Public Symposium

The University of Southern California’s Viterbi School of Engineering and the National Academy of Engineering are jointly hosting this public symposium, “Engineering and Managing the Megacity: Infrastructure, Energy, Environment, Transportation, Natural Hazards and Security.”

Viterbi faculty research on communications, energy, the environment, and more will also be on display.
PROGRAM

Engineering and Managing the Megacity: Infrastructure, Energy, Environment, Transportation, Natural Hazards and Security

1:00 p.m. Welcome and Introduction
Dr. Yannis C. Yortsos (NAE 2008)
Dean
Organizing Host
USC Viterbi School of Engineering

1:05 p.m. Opening Remarks
Dr. Charles M. Vest (NAE 1993)
President
National Academy of Engineering
President Emeritus and
Professor, Mechanical Engineering
Massachusetts Institute of Technology

1:15 p.m. Speaker Session I
Session Chair
Dr. Jean-Pierre Bardet
Professor of Civil and Environmental Engineering
and Chair, Sonny Astani Department of Civil and Environmental Engineering
USC Viterbi School of Engineering

Speakers
1:15 p.m. Critical Infrastructure for Megacities
Dr. Thomas O’Rourke (NAE 1993)
Thomas R. Briggs Professor of Engineering
School of Civil and Environmental Engineering
Cornell University

1:45 p.m. Global Growth and the Future of the Energy System
Dr. Donald L. Paul
Executive Director
University of Southern California Energy Institute,
and William M. Keck Chair of Energy Resources

2:15 p.m. Rethinking Water in Megacities
Dr. David Sedlak
Professor of Civil and Environmental Engineering
University of California, Berkeley

Break 2:45 p.m. – 3:00 p.m.
program continues next page
3:00 p.m.  Session II

Chair

Dr. Roger Ghanem
Professor of Civil and Environmental Engineering
Sonny Astani Department of Civil and Environmental Engineering and Department of Aerospace and Mechanical Engineering
USC Viterbi School of Engineering

Speakers

3:00 p.m.  Emissions, Trends, Characteristics and Health Effects of Air Pollutants in the Megacity of Los Angeles
Dr. Constantinos Sioutas
Fred Champion Professor
Sonny Astani Department of Civil and Environmental Engineering
USC Viterbi School of Engineering

3:30 p.m.  Will Megacities Always Have Mega Traffic Congestion?
Dr. Martin Wachs
Senior Principal Researcher
RAND Corporation

4:00 p.m.  Using Large-Scale Numerical Simulations to Forecast Earthquake Ground Motions
Dr. Thomas Jordan (NAS 1998)
William M. Keck Professor of Earth Sciences
University of Southern California, and Director, Southern California Earthquake Center
Yannis C. Yortsos is Dean of the Viterbi School of Engineering at the University of Southern California. He is the Chester F. Dolley Professor of Chemical and Petroleum Engineering, and holds the Zohrab A. Kaprielian Dean's Chair in Engineering. Yortsos is well known for his work on fluid flow, transport and reaction processes in porous and fractured media with applications to the recovery of subsurface fluids and soil remediation. He also has been actively involved in the peer review of the Yucca Mountain Project for the disposal of high-level radioactive waste. Along with his partners at Duke University and Olin College, he helped promote the National Academy of Engineering Grand Challenges of Engineering by co-hosting the first NAE Grand Challenges Summit at Duke University in 2009, and its follow-up at USC in 2010. The first summit spawned the Grand Challenges Scholars Program for undergraduate engineering schools across the nation. Yortsos received his B.S. from the National Technical University, Athens, Greece, and his M.S. and Ph.D. from the California Institute of Technology, all in chemical engineering.

Charles M. Vest is president of the U.S. National Academy of Engineering and president emeritus of the Massachusetts Institute of Technology. A professor of mechanical engineering at MIT and formerly at the University of Michigan, he served on the U.S. President's Council of Advisors on Science and Technology from 1994-2008, and chaired the President's Committee on the Redesign of the Space Station and the Secretary of Energy's Task Force on the Future of Science at the Department of Energy. He was a member of the Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction, and
the Secretary of Education’s Commission on the Future of Higher Education. He was vice chair of the U.S. Council on Competitiveness for seven years, has served on the boards of DuPont and IBM, and was awarded the 2006 National Medal of Technology. He is the author of a book on holographic interferometry and two books on higher education. Constant themes throughout his career have included the quality and diversity of the U.S. engineering workforce; sustained excellence of U.S. higher education; global openness to the flow of people, education, and ideas; university-government-industry partnership; and the innovative capacity of the United States.

