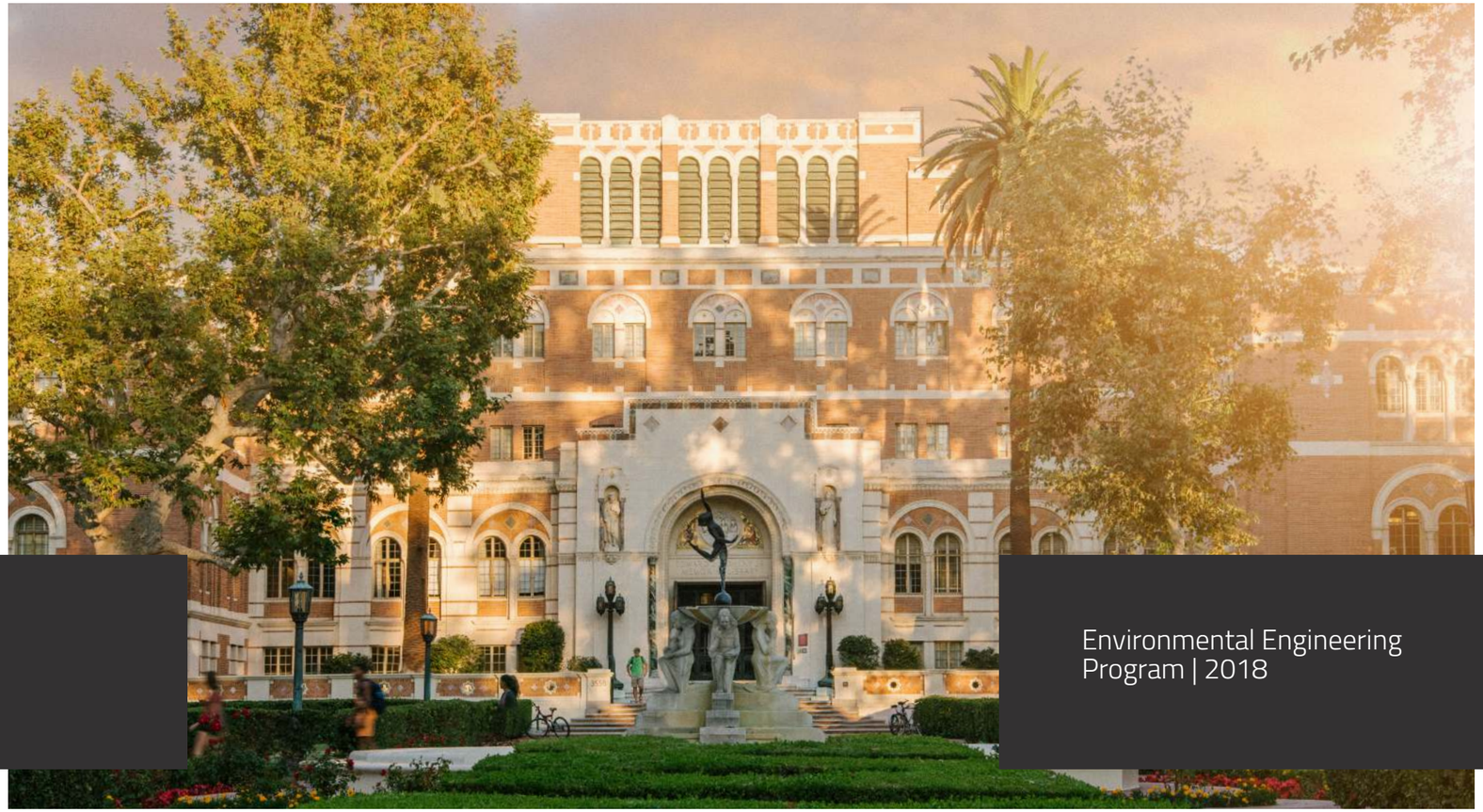
USC Viterbi

Sonny Astani Department of Civil and Environmental Engineering

Environmental Engineering at USC Viterbi



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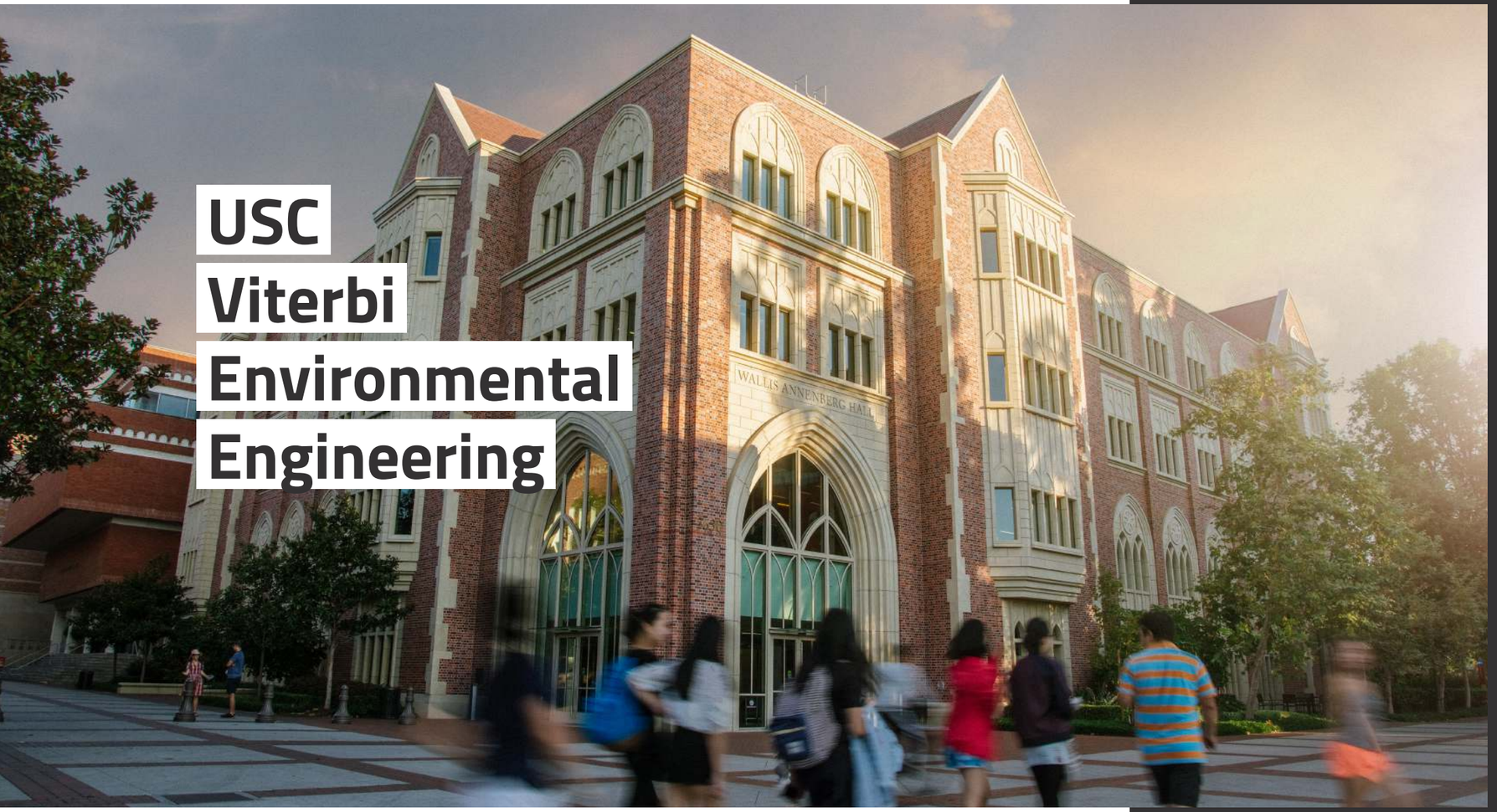
Environmental Engineering Program | 2018



USC Viterbi Environmental Engineering

Hello

Located in Los Angeles, a global center for technology, arts and international business; USC Viterbi fosters world-class research and practical innovation.

