Civil & Environmental Engineering News

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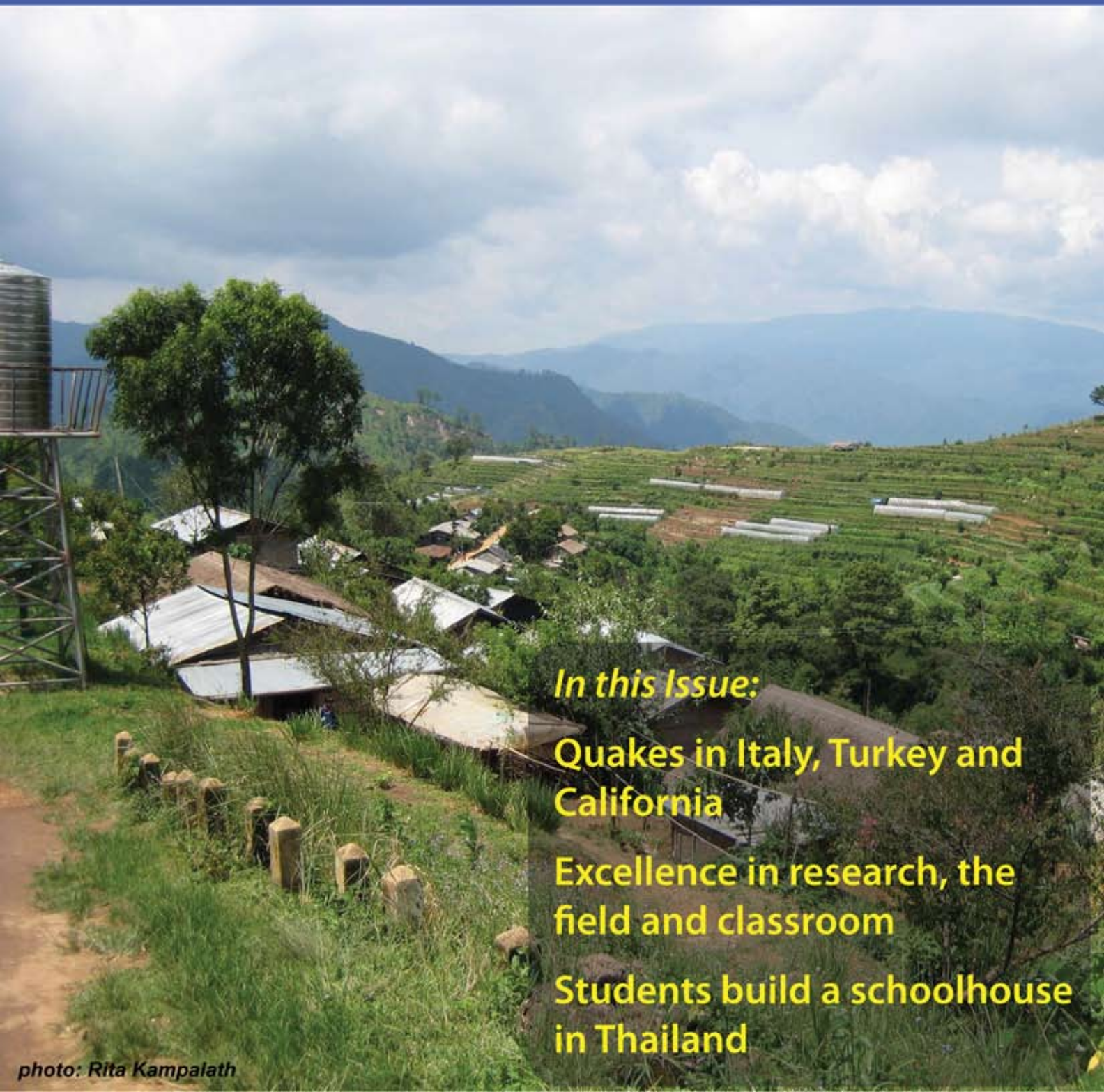

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Quakes in Italy, Turkey and California

Excellence in research, the field and classroom

Students build a schoolhouse in Thailand

photo: Rita Kampalath

Message from the Chair

My distinguished colleagues and friends,

While many global, environmental, social, and economic challenges lie before us, civil and environmental engineers, and our department in particular, are more than ever equipped to tackle these challenges. In the American Recovery and Reinvestment Act (ARRA), which was signed into law by President Obama February 17th, 27 billion dollars are allotted to infrastructure and transportation improvements nationwide. In the arena of infrastructure improvement alone, California will receive $609.76 million, with a total of $268.31 million allotted for improvements in the Los Angeles, Long Beach, and Santa Ana regions. California also will receive more than $1 billion to improve public transportation in the region, including modernization of transit systems, improvement in railway and airport infrastructure, and rehabilitation of roads, highways, bridges, and ports. The enormous potential of our students and the incredible capacities and talent of our researchers and staff are poised to pursue research in all of these areas.