Jean-Pierre Bardet is professor and chair of the Sonny Astani Department of Civil and Environmental Engineering at the USC Viterbi School of Engineering. His research is in geomechanics; geoinformation; geotechnical engineering; and earthquake engineering. Bardet’s post-earthquake reconnaissance reports of devastating earthquakes in California, Japan, Turkey, Taiwan, and India have been recognized by the National Academy of Engineering’s Frontiers of Engineering Program and awarded the Academy’s Gilbreth Lectureship. He contributed to construction of the system integration of the George E. Brown, Jr. Network for Earthquake Engineering Simulation, one of the largest projects ever sponsored by the National Science Foundation in the field of earthquake engineering. Bardet is actively involved in engineering education reform at the state level with the California Engineering Education Council, and at the national level with the American Society of Civil Engineers. He is presently leading a major multidisciplinary research initiative on megacities at USC. Bardet received his Ph.D. from the California Institute of Technology.
Tom O’Rourke is the Thomas R. Briggs Professor of Engineering in the School of Civil and Environmental Engineering at Cornell University. He is a member of the U.S. National Academy of Engineering (1993) and a Fellow of the American Association for the Advancement of Science. He holds a number of distinctions for his research and teaching, including the ASTM C.A. Hogentogler Award; the ASCE Collingwood, Huber Research, C. Martin Duke, Stephen D. Bechtel Pipeline Engineering, and Ralph B. Peck Awards; and the British ICE Trevithick Prize. He gave the 2009 Rankine Lectureship. He served as President of the Earthquake Engineering Research Institute and as a member of the U.S. National Science Foundation Engineering Advisory Committee. He is the author or co-author of more than 340 technical publications. His research interests are in geotechnical engineering, earthquake engineering, underground construction technologies, engineering for large, geographically distributed systems, and geographic information technologies and database management. He is a member of the NIST Advisory Committee for Earthquake Hazards Reduction. He has served as chair or member of the consulting boards of many large civil construction projects, as well as peer review chair for projects associated with highway, rapid transit, water supply, and energy distribution systems.

Donald Paul is executive director of the Energy Institute and William M. Keck Chair of Energy Resources at the University of Southern California. His extensive involvement with major energy RD&D initiatives include the DOE Regional Smart Grid Demonstration in partnership with the Los Angeles Department of Water and Power, the Center for Smart Oil
Field Technologies, and the recently established Center for Energy Informatics. Dr. Paul had a distinguished 33-year career with the Chevron Corporation, retiring in 2008, as vice president and chief technology officer. He advanced through positions of increasing responsibility in technology, exploration and production operations, and executive management, including a term as president of Chevron’s Canadian subsidiary. A recent appointee by the U.S. Secretary of Energy to the National Petroleum Council, Dr. Paul is also senior advisor to the Center for Strategic and International Studies. Dr. Paul received his B.S., M.S., and Ph.D. degrees from the Massachusetts Institute of Technology.

David Sedlak is a professor of civil and environmental engineering at the University of California, Berkeley. Dr. Sedlak teaches and conducts research in the area of water quality. Much of his current research addresses the fate of organic contaminants in municipal wastewater effluent. During the past decade Sedlak and his students have evaluated the fate of steroid hormones in surface waters, the formation of the potent carcinogen NDMA in advanced water recycling facilities and the transformation of pharmaceuticals in effluent-dominated surface waters and engineered treatment wetlands. Dr. Sedlak served on the U.S. Environmental Protection Agency’s Science Advisory Board for Drinking Water from 2002-2009. He is currently an associate editor for Environmental Science & Technology and a member of the National Research Council’s Committee on Water Reuse. Dr. Sedlak received his B.S. from Cornell University and his Ph.D. from the University of Wisconsin.
Roger Ghanem is a professor of civil and environmental engineering in the Viterbi School’s Sonny Astani Department of Civil and Environmental Engineering and holds a joint appointment in the department of Aerospace and Mechanical Engineering. His research interests are in probabilistic modeling, uncertainty quantification, and predictive science, with particular focus on complex interacting systems. Ghanem serves on the Board of Governors of the Engineering Mechanics Institute of ASCE, is a Fellow of the U.S. Association for Computational Mechanics, and serves on the editorial board of a number of technical journals. He has been recognized for his research and teaching with the receipt of numerous national and international awards. Ghanem received his B.E. from the American University, Beirut, Lebanon and his M.S. and Ph.D. from Rice University.

Costas Sioutas is the inaugural holder of the Fred Champion Professorship in Civil and Environmental Engineering at the USC Viterbi School of Engineering. His research has focused on investigations of the underlying mechanisms that produce the health effects associated with exposure to air pollutants generated by a variety of combustion sources, such as traffic (including light and heavy-duty vehicles, natural gas buses, and biodiesel vehicles); harbor and airport operations; power plants; and photochemically induced atmospheric reactions. During his faculty career, he has directed – either as principal or co-principal investigator – 40 research grants exceeding $40 million (with USC’s allotment reaching $16 million), many of which projects extend through 2012, and beyond. He has authored nearly 200 peer-reviewed journal publications and 5 book chapters. Dr. Sioutas holds 13 U.S. patents in the development of instrumentation for aerosol measurement and emissions control.
His published work has received over 5,300 citations as noted by the Institute of Scientific Information Web of Science, and he is among the top 1% of engineering authors worldwide as recorded by the ISI. Results from his published studies have been employed by the U.S. Environmental Protection Agency in their National Air Quality Criteria document in promulgating stricter air quality standards. Dr. Sioutas received his Sc.D. at the Harvard School of Public Health in the department of Environmental Engineering.

