

Civil and Environmental Engineering

at **UCLA**

Chair's Message

You are reading the sixth C&EE bi-annual newsletter produced under my chairmanship, and a recent perusal of the previous five reminded me of the excellent teaching and research that has been conducted by our faculty. The accomplish-

William W-G. Yeh



ments are extraordinary for a relatively new department (formed in 1983) of our size. In fact, though we are roughly half the size of the typical department in our discipline, our graduate program in civil engineering is now 26th in the

latest U.S. & World Report national rankings. I expect the graduate program to soon join the elite top 25, a major threshold our undergraduate program crossed in 2003.

Of course the trend will continue not by reflecting on past achievements, but instead by continuously harnessing the considerable research and teaching strengths of all our faculty members, both junior and senior alike. Along these lines, our newest addition, Asst. Prof. **Eric Hoek** already has taken great strides toward establishing his laboratory group and research program, and even has filed a provisional patent application for a new 'hydrophilic and antimicrobial' reverse osmosis membrane intended for use in desalination and water purification processes. I suspect we'll be hearing more about this promising research enterprise and others in the future.

Professor **J. Woody Ju** quickly resumed in full his vigorous, multi-faceted research program after completing his term as department chair nearly three years ago. The scope and

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Stolzenbach Wins Teaching Award

C&EE Professor Keith Stolzenbach is one of six recipients of the 2005 UCLA Academic Senate Distinguished Teaching Award.

Selected by the Academic Senate's Committee on Teaching, comprised of faculty members as well as alumni and student representatives,

the award recognizes and honors "distinguished teaching" and those "who bring respect and admiration to the scholarship of teaching." Prof. Stolzenbach was nominated for teaching both in the C&EE Department and in the General Education Cluster Program. In his capacity with the latter he coordinates and teaches the GE Cluster course "The Global Environment," sponsored by UCLA's Institute of the Environment.

Prof. Stolzenbach obtained his PhD at MIT and taught there for 18 years before joining UCLA in 1992, first as an adjunct professor and four years later as a full-time faculty member. In his research he investigates how water movement in natural water bodies affects the fate and transport of pollutants and natural substances. He is particularly interested in the interaction between fluid motion and chemical and biological processes.

Stolzenbach will be honored at the annual UCLA Alumni Association Awards Ceremony on May 15 and again in the fall at the annual Andrea L. Rich Night to Honor Teaching, where he also will receive a cash award.

Distinguished Alumnus Awarded

Robert E. Englekirk received ASCE's T.Y. Lin Award for his paper "Design-Construction of the Paramount - A 39-Story Precast Prestressed Concrete Apartment Building," which appeared in the July/August 2002 issue of the *PCI Journal*. The award is presented to the author of a paper "that deals with prestressed concrete in a meaningful fashion." The award adds to the long list of honors bestowed upon the UCLA alumnus and founder/chairman emeritus of Englekirk Partners Consulting Structural Engineers, Inc. for his contributions to the field of structural engineering.

With over 35 years of experience in structural engineering design, Englekirk and his firm are responsible for construction valued at over \$100 billion, including three recent California landmarks: the Hollywood & Highland complex with its centerpiece Kodak Theater, the billion-dollar Getty Cen-

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Reed Hutchinson, UCLA Photo



An impressionistic sketch by Associate Professor Jonathan Stewart regarding his current sabbatical in Italy as a Fulbright Lecturer. Read about his Lecturing award online in the spring 2004 edition of the C&EE newsletter (www.cee.ucla.edu).

We knew from the moment we arrived that our Italy experience would be different from life back home. One of the first things we did was call a relative outside Rome. "Come on over," he said, "we slaughtered the pigs today." Later, his words made perfect sense: refrigeration is expensive here, so it's best to butcher meat in January. In fact, most of the things that seemed strange at first now seem practical. Our apartment has no oven, but bakeries abound. Our bed is comprised of many small mattresses stitched together, but it's a logical alternative to carrying a large mattress up seven flights of stairs. Stores close for a few hours in the afternoon, but they remain open late, giving commuters time to shop after they get home.

We began to adjust when we stopped looking for supermarkets and learned to appreciate the conveniences of our neighborhood. We buy all our meat and cheese cut fresh at delis. The wine at local shops is good and very inexpensive. Our daughters are served hot, two-course meals at school, saving mom and dad the trouble of preparing bag lunches. And the amazing offerings at local pasticcerie have prompted us to write a weekly pastry report to friends and family back home. We even have adapted to the Roman way of doing business, in which most appointments and deadlines are flexible. While it can be frustrating to wait for someone to return from a three-hour lunch, the delays force one to relax – don't get mad, get a cappuccino. We like it here, and our transition will be complete once we convince our three-year-old that the bidet is not a bathtub.

