

NEWSLETTER

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Department expands focus on environmental engineering

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Advancing the study of ambient particulate matter

P.6 ADVISORY BOARD MEMBERS INDUCTED
New CEE advisory board members champion innovation

Welcome New Faculty

Two new faculty members with interests in energy efficiency in producing high quality water have joined existing faculty members in the Astani Department to address challenges of water and energy infrastructure, extreme events, and human-building interactions. Dr. Amy Childress, professor and director of the Environmental Engineering Program, joined the Department in July. Dr. Kelly T. Sanders, assistant professor of Civil and Environmental Engineering, joined the Department this January.

"I am pleased to welcome both of these new faculty members to our staff and excited by their breadth and depth of experience that they will now share with us," says Dr. Yannis C. Yortsos, dean of the School.

Dr. Childress' research interests focus on the advancement of water and wastewater processes to reduce energy consumption in clean water production; the development of innovative solutions to extract resources from wastewater; and the application of new methodologies to leverage uncommon sources to produce energy.

Dr. Sanders' research aims to increase the sustainability of large-scale water, energy, and food systems. In particular, she is interested in identifying opportunities to implement synergistic conservation strategies that decrease the energy, water, and environmental impacts associated with the production, delivery, and consumption of these critical resources.

ADDRESSING A GLOBAL CHALLENGE

The global challenge of fresh water scarcity captured Dr. Childress' interests early in her career. Today she focuses on evaluating the energy, recovery, and water quality advantages that will lead to systems that reduce energy consumption in clean water production, reuse water during energy production, and leverage uncommon sources to produce energy.

Her focus considers all sides of the water-energy nexus in order to provide holistic and realistic solutions to the problem of finite water and energy resources.



Dr. Amy Childress and Dr. Kelly T. Sanders
Photo by Lance Hill

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“Improving drinking water treatment and wastewater reclamation processes is critical for achieving fresh water supply goals,” she says. “In addition, it is imperative that we reduce the discharge of by-products to the environment, limit the chemical and material consumption, and minimize the energy, carbon, and infrastructure footprints of treatment systems in order to make these processes sustainable.”

By exploring how to optimize conventional water treatment processes, Dr. Childress hopes to integrate them with newer processes to develop novel hybrid systems with improved environmental sustainability. To accomplish this, she is focusing on membrane contactor processes for innovative solutions to contaminant and energy challenges; pressure-driven membrane processes as industry standards for desalination and water reuse; membrane bioreactor technology; and colloidal and interfacial aspects of membrane processes.

Dr. Childress serves on the Association of Environmental Engineering and Science Professionals (AEESP) Foundation Board of Directors and previously served as the AEESP president. She earned her bachelor’s degree in civil engineering from the University of Maryland and her master’s degree and Ph.D. in civil and environmental engineering from the University of California, Los Angeles. Prior to joining USC, she was professor and chair of the Civil and Environmental Engineering Department at the University of Nevada, Reno. This spring she will teach a graduate course in process kinetics and dynamics.

BETTER MANAGEMENT OF CRITICAL RESOURCES

As populations increase, so does the stress on large-scale energy and water systems. Dr. Sanders is working to alleviate that stress by addressing issues at the intersection of engineering, science, and public policy. Her goal is to increase the sustainable development of the urban and agricultural sectors through three major focus areas: the energy-water nexus, sustainable waste management, and low-impact food production.

By analyzing the relationship between energy and water systems, Dr. Sanders quantifies the energy that is consumed to produce water at the time, location, and temperature that is demanded. She can also analyze how water is used to extract, process, transport, and transform primary forms of energy. “Those results can be used to inform better decision-making with regard to energy and water resource management,” she explains. “For example, 50 percent of our country’s water withdrawals are used to cool power plants. I’m exploring how water conservation efforts might be implemented through changes to competitive retail electricity markets.”