The USC Viterbi School of Engineering is internationally recognized for creating new models of education, research and commercialization that are firmly rooted in real world needs. The School's first priorities are the education of outstanding students and the pursuit and publication of new research.

As the School's faculty and students extend the frontiers of engineering knowledge through their research, they also apply engineering and technology to address societal challenges. The School stimulates and encourages qualities of scholarship, leadership, ambition and character that mark the true academic and professional engineer — to serve California, the nation and the world.

Why Choose the Sonny Astani Department of Civil and Environmental Engineering?

The Environmental Engineering program in the Sonny Astani Department of Civil and Environmental Engineering at USC comprises a unique team of faculty members who work collaboratively in research areas highly relevant to the dynamic field of environmental engineering.

Our faculty addresses water, air, and energy challenges that face urban and natural environments. Our unique undergraduate and graduate programs lead to BS, MS, and PhD degrees in engineering.

We have built new laboratories and designed a new curriculum; our world-class program of integrated research and education is rapidly evolving.

We seek to develop students into engineers who can solve community, regional, and national challenges.

Our faculty collaborate closely with industrial and utility partners in Southern California, across the nation, and around the world.

Ph.D Programs

Water Reuse and Desalination Technologies

Resource Recovery from Waste Streams

Environmental Chemistry

Contaminant Transport and Aquifer Remediation

Sustainable Energy

Urban Climate and Air Pollution

Amy Childress

Professor

Dr. Childress' research team carries out projects on membrane 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 physiochemical processes.

Honors & Awards

2017 Co-editor, Desalination

2017 Research Advisory Council member of Water Environment & Reuse Foundation

2008 President of Association of Environmental Engineering and Science Professors

2001 CAREER Award from National Science Foundation

Selected Publications

McGaughey, A. L., Gustafson, R. D., & Childress, A. E. (2017). Effect of long-term operation on membrane surface characteristics and performance in membrane distillation. Journal of Membrane Science.

Zou, S., Yuan, H., Childress, A., & He, Z. (2016). Energy consumption by recirculation: a missing parameter when evaluating forward osmosis.Environmental Science & Technology.

Suárez, F., Ruskowitz, J. A., Tyler, S. W., & Childress, A. E. (2015). Renewable water: direct contact membrane distillation coupled with solar ponds. Applied Energy.

Contact

amyec@usc.edu | amyechildress.com

Education

Ph.D. | University of California, Los Angeles | 1997

Membrane processes play a key role in minimizing the interdependence of water and energy

George Ban-Weiss

Assistant Professor

Climate change and urban air pollution are two of society's great challenges. Dr. Ban-Weiss investigates how climate, air quality, and land cover interact from urban to global scales. His team also investigate practical solutions for mitigating climate change and air pollution in urban areas.

Research

Urban climate and air pollution

Solutions for countering urban warming and air pollution

Global climate change

Land-atmosphere interactions

Climate modeling, air pollutant measurements, and satellite observations

Contact

banweiss@usc.edu | www-bcf.usc.edu/~banweiss

Education

Ph.D. | University of California, Berkeley | 2008

MIT Technology Review's 35 Innovators Under 35

Honors & Awards

2014 Rose Hills Foundation Research Fellowship

2014 Charles Lee Powell Foundation Research Award

2016 Member of Development Team that won R&D 100 Award

Selected Publications

Vahmani P, Sun F, Hall A, Ban-Weiss GA (2016) Investigating the climate impacts of urbanization and the potential for cool roofs to counter future climate change in Los Angeles. Environmental Research Letters.

Vahmani P and Ban-Weiss GA (2016) Climatic consequences of adopting drought tolerant vegetation over Los Angeles as a response to California drought. Geophysical Research Letters.

Zhang J, Zhang K, Liu J, Ban-Weiss GA (2016) Revisiting the climate impacts of cool roofs around the globe using an earth system model. Environmental Research Letters.

Kelly Sanders

Assistant Professor | Dr. Teh Fu Yen Early Career Chair

Dr. Kelly Sanders' research aims to ease tensions between human and natural systems. Specifically, her research team uses system-scale analysis to develop frameworks to reduce the environmental impacts of providing energy, water, and food services and identify opportunities to leverage the interdependencies between these critical resource systems to achieve efficiencies.

