# Civil & Environmental Engineering

henry samueli school of engineering and applied science | UCLA | Fall 2009



### Message from the Chair



It is with great pleasure that we start the academic year with such auspicious beginnings. I would first like to welcome our newest faculty member, Professor Shaily Mahendra, to our department. Dr. Mahendra comes to us with a rich background of experience and research in nanotoxicology and environmental microbiology. Shaily uses cutting edge microbiological, chemical, and isotopic technologies to investigate and manipulate microbial communities in natural environments as well as engineered wastewater or bioremediation systems. I invite you to take a moment to read her feature article on the following page.

I would also like to welcome the many new students both undergraduate and graduate, who have enrolled in our prestigious engineering program this year. We have experienced a signficant increase in enrollment from last year, of approximately 11% and 23% for undergraduate and graduate students, respectively. I look foward to getting to know you and hope that you take advantage of the expertise and opportunities our department has to offer both in and outside the classroom.

For instance, Professor Terri Hogue exemplifies the level of excellence that our department strives to maintain; her recent National Science Foundation (NSF) Career Award recognizes her and her team's capacity for important research in water resources engineering and environmental protection. Furthermore, the <code>nees@UCLA</code> center is getting \$4.5 million in NSF funds to support various research projects. Our faculty are also recognized by industry - Professor Jian Zhang was awarded the Northrop Grumman Excellence in Teaching Award for her research achievement and her teaching and mentorship skills.

Despite the economic challenges at hand, we have sustained quite a level of support through our Industrial Affiliates program (IAP). This program, coordinated by faculty Professor Jon Stewart, has been key in helping our department maintain its rigorous academic and research programs. I would like to thank CTS, Geosyntec, Van Beveren and Butelo, and Sabol and Englekirk for their recent IAP membership renewals and generosity. Please find more information about the many benefits of becoming an Industrial Affiliates member on page 14.

A faculty retreat was held on November 13 and was very well attended. During the retreat, the department's research expenditures, enrollment levels, and staff management were reviewed. Extensive discussions were held to improve curriculum, junior faculty mentoring, CEE By-Law 55 revisions, and student advising.

An Industry Advisory Board (IAB) is scheduled to take place in February 2010. Our last meeting in February 2008 was very successful and we look forward to another productive meeting, which will be detailed in a committee report. We will continue to seek IAB members' advice to support and improve education and curriulcum selection, faculty recruitment, industry collaboration, and to adapt to challlenges in space and budget shortfalls. The overarching goal of these meetings is to ensure that our department is functioning efficiently and effectively, nurturing the excellence of our students, department staff, and faculty.

This year we will meet the challenge of our budget crises and economic climate head-on. We will take this opportunity to re-examine our education and research programs so that we can emerge as an even stronger department. Our faculty generated 33% more funding this year compared to the previous year; this is only one example of our increased efforts to transform this challenge into an opportunity to demonstrate the caliber of our work and people.

Again, we invite you to take a moment to find out more about the activities within our department. Thank you.

J.S. Chen

Chancellor's Professor

Department Chair, Civil and Environmental Engineering



## **Dr. Shaily Mahendra**

#### Finding a home in Los Angeles and at UCLA

In Fall of 2009, the Civil and Environmental Engineering Department at UCLA was pleased to welcome to their group of prestigious faculty its newest hire, Dr. Shaily Mahendra.

"For as long as I can remember, I have aspired for a career in academia. The challenging atmosphere of higher learning provides me with the intellectual stimulation that I enjoy and value," says Dr. Mahendra, who conducts research and teaches courses in the area of environmental microbiology. Shaily uses state of the art microbiological, molecular biological, chemical, and isotopic tools to characterize and control microbial communities in natural environments. as well as those in engineered wastewater treatment or bioremediation systems. She also investigates mechanisms of transformation, toxicity, and trophic transfer of emerging contaminants and nanoparticles. In her personal and professional life, Dr. Mahendra shares the philosophy of Uncle Ben, who advised Peter Parker (Spiderman), that "with great power, comes great responsibility". She stresses that we should consider environmental and public health implications of advances in energy, materials, biotechnology, and nanotechnology

to promote sustainability rather than environmental liability.