University of Southern California

Dr. Sanders has also investigated energy conservation tactics through changes in the water sector, water recycling at hydraulic fracturing sites, and the energy and water requirements of the food system in the United States. In the future, she plans to explore the role of decentralized energy and water systems in achieving more sustainable urban communities. Dr. Sanders earned her bachelor’s degree in bioengineering from Pennsylvania State University, her master’s degree from the University of Texas at Austin Department of Mechanical Engineering, and her doctorate in civil engineering from the University of Texas at Austin. ■

CONFERENCE SPEAKERS

Astani CEE faculty members have been featured speakers at conferences and professional meetings across the globe:

- **Dr. Burcin Becerik-Gerber** represented the USC Viterbi School of Engineering at the National Academy of Engineering’s 19th annual U.S. Frontiers of Engineering symposium last September. Around 100 outstanding engineers under the age of 45 met for an intensive two-and-a-half-day symposium to discuss cutting-edge developments in four areas: designing and analyzing social networks, cognitive manufacturing, energy and reducing dependence on fossil fuels, and flexible electronics.
- **Dr. George Ban-Weiss** was invited to give a talk about how atmospheric particles alter clouds around the globe at the 32nd Annual Conference of the American Association for Aerosol Research (AAAR).
- **Dr. Amy Childress** was invited to give a talk at the 2013 National Water Research Institute Clarke Prize Conference titled “Advanced Membrane Systems for Contaminant and Energy Challenges.”
- **Dr. Patrick Lynett** was invited to give a talk at the American Geophysical Union fall meeting in San Francisco in which he described ongoing research about tsunami impacts in ports and harbors.
- **Dr. Najmedin Meshkati** delivered the keynote address at the 11th annual conference of the Singapore Institution of Safety Officers. His address was titled “Effective Safety Leadership.”
- **Dr. Ketan Savla** was an invited speaker at the summer school on Multi-agent Networked Systems, which was organized by the Initiative for Mathematical Sciences and Engineering at the University of Illinois, Urbana-Champaign. He talked about distributed routing policies for dynamical network flows, with applications to transportation networks.
- **Dr. Constantinos Sioutas** was invited to give a plenary talk on chemical and physical properties of combustion aerosols at the European Aerosol Conference Special Workshop on Aerosol Emissions from Fossil Fuel and Biomass Combustion.

FACULTY NEWS

FACULTY AWARDS

Congratulations to our faculty for receiving the following awards:

- **Dr. Costas Synolakis** was awarded the 2014 Sergey Soloviev Medal of the European Geophysical Union.
- **Dr. Najmedin Meshkati** received the 2013 Steven B. Sample Teaching and Mentoring Award from the USC Parents Association.
- **Dr. Lucio Soibelman** was named Honorary Professor of Beijing University of Civil Engineering and Architecture in China.

NEW FACULTY GRANTS

Dr. Constantinos Sioutas

Project Title: Southern California Children's Environmental Health Center (SC-CEHC)

Agency: National Institutes of Health in collaboration with the Keck School of Medicine

Dr. Sami Masri

Project Title: Low-Powered Wireless Sensors for Asset Management or Health Monitoring of Structures and Pavements

Agency: Michigan State University (PRIME: Federal Highway Administration)

Dr. Erik Johnson

Project Title: Collaborative Research: NEESR Planning: Toward Experimental Verification of Controllable Damping Strategies for Base Isolated Buildings

Agency: National Science Foundation

Dr. Constantinos Sioutas

Project Title: Development of a Versatile Aerosol Concentrator Enrichment System (VACES)

Agency: University of Bern

Dr. Constantinos Sioutas

Project Title: Evaluation of Ambient Particulate Matter Neurotoxicity Using Primary Human Brain Cells

Agency: South Coast Air Quality Management District AQMD (Collaborative research with the Western University of Health Science)

Dr. Patrick Lynett

Project Title: Tsunami Modeling in Support of the USGS Science Application for Risk Reduction (SAFRR) Project

Agency: Southern California Earthquake Center (PRIME: U.S. Geological Survey)

FURTHERING CIVIL ENGINEERING ACHIEVEMENT



In 2012, Dr. Patrick Lynett was appointed as the inaugural holder of the John and Dorothy Shea Early Career Chair in Civil Engineering, recognizing his exceptional distinction and promise in the study of near-shore wave dynamics with a specific point of interest in coastal hazards. John F. Shea (BA '49), the chair's donor and namesake, has exemplified a huge commitment to USC and the Viterbi School of Engineering. Shea, who dedicates himself to philanthropic work with his wife, hopes to enable further outstanding achievements at Viterbi with his financial support. The Early Career Chair is an emblem of Shea's dedication to giving back and promoting further development of the Civil Engineering Department. Dr. Lynett and John Shea recently met at the Half Century Trojans Annual Hall of Fame Luncheon where John Shea received the Hall of Fame award presented by Dean Yortsos. From left: Dean Yortsos, John Shea, Dr. Patrick Lynett, and Dr. Erik Johnson

Yen Scholarship in Environmental Engineering Receives Third Major Gift

For the third year in a row, Dr. Shiao-Ping S. Yen, Professor Teh-Fu Yen's wife, made a \$100,000 gift to the **Professor Teh-Fu and Dr. Shiao-Ping S. Yen Scholarship in Environmental Engineering Fund** at the Viterbi School of Engineering. Dr. Teh-Fu Yen worked at USC for more than 40 years (1969–2010) and made many ground-breaking contributions in the area of chemical and biological processes in environmental engineering.

