

# NEWSLETTER

**P.1** 2012 DORMAN LECTURE  
Environmental engineering mega problem discussed

**P.2** TSUNAMI RESEARCH  
Viterbi professors join with California to enhance state's preparedness

**P.5** DISTINGUISHED CAREER  
A life's work of providing the world with better access to water



**Dorman Lecture Leaders**

From left are USC Viterbi Dean Yannis C. Yortsos, USC President C.L. Max Nikias, CMU President and Dorman lecturer Jared L. Cohon, USC Sonny Astani CEE Department Chair Lucio Soibelman, and civil engineer and architect Albert Dorman.

## CMU President Explores the Hidden Costs of Energy in 2012 Dorman Lecture

Dr. Jared L. Cohon, president of Carnegie Mellon University (CMU) and member of the National Security Higher Education Advisory Board, brought an environmental engineering mega problem—the hidden costs of energy—to USC's Ronald Tutor Hall for the 2012 Albert Dorman Distinguished Lecture Series this spring.

Dr. Cohon opened his lecture by describing energy as "one of the great problems of our time." He expressed his hope that the transition to a sustainable energy future is possible although it will take many decades and require technology, management, and policy innovations. The audience included the lecture series' preeminent namesake, Albert Dorman, as well as USC President C. L. Max Nikias, Viterbi School Dean Yannis C. Yortsos, Sonny Astani CEE Department

Chair Dr. Lucio Soibelman, and numerous Viterbi faculty, students, and staff.

Last year, Dr. Cohon chaired the U.S. National Academies' Committee that, at the request of Congress, produced the report *The Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use*. The report examines the hidden health and environmental costs of energy production and consumption in the United States. Using the most advanced economic methodology and the best available data, the committee estimated \$120 billion per year in non-climate damages from producing and using energy in America.

Dr. Cohon spoke about the committee's task to estimate the dollar value of externalities—the giant costs to the nation of this energy that

## Viterbi Professors Join with California to Study Effects of Tsunamis

More than a year after the devastating March 2011 earthquake and tsunami in Japan, engineers from the USC Viterbi School of Engineering Tsunami Research Center are working with the state of California to better understand the damaging currents caused by tsunamis.

Sonny Astani Associate Professor Patrick J. Lynett and Adjunct Research Professor Jose Borrero are leading the work that is expected to improve the state's tsunami preparedness. Using hydrodynamic computer modeling and historical tsunami data, the engineers are evaluating the currents generated by tsunamis and their effect on California's ports and harbors. Results will be used to determine safe depths for evacuation, to map zones that might be prone to higher or lower currents under tsunami conditions (to inform how ships and boats are moved and evacuated), and to create hazard maps for ports, harbors, and marinas. The study is funded by the California Geological Survey, the California Emergency Management Agency, and the Federal Emergency Management Agency.

The currents created by tsunamis in ports and harbors are not well understood and can cause damaging forces in areas far from the location of the tsunami-causing earthquake. Currents caused by last year's tsunami after the earthquake in Japan caused tens of millions of dollars of damage at 27 harbors along the California coast, particularly in Santa Cruz and Crescent City. In Santa Barbara, swirling currents lasted for more than 24 hours, with the strongest

currents taking place long after the initial waves.

When a magnitude 8.3 earthquake off of Russia's Kuril Islands caused a moderate tsunami in November 2006, it brought a nearly six-foot wave to the Crescent City harbor and caused \$10 million in damage. Repairs from that event had not yet been completed when the March 2011 tsunami from Japan struck.

The study is part of a proactive effort by the state to re-evaluate certain elements of its tsunami preparedness based on lessons learned from the Japan event. During that tsunami, even though it was reasonably well known that moderate waves were going to hit the California and Oregon coasts, the strength and duration of the currents were severely underestimated. This research study, which will last through the end of 2012, should help to improve such estimates in the future.

Dr. Lynett's research focuses on coastal engineering with a special interest in short-time coastal hazards, such as hurricanes and tsunamis. He was a member of the 2005 International Tsunami Survey Team to Sri Lanka, the 2005 Hurricane Katrina Coastal Impacts Survey Team, the post-tsunami survey team in American Samoa in 2009, and numerous surveys throughout the Pacific after the 2011 tsunami in Japan. Among his awards are the Department of the Army Commander's Award for Public Service given for Dr. Lynett's post-Katrina work and a prestigious Guggenheim Fellowship in 2010. ■



Dr. Patrick J. Lynett

**Dr. Patrick J. Lynett** is the inaugural holder of the John and Dorothy Shea Early Career Chair in Civil Engineering. Associate Professor Lynett joined the Viterbi Faculty in the fall of 2011. He graduated from Cornell University in 2002 with a Ph.D. in civil and environmental engineering.