Honors & Awards

2017 Selected to participate in the 2017 National Academy of Engineering Frontiers of Engineering program

2016 MIT Technology Review's 35 Innovators Under 35

2016 Orange County Engineering Council Outstanding Educator Award

Selected Publications

R.A.M. Peer, J.B. Garrison, C. Timms and K.T. Sanders. (2016). "A spatially and temporally resolved analysis of environmental trade-offs in electricity generation." Environmental Science & Technology.

M. Meng, M. Chen and K.T. Sanders. (2016). "Evaluating the feasibility of using produced water from oil and natural gas production to address water scarcity in California's Central Valley." Sustainability.

K.T. Sanders. (2015). "Uncharted waters? The future of the electricity-water nexus." Environmental Science & Technology.

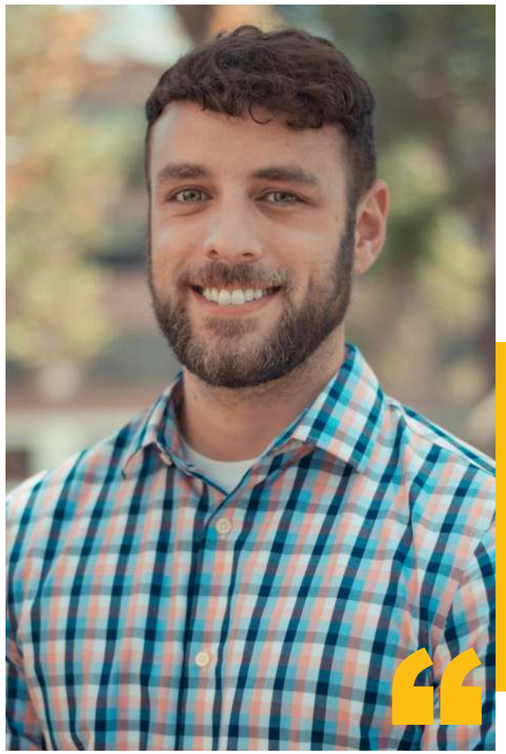
Contact

ktsanders@usc.edu | s3research.usc.edu

Education

Ph.D. | University of Texas, Austin | 2013

Forbes 30 under 30 in Energy



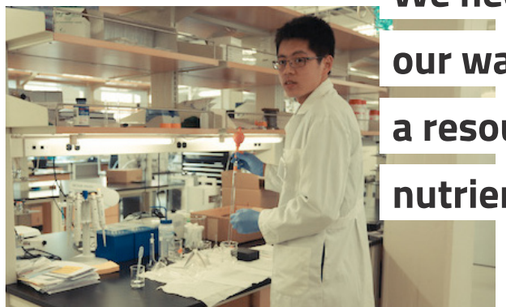
Dr. Smith uses advanced chemical, molecular, and bioinformatics tools to develop new and emerging biotechnologies to improve water infrastructure. He investigates anaerobic membrane bioreactors for energy recovery and production of reuse quality water during domestic wastewater treatment.

Adam Smith

Assistant Professor

Dr. Smith's research team explores microbially-driven engineered processes for water management with an emphasis on resource recovery from waste streams.

We need to reconceptualize our waste streams as a resource of energy, nutrients, and water



Contact

smithada@usc.edu | smithresearchusc.com

Education

Ph.D. | University of Michigan | 2014

Selected Publications

Becker, A. M., Yu, K., Stadler, L. B., & Smith, A. L. (2017). Co-management of domestic wastewater and food waste: a life cycle comparison of alternative food waste diversion strategies. Bioresource Technology.

Smith, A. L., Skerlos, S. J., & Raskin, L. (2015). Membrane biofilm development improves COD removal in anaerobic membrane bioreactor wastewater treatment. Microbial Biotechnology.

Smith, A. L., Skerlos, S. J., & Raskin, L. (2015). Anaerobic membrane bioreactor treatment of domestic wastewater at psychrophilic temperatures ranging from 15 °C to 3°C. Environmental Science: Water Research & Technology.