My lecturing as a Fulbright scholar at the Univ. of Rome has proven to be a wonderful experience. Though the university has facilities dispersed across the city, I lecture in an old building in the historic core (local landmarks include the Mausoleo di Augusto and Piazza di Spagna, otherwise known as the Spanish Steps). The course is on Earthquake Engineering, with doctoral students and faculty from across Italy attending. The topic is remarkably timely, as much of Italy was seismically re-zoned within the last year

from low- to high-seismic hazard in response to a tragic, though small, earthquake that caused the collapse of an occupied school building. This has created a huge demand here for Civil Engineers with an earthquake background, but at present the educational infrastructure does not exist. Accordingly, the course is better received than I originally expected

and the students are highly motivated. I'm also working with several local faculty to initiate research on earthquake ground motion characterization using Italian data. There turns out to be an urgent need for that, and the Italians can benefit a great deal from some similar recent efforts in California. So there's much work to be done before our return in June.

All told, it has been fantastic for the whole family to be here. For me, this sabbatical opportunity not only has been a refreshing interruption to a sometimes harried academic routine, but more importantly it has facilitated a much needed and enlightening exchange of views and perspectives.



With St. Peter's Basilica in the background, it's the Stewarts: Claire, Theresa, Bonnie, Alisa, and Jonathan

Chair (continued from front page)

ambition of his various projects within the domain of structural engineering and mechanics is truly remarkable and cannot be described adequately within these pages. Nevertheless, from modeling of next-generation materials to medical biomechanics testing to examining the fracture mechanics of metal alloys, we hope to stimulate interest in Woody's work by placing it in the *Research Spotlight*, the fourth in a series featuring the ongoing research of C&EE faculty.

On the teaching end of things, Professor **Keith Stolzenbach** recently won a prestigious, campus-wide Academic Senate Distinguished Teaching Award. Turn to the front page of this newsletter and learn more about Keith's well-deserved honor. Congratulations Keith.

I am pleased to announce that in the field of structural engineering we have successfully recruited Dr. Jian Zhang, currently an Assistant Professor at the University of Illinois, Urbana-Champaign. We are quite excited about Dr. Zhang's July arrival, and look forward to profiling her in the next newsletter. In addition, we continue our effort to recruit someone in the geotechnical engineering area.

I began by recounting my visit to the department web site. I'd like to end, as always, by encouraging alumni and other friends of the department to do the same – at www.cee.ucla.edu. You can learn more about what we're doing and use the feedback link to share your opinions and relay your own news to us.

Published every fall and spring quarter, the UCLA C&EE newsletter is edited and designed by Mike Gaetani. This and previous newsletters can be viewed at www.cee.ucla.edu.

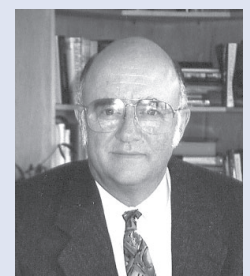
Alumnus (continued from front page)

ter, and the Paramount, the tallest concrete building in the state located in San Francisco. He has been the recipient of the American Concrete Institute's Alfred E. Lindau Award, the Henry C. Turner Award, the Outstanding Concrete Construction Project Structure Award, and the Precast Concrete Institute's Professional Design Award. More recently his career accomplishments were recognized by the L.A. Chamber of Commerce and the L.A.

Area Construction Industry, which presented him with a Lifetime Achievement Award in 2001, and by UC San Diego's Jacobs School of Engineering, which conferred upon him its Outstanding Executive Award in 2003.

A Fellow of ACI since 1992, Dr. Englekirk obtained his MS and PhD degrees from UCLA in 1965 and 1970. Not only a private sector practitioner, he is the author of hundreds of technical papers and two text books, including

Seismic Design of Reinforced and Precast Concrete Buildings, published in 2003. He served as an Adjunct Professor at UCLA for 20 years and currently continues in that capacity at UC San Diego's Structural Engineering Dept., teaching a graduate course in concrete and structural design.