Continued from page 1

## CMU President Explores the Hidden Costs of Energy in 2012 Dorman Lecture

had not been included in the total price paid for it, excluding the possible costs of climate change. According to Dr. Cohon, 57 percent of the energy people use is eventually lost. He displayed examples from the report illustrating how much money is wasted on energy use. He delved into the externalities of the energy economy from electricity generation by coal plants—the largest source—to transportation, the second largest. His presentation highlighted some paradoxes; for example, electric cars have higher externality than conventional gas vehicles, from their battery production costs as well as from their electricity consumption.

He believes sustainability in energy—or anything else—will not and cannot be attained until external effects are internalized. Doing so, he said, is relatively straightforward in a conceptual sense, via taxes or other policy measures, such as a carbon tax or cap-and-trade.

Dr. Cohon concluded that creating effective policies will require an interdisciplinary approach with particular attention to technologies and their analysis. “The best way to stop the damage is by reducing emissions, improving energy efficiency, or shifting to cleaner methods of generating electricity,” he explained. “We must figure out how to reduce the damage by determining its size and the finances required for reduction.”

Dr. Cohon is a member of the National Academy of Engineering (NAE) and became CMU’s eighth president in 1997, after serving for

five years as dean of Yale University’s School of Forestry and Environmental Studies.

Prior to that, he was a faculty member at Johns Hopkins University. In 2011, the American Association of Engineering Societies awarded him the National Engineering Award. ■



Albert Dorman, for whom the lecture series is named.

**The Albert Dorman Distinguished Lecture Series honors Albert Dorman**, the civil engineer of record for Disneyland in Anaheim and considered one of the most well-known civil engineers in America. Dorman received his master’s degree in civil engineering from USC in 1962. He is also an architect. Dorman is the founding chairman of AECOM Technology Corporation, a NYSE-traded global company with over 40,000 employees, responsible for many prize-winning large-scale projects. He was the first person to become both a Fellow of the American Institute of Architects (AIA) and a Distinguished Member of the American Society of Civil Engineers (ASCE). His achievements include being elected a member of the National Academy of Engineering (NAE) and winning the ASCE Outstanding Lifetime Achievement Award in Leadership.

## Rojas is First Viterbi Student in 22 Years to Win University Outstanding TA Award



Teaching Assistant Fabian Rojas receives his University Outstanding Teaching Assistant Award from Professor Erik Johnson.

Sonny Astani Teaching Assistant Fabian Rojas is the first Viterbi student to receive the University Outstanding Teaching Assistant Award.

Every year at the Honors Convocation, USC honors faculty members and students for their achievements in leadership and scholarship. At this year's ceremony, Rojas was commended for his distinction and his dedication to education and his patience with undergraduate and graduate students. The Sonny Astani Department of Civil and Environmental Engineering has twice awarded Rojas for the departmental Outstanding Teaching Assistant Award, a testament to his dedication as a teacher.

A Fulbright Scholar, Rojas was a teaching assistant for undergraduate and graduate courses from 2008 to 2012. He consistently impressed students and faculty with his patience and mastery of the material, as

well as his thorough explanations of difficult concepts. His open-door policy and generosity with his time have contributed greatly to student learning.

Rojas's research focuses on performance-based design of structures in reinforced concrete and steel, nonlinear structural analysis, seismic hazard analysis, earthquake-resistant design criteria for structures, and nonlinear modeling of reinforced concrete wall structures. He also has nine publications in journals and several conference papers in those areas.

Rojas, advised by Professor Anderson, earned his Ph.D. in August 2012 in civil engineering with specialization in finite element analysis of shear wall structure and earthquake engineering. He earned his master's degree in civil engineering from USC in 2007. He received his civil engineering degree at the University of Chile in 2004, where he was ranked first in his class and honored by the Association of Engineers of Chile as "the best civil engineering graduate of the generation 2004." He is an experienced structural engineer and software developer specializing in the automatization of structure design under dynamic and static loads.