William Yeh's induction into the National Academy of Engineering highlights the quality of research of our department. On December 12 and 13, more than 100 attendees celebrated Yeh's accomplishments at an honorary symposium. Included amongst these attendees were over 40 doctoral students, a reflection of Yeh's significant teaching and mentoring contributions in addition to the impact of his research.

Our departmental faculty has also been awarded several important grants, including Eric Hoek's two 5-year grants of over $20 million each to study nanotechnology and desalination, and Jian Zhang's NSF grant to develop an adaptive seismic protection system. Furthermore, several faculty have been recognized for their excellence in research and education: Terri Hogue was awarded the Northrop Grumman Excellence in Teaching; John Wallace received Best Paper award in Earthquake Spectra; and Woody Ju was named an ACI Fellow by the American Concrete Institute.

These accomplishments are underlined by the important contributions and achievements of students this past year. To name two: Ph.D. candidates Bart Forman and Helen Jung won best poster awards at American Geophysical Union conferences. Jung, who will be graduating in Spring 2009, has also accepted a faculty position at California Baptist University in Riverside.

Several C&EE affiliated engineering student groups have also stood out in their dedication to service learning, both locally and internationally, and academic/technical design prowess. Engineers Without Borders-UCLA, under the mentorship of Tom Sabol, designed and constructed an elementary school in No Lae, Thailand that was completed just this past winter break. Furthermore, the American Society of Civil Engineers Student Chapter, placed in several national design competitions for the concrete canoe and steel bridge, while coordinating a highly successful career fair to connect over 30 industry companies with graduate and undergraduate students.

Most recently, we have had the great pleasure of welcoming Karl Holmes to our team. His expertise in management services has been critical to helping our department function smoothly.

We welcome your comments and suggestions. Please stay informed about our department activities by visiting us at www.cee.ucla.edu.

Sincerely,

J.S. Chen
Chancellor's Professor & Chair

on the cover: Professor Stewart explores earthquake damage in Abruzzo region of Italy

On April 6, 2009, the central Italian region of Abruzzo was struck by an earthquake of magnitude 6.3. Maximum observed vertical displacement due to faulting at the ground surface was 25 cm, although there was no surface fault rupture. L'Aquila, a city with a population of 73,000, suffered the most damage in the region, to both older masonry buildings and modern reinforced concrete structures.

Professor Jonathan Stewart traveled to Italy as part of a Geo-Engineering Extreme Events Reconnaissance (GEER) team to investigate geological, seismological, and geotechnical engineering aspects of this earthquake. More findings are available in the GEER report, available at www.ucla.cee.edu.

The earthquake was recorded by 56 digital strong motion instruments, making this the most well-recorded earthquake to date in Italy. The GEER team fleshed out the recorded information with on-site inspections of triggered geological features and structural damages.

Structural damages were intensified or minimized according to the underlying geology of the town and building construction type. For example, San Pio delle Camere, which was built on carbonate bedrock, showed no signs of any significant structural damage to all building types. However, in the nearby village of Castelnuovo, which is underlain by relatively young Pleistocene sands and silts, most of the buildings collapsed and a large sinkhole formed.

Similarly, a collapse rate of 80% in unreinforced masonry structures was observed in Onno, a small village built on similar geology. However, little damage was observed in reinforced concrete structures. Within L'Aquila, significant damage occurred to both nonductile reinforced concrete buildings and unreinforced masonry buildings. There, too, the damage appears to have been localized in areas with relatively soft soils or near the tops of slopes. Dr. Stewart is also currently involved in an NSF-funded project analyzing buildings along the Wilshire corridor in Los Angeles for weaknesses including the structures' building materials.