Daniel McCurry

Assistant Professor

Dr. McCurry's research applies the tools of organic and analytical chemistry to solve environmental problems. His research team primarily works in the areas of wastewater reuse and drinking water treatment. Specific projects include identifying and minimizing trace carcinogens during wastewater reuse, and expanding the disinfectant portfolio for water treatment.

Honors & Awards

2017 Editor's Choice Paper in Environmental Science: Water Research and Technology

2017 Outstanding Reviewer for Environmental Science: Water Research and Technology

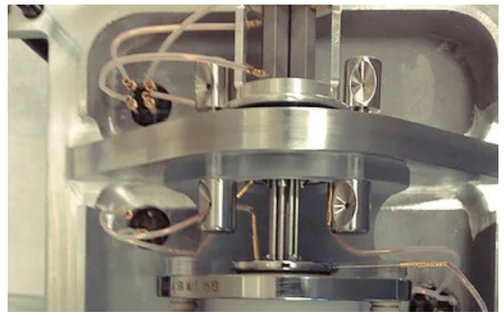
2012-2015 NSF Graduate Research Fellowship

Selected Publications

McCurry, D. L., Ishida, K. P., Oelker, G. L., & Mitch, W. A. (2017). Reverse osmosis shifts chloramine speciation causing re-formation of NDMA during potable reuse of wastewater. Environmental Science & Technology.

McCurry, D. L., Krasner, S. W., & Mitch, W. A. (2016). Control of nitrosamines during non-potable and de facto wastewater reuse with medium pressure ultraviolet light and preformed monochloramine. Environmental Science: Water Research & Technology.

McCurry, D. L., Quay, A. N., & Mitch, W. A. (2016). Ozone promotes chloropicrin formation by oxidizing amines to nitro compounds. Environmental Science & Technology.

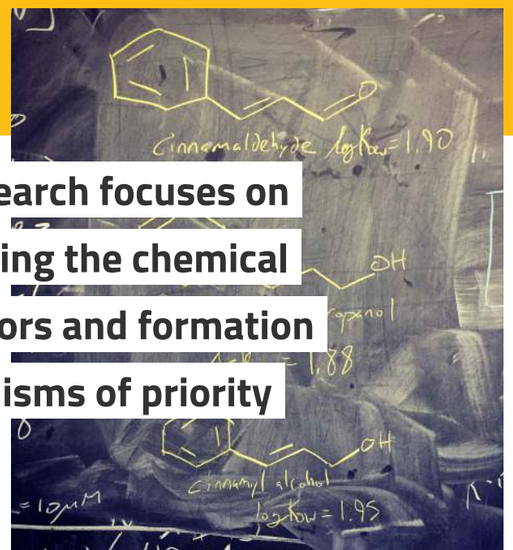


Contact

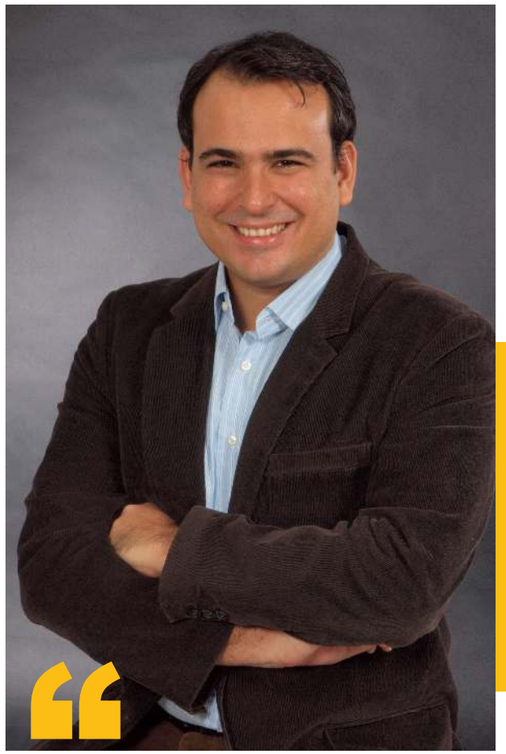
dmccurry@usc.edu | mccurrylab.com

Education

Ph.D. | Stanford University | 2016



"Our research focuses on identifying the chemical precursors and formation mechanisms of priority DBPs



The research carried out by Dr. de Barros' team includes: (1) developing computationally efficient and novel semi-analytical solutions for partial differential equations describing flow and transport in porous media and rivers and (2) improving fundamental understanding of solute dispersion in porous materials.