Dr. Mahendra's career in engineering and research began in New Delhi, India, where she earned her Bachelor's degree from the Indian Institute of Technology (IIT). As early as sophomore year, she started assisting professors in their

"We need to be proactive in

impacts of nanomaterials,

so that we can participate in

their design and disposal in

an environmentally-responsi-

understanding the long-term

research and consulting projects. While she explored various branches of Civil and Environmental Engineering, such as design of a landfill (geotechnical), structural analysis and design of an international

airport building, and modeling of a well field, she found various environmental engineering projects in Prof. Mukesh Khare's lab most interesting. Upon graduation, Shaily worked at the Tata Energy Research Institute, India's leading energy and environmental research organization. At TERI, Dr. Mahendra was a

ble way. "

research associate who helped develop reactor designs for biogas production from solid waste and wastewater.

Working towards her long-term career goal of academic research, Dr. Mahendra arrived at Syracuse University, where she received the Center for Environmental Science and Engineering fellowship for her master's degree. Under the supervision of Prof. Andria Costello, Shaily demonstrated how trace metals affect bacterial growth and enzyme activities, quantifying inhibitory effects on bioremediation of chlorinated solvents.

After spending two winters in upstate New York, Shaily yearned for the sunshine and milder climate of California. She moved to UC Berkeley to continue her graduate education. Her PhD research, which was recognized with the CH2M Hill/AEESP Outstanding Doctoral Dissertation Award, included the identification and characterization of a new bacterium that can completely biodegrade 1,4-dioxane, a carcinogen and emerging water contaminant. Shaily credits her success (survival?) during 6 long years at Berkeley to Prof. Lisa Alvarez-Cohen for her outstanding mentorship, patience, and support. She continues to collaborate with her colleagues at Berkeley on projects she initiated on whole genome sequencing of the dioxane-degrading bacterium, Pseudonocardia dioxanivorans.

To apply her training in microbiology to a new class of emerging contaminants and nanomaterials, Dr. Mahendra accepted a research scientist position at Rice University in Houston, Texas. Shaily and her

mentor, Prof. Pedro Alvarez, advanced our understanding of potential hazards of quantum dots, which are semiconductor nanoparticles comprised of heavy metal cores, often coated with organics. This organic shell makes quantum dots biocompatible, and presumably ensures

(Mahendra, continued on page 6...)

## Faculty Spotlights

### Prof. Hogue receives NSF Early Faculty CAREER Award



Professor Terri Hogue was recently awarded the NSF CAREER award for her project, "Investigation of Regional Land-Atmosphere Interactions in Semi-arid Cities Using the WRF-Noah-Urban Canopy Model." This project will address fundamental questions on land-atmosphere interactions in semi-arid, urbanized landscapes and the potential impacts of a changing climate on human populations and regional water and energy budgets.

Future climate extremes are expected to significantly impact populations in semi-arid regions, exacerbating regional water supply problems and increasing energy demands. With probable declines in precipitation, increasing probability of extreme events, and already

depleted stocks in many large storage systems (e.g., Colorado River), there are critical water policy issues that require sophisticated modeling of climate-surface interactions to better understand and predict future impacts. Current water resource management strategies are limited by reliance on the predictive

"The ultimate goal of the

project is to develop a model-

ing framework [applicable

to] urban centers that helps

address potential water and

energy demand shortages in

western U.S. cities. "

capabilities of General Circulation Models (GCMs) which have poor spatial resolution at the regional scale.

This five-year CAREER project will develop a regional, high-resolution landatmosphere-urban canopy model that

integrates ground-based and remotelysensed observations to simulate atmospheric and surface processes (water and energy balances) within extremely heterogeneous and highly urbanized landscapes. Initial work will focus on two large urban centers in the western U.S. - Los Angeles, California and Phoenix, Arizona.

A range of historical atmospheric condi-

tions (normal heat conditions, extreme heat waves, anomalous precipitation, etc.) will be simulated to investigate urban-climate interactions. The sensitivity of the urban climate to land cover "greenness" will also be studied to evaluate the trade-offs of evaporative cooling from increased canopy cover (water

demand) and related impacts on urban heat (energy demand) in waterstressed regions.

This CAREER project will also involve integration of observational networks and environmental

curriculum into urban school districts in Los Angles (partnering with the UCLA SEE-LA GK-12 program), helping to foster environmental science awareness and build a foundation for an educated workforce capable of engineering solutions and mitigating impacts.



Professor William Yeh was elected an Honorary Diplomate, Water Resources Engineer in the American Academy of Water Resources Engineers. This is the Academy's highest honor awarded to an individual who has demonstrated advanced expertise in water resources engineering, extensive experience, strong ethics, and a commitment to life-long professional development. Dr. Yeh was also recently elected into the National Academy of Engineering and honored by colleagues and students for his contributions to the field of water resources and engineering.