In contrast to the heavy structural damage caused by the L' Aquila earthquake, observed ground failures were mostly confined to local, minor land and rock slides and sediment slumping near Lake Sinizzio. Two local bridges were collapsed or heavily damaged during the earthquake, and ground cracks up to 1 m deep, 20 m long, and with a maximum vertical displacement of 15 cm were observed directly adjacent to the bridge abutment. Overall, dams and retaining walls performed well in the region, although a few failures were observed.

A source model for the earthquake has been developed using GPS data, InSAR data, and field observation. Also, detailed maps of ground failure events, and the severity and density of damaged buildings in several local villages, have been recorded.

Dr. Taciroglu provides earthquake safety expertise to Turkey government

A driving need exists all over the world to determine ways to mitigate the risks of earthquake damage by either constructing new buildings or retrofitting old ones to become adequately strong. Professor Taciroglu, in collaboration with several faculty at Turkish universities, will be conducting tests on an existing reinforced-concrete building in Istanbul. Data from these tests will be used to develop more reliable methods to determine the risk of collapse of existing stocks of vulnerable buildings in US and Turkey.

After the 7.6 magnitude earthquake struck in 1999, the Turkish government set out to catalog the earthquake readiness of public buildings in the country, including schools and government buildings. Crews tested concrete cores from these buildings for quality and used electromagnetic scanners to analyze steel reinforcements within the structural members. Based on these measurements, the buildings were divided into sound buildings, buildings in need of retrofitting, and buildings that were so deficient that they needed to be

7.6 magnitude earthquake damage (left) and Sariyer Primary School (above) is the first structure to be evaluated for earthquake-safety.

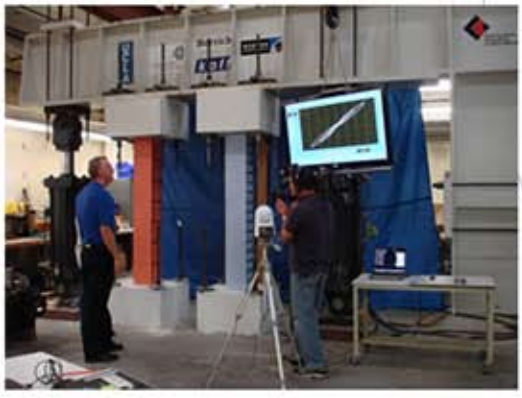
In 2008, Dr. Taciroglu spent several months in Turkey touring these public buildings. Based on observations made during this survey and structural data collected by the government, the Sariyer Primary School was chosen as the initial study site.

To determine the best way to mitigate risks associated with earthquakes, static tests, to determine the strength of the existing load-bearing frame, and dynamic tests, to determine dynamic properties such as natural periods and damping, will be performed on the Sariyer Primary School. through various support

During the study, part of the school building will be stabilized, and the remaining portion of the building will be pressed towards the stabilized portion to determine the level of structural integrity that remains after the earthquake damage. To further examine the effect of seismic shaking on these damaged structures, inertial shakers will be placed on top of the school building to determine the changes in damping and member stiffnesses.

Several additional buildings are in line to be tested as the project develops based on initial results.

Dr. Wallace participates in Great Shakeout



As part of an earthquake awareness event throughout Southern California, the Great Southern California Shakeout, Professor John W. Wallace and Dr. Bob Nigbor of the Network for Earthquake Engineering Simulation at UCLA (nees@UCLA) built two columns to be shaken in a simulated earthquake.

Both columns were reinforced with steel; one column had steel reinforcements according to current code, and the other was representative of 1950's construction. In the equivalent of a 6.5-7 magnitude quake, the 1950's style column almost completely collapsed, while the modern column held its ground. For more information on the column test, see the nees website (nees.ucla.edu/kcet.html).

Professor Terri Hogue wins Northrop Grumman Teaching Award

Professor Terri Hogue was the recipient of the 2008 Northrop Grumman Excellence in Teaching Award. This honor was celebrated at the Henry Samueli School of Engineering and Applied Engineering Awards ceremony in late 2008.

Prof Hogue and class in the Sierras, investgating snow pack for a field hydrology course.

The Teaching Award recognized Professor Hogue's dedication to her students and excellence in teaching since she started at UCLA in 2003. Many of her students are inspired by her to continue on to graduate school and hydrology research upon finishing their undergraduate studies.

The committee was especially impressed by Professor Hogue's ability to directly engage students in hydrology through an innovative teaching dynamic, in which she combines the rigor of classroom academics with applied field science.