We aim to create computationally efficient, theoretically sound and accurate predictions of solute transport behavior in environmental flows.

Felipe de Barros

Assistant Professor

Dr. de Barros' research develops task-driven, application-oriented, integrated models for simulating, optimizing, and predicting flow and transport in hydrogeological systems. His research lies on the interface between environmental engineering, hydrology, and environmental fluid mechanics.

Contact

fbarros@usc.edu

Education

Ph.D. | University of California, Berkeley | 2009

Honors & Awards

NSF CAREER Award 2017

2016 Editor's Citation for Excellence in Refereeing (Water Resources Research, AGU)

2015 Rosette Award from the International Society for Porous Media (INTERPORE)

Selected Publications

Henri, C. V., Fernàndez Garcia, D., & de Barros, F. P. J. (2015). Probabilistic human health risk assessment of degradation related chemical mixtures in heterogeneous aquifers: Risk statistics, hot spots, and preferential channels. Water Resources Research.

de Barros, F. P. J., Dentz, M., Koch, J., & Nowak, W. (2012). Flow topology and scadelar mixing in spatially heterogeneous flow fields. Geophysical Research Letters.

de Barros, F. P. J., & Rubin, Y. (2011). Modelling of block-scale macrodispersion as a random function. Journal of Fluid Mechanics.

Constantinos Sioutas

Fred Champion Professor of Civil and Environmental Engineering

Dr. Sioutas' research team works to investigate the underlying mechanisms that produce the health effects associated with exposure to air pollutants generated by a variety of combustion sources, such as traffic, harbor, and airport operations, power plants, and photo-chemically induced atmospheric reactions.

Honors & Awards

2014 David Sinclair Award, American Association for Aerosol Research

2012 Top cited article 2011-2012; Atmospheric Environment

2001-Present Member of the Air Quality Advisory Committee of the State of California on Particulate Matter

Selected Publications

Shirmohammadi, F., Sowlat, M. H., Hasheminassab, S., Saffari, A., Ban-Weiss, G., & Sioutas, C. (2017). Emission rates of particle number, mass and black carbon by the Los Angeles International Airport (LAX) and its impact on air quality in Los Angeles. Atmospheric Environment.

Daher, N., Ruprecht, A., Invernizzi, G., De Marco, C., Miller-Schulze, J., Heo, J. B., ... & Sioutas, C. (2011). Chemical characterization and source apportionment of fine and coarse particulate matter inside the refectory of Santa Maria Delle Grazie Church, Home of Leonardo Da Vinci's "Last Supper". Environmental Science & Technology.

Zhu, Y., Hinds, W. C., Kim, S., & Sioutas, C. (2002). Concentration and size distribution of ultrafine particles near a major highway. Journal of the Air & Waste Management Association.

Dr. Sioutas' team has developed several state-of-the-art particle sampling technologies that have enabled the assessment of the relative toxicity of particulate pollution sources using, for the first time in the literature, realistic atmospheres in in vivo and in vitro studies in multimillion-dollar research centers funded by the US EPA, NIH, and CARB in Southern California. Several of these technologies are also being used by agencies such as the US EPA, as well as a host of international institutes in Europe and Asia.

Contact

sioutas@usc.edu | aerosol.usc.edu

Education

Sc.D. | Harvard University | 1994

Best Publication in Atmospheric Environment - Haagen-Smit Prize (2011)

Massoud Pirbazari

Professor

Dr. Pirbazari's main research interest is bio-physicochemical processes for drinking water treatment. He is currently conducting research on bio-membrane technologies for water reclamation and reuse. He is also investigating "Plant-Sediment Microbial Fuel Cell" processes for treatment of industrial wastewaters with simultaneous power generation for energy sustainability.