Dr. Teh-Fu Yen was born in Yunnan, China, in 1927 and received his Ph.D. in organic chemistry and biochemistry from the Virginia Polytechnic Institute in 1956. He married his wife in 1959 in Akron, Ohio. She is an important research scientist at JPL and was awarded the Distinguished Scientist Award by NASA in 2012. We appreciate Dr. Shiao-Ping S. Yen's donation and her enthusiasm in supporting our students. Dr. Yen's legacy and memory will continue to live on through the **Professor Teh-Fu and Dr. Shiao-Ping S. Yen Scholarship in Environmental Engineering Fund.** ■

GRADUATE STUDENT NEWS

Developing Novel Techniques to Evaluate Ambient Particulate Matter



Dongbin Wang is working on a novel system that can collect ambient particulate matter. Photo by Lance Hill

Numerous studies have documented robust associations between ambient particulate matter (PM) and adverse health outcomes. **Dongbin Wang**, a Ph.D. student in the Sonny Astani Department of Civil and Environmental Engineering, has developed a novel system that evaluates physical, chemical, and toxicological properties of ambient PM. Different from conventional filtration and impaction collection mechanisms, his system can collect ambient PM directly in an aqueous suspension for subsequent chemical analysis and in vitro health studies. This system effectively eliminates the elaborate procedures previously necessary for collecting particles from a filter substrate and can be modified to be combined with a chemical analyzer to achieve online chemical component measurements.

Supervised by Dr. Constantinos Sioutas, Dongbin has been working on projects funded by the California Environmental Protection Agency (CalEPA), the South Coast Air Quality Management District (AQMD), and the National Institute for Occupational Safety and Health (NIOSH). His research has been published in several journals and presented at international conferences. Dongbin was awarded a 2011-2012 David M. Wilson Book Scholarship and one of the CEE Department's 2012-2013 Research Assistant Awards. ■

Ph.D. Student Retreat

Dr. Lucio Soibelman, chair of the CEE Department, led the department's first annual Ph.D. retreat at the end of last September. The weekend kicked off with dinner at the USC University Club and was followed by topical discussions, which included ethics and academic integrity for presentations and papers, professional etiquette, and publishing articles. In addition, students reviewed the new Ph.D. Handbook and elected **Arsalan Heydarian** as the 2013-2014 Ph.D. Representative to the Department.

PH.D. PAPER AWARD

Nan Li received the Charles Eastman Top Ph.D. Paper Award at the CIB W78 Conference in Beijing, China, last October. The award recognizes the significance of contributions young researchers make to the area of integrated IT application throughout the life-cycle of buildings and related facilities. Nan's paper was chosen over 21 others in both scientific excellence and presentation quality. ■

Astani CEE RA/TA Awards



Four outstanding Ph.D. students were honored at the Astani CEE RA/TA Awards Luncheon in October. Recipients of the Researcher Award were **Farrokh Jazizadeh Karimi**, and **Dongbin Wang**. Recipients of the Teaching Assistant Award were **Ryan Thacher**, and **Mahmoud Kamalzare**. Congratulations to our award winners! Pictured from left are: Mahmoud Kamalzare, Dr. Burcin Becerik-Gerber, Farrokh Jazizadeh Karimi, Dr. Felipe de Barros.

UNDERGRADUATE STUDENT NEWS

Making the Most of the USC Experience



Natalie Alvarez is a senior civil engineering student.

My summer was filled with fun, training, and opportunities to apply my knowledge in real-world situations — all as a result of my internship at The Boeing Company.

