

engineeringNews

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ANTON WALSHING PHOTO



VERY CLEAN. VERY STABLE.

SUITED UP: Bill Flounders, technology manager of the new Marvell Nanofabrication Laboratory, leads a tour through its 15,000 square foot cleanroom. In addition to a sophisticated air handling system that filters out almost all particles, the cleanroom's support floors are 39-inch thick closed cell waffle slabs that restrict structural vibration to less than 125 micro-inches per second. That's key for the lab's researchers working on computer chips, who use beams of electrons to draw lines 50,000 times smaller than the diameter of a human hair.

Better than sunlight

Team wins global competition for indoor agriculture lighting system

PHOTO COURTESY OF CHRIS ANDERSON



BIG PRIZE: Chris Anderson poses with the first place, \$30,000 check that his team won, surrounded by finalists in the Meltwater Group Global Scholarship Contest.

If you haven't heard it already, here's a new buzzword: vertical farming.

In the most simple terms, it's farming indoors in the city, growing food in multi-story buildings to feed urban dwellers. (No, not marijuana, real food. Think moving an Iowa

corn farm into the Transamerica Pyramid.) Technical systems replace natural ones in a lab-like environment and eliminate the need to import food thousands of miles to the city, saving fossil fuel energy and carbon output.

Vertical farming, still just a concept, invites loads of questions. One of the most basic is how to replace the sun. Current indoor lighting systems cost too much and use too much energy to make large-scale indoor agriculture viable. Ph.D.

Continued on page 2

POP QUIZ



Why did you choose Berkeley Engineering?



Shelli Skinner, EECS junior

"I was torn between UCLA and Cal, but I came to Cal Day and liked the atmosphere, and there was a lot of support for women engineers. That appealed to me."



Carolyn Kwok, BioE junior

"I wasn't sure if I'd like engineering, but I figured it was a good place to see if it was right for me. I ended up sticking with it."



Justin Borja, ME sophomore

"My mom is an engineer, my sister goes here, and it's just far enough away from San Diego that I can leave home but go back whenever I want to."



Tim Racine, CEE grad student
"Because it's the best."

Better than sunlight

Continued from page 1

students Chris Anderson (Applied Science and Technology), Ryan Miyakawa (Applied Science and Technology) and David Carlton (EECS) think they have a solution: LEDs.

"Solid-state lighting has gotten to the point recently where you can target very specific frequencies," says Carlton, whose research is in photovoltaics.

When the team learned that plants utilize specific wavelengths in photosynthesis, they put two and two together: use the latest advances in LED lighting to target that color spectrum ensuring that, when the lights sip energy, they're doing so in the most efficient way possible.

Excited about the prospect, they developed a two-minute video pitch last October and entered it in the Meltwater Group Global Scholarship Contest, which honors innovative business ideas developed by college students. Their entry caught the attention of judges, and Anderson went to the Netherlands in November to present the concept in the competition's final round.

"When we found out we won, it was awesome," says Anderson, whose research focuses on optics. "It was one of the best moments of my life."

The team is using the \$30,000 prize to move its idea into development and later, testing. In their spare time, they've begun work on the light's circuitry and have developed a business plan. They've contacted the idea's biggest proponent, Dickson Despommier, a professor of environmental health science at Columbia University, to discuss their plans. If the prototype works as they've hypothesized, they hope to lure angel funding by the end of this year.

The longtime friends first read about vertical farming late last summer in *Popular Science* and *Scientific American*. The far-out idea grew more plausible as they thought about fossil fuel consumption and land use in the current agricultural model.

Miyakawa, an optics researcher, has become the group's de facto plant expert, consulting with the biology department and attending a plant biology conference in January. "I knew nothing about plants six months ago," he says. "Except enough to kill some house plants. It's amazing how much you can learn." ■



View their winning video at
http://www.physicsandmusic.com/ryan_stuff/meltwater/meltwater_video.mov

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VIEW FROM the TOP

conversations with innovative leaders

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< announcements >



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

Get research experience

Want to work in a lab this summer? The Berkeley Summer Bioengineering Research Program provides stipends for undergraduates to do full-time research with a bioengineering faculty mentor for 10 weeks over the summer. Learn more and apply online at <http://bioeng.berkeley.edu/bsbrp/>. Applications due WEDNESDAY, MARCH 18!

CEE Career Fair

The annual Civil and Environmental Engineering Career Fair will take place on WEDNESDAY, MARCH 18, from 2 to 6 p.m. in Pauley Ballroom, MLK Student Union. Over 50 companies will be in attendance. Pre-registration is required. For information, contact Kimberly Leung at careerfair@calasce.org.

\$30,000 in prizes

Have an idea that demonstrates the ability of IT to address a major societal challenge? Consider entering it into the fourth annual CITRIS White Paper competition, which will award \$30,000 in prizes. White papers should be 5 to 10 pages in length, not including appendices. Deadline to apply is MONDAY, MARCH 23. Learn more and apply online at www.citris-uc.org/Big-idea-deadline-2009.

Biotech in your future?