Prof. Eric M.V. Hoek's nanocomposite membrane research has received numerous awards (2007 Global Water Awards Distinction for Innovation of the Year, Public Works Magazine 2007 Trendsetter). Nanocomposite RO membranes are now being developed commercially by NanoH2O Inc. - a Los Angeles based nanotechnology company - and recently made the Global Water Intelligence list of "the ten most important new technologies which could change the way the world of water works."



Dr. Mike Stenstrom (Environmental Group, Distinguished Professor) was invited to speak at the 2009 International Conference on Low-Carbon Society in Taipei, Taiwan. His presentation was entitled, "Towards a Low-Carbon Society: Development and Practices in the USA." In addition to consulting for the LA County Sanitation District and Bureau of Sanitation for LA city. Dr. Stenstrom is also currently serving on an expert panel advising Boeing, Geosyntec, and the Regional Water Quality Control Board on stormwater management for the Santa Susana Field Laboratory.

# Faculty Spotlights

# Dr. Zhang wins Northrop Grumman Excellence in Teaching Award

"What impresses me most is

that she is a nice teacher, a

respected research advisor, a

hard-working young faculty, and

a good mom of two happy kids.



Dr. Jian Zhang recently received the Northrop Grumman Excellence in Teaching Award,

conferred on November 6, 2009, at the UCLA HSSEAS Awards Dinner at the Beverly Wilshire Hotel.

Dr. Zhang's research expertise is in earth-

quake engineering, structural dynamics and mechanics, with an emphasis on the model-

ing, analysis and protection of structural systems under extreme loads and currently teaches several courses in these areas.

"At the beginning of one of her courses, [I] felt that the material was so profound and formidable," says one of her former students, "but by the end, I was amazed because I was able to comprehend the subject and felt more confident in my studies. I love that feeling."

Dr. Zhang's excellence in research also extends to her immense ability to mentor and guide her graduate students. According to several of her PhD students, she is "inspiring" because of her "enthusiasm in research and keen insight" and her "endless guidance and excellent instruction."

She has worked on various research projects supported by the NSF, California Department of Transportation and Pacific Earthquake Engineering Research Center. Her recent research activities include performance-based implementation of adaptive stiff-

ness and damping devices for improving seismic performance of bridges, development of fragility functions for seismic as-

sessment of bridges, nonlinear modeling of reinforced concrete members considering axial-shear-flexure interaction, soil-structure interaction, and ground motion characterizations.

Previous C&EE recipients of this award include Drs. Terri Hogue, Jenny Jay, Steve Margulis,

and Jonathan Stewart.



Dr. Zhang and Dr. Ray Haynes, Director of University Technical Alliances at Northrop Grumman Corporation, who presented the award.



#### Dr. Julius Glater presented with Lifetime Achievement Award by the American Membrane Technology Association

Dr. Glater was honored by the American Membrane Technology Assocation this past year with the Lifetime Achievement Award, "In recognition of his involvement with RO and desalination since the 1960's at UCLA and many achievements including a paper capturing the historical development of membranes, as an adjunct professor emeritus, this walking encyclopedia continues to encourage and advise doctoral students."

He was one of the pioneering researchers that contributed to the creation of the first viable reverse osmosis technology.

-Dr. Eric Hoek

One of his most recent and significant contributions to the field of desalination was as a founder of UCLA's recently established Water Technology Research Center, along with Drs. Cohen (ChemEng), Hoek (CEE), Jenkins (UCD, Biological and Agr Engr), Christophides (ChemEng), and Kaiser (EE).

Dr. Glater has authored over 35 articles in the field of membrane science. Dr. Glater was also a short-distance runner in high school and college, an airforce veteran of WII in the South Pacific, an Air Traffic Controller, and Certified Meteorologist.

"Bud's passion for basic research, his kindness and patience in mentoring students, his solemn wisdom and collegiality make him a very special person. His example is one for all of us to follow, " says Dr. Eric Hoek, "It is great to see him being recognized by an industry that he helped spawn."



"I not only want to be a problem-solving engineer, who knows how to answer a tough question, but also an inquisitive scientist, who knows equally well how to ask one."

> -Professor Shaily Mahendra

#### (Mahendra, continued from page 2)

that toxic elements would not become exposed to the environment or people. Quantum dots are used in diverse applications, ranging from solar cells and LEDS to medical imaging and drug delivery.