As a senior studying civil engineering, I thought that working at Boeing's Satellite Development Center in El Segundo, California, would be a great experience, and I was right. I spent time working as a mechanical engineering intern for the Mechanisms Department, testing satellite antenna deployment actuators and assisting the responsible engineer on the redesign of a deployment actuator for a new satellite. The internship also gave me an in-depth look at the other departments at Boeing through tours and lunch-and-learn events. Two highlights of my internship included a tour of the Long Beach C-17 production facility and meeting astronaut Andrew Feustel, who flew on the Space Shuttle Endeavour's last mission.

There was plenty of fun involved, as well. I represented Boeing with the other interns and recent hires in the Aerospace Summer Games and competed against the other Southern California aerospace companies in fun relay games and beach volleyball competitions.

Back at the USC campus, I am a Viterbi Student Ambassador, a member of the executive board of the Society of Women Engineers, and a member of Gamma Phi Beta sorority. USC has given me the opportunity to be involved in undergraduate research at the USC Center on Megacities, to study abroad in Madrid through the Viterbi Overseas Program, and to enhance my leadership skills as president of the USC Women's Lacrosse Club. ■

ASTANI CEE TAILGATE



The Astani CEE tailgate was held outside of Kaprielian Hall in September and attracted a large crowd, including several David M. Wilson board members. Special thanks to Dr. Dave Wong, who was the event's grill master.

NEW MENTORING PROGRAM TO BENEFIT UNDERGRADS

Dr. Emily Caviglia, director of CEE Undergraduate Programs, has developed a CEE faculty mentoring program that will guide undergraduate students in areas of academic emphasis, career development, and postgraduate study. The program provides structured opportunities for undergrads to interact with faculty members outside the classroom, helping them benefit from faculty members' technical expertise and industry knowledge. ■

New CEE Advisory Board Members Introduced

On November 7th, the new members of the CEE Advisory Board were introduced to Dean Yortsos, CEE Department Chair, faculty, staff, students, and staff of Viterbi advancement. The agenda included a presentation on the Department's strategic plan and ENE program, research presentations by new hires and faculty, presentations by undergraduate, master's, and Ph.D. students, ABET presentation by Dr. Wellford, FCCCHR presentation by Dr. J.J. Lee, and an open discussion with Dr. Soibelman and the following board members:

Sonny Hassan Astani

Astani Enterprises / CEO
USC, M.S. Industrial & Systems Engineering '78

Brandon Blaylock

AIRMAIL USA / CEO and President
USC, B.S. Civil Engineering '79
USC, M.S. Petroleum Engineering '83
UCLA, M.B.A.

Lewis P. Cornell, P.E.

AECOM / Vice President
California District Operations Manager
University of Pittsburgh, B.S. Civil
Engineering '92

Patrick Reed Fuscoe

Fuscoe Engineering, Inc. / President & CEO
USC, B.S. Civil Engineering '72

John Hanula, AIA

CH2M HILL / Senior Vice President
University of Tennessee-Knoxville,
B.A. Architecture '83
M.S. Civil Engineering '84

George L. Pla

Cordoba Corporation / President & CEO
USC, M.P.A. Public Administration '74

Stephen C. Schrank

Rancho Mission Viejo / Retired
Executive Vice President
USC, B.S. Civil Engineering '69
USC, M.B.A. Business Administration '74
Southwestern University, J.D.

David Howard Siemek

BNSF Railway / Enterprise Architect,
Enterprise Architecture and Emerging
Technologies

Walter H. Singer

Advanced Chemical Transport / President
USC, B.S. Civil Engineering '82
California State University, San Francisco,
M.B.A.

Peter Wilson Trelenberg

Exxon Mobil Corporation / Manager,
Environmental Policy & Planning
University of Wisconsin-Madison,
B.S. Civil & Environmental Engineering '80

Air Quality Study Wins Aerosol Research Poster Presentation Contest

Arian Saffari, a second-year Ph.D. fellow, won the poster presentation competition at the annual meeting of the American Association of Aerosol Research (AAAR) in Portland, Ore. His poster illustrated his study of the toxic properties of atmospheric particles in the Los Angeles metropolitan area and their relationship with chemical composition and pollution sources. His poster was chosen from more than 300 presentations at the meeting.

Arian's study, which was funded by South Coast Air Quality Management District (SC-AQMD), utilized a state-of-the-art biological assay to quantify the variation of toxicity associated with airborne particles in different seasons and different

regions of Southern California. The results of his study have important and immediate implications in progressive air quality regulations designed to protect the health of Southern California residents.