**Martin Wachs**, a senior principal researcher at the RAND Corporation, served as director of the RAND Transportation, Space and Technology Program through the end of 2010. Dr. Wachs was a professor of civil and environmental engineering and city and regional planning at the University of California, Berkeley until 2005, where he also directed the University’s Institute of Transportation Studies. Dr. Wachs spent 25 years at the University of California, Los Angeles, where he chaired the Department of Urban Planning. Wachs is the author of 170 articles and 4 books on subjects related to relationships between transportation, land use, and air quality; transportation needs of the elderly; techniques for the evaluation of transportation systems; and the use of performance measurement in transportation planning. His research also addresses issues of equity in transportation policy, problems of crime in public transit systems, and the response of transportation systems to earthquakes and other natural disasters. His most recent work focuses on transportation finance in relation to planning and policy. Dr. Wachs served on the executive committee of the National Academies’ Transportation Research Board for nine years and was the TRB Chairman in 2000. He is the recipient of a Guggenheim Fellowship, two Rockefeller Foundation Humanities Fellowships, a UCLA Alumni Association Distinguished Teaching Award, the Pyke...
Johnson Award for the best paper at an annual meeting of the TRB, and the Carey Award for service to the TRB. He is a National Associate of the National Research Council of the National Academies. In 2006, Dr. Wachs was named “Member of the Year” by the San Francisco Chapter of the Women’s Transportation Seminar and was awarded the “Distinguished Planning Educator” award for lifetime achievement by the Association of Collegiate Schools of Planning. In January 2010, he delivered the Thomas Deen Distinguished Lecture at the TRB’s annual meeting. Dr. Wachs received his M.S. and Ph.D. from Northwestern University, and his B.S. from the City University of New York.

**Thomas Jordan** is the William M. Keck Professor of Earth Sciences at the University of Southern California, and director of the Southern California Earthquake Center. The SCEC is a distributed organization involving more than 70 universities and research institutions. Jordan’s research is in system-level models of earthquake processes, earthquake forecasting and forecast-evaluation, and full-3D waveform tomography. His scientific interests include continent formation and evolution, mantle dynamics, and statistical geology. He has authored approximately 200 scientific publications, including two undergraduate textbooks. He is a member of the California Earthquake Prediction Evaluation Council and serves on the Governing Board of the National Research Council and the Board of Directors of the Seismological Society of America. He taught at Princeton and the Scripps Institution of Oceanography before joining the faculty of the Massachusetts Institute of Technology in 1984, where he served as the head of MIT’s Department of Earth, Atmospheric and Planetary Sciences from 1988 to 1998. He came to USC in 2000, was named SCEC Director in 2002, and was appointed a University Professor in 2004. He is a recipient of
the Macelwane and Lehmann Medals of the American Geophysical Union, and the Woollard Award of the Geological Society of America. He is a member of the National Academy of Sciences, the American Academy of Arts and Sciences, and the American Philosophical Society. Dr. Jordan received his Ph.D. from the California Institute of Technology in 1972.
Faculty Research Poster Presentations
Thurs. Feb 10, 2011, 5:00 p.m. – 9:00 p.m.
Town and Gown Foyer

Transportation Economics
Quantifying Economic Losses from Travel Forgone Following a Large Earthquake in a Metropolitan Area
James E. Moore, II, Professor of Industrial and Systems Engineering

Transportation Vehicles
Intelligent Assist Driving in the Megacity
Petros Ioannou, Professor of Electrical Engineering

Urban Health Issues
Behavioral Signal Processing & Behavioral Informatics
Shrikanth Narayanan, Viterbi Professor of Engineering

Infrastructure/Smart Buildings
Participatory Urban Data Collection: Planning and Optimization
Cyrus Shahabi, Professor of Computer Science

Energy
Data Management for Energy Informatics
Viktor Prasanna, Charles Lee Powell Professor of Engineering

Urban Security Issues
Urban Security: Game-Theoretic Allocation of Security Forces in a City
Milind Tambe, Professor of Computer Science and Industrial and Systems Engineering/Bo An, Post-doctoral Researcher

Water Quality
Aquatic Networked Robots: Measuring Anthropogenic Impact of Megacities on the Marine Ecosystem
Gaurav Sukhatme, Professor of Computer Science

Green Buildings
Energy Literacy and Adaptive and Behaviour-Driven Energy Control
Burcin Becerik-Gerber, Assistant Professor of Civil and Environmental Engineering
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