"We need to be proactive in understanding the long-term impacts of nanomaterials, so that we can participate in their design and disposal in an environmentally-responsible way. While nanoparticles encased in products or composites might be safe in their short-term applications, they are highly reactive and toxic when released or transformed under certain conditions, Dr. Mahendra explains. "In our work, we found that slight changes in pH degraded quantum dot coatings, releasing the core metals and killing bacteria. Fungi, in contrast, were impacted by intact as well as degraded quantum dots. It is particularly important to evaluate nanomaterial-microbial interactions because microorganisms are at the foundation of all known ecosystems, and also serve as indicators of the toxic effects on higher organisms."

At Rice, Dr. Mahendra also studied the disinfection of viruses, bacteria, and fungi in the presence of silver nanoparticles contained in water filtration membranes, polymers, and oil paints. She also started a project to explore natural and engineered bioremediation of 1,4-dioxane in cold climates.

When Dr. Mahendra saw that there was a faculty position in the Department of Civil and Environmental Engineering at UCLA, she was eager for the opportunity to return to California and establish her niche. She felt that her experience and research specialties would greatly complement the current group of faculty.

"This [environmental] group has experts in aquatic chemistry, membranes, reactor engineering, and transport/modeling of environmental phenomena - these faculty would provide immense perspective to my work, and I hope that my background in microbiology and nanotoxicology would fill crucial gaps in the department and offer myriad opportunities for creative and collaborative research," says Dr. Mahendra.

Shaily was also excited at the prospect of working with others outside of the CEE Department and School of Engineering, such as the California NanoSystems Institute, Molecular Biology Institute, and the colleagues across campus.

Prof. J.S. Chen, chair of the Civil and Environmental Engineering Department, says, "Dr. Mahendra is an extremely talented individual, whose work in biotechnology and nanotoxicology adds an important and critical element to our department. Our research and projects are rooted in addressing important civil infrastructure and environmental infrastructure/protection issues; we are honored to have Dr. Mahendra join our

department."

Currently, Dr. Mahendra and her research group are working to characterize the toxicology of nano-sized metal particles on freshwater algae by varying dose and particle properties. The stress on these organisms is evaluated not only in terms of their mortality numbers, but also understanding the genetic basis of toxicity and adaptation. As algae are being utilized for biodiesel and hydrogen production, these efforts will provide valuable insights into how metals, nutrients, and other factors will enhance or inhibit their growth and activity. She is also carrying out genomic and transcriptomic studies of Pseudonocardia dioxanivorans, and biodegradation of perfluoroalkyl compounds by bacteria and fungi. Dr. Mahendra is teaching a graduate course in environmental biotechnology in Fall and undergraduate microbiology in Spring.

Shaily is thrilled to be a UCLA engineering professor, "I feel I can make a difference through published research and training of young minds. I not only want to be a problem-solving engineer, who knows how to answer a tough question, but an inquisitive scientist, who knows equally well how to ask one."

For more information, please visit www. cee.ucla.edu.

## Research Spotlight

# Brandenberg and Stewart receive NSF grant to study seismic stability of Bay area levees

Article courtesy Drs. Scott Brandenberg, Jonathan P. Stewart, and Robb E.S. Moss

The widespread failure of the New Orleans levee system caused by Hurricanes Katrina and Rita in 2005 was a warning sign for California, where the Sacramento-San Joaquin Delta levees deliver fresh water to over 22 million residents and protect farmland and wildlife habitat. The Delta is susceptible to the dangers of flooding, as the result of climate change, burrowing animals, invasive species, and earthquakes, an increasingly and particularly urgent and onerous threat.

UCLA Civil and Environmental Engineering Professors Brandenberg and Stewart, and Professor Moss (CalPoly, CEE) have teamed up to address these dangers in a recently funded project entitled, "Seismic Deformation Potential of Levees on Peaty Organic Soil in the Sacramento-San Joaquin Delta."

The Delta spans a 700,000 acre estuary at the confluence of the Sacramento and San Joaquin rivers, which drain California's Central Valley west into the San Francisco Bay. It is characterized by numerous plant species adapted to historical flooding events, which also in turn delivered sediments, resulting in rich peaty soils. These soils are not well-characterized and, therefore, the potential hazards of an earthquake event are not understood. Furthermore, the current levee systems are not permanent engineered structures; rather

hazardly constructed by gold rush settlers in the mid 19th century.

| Solve |

they are structures that were hap-

aerial photo of Delta: Roy Tennant; upper left: potential failed levee scenario; lower right: test configuration.