The award requires not only the full support of the department and school but also support from students who have worked with Professor Hogue in both a classroom and research environment. One student wrote that Professor Hogue "encourages her students to succeed, offers them the opportunity to learn about conducting research and fights for programs that will ultimately graduate better and well-equipped students."

Professor Hogue's students "love her style of teaching" and are "truly inspired" by her energy, attention, and dedication, said another student in praise of her truly exceptional abilities as a teacher and individual.

Professor Hogue was also recognized as "Professor of the Year" by the UCLA chapter of American Society of Civil Engineers, two years in a row.

Previous C&EE awardees include Professors Jenny Jay, Jonathan Stewart, and Steve Margulis. For information about Professor Hogue and previous award recipients, please visist www.cee.ucla.edu.

Prof Hogue takes a water sample measurement.

NORTHROP GRUMMAN

Congratulations Dr. Hogue on your advancement to Associate Professor with tenure!

Grants and Projects

Dr. Eric M.V. Hoek was part of a UCLA and UCSB led team that was recently awarded a $24-million five-year grant by the National Science group within the UC Center for Environmental Implications of Nanotechnology that will produce and characterize a wide array of nanoparticles, which will then be studied by teams of environmental scientists and toxicologists to determine their fate, transport, and toxicity in the environment. More information about the CEIN can be found at http://cein.cnsi.ucla.edu/pages/.

Associate Professor Eric M.V. Hoek was part of a Cornell University-led team that was awarded a $25-million, five-year research grant by the King Abdullah University of Science and Technology (KAUST). The KAUST-Cornell Center for Energy and Sustainability focuses on a new class of nanoscale inorganic-organic hybrid materials recently discovered at Cornell. Hoek will lead a group within the Center that will develop nanoparticles and technology into next generation desalination and water purification membranes. More information can be found at http://www.research.cornell.edu/VPR/KAUST-Cornell/index.html.

Dr. Jian Zhang is co-Principal Investigator on an NSF grant for $1.6 million that will be used to develop the next generation of adaptive seismic protection systems. Previously, seismic protection systems have either been passive, such as rubber platforms at the base of a building to absorb motion, or active, such as a piston that would push liquid out through a hole at various speeds depending on the strength of the shaking. However, active systems require power to operate, and passive systems are unable to adapt to varying earthquake strengths. Prof. Zhang's research will focus on combining the best features of both of these seismic protection systems.

Faculty Awards & Honors

In a symposium held on December 12-13, 2008 , **Dr. William Yeh** was honored for his many contributions to the water resources and engineering field, including his recent election to the National Academy of Engineering (NAE). The symposium was organized by Dr. Yeh's PhD graduates, Drs. Miguel Marino, Chuching Wang, Tracy Nishikawa, and Mario Putti, as well as by several C&EE faculty: Drs. Terri Hogue, Steve Margulis, and Michael Stenstrom.

Regarding the celebration, which drew over 130 attendees from countries such as Italy, Korea, Taiwan, and Australia, Yeh said, "I was so honored, humbled, and overwhelmed."

He also added with a smile, "They tried to make it a surprise but eventually they had to tell me."

Dr. Woody Ju received numerous honors this past year. Among these honors include the ACI Fellow Award by the American Concrete Institute and the position of Invited Chair Professor from LMT Cachan, ENS Cachan, CNRS and the University of Paris VI, France for 2008-2009. As invited chair, Dr. Ju will work to enhance research collaboration of in composite materials, multiscale materials modeling, and computational mechanics.

Dr. Jenny Jay has been granted tenure as Associate Professor. She currently directs an active research program related to mercury and arsenic biogeochemistry, and microbial contamination at local beaches.

Dr. John Wallace and 10 co-authors have been awarded the Best Paper award for Vol. 23 (2007) of Earthquake Spectra, which is the Professional Journal of the Earthquake Engineering Reserach Institute. The paper title is “Update to ASCE/SEI 41 Concrete Provisions.”

for more info: www.cee.ucla.edu

Former UCLA C&EE Professor Tom Harmon leads researchers in characterizing Argentinian lakes in project PASEO

Dr. Tom Harmon, one of the founding faculty of the University of California, Merced School of Engineering, and former UCLA C&EE professor, leads a team of researchers in investigating and characterizing biogeochemical cycling in several Argentinian lakes. By collaborating with computer scientists and electrical engineers, Dr. Harmon has formed a unique partnership in which the respective experts of each background are leveraged. In this partnership, his team has been able to devise innovative tactics to collect extremely dense/diverse spatial and temporal data of various chemical and biological species in the lakes. Dr. Harmon still works closely with UCLA as a principal investigator of the NSF-funded Center for Embedded Networked Sensing. For more info: https://eng.ucmerced.edu/paseo/.