Contact

pirbazar@usc.edu

Education

Ph.D. | University of Michigan | 1980

Distinguished Service Award -USC Viterbi (1993)

Honors & Awards

1981 Academic Achievement Award, First Place among Doctoral Dissertations, American Water Works Association

1979 First Place Award, Biological Sciences Exhibition, Annual Meeting of Micro-Beam Analysis Society

Selected Publications

Thacher, R., Ravindran, V., and Pirbazari, M. (2016). Modeling and performance prediction of chromate reduction by iron oxide coated sand (IOCS) in adsorber reactors. AIChE Journal.

Ersever, I., Ravindran, V., Tsai, H.H., and Pirbazari, M. (2014). Modeling and design of anaerobic fluidized bed reactor with recycling for denitrification of reverse osmosis concentrate. Chemical Engineering Science.

Kan, J., Hsu, L., Cheung, A., Pirbazari, M., and Nealson, K.H. (2011). Current production by bacterial communities in microbial fuel cells enriched from wastewater sludge with different electron donors. Environmental Science and Technology.

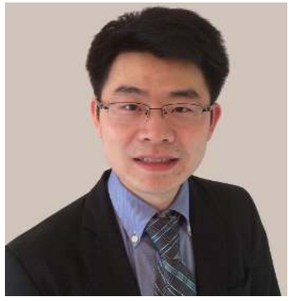
Affiliated Faculty

The Sonny Astani Department of Civil and Environmental Engineering has 24 tenured/ tenure track faculty members and four professors of practice. Three of our faculty members hold early career chairs and three hold chaired professorships. Eleven faculty members are Young Investigator or Early Career awardees, and many are fellows of professional organizations.

Lucio Soibelman

"Our first priorities are the education of outstanding students and the pursuit and publication of new research."

"We're all working together, that's the secret.



Qiming Wang

Prof. Wang's expertise is in integrating additive manufacturing innovations with fundamental mechanics to address engineering sustainability challenges from improved infrastructure to clean water. His recent research projects are focused on three themes: additive manufacturing of extreme materials at their theoretical limits, autonomously self-repairing materials and structures, and fouling management for water membranes.

Mitul Luhar

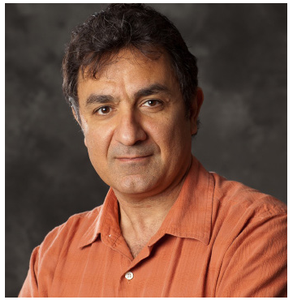
Prof. Luhar is an Assistant Professor in the Department of Aerospace and Mechanical Engineering at USC. His research interests include environmental fluid mechanics, turbulence, and flow-structure interaction. His research team focuses on turbulent flow interacting with complex surfaces and interaction between flow and flexible structures.

Burcin Becerik-Gerber

Prof. Becerik-Gerber is the founding director of the Innovation in Integrated Informatics Lab. Her research falls at the intersection of built environment, machine intelligence, and socio-technological systems. Specifically, her work focuses on acquisition, modeling, and analysis of the data needed for user-centered built environments, and the development of novel frameworks and visualization techniques to improve built-environment efficiency, sustainability, and resiliency while increasing user satisfaction.

Patrick Lynett

Prof. Lynett's research interests are directed towards a better understanding of coastal processes, such as nearshore circulations, wave evolution from generation to the shoreline, multi-scale hydrodynamic interactions, and sediment transport. Investigations combine numerical modeling with both controlled experiments and field observations. Short time-scale coastal hazards, such as hurricanes and tsunamis, are of particular interest.



Roger Ghanem

Prof. Ghanem expertise is in the area of probabilistic modeling and risk assessment. A current focus of his research is on the development of inference and design algorithms for problems involving multiscale and multi-physics interactions with application to automotive, aerospace, and environmental engineering problems. Additional current interest include data-driven methods for problems with poorly understood or highly complex physics.

Join us.

Become a part of our USC community.

Our world class program of integrated research and education continues to evolve.

“Our first priorities are the education of outstanding students and the pursuit and publication of new research.