"The seismic hazard is exceptional because of the potential for multiple simultaneous breaches, inundating many islands within the Delta," says Dr. Brandenberg, "which is expected to cause 10 to 70 failures of the existing levees in a single earthquake, flood[ing] multiple islands, draw[ing] in saline water from the San Francisco Bay, and compromis[ing] water intakes at pumping stations...for up to 20 to 30 months."

The State of California has responded to these risks by instating bond measures to sponsor the Delta Risk Management Strategy (DRMS), aimed to quantify seismic and flood risks in the Delta using state of the science data collection and analytical tools.

This involves "characterizing levee sites as potentially liquefiable or non-liquefiable" – which would help determine the risk to levees in the event of a natural disaster, according to Brandenberg. These risks have only thus far been studied using the Newmark sliding block analysis in previous work, which presents an issue within the current system.

In their proposals, the UCLA CEE groups indicates that "Peat is more pervasive than liquefiable sand in the Delta" and that "much less is known about the seismic behavior [of peat]," and that levees on peat soil show poor performance when tested under strong ground motion.

The proposal was funded in by the George E. Brown Network for Earthquake Engineering Simulation (NEES)" and will involve conducting full-scale testing of levee structures to investigate the *in situ* deformation potential of the peaty organic foundation soils under realistic stresses and boundary conditions. The nees@UCLA facility in particular specializes in field testing capabilities and includes mobile field shakers that can impose large dynamic horizontal forces in the frequency range characteristic of earthquake shaking.

Most in-field testing has proven problematic, as most levees that may be potentially suitable for the test currently impound water. The research group is thus planning to construct a pilot scale levee on the interior of an island and wait for ideal and natural conditions to occur --- essentially, the peat needs to consolidate (which can be partially induced by wick drains) Once this occurs, they can then subject that constructed levee to a mobile field shaker.

Progress of this project is documented at http://nees.ucla.edu/neesrii/index.html. For more information, contact Dr. Scott Brandenberg at sjbrandenberg@ucla.edu.

## Research Highlights



### Earthquake forces Niigata power plant shutdown in 2007; UCLA researchers travel to Japan to investigate

In 2007, Japan was shaken by a 6.6 magnitude Niigata-ken Chuestsu-oki earthquake that limited operations at the Kashiwazaki-Kariwa nuclear power plant for the last 1.5 years. This nuclear power plant houses the world's first advanced boiling water reactor, which generates electricity by using a steam-powered turbine (the steam being generated by nuclear fuel).

The 2007 earthquake produced strong ground motions that were recorded by a downhole array. The peak accelerations at the base of the array were approximately 0.8 g, which is the highest ever recorded in such an array. This data is therefore uniquely valuable for the study of nonlinear site response, which relates to how near-surface soils modify the characteristics of earthquake ground motions. Moreover, the site experienced a signifi-

cant amount of settlement from seismic compression of unsaturated soils. This too is invaluable information, as no previous case history world-wide has had both measured settlements from seismic compression and measured ground motions.

Graduate student Eric Yee and Professor Jon Stewart travelled to the site in October 2009 to perform the geotechnical testing required to flesh out the data set into a usable case history. Yee worked with Japanese contractors and collaborators to collect soil samples for laboratory testing and to conduct standard penetration testing with energy measurements.

This data, according to Yee, will allow engineering models for nonlinear site response and seismic compression, many of which were developed in previous research at UCLA, to be validated for strong shaking levels. According to Stewart, this validation for strong shaking conditions is extremely important because engineering design in California typically occurs for similarly strong shaking levels.

Prior to the field excursion, Yee developed analytical and testing skills required for the data collection, including the use of sophisticated instrumentation and data acquisition equipment. This field study was coordinated with Japanese collaborators, namely Dr. Kohji Tokimatsu from the Tokyo Institute of Technology. Yee is currently a graduate student in Civil and Environmental Engineering, under the supervision of Professor Jon Stewart.

For more information, please contact mailericyee@ucla.edu.

## Research Highlights

Innovative data assimilation technique developed by Yeh group is used to predict groundwater pumping effects in Las Posas Basin



For the past two years, UCLA researchers Professor William Yeh, Dr. Don Kendall, and Dr. Wei-Chen Cheng have been collaborating on a project to assess groundwater pumping in the Las Posas Basin located in Ventura County. They have developed an algorithm using MODFLOW simulation models to determine the degree of groundwater pumping based on a handful of user inputs such as head, geography, and other data.