Alumni Updates

Dr. **Diego Rosso**, who obtained his Ph.D. from C&EE in 2005 under the instruction of Dr. Mike Stenstrom, was recently hired as an assistant professor at the University of California, Irvine in Civil and Environmental Engineering with a joint appointment in Chemical Engineering and Materials Science. Dr. Rosso's work involves monitoring greenhouse gas emissions from wastewater treatment plants and dynamic modeling of the plant's carbon footprint. Dr. Rosso is also the faculty advisor of the UCI chapter of Engineers without Borders. More info: http://www.epl.eng.uci.edu/

Dr. **Sarah Rothenberg**, who graduated under the instruction of Drs. Jenny Jay and Rich Ambrose (Environmental Science and Engineering) is a postdoctoral fellow for Professor Xinbin Feng at the Institute of Geochemistry in Guiyang, China. Dr. Rothenberg's research involves maternal and neonatal methylmercury exposure through the consumption of rice in one of the villages near the Wanshan Mercury Mine (about 5 hours east of Guiyang). More info: email ceenewsletter at gmail.com for Sarah's contact.

Dr. **Michael Durand**, who obtained his Ph.D. from C&EE in 2007 under the instruction of Dr. Steve Margulis, was recently promoted to research scientist at Ohio State University in the Byrd Polar Research Center. He is currently the principal investigator for a project entitled, "Relating in situ snow cover properties to multi-scale, multi-frequency remote sensing data utilizing the CLPX dataset." More info: http://bprc.osu.edu/water/

Dr. **Masoud Sanayei**, C&EE graduate of 1986, currently professor and chair at the Tufts Department of Civil and Environmental Engineering, is PI on a NSF-funded project working with the University of New Hampshire and two engineering firms. His research focuses on the development of a three-dimensional computer model that would be updated as bridge repairs occurred to better monitor and maintain the health of the bridge throughout its lifetime. Advisor: Dr. Dick Nelson. More info:

Alumni & Affiliates! We want to know what you're up to! If you have a story or you know of a colleague who has an interesting story, please contact us at ceenewsletter at gmail.com.

Graduate Student Highlights

Ph.D. candidate **Rita Kampalath** received the Martin Rubin Scholarship Award. Ms. Kampalath's presentation, "Investigation of mercury methylation pathways in biofilm vs. planktonic cultures of Sulfate-Reducing Bacteria," was also accepted in a platform session to be given at the 2009 International Conference on Mercury as a Global Pollutant in China. Rita plans to defend summer 2009. Advisor: Dr. Jenny Jay

Ph.D. candidate **Keith Musselman** (co-advised by Noah Molotch) received a NASA Earth System Science Fellowship for his proposal entitled: "Remote sensing and ground data assimilation using a basin-scale snow water equivalent reconstruction method toward use in Hydrologic Runoff Applications". The prestigious three year award will fund his ongoing Ph.D. work. Advisor: Dr. Steve Margulis

Graduating in June 2009, **Arun Prakash** holds a joint appointment as a post-doctoral scholar and lecturer in Civil and Environmental Engineering at the University of California at Los Angeles. His research interests are primarily in developing efficient computational methods for solving diverse problems in science and engineering. Dr. Prakash will be joining Purdue University faculty in Computational Mechanics department as assistant professor. Advisor: Dr. Ertugrul Taciroglu More info: http://www.seas.ucla.edu/~arun/

Ph.D. candidate **Helen Jung**, who is defending spring 2009, received the Outstanding Student Paper Award (2008) from the American Geophysical Union for her paper entitled "Integrating Soft Data into Hydrologic Modeling to Improve Post-fire Parameter Estimates." Helen will be joining the faculty at the Baptist University of Riverside in Riverside, California. Advisor: Dr. Terri Hogue

American Society of Civil Engineers (ASCE)

From Canada to Hawaii to the Grand Ackerman Ballroom on the UCLA campus, the UCLA ASCE has had a very productive year so far.