Professor J. Woody Ju and his group have been conducting advanced research employing multi-scale material modeling and simulation in an effort to generate innovative experimental and computational paradigms involving structures and new engineering materials such as carbon nanotubes, nanocomposites, metals, metal matrix composites, brittle matrix composites, cementitious composites, geomaterials, and biomaterials. The program's objective is to develop accurate, versatile, economical and effective tools and conceptual frameworks for better understanding, predicting and simulating the behavior and performance of those structures and materials for a broad range of engineering applications and practices.

In one project, Prof. Ju and graduate student Jay Huang are collaborating with Lawrence Livermore National Laboratory on the experimental fabrication and characterization of single carbon nanotubes (CNT), the use of CNT as a bioprobe, the nano/micro-mechanical modeling of CNT, and the modeling of CNT-based nanocomposites as next-generation structural materials. This includes modeling the nanostructural bonds in CNT for the "armchair" and "zigzag" patterns under molecular stretching or twisting which govern nano-scale deformation (Fig. 1). In another project Ju is working with researchers at the UCLA Medical School and Proctor & Gamble Pharmaceuticals on biomechanics testing, computerized tomography imaging and micromechanical modeling of human bones. With the assis-

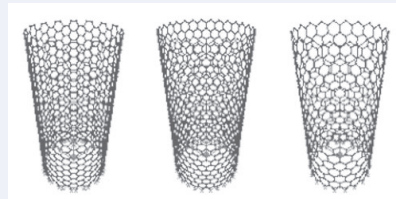


Fig. 1. Modeling C-C bond in CNT for stretching and twisting

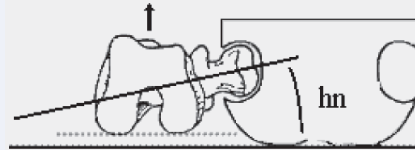


Fig. 2. Orientation of first section of femoral head and neck (hn)

tance of computerized imaging they are modeling the trabecular microstructure of human femur bones in an effort to identify ways of mitigating stress fractures and bone damage due to osteoporosis (Fig. 2). On the new frontier of multi-scale modeling of the dislocations, fracture mechanics and fatigue-crack growth of metal alloys, Ju and grad student Sehin Oh are conducting research aimed at unifying multi-physical theories and mechanisms. This includes an examination of the progressive stages of the formation and growth of fatigue micro-cracks in metals as a result of repeated loading (Fig. 3). In other projects, Prof. Ju is: collaborating with C&EE Prof. J.S. Chen, Caterpillar Corp., and grad students Anny Kuo and Matt Yuan to develop innovative cyclic evolutionary elastoplastic damage-healing models for earth moving simulations; modeling micro-mechanical elastoplastic damage mechanics for advanced composites with evolutionary microstructures with grad student Paul Ko and Professors L.Z. Sun and H.K. Lee, both UCLA graduates; and, with grad students Prechaporn Suwatnodom and Frank Tehrani, developing theoretical and computational tools to characterize and simulate the performance of fiber reinforced cementitious composites.

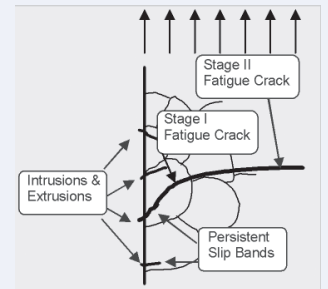


Fig. 3. Multi-scale fatigue crack growth

Alumni News...

Marshall Davert (PhD 1993) recently completed the Harvard Business School's *Executive Business Training Program*. He is Northern California Group Manager of MWH, a global engineering and project delivery firm specializing in water, wastewater, and water resources planning and management. Davert and his team of UCLA alumni – Yung-Hsin Sun (PhD 1995), Ming-Yen Tu (PhD 2002), Anna Fock (MS 1999), Jafar Faghieh (MS 2000), and Roger Putty (MS 1989) – are working on surface water storage, groundwater and conjunctive use, hydroelectric power, flood control, and habitat restoration projects throughout the western U.S.

Albert Kim (PhD 2000), Assistant Professor of Civil & Environmental Engineering at the Univ. of Hawaii at Manoa, received the prestigious NSF CAREER award, which recognizes and supports young teacher-scholars likely to be the academic leaders of the future. Kim's five-year research program, "Aggregate-Enhanced Membrane Filtration," in-

volves the use of a small supercomputer, comprised of clusters of Linux-based computers, which will be used to develop models and simulation algorithms for predicting the effectiveness of water filtration processes. The goal is to better understand the hydrodynamic, physical and chemical interactions between particles in the water and on the membrane filter surface. The research will help advance membrane filtration technology and result in more efficient ways to produce the world's most precious resource – water.