Calleguas Municipal Water District (CMWD) has been storing water in Las Posas Basin by injecting water but needs a better understanding of the effects of water withdrawal from many private wells in the area. From 1996, the Aquifer Storage and Recovery (ASR) program has been acting to store surplus surface water in the groundwater aquifer for emergency needs and future uses.

n California, property rights do not require landowners in non-adjudicated basins to measure their groundwater pumping rates and publicly disclose them. While the private well owners are asked to submit data regarding the quantity of water withdrawn, some of the data may be too sporadic for use in the model that determines the effects on the water table of water withdrawn from these private wells. The model being developed by these researchers will provide a more accurate way to account for the total volume that is withdrawn from aquifers, which will enable CMWD

to determine the best locale for injection wells to increase groundwater storage as well as track unreported pumping.

Dr. Kendall, the general manager of the Calleguas Municipal Water District says, "The nudging algorithm, coupled with the groundwater model represents a breakthrough and will allow staff to quickly and effectively manage the basin. Furthermore, this technique will allow managers to reliably locate areas where unreported pumping may be occurring. This is very important given the fact that imported water is retailing for more than \$1,000 per acre foot."

With a well calibrated simulation model, the pumping estimation is highly accurate; according to Dr. Cheng, their implementation of this algorithm has an error that is below 10% for global pumping rate estimation using simulation model, well locations, and head observations, based on comparisons of numerical simulation results to hypothetical pumping scenarios, over the Las Posas region.

For more information, please contact wccheng@ucla.edu. Details of this model can be found in a recent 2009 publication in *Water Resources Research*.

### Student Highlights

Undergraduate student Joy Park was awarded Edward K. Rice Outstanding Bachelor's Student recognition at the November Engineering Awards dinner. Ms. Park served as the President of the UCLA Chapter of the American Society of Civil Engineers and was involved in the Chi Epsilon Honor Society. Ms. Park is currently employed at Turner Construction and plans to return to graduate school next year.



Graduate student MaryTheresa Monahan-Pendergast, was awarded the Sallie and Russell O'Neill Memorial Scholarship in Engineeering and Applied Science by the UCLA Faculty Women's Club. She is advised by Prof. Eric M.V. Hoek and is studying nanotechnology based membrane materials for environmental applications.

Graduate students Christine Lee and Katie Mika received an EPA student competition grant for People, Planet, and Prosperity for their proposal entitled "Using an integrated approach of rapid microbial detection technology and community education to reduce waterborne illness in Dar es Salaam, Tanzania." Advisor: Jay

Chancellor's Prize

Christopher Motter - advisor: Wallace

Eugene Cota-Robles Fellowship

Abdou Diop - advisor: Stewart

MaryTheresa Monahan-Pendergast - advisor: Hoek

David Johnson - advisor: Stewart

Cota-Robles Graduate Research Mentorship

Adam Siade - advisor: Yeh

Dissertation Year Fellowship

Christine Lee - advisor: Jay

University of Caliofrnia Office of the President (UCOP) Dissertation Year Fellowship

Timothy Ancheta - advisor: Stewart

NSF Graduate Research Fellowship Program

Marcia Ferreira - advisor: Jay

MaryTheresa Monahan-Pendergast - advisor: Hoek

*Martin Rubin Scholarship* Shi-Yu Xu - advisor: Zhang

#### Recent Ph.D. Defenses. Congratulations!

Dr. Xiao-fei Huang, Ph.D. Defense

"Mechanisms of Bacterial Adhesion to Seawater Reverse

Osmosis Membranes"

Advisor: Hoek

Dr. Rita Kampalath, Ph.D. Defense

"Biogeochemical controls on environmental mercury meth-

ylation" Advisor: Jay

Eileen Idica, Ph.D. Defense (January 2010)

"Contaminant Transport in the Southern California Bight"

Advisor: Stolzenbach

Dr. Shane-Wei Chi, Ph.D. Defense

"Image-Based Computational Mechanics Frameworks for

Skeletal Muscles" Advisor: Chen

Chung-Hao Lee, Prospectus

"Atomistic to Continuum Modeling of DNA Molecules"

Advisor: Chen

Dr. Bart Forman, Ph.D. Defense

"A Satellite-derived Ensemble Data Assimilation Framework for Estimating Distributed Hydrologic Forcing and Its Uncer-

tainty"

Advisor: Margulis

Dr. Anna Jawor, Ph.D. Defense

"Removal of Problematic Metals from Water via Nanoparticle?