As a Ph.D. student, Rojas was an active student member of the Earthquake Engineering Research Institute (EERI) and is one of the cofounders of the student chapter of the Earthquake Engineering Research Institute (EERI)/Southern California Earthquake Center (SCEC) at USC, where he served as the president from 2009 to 2010 and as treasurer from 2010 to 2012. Under his leadership, the chapter developed innovative learning opportunities for undergraduates as well as for K-12 students in neighboring schools. He was also a student member of the American Society of Civil Engineers (ASCE) and the American Concrete Institute (ACI).

In March 2010, following the magnitude 8.8 earthquake in Chile, Rojas returned to his home country as part of a reconnaissance team of professional engineers, serving as the group's guide and facilitator. The team produced eight journal publications as a result of their findings, with Rojas serving as lead author on two of the papers. For his contributions, he received the President's Award from the Los Angeles Tall Buildings Structural Design Council in May 2010. ■

## CEE Alumnus's Distinguished Career Has Served His Profession and the World

For USC civil engineering alumnus John T. Morris (BSCE, 1972), providing the world with better access to water has been a life's work. Beginning in 1966 during his 13-month tour in Vietnam, and for the last 45 years, he has helped California municipalities and countries around the world protect their water supply. As principal of MORRIS Water Resources Consultants and a mentor for USC's chapter of Engineers Without Borders, he has been an important contributor to the water resources engineering field and humanitarian projects.

Morris's work has not gone unnoticed. He was recognized by the American Academy of Water Resources Engineers (AAWRE) last year as an Honorary Diplomat for his significant contributions to the field of water resources engineering and as an example in furthering AAWRE's mission. Morris was also recognized by the Water Environment Federation (WEF) as a 2011 Inaugural WEF Fellow Recipient for his distinguished accomplishments and contributions that have made an impact in the global water environment. Morris is a Life Member of the WEF.

His experience encompasses the program management, planning, permitting, design, and construction of water supply, wastewater, and reclaimed water systems; feasibility studies and planning for water reclamation facilities; and planning, design, and construction services for major civil works. He is the principal engineer on a wide range of designs, analyses, and master planning projects including assistance in the design and adaptation of computer programs for planning projects.

He is also the president of the David M. Wilson Affiliates, USC's alumni group for the Sonny Astani Department of Civil and Environmental Engineering; serves on CEE's advisory board; and is the secretary of the board of directors of the Metropolitan Water District of Southern California. A Fellow and Life Member of the American Society of Civil Engineers (ASCE), Morris has served as president of ASCE's Los Angeles Section and is a Life Member of the American Water Works Association, serving as chair of the National Desalting Committee. ■



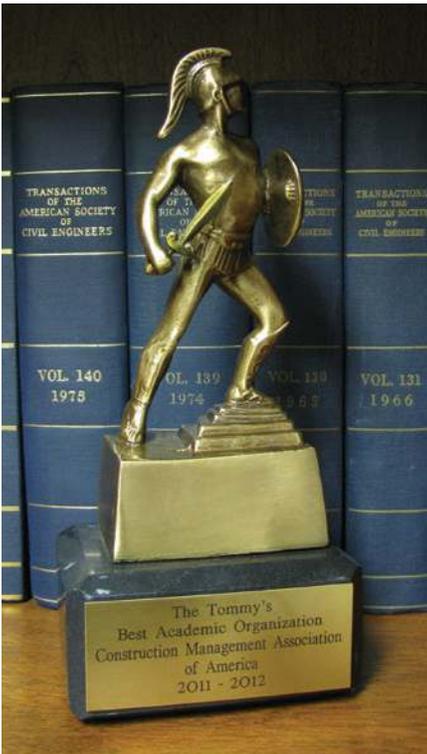
*John T. Morris, pictured here with his wife Sandy, was recognized by the American Academy of Water Resources Engineers (AAWRE) last year as an Honorary Diplomat.*

## Social Events

The Social Committee of the David M. Wilson Affiliates (DMWA) hosted two successful events this past year. The first event, a membership recruitment event in Fall 2011, was at the home of DMWA President John T. Morris. It focused on increasing DMWA membership from USC Sonny Astani CEE Alumni in the San Gabriel Valley region. The event was attended by 38 participants, with many expressing interest in joining DMWA.

