teams had recently completed EE 192, Mechatronics Design Lab, a capstone design course taught by EECS professor Ron Fearing. Under the guidance of Fearing and GSI Kevin Peterson, the students had dedicated their spring semester to building fast, reliable cars that could win the Natcar competition. In the process, they drew on their knowledge of circuits, signal processing, control and software to create a working robot.

Manandhar's team alone poured hours and hours into the design and redesign. They shopped for parts, constructed the car, tweaked systems and tested and tested (but

not so much as to

wear the car down).

Finally, a week before the competition, they

made a radical and

risky decision to swap out

the entire chassis for a different one and build the whole car again from scratch.

Why? To improve its performance.

But their luck didn't hold, the team reported. During one of its runs around the track, the car went haywire, they told Manandhar, and drove itself into a wall.

Totaled. Manandhar, who couldn't attend the competition, finished the call and hung up. "Oh, I was bummed," he recalls.

Then his teammates called back.

Ha, ha! They'd *won* the competition.

"It was awesome," says teammate Trung Tran, an EECS senior, referring mainly to the win, but also to the practical joke they had pulled off. (Incidentally, the three thought it would be funny to name their car "Off Track" at the beginning of the project.)

"Hearing that we won was very nice," says Manandhar, grinning. "Finally."

"My only disappointment was that we didn't set a new speed record," adds EECS senior Larry Van Pham Ly, referring to their winning time of 30.61 seconds, or 9.26 feet per second. (The record of 9.86 feet per second, set in 2006, is held by Robert Gregg, John Breneman and Rick Mann, now all Berkeley alumni.)

Cal's ambition translated into impressive results. Berkeley swept the competition, capturing first through sixth places. The closest rival, a UC Davis team, took seventh.

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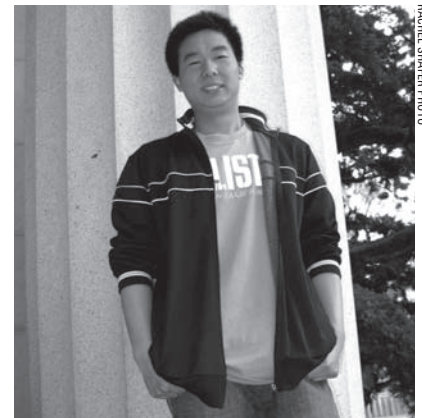
With graduation just six months away, EECS senior Willis Lin is applying for jobs, and that got him thinking about the value of his Berkeley Engineering degree. Recently, he made a gift to the college to support its sterling reputation.

Lin donated to the 2009 Engineering Senior Gift Campaign, which aims to raise \$10,000 from 50 percent of the senior class to support the college's mission to provide the best engineering education in the world. The campaign, launched October 27 and part of the larger "Campaign for Berkeley," generates funding to sustain programs and activities that enrich the undergraduate experience.

Donations like Lin's are critical. The college, despite its public university status, receives only one-third of its operating budget from the state government (that includes student fees). The future value of a Berkeley Engineering degree rests on alumni and other individuals who are willing to support its upkeep.

"It seems to be a built-in culture at private schools like Stanford where older alumni give, and that tradition is passed on to younger alumni," Lin observes. "We need to be doing this. I've had some friends complain about how old some piece of classroom equipment is, but if you don't give back, you can't complain."

Everyone who donates will receive



RACHEL SHARER PHOTO

BEARS WHO SHARE: "You can't get a better education anywhere else," Willis Lin says, explaining why he was motivated to donate to the Engineering Senior Gift Campaign.

a small appreciation gift from the college and their names will be published in the college's annual report and other publications. In addition, every student who makes a gift of \$35 or more and pledges to make an equal gift over the next three years will receive a complimentary Berkeley Engineering Alumni license plate frame. It's the college's way of saying thanks for your extra support. To make a gift, visit the website below.

The Class of 2009 is also looking for student volunteers to join its leadership committee. For more information, get in touch with Tara McCulloch at tmcculloch@berkeley.edu. ■

www.coe.berkeley.edu/seniorgift



< announcements >



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

Green innovation lecture

UC Davis associate professor Andrew Hargadon will deliver a talk entitled “The Networks of (Green) Innovation” on WEDNESDAY, DECEMBER 3, at noon in 290 Hearst Memorial Mining Building. The event, part of the CITRIS Research Exchange at UC Berkeley, is free and open to the public. For more information, go to www.citris-uc.org/events/research_exchanges.

December grads

Congratulations on your upcoming graduation from Berkeley Engineering, and welcome to the alumni community! We'd like to honor your success at a festive chocolate fondue and champagne reception. Join your classmates, faculty and college staff in the Betty and Gordon Moore Lobby of Hearst Memorial Mining Building at 5 p.m. Wednesday, December 10. Send an e-mail to bears@berkeley.edu before FRIDAY, DECEMBER 5, to RSVP and reserve your special gift.

