The Kappe Lecture Series

AMERICAN ACADEMY OF ENVIRONMENTAL ENGINEERS & SCIENTISTS®

Sharing the knowledge of today's practitioners with tomorrow's engineers and scientists.

2015

The 2015 Kappe Lecturer

Jay Banner, Ph.D., BCES

Professor/ Director

University of Texas at Austin

Environmental Science Institute

Education

- BA, Geology, University of Pennsylvania, 1978
- MS, Earth Sciences, State University of New York, 1981
- PhD, Earth Sciences, State University of New York, 1986

Professional Associations

- American Academy of Environmental Engineers and Scientists
- Geological Society of America

Jay Banner was born and raised in New York City and was interested in science from an early age. He attended the University of Pennsylvania as a Chemistry major and switched majors to Geology partway through to his Bachelor's degree. He pursued graduate studies in geology and geochemistry at the State University of New York at Stony Brook, where he received his MS and Ph.D.

After receiving his Ph.D., Dr. Banner was a post-doctoral fellow at the California Institute of Technology and Louisiana State University. He joined the faculty in the Department of Geological Sciences at the University of Texas in 1990 in Austin, Texas. He is presently the Fred M. Bullard Professor in the Jackson School of Geosciences and Director of the Environmental Science Institute at UT-Austin.

Dr. Banner is a geochemist who investigates the impacts of urbanization on aquifers and streams, and the reconstruction of past climate change, soil erosion and ocean chemistry. His field research sites include Texas, Guam, Western Australia, the midcontinent and Great Basin USA, Barbados, and the Bahamas. Banner co-developed and teaches UT-Austin's first Signature Course, *Sustaining a Planet*, and helped develop the university's newest interdisciplinary degree, a B.S. in Environmental Science.

Dr. Banner is a Fellow of the Geological Society of America, and was the first person certified as an Environmental Scientist by the American Academy of Environmental Engineers and Scientists. Among the recent honors he has received are the UT Board of Regents Outstanding Teaching Award (2013), the Texas Exes Teaching Award (2012), the Friar's Centennial Teaching Fellowship Award (2011), induction into UT-Austin's Academy of Distinguished Teachers (2011), and the Jackson School of Geosciences Outstanding Educator Award (2010).

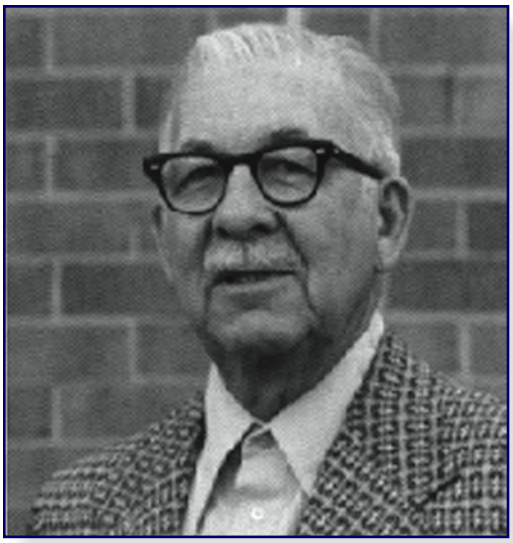
Abstracts of Lectures Offered

Past, Present, and Future Climate Change Impacts on Water in a Semi-Arid Region: Science and Policy

Texas comprises the eastern portion of the Southwest region, where the convergence of climatological and geopolitical forces has the potential to put extreme stress on water resources. Geologic records indicate that Texas experienced large changes in moisture sources and amounts on millennial time scales in the past, and over the last thousand years, tree-ring records indicate that there were significant periods of drought in Texas. These droughts were of longer duration than the 1950s "drought of record" that is commonly used in planning, and they occurred independently of human-induced global climate change. Although there has been a negligible net temperature increase in Texas over the past century, temperatures have increased more significantly over the past three decades, and the region experienced a record drought in 2011 that is ongoing. Under essentially all climate model projections, Texas is susceptible to significant climate change in the future. Most projections for the 21st century show that with increasing atmospheric greenhouse gas concentrations, there will be an increase in temperatures across Texas and a shift to a more arid average climate. Studies agree that Texas will likely become significantly warmer and drier, yet the magnitude, timing, and regional distribution of these changes are uncertain. With a projected doubling of the state's population by 2065, science, engineering, and economics are essential elements needed for the state's planning for the projected changes.

Cave Mineral Deposits as Proxies for Past Climate Change

Cave mineral deposits, or 'speleothems', provide a record of past changes in the composition and amounts of cave drip water that feed their growth. In turn, these changes in drip water may be used to infer past changes in climate above caves. Given that caves occur on all continents and that speleothems can grow continuously on time scales of decades to over 100,000 years, there is much interest in their application to reconstructing large and abrupt Pleistocene climate changes and Holocene changes that influenced early civilizations. With modern mass spectrometry, methods for dating and geochemical analysis of speleothem growth layers offer the prospect of high resolution reconstructions. These prospects are balanced by the complexity of non-climatic processes that can affect speleothem compositions, during transmission of water through the vadose zone and in the cave environment. These processes are addressed through examination of modern karst systems, including monitoring of physical and chemical hydrology, cave meteorology, speleothem growth on artificial substrates, and chemical and isotopic equilibrium. Studies from Texas and the tropics portray the information speleothems provide regarding past changes in temperature, rainfall sources and amounts, vadose flow paths, and seasonality.



"A man's debt to his profession is to help those that follow."

STANLEY E. KAPPE, P.E., DEE, a successful environmental engineer, believed he owed a debt to the profession that rewarded him so well. During his life, he gave of himself to his university and to his profession through countless hours of volunteer activity. And, through this Lecture Series, he continues to share his good fortune with tomorrow's environmental engineers.

He graduated from Pennsylvania State University in 1930 with a bachelor's degree in sanitary engineering. He served with the Pennsylvania State Health Department and the U.S. Army Corps of Engineers before joining the Chicago Pump Company as its Eastern Regional Manager in 1935. In 1945, he founded Kappe Associates, Inc., a water supply and wastewater equipment company headquartered in Rockville, Maryland, and continued as its Chief Executive Officer until his death in 1986.

His peers recognized his contributions to the profession by numerous awards, including the AWWA Fuller Award, the WPCF Arthur Sidney Bedell Award, the WPCAP Ted Moses and Ted Haseltine Awards, and the AAEE Gordon Maskew Fair Award. In 1985, Pennsylvania State University named him Outstanding Engineer Alumnus.

Stanley E. Kappe was an activist member and leader in several national and Chesapeake region professional societies. He served as the Executive Director of the American Academy of Environmental Engineers from 1971 to 1981.

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