The second event was the annual Newport Beach Holiday Boat Parade party graciously hosted by Ted and Ruth McConville, at their home on Balboa Island. This event was attended by current DMWA members, who enjoyed boats and yachts passing by, beautifully decorated in festive holiday lights. The delicious refreshments and Trojan camaraderie helped fill the event with holiday cheer.

## STUDENT NEWS



### CHAPTER WINS AWARD

The student chapter of Construction Management Association of America (CMAA) won the 2012 Tommy for Best Academic Organization. The Tommy Awards, designed by USC, honor students for their involvement and leadership. The chapter is advised by Professor Henry Koffman and provides students interested in construction management the opportunity to develop connections within the construction industry.

### SCHOLAR AWARD

Graduate student **Charles DeVore** was awarded the Achievement Rewards for College Scientists Scholar Award for the 2011-2012 academic year in recognition of his outstanding past academic performance and excellent promise for future scholarship. Since starting his graduate studies, Charles has expanded across multiple disciplines earning a master's degree in electrical engineering. Now a Ph.D. candidate, his research interests include designing smart building systems that can self-diagnose damage.

### STEM LEADERS OF TOMORROW

Research assistants **Charles DeVore** and **Geoffrey Kavulya** have each received a National Science Foundation award to continue their promotion of science, technology, engineering and mathematics (STEM) research and extending it to K-12 through the Body Engineering Los Angeles (BE-LA) program. This new program is designed to prepare the best Ph.D. students to become STEM leaders of tomorrow.

## Student Teams Win in Regional Competition

- Nine USC teams competed against 15 other schools in the **25th Annual Associated Schools of Construction Student Competition**. Five of the teams won first, second, and third places in their respective events.
- The USC Commercial Team, coached by Viry Martino, won first place. Team members include: **Katy Martin, Elizabeth Greynald, Ben Rogowski, David Perera, Rafi Halajian, Kristy Beal, Sohaela Amiri, and Francisco Iturbe**.
- The USC Design Build Team, coached by Jess Drake, won second place in the Design Build competition. Team members include: **Laura Shinnors, Margaux Rotter, Phuoc Nguyen, Adam Laufer, Jason Andrew, Brad Bangar, Christian Chandra, and Erik Aden**.
- The USC Graduate Team One, coached by Daniel Camin, won third place. Team members include: **Dan McAuliffe, Jennifer Schlesinger, Robert Diprimo, Sonny Chow, and Lauren Reinholdt**.
- The USC Building Information Modeling Team, coached by Shobhit Baakar, won third place. Team members include: **Anna Severt, Kameron Burk, Austen Goodson, Yvette Roman, Jhumann Ung, Megan Williams, Channing Brace, and Aleksandra Strockhova**.
- The USC Alternate Team won third place. Team members include **Bavrina Bigjahan and Usama Donglah**.

# FACULTY SPOTLIGHT



## INAUGURAL MEDAL WINNER

**Dr. Sami Masri** is the first recipient of the ASCE George W. Housner Structural Control and Monitoring Medal. The award recognizes his seminal contributions to the field of structural control and monitoring of civil infrastructure systems.

## OUTSTANDING RESEARCHER

Sonny Astani CEE Department Chair  
**Dr. Lucio Soibelman** has been honored with Fiatech's 2011 Celebration of Engineering & Technology Innovation (CETI) Award for Outstanding Researcher. Fiatech, an international community which concentrates on

advancing capital projects, recognized Dr. Soibelman for his development and integration of frameworks and algorithms that have improved construction management efforts to extract concepts, causal relationships, and patterns of interest from complex infrastructure-oriented data.

## PAPER'S AUTHOR RECOGNIZED

**Dr. Constantinos Sioutas** received the 2011 Haagen-Smit Prize for his outstanding paper about freeway exposures, published in *Atmospheric Environment*. This paper has been used to craft state and federal legislation mandating the placement of high

schools at certain distances from roadways to reduce the risk of exposing children to deleterious pollutants.

## GORDON S. MARSHALL PROFESSOR APPOINTED

**Dr. Roger Ghanem** has been appointed the Gordon S. Marshall Professor of Engineering Technology, recognizing his exceptional distinction in engineering. His research focuses on uncertainty quantification in computational science and engineering and associated methods for risk assessment.