Get your foot in the door at a leading biotech company before you graduate! Now you can do a six- to seven-month extended internship at a leading biotech company through the Bioengineering Cooperative Education Internship Program. Take a semester off to work at one of the pre-approved companies and get guaranteed readmission when you return. All majors welcome! Application deadline is TUESDAY, MARCH 31. Learn more and apply now at <http://bioeng.berkeley.edu/coop.php>.

Commencement registration

The 2009 Commencement ceremony will be a traditional all-college ceremony held on Saturday, May 23, from 8:30 a.m. to 12 p.m., at the Hearst Greek Theatre. Departmental receptions will follow at various campus locations. Visit the official website www.coe.berkeley.edu/commencement to register online to participate in Commencement and reserve your tickets. There is a six-ticket limit per graduating student. Registration deadline is MONDAY, APRIL 20. If you have questions, please contact Dawn Kramer at dkramer@berkeley.edu.

Graduating this semester?

In order to graduate, you must declare your candidacy, commonly called "placing yourself on the degree list." If you fail to officially place yourself on the degree list, you will not graduate this spring, whether you've completed all requirements or not. Graduate in this sense does not mean participating in the Commencement ceremony — it means earning a degree from Cal. Check Bear Facts today to verify if you are on the Spring 2009 degree list, which will say *Bachelor of Science, Spring 2009*. Questions? Contact the Student Affairs Office at 642-7594.



Teach E 98!

Want to share everything you wish you had known as a freshman engineer? We are looking for passionate instructors to teach E 98 in Fall 2009. E 98 is a fun DeCal class designed to help freshmen engineers get the most out of Berkeley. Each section meets one hour a week, with three instructors and 20 students. E 98 is an amazing opportunity to build teaching and communication skills, and it works around your schedule! Apply online at e98.berkeley.edu.

TEXT ENGI

Ask a Kresge Engineering librarian your question(s) by texting 66746. Start your message with the keyword ASKENGI. A librarian will text you back an answer within two hours, Monday through Friday, 10 a.m. to 5 p.m. Questions asked after hours will receive a response the next business day. For details, go to www.lib.berkeley.edu/ENGI/txt_engi.shtml.

Correction

Our apologies! We incorrectly stated that the new plaza west of the CITRIS headquarters building would open after the building's official dedication ceremony on February 27. Here's the correct information: The fences were down for the ceremony weekend only, then closed again. The college will reopen them in a couple weeks after the last few trees are planted. The east side will reopen once the bridge work is complete, in approximately two weeks.

Engineering News wishes you good luck on your midterms! Have a great spring break.

< of note >



RACHEL SHAFFER PHOTO

Need answers from Cal's student government? Contact fellow engineer, BioE junior **Tu Tran**, who represents engineers in the ASUC Senate this academic year.

During his term so far, he co-led a campaign to wrangle more professors into submitting their textbook orders early to the Cal Student Store, resulting in big savings — \$100,000 total — for students buying books. He also worked with the leadership of various engineering societies to promote greater involvement in the student-run Berkeley Engineers and Mentors (BEAM) outreach program. E-mail Tran at tutran@asuc.org. ■

Photos: Engineering4Kids

Eleven engineering clubs host daylong, outreach event

Engineering got gooey, sticky, muddy, runny, shaken, filtered and launched — as in paper airplanes — on Saturday, February 21, at the second annual Engineering 4Kids Day, the student-conceived, student-run outreach event that introduces local fourth through sixth graders to the field. Etchervy Hall rang with the excited chatter of 150 children who learned basic principles while doing 11 dif-

ferent activities taught by 75 volunteers, most of them Berkeley Engineering students.

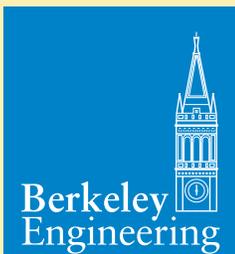
“Thanks to the help and energy of all the volunteers, the event was a success,” says ME graduate student Nick Galano (B.S.'08 ME), an event organizer. “Participants got a taste of the variety of engineering disciplines and the creativity involved with engineering applications.” ■



RACHEL SHAFFER PHOTOS

PROMOTING CONSERVATION: CEE graduate student Sintana Vergara (right) discusses how much waste is associated with plastic water bottles and why it's better to drink from a reusable water bottle filled with tap water. The lesson was part of an activity run by Engineers for a Sustainable World.

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SMOOSHING STRAWBERRIES:

BioE sophomore Joanna Chen teaches participants how to extract DNA from mashed strawberries. Participants will send the goop through a coffee filter and add detergent, salt and alcohol in order to extract clumps of DNA, which appear as white strands. This activity and the one pictured below were jointly run by the Bioengineering Honor Society, Biomedical Engineering Society and Engineering World Health.



UNCLOGGING ARTERIES: BioE junior Philip Chung explains how vascular stent implantation allows for increased blood flow through arteries clogged with cholesterol and plaque. Beforehand, Chung and other teachers demonstrated a model of a heart pumping blood, and then gave it a heart attack by adding pudding or “cholesterol” into the system.