Enhanced Membrane Filtration"

Advisor: Hoek

Dr. Keiji Yanase, Ph.D. Defense

"Micromechanics and Effective Thermo-Mechanical Damage

and Deformation Responses of Composite Materials"

Advisor: Ju

Dr. William Elmer, Ph.D. Defense

"Computational Methods for Simulation of Extreme Events on

Concrete Structures." Advisor: Taciroglu

Dr. Wichitra Singhirunnusorn

"An Appropriate Wastewater Treatment System in Developing

Countries: Thailand as a Case Study"

Advisor: Stenstrom

Dr. Yuchuan Tang, Ph.D. Defense

"Soil-Structure Interaction and Its Role in Performance-Based

Seismic Analysis of Shear Wall Structures"

Advisor: Zhang

Wang Xi, Prospectus

"Performance Based Implementation of Adaptive Stiffness

and Damping Devices for Highway Bridges"

Advisor: Zhang

Dr. Pirooz Kashighandi, Defense

"Demand Fragility Surfaces for Bridges in Liquefied Laterally

Spreading Ground." Advisor: Brandenberg

Naresh Bellana, M.S. Thesis

"Shear Wave Velocity as Function of SPT Penetration Resistance and Vertical Effective Stress at California Bridge Sites."

Advisor: Brandenberg

Dr. Jongyoun Kim, Ph.D. Defense

Advisor: Hogue

## Alumni & Affiliates Updates



**Dr. Dave Ginsburg** (Postdoc '09) is a lecturer at the University of Southern California in the Environmental Studies program. Dr. Ginsburg has also taught biology at Santa Monica College and Pierce College. Dr. Ginsburg is currently developing an innovative community-based education and scientific research program that engages community college students in field research. Dr. Ginsburg will also be an instructor for the 2010 International Graduate Training Course in Antarctic Marine Biology. Dr. Ginsburg's previous work in Antarctica is also featured in a children's book entitled "Menorah Under the Sea" by Esther Heller.



Astrid Dumesnil (MS '06) working as a civil engineer at KPFF. She is working on numerous projects including the UCLA Wasserman structure, that will be located near the Jules Stein and Doris Stein buildings. She is also working on an Embassy building in Santo Domingo with MRY Architects and Planners and the Eli and Edythe Broad Center at USC with ZGF Architects. When

Ms. Dumesnil is not working, she looks forward to occasional visits home in France.



**Dr. Thomas Kang** (PhD 04) is currently Assistant Professor at the University of Oklahoma in Civil Engineering and Environmental Science, and, along with 3 co-authors, has been awarded the 2009 ACI Wason Medal for Most Meritorious Paper for Vol. 29 (2007) of Concrete International. The paper is entitled "Post-Tensioned Slab-Column Connections." He is sole PI on a \$0.6 million

infrastructure project co-funded by federal and state research agencies. His research focuses on design and rehabilitation of concrete structures using advanced new materials such as hybrid fibrous polymers. Advisor: Dr. John Wallace. More info: http://www.cees.ou.edu/faculty/index.html#kang



**Dr. Frank Tsai** (PhD 02, Yeh) has been promoted to Associate Professor with tenure in the Department of Civil and Environmental Engineering at Louisiana State University. Dr. Tsai received the 2008 LSU Tiger Athletic Foundation Undergraduate Teaching Award. He is currently an Associate Editor for the ASCE Journal of Water Resources

Planning and Management as well as Journal of Hydrologic Engineering.

Alumni and Affiliates - Send us your updates! ceenewsletter@gmail.com





**Seth Saafeld** (MS'06) is in the Navy and stationed in Jacksonville, FL. He currently flies two types of helicopters for his squadron, the DragonSlayers. His deployments include protecting carriers from submarines and/or retrieving Special Ops units or pilots who have gone down.



**Regina Quan** (BS '05) is in the Civil Engineering Corps Division of the Navy. She is currently stationed in Rota, Spain after a several-year tour in Okinawa, Japan. Ms. Quan coordinates different civil engineering project efforts such as building/structure design and construction and community outreach.



## Student Group Updates

American Society of Civil Engineers provide opportunities for students to find jobs, interact with faculty, participate in national/international competitions

update courtesy of Brandon Hale, ASCE officer

ASCE Career Fair: One of UCLA American Society of Civil Engineer's goals is to foster connections between industry and students. To help accomplish this goal, ASCE holds career fair each year: one in Fall and the other in Winter. The career fairs connect civil and environmental engineering students with companies and agencies that are excited to hire future UCLA graduates. This year, ASCE's strongest supporters will attend and meet the roughly 250 undergraduate and graduate students who attend each career fair (Winter Career Fair to be held January 28, 2010).