UCLA ASCE advanced to the national Concrete Canoe competition in Montreal, Canada in June 2008 for the first time in 11 years with its 19th Concrete Canoe, *Archimedes*. A team of directors, paddlers, alumni, and future directors traveled to the competition, at which they won 9th place among the 200 competing schools. The UCLA ASCE steel bridge building team also had a successful year, placing third in the regional competion and making it to the national competition in 2008 for the first time in many years.

Tina Cydzik (above right, UCLA C&EE B.S. 05, M.S. 06), now working for engineering and science consulting firm Exponent, was "very impressed" by the students. ASCE Career Fair snapshot (above, left).

Back home at the UCLA campus, over 200 Civil and Environmental Engineering (C&EE) students poured into the Grand Ackerman Ballroom to meet professionals from different engineering firms and agencies at the student run UCLA ASCE Winter Career Fair, held on on January 28, 2009. Over thirty companies were present with positions for hire. "I'm very proud of the turnout of companies. UCLA students are very high caliber which is why we were able to put together such a successful career fair," said Career Fair Coordinator Alexi Poulous.

For more information, visit www.ascebruins.org.

Engineers Without Borders (EWB)

Engineers Without Borders - No Lae, Thailand. Under the supervision of Dr. Tom Sabol and Dr. Ertugrul Taciroglu, the UCLA chapter of Engineers without Borders designed and constructed a much-needed preschool in village in No Lae, Thailand. The school, to be used be Burmese refugees, was dedicated December 2008.

Students involved in the project.
Diane Budzik (UCLA EE, PhD Student), Lauren Seasbury (UCLA C&EE Undergraduate), Rita Kampalath (UCLA C&EE PhD Student), Steve Hunt (UCLA MAE Undergraduate), Anna Davitian (UCLA MAE M.S.), Karen Keal, Jeanne Li, and Sunai Kim (UCLA C&EE M.S.)
For more info: www.seas.ucla.edu/ewb

Engineers in Training Day

On November 26, 2008, around 200 high school and junior high school students visited UCLA for Engineers in Training (EIT) day. EIT day is one of three quarterly outreach events organized by the American Indian Science and Engineering Society (AISES), the National Society of Black Engineers (NSBE), and the Society of Latino Engineers and Scientists (SOLES). The high school student visit was coordinated by the Mathematics Engineering Science Acheivement (MESA) programs of five different LAUSD schools. Student groups hold workshops covering subjects such as UC applications, financial aid opportunities, and details of different engineering majors from a current UCLA student. Other workshops are sponsored by companies, such as project management from BAE systems, creative teamwork from PG&E, cryogenic science from Air Products (see photo), and structural engineering from Degenkolb Engineering. The culminating event of EIT day is an "Egg Drop" competition; student teams are given 2 eggs and various materials, and left to design a device that will protect the eggs from a 4-story fall.

Industrial Affiliates Program

Starting in the 2009-2010 academic year, the Industrial Affiliates Program (IAP) has undergone several changes to enhance the experience of corporate members. IAP seeks to increase the exposure of top CEE undergraduate and graduate students to high-quality industrial partners and vice versa. Companies join IAP to increase the talent pipeline from UCLA and to enhance the corporate profile on campus. Benefits to IAP members include being provided student resumes targeted to corporate interests, invitations for on-campus visits of corporate representatives to give technical seminars, and informal gathering of corporate staff with faculty and students over lunch or dinner. Plans are also in the works to have graduate students travel to offices to give brown bag lunch seminars on their research topics. This will have the additional benefit of transferring research results directly into practice. Full members are also offered free registration at job fairs organized by the UCLA student chapter of the American Society of Civil Engineers (ASCE).

Membership is available to firms at three levels: Associate Membership for small firms, Associate Membership, and Full Membership. At the small firm associate membership level, IAP will provide student intern resumes, access to research reports, CEE seminar invitations, a subscription to the CEE newsletter, and the opportunity to disseminate career opportunities to students. At the next level of associate membership, members will be able to deliver an on-campus technical seminar in addition to all the benefits listed above Finally, full members will receive all of the benefits to being an associate member, plus on-site presentations from students and faculty, the option to sponsor representatives to work on campus with faculty, participate in Company Day at UCLA and partake in a subsequent dinner with faculty and graduate students, and receive the opportunity to sponsor research programs, summer internships, and undergraduate or graduate course projects. More information regarding the IAP program is available at: http://cee.ucla.edu/cgi-bin/iap-home.php.

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