Tinker Day

Engineers and non-engineers are invited to Tinker Day, which takes place every Friday from 2 to 5 p.m. in the north foyer of Hesse Hall. Come tinker on your projects or learn new tinkering skills. For information, e-mail Romy at romy@berkeley.edu.

Win a \$100 Best Buy gift card

Take a short survey about *Engineering News*, and you'll automatically be entered into a raffle drawing for the \$100 Best Buy gift card. Surveys can be found in the waiting area of 308 McLaughlin Hall, or take it online at www.coe.berkeley.edu/news-center/publications/engineering-news/take-our-survey.html. We want to improve this publication to better serve you!



< career corner >

WITH MSE/NE ALUM PETER HSUEH

After graduating from Cal, Peter Hsueh (B.S.'93 MSE/NE) earned a master's degree in health physics from Texas A&M. He worked for two years at Isotope Product Laboratories in Burbank, starting as an engineer and ending as a health physicist before going to law school. After passing the California Bar Examination and working as a patent attorney, he joined Christie, Parker & Hale, an intellectual property law firm in Pasadena. Hsueh specializes in patent prosecution, helping inventors obtain patents from the U.S. Patent and Trademark Office.

What do you like about your job?

I love new gadgets and technological innovations; working with inventors exposes me to the latest developments out there. It's especially gratifying to see the new products that I helped get patents for, whether I'm at the supermarket or watching commercials on TV. Another great thing about my job is that most of the attorneys here have engineering or science degrees so I feel comfortable in my peer group.

How did you go about finding your interest/passion?

I was always interested in pursuing a law career because my grandfather was a prominent judge in pre-communist China. I really admired him.

What's the secret to landing a job?

If there's an economic recession, it will make it even harder for first-time job seekers to land a competitive job, so don't get discouraged. Apply the art of effective negotiation tactics. Be persistent in a polite, acceptable manner. I almost did not get hired at my first law firm after working there as a summer associate, largely due to one individual who apparently did not like me; I contacted other partners that I had worked with and they

supported me by arguing on my behalf. I was eventually offered a job.

What are some things to think about while considering a potential job?

Know your strengths and interests, and also remember that it's okay to change directions in your career path, especially because jobs are in transition. Whether it's due to outsourcing, downsizing or some other unexpected shift, be prepared to reinvent yourself. Rely on your personal skills, your friendships and stay informed about the world around you.

Have additional questions? E-mail peter.hsueh@cph.com.

< of note >

Driven to win the Natcar contest

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Congratulations to EECS graduate students Ashima Atul, Erika Chin, David Poll, Henry Cook, Seth Horrigan and Joshua Paul! They are among 50 students honored as the Siebel Foundation's 2009 Siebel Scholars. Pictured top, from left, are Dean Shankar Sastry, Cook, Horrigan, Chin and EECS professor Costas Spanos. Pictured bottom, from left, are Paul, Atul and EECS professor Edward Lee. ■

Professor Fearing credits the success to highly motivated students, GSI Peterson's expertise and an extensive testing period that allowed teams to identify bugs and improve performance.

"The system is limited by its weakest component, which could be a mechanical item, an electrical connector, a circuit, a sensor or an algorithm," Fearing explains. "Students get a chance to work on all levels of design, and we have enough time at the end of the semester that these designs can really be proven and improved."

So what was Manandhar, Tran and Van Pham Ly's secret to winning? There were several. They consulted with record-holder Rick Mann. They used their own funds to buy a new chassis (actually two), replacing the older, heavier one they'd inherited from a previous team. They used a servo motor that offered finer, more sophisticated control. ("A regular DC motor is sort of boring," says Tran.) They designed the car so it would "learn"

the track as it made its initial run, optimizing later runs to minimize drift on the curves and maximize speed on the straightaways. They installed a wireless Bluetooth connection in the car so problems could be debugged as they occurred in real time, making testing highly efficient. They divided up areas of responsibility and gave each other freedom to invent and push the car's physical limits.

Above all, they kept their sense of humor.

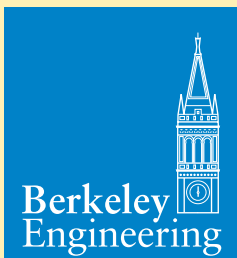
"It was a good time," says Manandhar. ■

"My only disappointment was that we didn't set a new speed record."

Want to know more details about Natcar? Go to www.ece.ucdavis.edu/natcar/. For information about EE 192, visit the course website at <http://inst.eecs.berkeley.edu/~ee192/archives.html>



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SUDOKU

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