8ICEG Invited Lecture

Dr. Edward Kavazanjian

Jr., Ph.D., P.E., NAE, Dist.M.ASCE

Invited Lecture Title

Biogeotechnical Engineering Applications for Environmental Protection and Restoration

【10:30 - 11:00 , Tuesday 30th Oct. 2018】

Biography

Dr. Edward Kavazanjian, Jr. is a Regents Professor and the Ira A. Fulton Professor of Geotechnical Engineering at Arizona State University. He joined the faculty at Arizona State University in August 2004 after 20 years as a practicing geotechnical engineer. Dr. Kavazanjian has Bachelor and Master of Science degrees in Civil Engineering from M.I.T. and a Ph.D. in Geotechnical Engineering from the University of California at Berkeley. In 2013, he was elected to the National Academy of Engineering for his work on design and construction of landfills and geotechnical earthquake engineering. He is recipient of the 2009 Ralph B. Peck Award, 2010 Thomas A. Middlebrooks Award, and the 2011 Terzaghi Award from the American Society of Civil Engineers (ASCE). In August 2015, he became Director of the Center for Bio-mediated and Bio-inspired Geotechnics (CBBG), a National Science Foundation-funded Engineering Research Center dedicated to the emerging sub-discipline of biogeotechnical engineering.

Abstract

Biogeotechnical engineering can contribute to environmental protection and ecological restoration in several different ways. Soil and groundwater remediation is the most common and most mature application of biogeotechnical engineering in engineering practice. However, soil and groundwater remediation is still a developing field and new and enhanced biogeotechnical techniques to mitigate soil and groundwater contamination are constantly being developed. Furthermore, there are a variety of ways in which biogeotechnical techniques can contribute to environmental protection and restoration. New and enhanced biogeotechnical techniques for soil and groundwater remediation under development include sequestration of groundwater contaminants via co-precipitation with carbonates, reduction and precipitation of chromium, arsenic and selenium, removal of nitrogen while precipitating phosphorous from ground and surface water, and microbial chain elongation to provide energy for

beneficial microbiological processes. Other biogeotechnical applications in environmental protection and remediation include fugitive dust control, mitigation of soil erosion due to surface water runoff, mitigation of the potential for internal erosion of soil in dams, levees, and embankments, and creation of low permeability subsurface barriers. Replacement of Portland cement as a binder for aggregates, i.e., biocementation, also contributes to environmental protection through the reduction in carbon dioxide emissions associated with Portland cement manufacture.