In January 2005 Haeng-Ki Lee (PhD 1999) took a position as a tenured Associate Professor of Civil Engineering at the Korean Advanced Institute of Science and Technology. Dr. Lee's research involves damage mechanics, micromechanics of composites, computational mechanics, and structural repair.

A Senior Staff Engineer at Northrop Grumman Corp. in Redondo Beach, Pam Emch (PhD 1995) is the System Engineer-

ing, Integration and Test Lead on Northrop's Geostationary Operational Environmental Satellite program, a position employing her background in both water resources/geophysics and aerospace engineering. This follows her work in Washington D.C. as Northrop's science/system engineering liaison on the National Polar-orbiting Operational Environmental Satellite Program, a joint NOAA/NASA/Dept. of Defense Government Program Office project.

Ming-Jame Horng (PhD 1994) recently was promoted to Division Director of Hydrology Measurement Technology at the Water Resources Agency of the Ministry of Economic Affairs, Republic of China (Taiwan).

Formerly a Chief Engineer and now an Associate in insurance matters and house counsel at an audio post-production studio, Susan Pelmulder (PhD 1994) passed the California Bar exam last year. While pursuing business law she has not forgotten her academic training, however, as she continues to try to convince lawyers that the tax code is merely a piecewise linear set of equations to be optimized...

ASCE News

UCLA's student chapter of the American Society of Civil Engineers (ASCE) organized and participated in a variety of events during the winter 2005 academic quarter, including our annual job fair and three general meetings. Over 20 local and national firms attended the job fair in February, providing our members with opportunities to apply for internships and full-time jobs. Representatives from Montgomery Watson Harza and the Los Angeles Department of Transportation sponsored two of our general meetings. The third general meeting served as an opportunity to recruit new members for our conference project teams.

Our project teams spent the winter quarter preparing for the 2005 Pacific Southwest Regional Conference, hosted by California State Univ. at Fullerton. At the end of spring break over 30 UCLA ASCE members attended and participated in conference competitions. Most notably, we won first place in the concrete bowling event, placed in the top three in five concrete canoe categories, and earned third place in the land surveying competition. The team's efforts paid off!

Spring quarter promises to be very exciting. During the second week of classes we displayed many of our design projects at Engineering Week, organized by the Engineering Society of the University of California. We currently are planning our annual student/faculty barbeque, end of the year banquet dinner, and officer elections.

Our chapter will be hosting the 2006 Pacific Southwest Regional Conference on the UCLA campus next April. Our officers are already working hard laying the groundwork for the three-day event. If you or your company are potentially interested in participating in some capacity, contact us at asce@seas.ucla.edu. Please visit our website (<http://www.seas.ucla.edu/asce>) for additional information about our chapter.

- Tina Cydzik, ASCE Historian



ASCE members at the Pacific Southwest Regional Conference banquet on April 2.

Chi Epsilon News

Late in the fall quarter UCLA's chapter of Chi Epsilon hosted the 2004 Pacific District Conference. The weekend-long event brought together over 115 faculty, alumni, and students representing 13 universities. Highlights included a tour of the Getty Center and a career fair featuring 14 regional and national civil and environmental engineering firms. Clearly the conference's success would not have been realized without the generous support of 15 corporate sponsors. We encourage you to visit our new website (<http://www.seas.ucla.edu/chiep>) to view conference photos and an acknowledgment list of our sponsors.

In continuing with Chi Epsilon tradition, in the winter 2005 quarter we turned our attention to the community. On two Saturday mornings our officers and new initiates drove to downtown Los

Angeles to assist the Los Angeles Food Bank with sorting food and preparing food packages for the elderly. The Food Bank provides 42 million pounds of food annually to members of the Los Angeles community, and we were very happy to contribute to that total and play a small part in helping those around us.

At our annual initiation ceremony on April 21st we welcomed 19 new initiates into the chapter. Our chapter's growth over the past academic year is wonderful, and we anticipate that our enlarged pool of talent

and creativity will allow us to become involved in more substantial projects during the coming academic year. In fact, throughout the spring quarter we plan to begin working on a long-term community service project, the details of which will be unveiled in a future report to the newsletter readership, and the steering of which will be transferred to our new officers, to be elected in May.

If you have any questions or would like to know more about our chapter, please visit our website or e-mail us at xe@seas.ucla.edu.

- Tina Cydzik, Chi Epsilon President

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