## Faculty Grants

**Dr. Constantinos Sioutas** has received multiple grants and awards for his research in air pollution, including:

- Two National Institutes of Health awards for research in "Air Pollution and Vulnerability to Alzheimer-like Neurodegeneration in Transgenic Models" and "Aging and Sensitivity to Vehicle-derived Air Pollutants in Male and Female Mice."
- An Air Quality Management District contract, "Sources, Composition, Variability and Toxicological Characteristics of Ultrafine Particles in Southern California."
- An award from the University of Texas at Tyler entitled "Development of a Versatile Aerosol Concentration System (VACES) for Inhalation Exposure Studies."

**Dr. Patrick Lynett** received a United States Geological Survey contract entitled "Modeling and Technical Support for Tsunami Hazard Analysis at the Salem-Hope Creek Facility." He also received an award from the National Science Foundation for his research on "Tsunami Induced Coherent Structures and Their Impact on Our Coastal Infrastructure."

**Dr. Patrick Lynett** and **Dr. Costas Synolakis** are working with scientists from the Southern California Earthquake Center located at USC on a project funded by the United States Geological Survey entitled "Tsunami Modeling in Support of the USGS Multi-hazards Demonstration Project."

**Dr. Sami Masri** and **Dr. Roger Ghanem** are working with researchers from the King Abdulaziz City for Science and Technology on a project entitled "Analytical and Experimental Studies of Aerospace System Structural Health Monitoring Based on System Identification Approaches."

**Drs. James Moore** and **Najmedin Meshkati** received a new grant from FTA/DOT. The USC Viterbi School of Engineering, in partnership with Rail Safety Consulting (RSC), a subsidiary of TÜV Rheinland Rail Sciences, and with the support of the Southern California Regional Rail Authority (Metrolink), has been funded by the U.S. Department of Transportation's Federal Transit Administration (FTA) to complete a research study of the implementation of Metrolink's new Positive Train Control (PTC) system.



Dr. Lucio Soibelman

Welcome to the new Sonny Astani Department of Civil and Environmental Engineering newsletter. This is a great opportunity to update our supporters about the fast-paced changes that the department is facing.

I was hired six months ago as the new department chair with the commitment and support from the dean of the Viterbi School of Engineering to hire 10 new tenure-track professors. Before moving to USC I worked with the department's faculty to define a new strategic plan that would help us with the faculty search process. We decided to focus our efforts on four dominant research thrust areas:

■ **Sustainable Development** — Sustainability in the context of civil engineering targets long-term viability of natural resources and engineered civil systems.

## Chair's Message

■ **Water Quality, Access, and Distribution** —

One of the great challenges facing the world now is providing an adequate supply of potable water, considering population growth and climate variability.

■ **Disasters and Extreme Events** —

Both natural (e.g. earthquakes, tsunamis, floods, climate change) and man-made (e.g. terrorist attacks, engineering failures, industrial accidents) disasters encompass the focus here. Research and education in this area includes all aspects of an event, from a fundamental understanding of the physical processes controlling its evolution to the resulting environmental and social reaction.

■ **Coupling of Complex Systems** —

Most natural and engineered systems are known to be complex, defined as systems characterized by their display of patterns of structure or behavior at one level of system organization that are diagnostic of interactions among parts of the system at other levels. Furthermore, individual systems do not exist in a vacuum. Transportation, critical infrastructure, and security, for example, all represent distinguishable complex systems, yet all must be in some way coupled. These couplings can be nonlinear and difficult to quantify. Efforts aim to integrate research across the Sonny Astani Civil and Environmental Engineering Department, as well with all outside disciplines that interact with civil systems.

I am very happy to report that we achieved our goal for the first hiring cycle and hired three new outstanding young researchers who will be joining the department as Assistant Professors during the next three semesters. In August 2012 we will be joined by Dr. Ketan Savla, in January 2013 by Dr. Felipe de Barros, and in August 2013 by Dr. George Ban-Weiss. The next newsletter will introduce the new faculty, their background, and their research focus.

2012 so far has been a very productive and successful year for the department, including seeing our graduates go on to excellent graduate and professional programs; our graduates and alumni getting jobs in industry, government, and academia; faculty and students receiving awards; faculty receiving large research funding awards; and the department earning a positive and well-deserved reputation.

The main reason for all this success is the quality of our students, alumni, staff, and faculty. Please continue to support the department and its many efforts, to spread the word about the work we do, and to let us know what you are doing with your lives and careers. ■