ASCE Upcoming Events: ASCE engages in many events for members and non-members throughout the year. On October 30, 2009, a student/professor barbecue was be held at Professor Stewart's home, giving students and faculty a chance to get to know each other in more relaxed atmosphere. ASCE is also reaching out to the Los Angeles community by introducing engineering to students at local Clover Elementary school, hosting the Popsicle Stick Bridge Competition for high school students, and promoting a blood drive, to help support UCLA Blood and Platelet Center's ongoing mission to collect blood donations.



Apart from events with the surrounding community, ASCE also holds many events internally. Information sessions with companies bring students together to meet industry representatives on a more personal basis. Many members work on projects throughout the year, developing skills by working effectively in teams, seeing a project through from start to finish, and taking on responsibility. Concrete canoe, steel bridge design, environmental design, surveying, seismic design, and geotechnical design projects bring students together to learn and have fun outside the classroom.

For more info: www.ascebruins.org

# Engineers without Borders: Student projects improve water supply and waste management in Guatemala and Nicaragua

Members of *Engineers Without Borders-UCLA* have maintained a strong involvement with international projects. A team of seven students traveled to Momostenango, Guatemala and implemented seven rainwater catchment systems. This year they will continue fundraising and will optimize the current design to make the systems cheaper and easier to construct. For the Nicaragua Sanitation Project, a team of four traveled to Kukra River, Nicaragua to construct a pilot project of three composting latrines. They also performed a site assessment for water. The team will assess the collected information to determine the best solution for the community's need for water.

Guatemala: Bart Forman (bforman@ucla.edu), Tarang Lal (tlal@ucla.edu), Savoth Hy (savoth@ucla.edu)

Nicaragua: Julia Pasternack (j.pasternack@ucla.edu), Karen Lee (ktlee0@gmail.com), Warren Kadoya (wkadoya@ucla.edu)

EWB-UCLA meets Tuesdays, 6:15 PM, Engineering IV, 38-138; please confirm @ www.seas.ucla.edu/ewb



### **Recent Civil and Environmental Engineering Events**

### Environmental Engineering & Water Resources (external speakers) Seminars

Fundamentals and Applications of Entrapped Cells for Environmental Remediation // Prof. Eakalak Khan, Dept of Civil Engineering, North Dakota State Univ ersity

Catalysis & Materials Engr for Energy & the Environment //
Cafer Yavuz, Research Associate, UC Santa Barbara

Tejon, Toll Roads, and the Death of Whales: Contrasting Advocacy Strategies for Conservation Now // Joel Reynolds, Senior Lawyer, National Resources Defense Council

Bacterial chemotaxis and degradation of aromatic hydrocarbon // Prof. Rebecca Parales, UC Davis

**Water Conservation & Reclamation in Australia** // Dr. Sergei Schreider, RMIT University, Melbourne, Australia

#### Structures and Geotechnical Seminars

Risk-informed seismic design of US nuclear power plants //
Annie Kammerer, Ph.D., P.E., of the U.S. Nuclear Regulatory Commission

**California's Levees: Then and Now** // Timothy M. Wehling, PE, Senior Engineer at the California Department of Water Resources

**Lessons from failures great and small** // Dr. John Osteraas, Principal, Exponent Failure Analysis

Engineers and the Law-What its Like to be an Expert Witness (or a defendant) in a Lawsuit // Clarke B. Holland, Esq.

Engineering-based Approach to Risk Analysis of Industrial Facilities // Dr. Paolo Bazzurro, Principal, AIR Worldwide



#### **About the Editors**

Mangshing Enterprise Incorporated

Christine Lee is a Ph.D. student under the supervision of Professor Jenny Jay. She is currently developing a rapid detection method for measuring fecal indicator bacteria, organisms that are used to assess water quality conditions. Ms. Lee's paper, detailing this method, was recently accepted for publication in the Journal of Applied Microbiology.

Katie Mika is a Ph.D. student under the supervision of Professor Jenny Jay. She is conducting multiple watershed studies in Southern California using microbial source tracking and source identification strategies. Ms. Mika recently completed a 4-month internship at the Environmental Protection Agency headquarters in Washington D.C.

### **Industrial Affiliates**

#### Mission

The Industrial Affiliates Program (IAP) is dedicated to initiating and forging partnerships with industry. We seek synergy between our educational and research goals and your corporate objective of increaseing student recruiment and visibility of firm on-campus and of translating research results to practical applications and practice.

#### **Services**

The Industrial Affiliates Program is committed to customizing services to each particular member in order to maximize talent benefits and institutional resources from the Civil & Environmental Engineering Department.

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