Arian is supervised by Dr. Constantinos Sioutas and is pursuing research primarily concerned with chemical properties of atmospheric aerosols and oxidative pathways leading to the toxicity of airborne particulate matter. AAAR is the largest professional organization in the field of aerosol science and its annual meeting attracted more than 1,200 participants from around the world. ■

ALUMNI NEWS

Two Alumni Estate Gifts Benefit the Astani CEE Department

The Sonny Astani Department of Civil and Environmental Engineering recently received two generous alumni estate gifts from long-time supporters of USC Viterbi. Both alumni were students when Professor David M. Wilson taught at the school, and they each channeled their gifts to the David M. Wilson Affiliates (DMWA), a departmental group that, in honor of Professor Wilson, provides financial support through endowments, donations, and memberships.

Lawrence (Ted) McConville (BSCE '43) and his wife Ruth were avid supporters of USC Viterbi School of Engineering and Board members of DMWA for many years. They annually hosted DMWA events at their Orange County home. Serving as Road Commissioner and County Surveyor for Orange County until his retirement in 1976, Ted was also a committee chairperson of the Orange County branch of the American Society of Civil Engineers and two-time winner of the fishing World Championship Release Tournament.

Harold Richard (Dick) Ginsberg (BSCE '60) was a licensed civil engineer since 1960 and a licensed traffic engineer since 1977. He was also a strong advocate for engineering higher education, as reflected in his long-time support of DMWA. Dick worked for Caltrans, the state agency responsible for highway, bridge, and rail transportation planning, construction, and maintenance. His wife Louise, an artist, was previously associated with Roseville Arts Center and Watercolors by Louise.

A portion of the two estate gifts is being used to seed an endowment fund for the creation of the David M. Wilson Early Career Chair in CEE. The Chair will be offered to a stellar new assistant professor, who, in the spirit of Professor Wilson, demonstrates scholarly promise and unwavering support of his or her students. Like McConville and Ginsberg, many alumni and friends find that planned giving delivers financial and tax benefits as well as the opportunity to make a larger contribution to USC Viterbi than they would otherwise be able to make. Bequests and other planned gifts have a profound and lasting impact on scholarship, teaching, and research at USC Viterbi and are a continuing source of strength and support for USC.

For more information on how you can make a planned gift in support of DMWA, please contact Margaret Kean, Executive Director, Viterbi Advancement at 213.740.6379 or margarak@usc.edu. ■



An estate gift from Ted and Ruth McConville (pictured here), along with one from Harold Richard (Dick) Ginsberg help support the CEE Department's mission.

CEE ALUMNI UPDATE

Hadi Meidani, a former Ph.D. student advised by Dr. Roger Ghanem, has recently accepted an assistant professor position in the Department of Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign. He is currently a postdoctoral research associate at the Scientific Computing and Imaging Institute at the University of Utah, conducting research on the stochastic multiscale analysis in computational chemistry. His research interests are stochastic analysis and multiscale modeling with applications in complex problems ranging from engineering mechanics to smart urban systems. He will join the University of Illinois in August 2014.

If you have recently updated your address or want to share information about your professional experiences, please email ceenewsletter@usc.edu. ■



Dr. Lucio Soibelman

Chair's Message

Welcome to the first 2014 issue of the Sonny Astani Department of Civil and Environmental Engineering Newsletter. Inside, we feature some of our faculty, staff, student, and alumni achievements from 2013—another fantastic year for the department. The new year promises to be equally exciting, as we started 2014 with five new faculty members in place, all of whom are already reenergizing the department. That's a trend we expect to continue as we add more faculty members over the next few years.

All of these accomplishments could not be achieved without the entire Astani CEE community and we are very grateful for your continuing support. Construction at Kaprelian Hall is now complete and I encourage you to visit the department, meet the new faculty, and tour the renovated areas. As always, please keep in touch and inform us about your life and career achievements. ■

Council of Academic Advisors Committee Elects Chair

Dr. Emily Caviglia has been elected as the 2013-2014 chair of the Council of Academic Advisors Committee. The USC Council of Academic Advisors is a group of graduate and undergraduate advisors who promote communication and collaboration between schools and academic advisors. The group meets monthly and also hosts social events as well as a biannual conference in the spring semester. This year, the committee's goal is to increase advisor communication regarding best practices, connect higher education research to professional roles, and create a forum for dialogue regarding major USC policy changes. ■