Climate Change: Impacts and Challenges for Geotechnical Engineers
April 21, 2017 - 4:30 p.m. - Purdue University, Krannert Auditorium

From rising sea-levels to changing weather patterns, the impacts of climate change are projected to have significant effects in the upcoming decades. As a result, management of climate change, from the implementation of mitigation measures to the design of adaptation strategies, is becoming increasingly important. For Geotechnical Engineers, new challenges will arise as a result of climate change impacts on existing infrastructure, as well as the performance needs of future infrastructure. In addition, changing groundwater levels and subsurface flow patterns will pose new problems, as will climate mitigation strategies, including the global movement toward a low carbon economy.

This lecture will first provide examples of climate change impacts that are likely to influence geotechnical engineering practice, together with the challenges such impacts pose. New research needs associated with these challenges will also be described. An example of a climate adaptation strategy, which involves an ambitious engineered green infrastructure program that is underway in New York City, will then be presented. This program involves collaboration between government agencies, geotechnical engineering practitioners, researchers and community groups. Design, monitoring and modeling results from the program will be summarized, as will lessons learned and future needs. The program is an example of an emerging class of climate change mitigation and adaptation strategies that relies on local, or neighborhood level, infrastructure interventions. The final part of the lecture will deal with the implications of this new approach to the future of geotechnical engineering practice, research and training. Introduction by Marika Santagata, Purdue University

Professor Patricia J. Culligan: At Columbia University, where she serves as the Founding Associate Director of Columbia University’s Data Science Institute and the Co-Director of the Earth Institute’s Urban Design Lab. Dr. Culligan’s expertise lies in the field of geo-environmental engineering, with an emphasis on water resource management and issues related to urban and environmental sustainability. Her research group is currently active in investigating the opportunities for green infrastructure, social networks and advanced measurement & sensing technologies to improve the management of urban water, energy, and eco-system services in the face of climate change.

She has received numerous research and teaching awards for her academic contributions, including the National Science Foundation’s CAREER AWARD and Columbia University’s Presidential Teaching Award. She has also served on the Board of Governors of the Geo-Institute and the National Academies Nuclear and Radiation Studies Board, and has chaired the National Academies Committee on Geological and Geotechnical Engineering. She is the author or co-author of more than 150 technical articles.

Professor Culligan received her MS from Leeds University, England and her MPhil and PhD from Cambridge University, England. She also holds a degree in Languages, Literature and Civilization from Université d’Aix-Marseille, France.

Presented in conjunction with the 15th Purdue Geotechnical Society Workshop
“Climate Change and Geotechnical Engineering”

The PGS was founded in May 2003 to enhance the strong bond and working relationship among alumni, faculty, students, and staff of the Geotechnical Engineering group at Purdue University for the benefit of all.

https://engineering.purdue.edu/PGS

GEOTECHNICAL ENGINEERING GROUP – LYLES SCHOOL OF CIVIL ENGINEERING – PURDUE UNIVERSITY
The Leonards Lecture was established in 2003 in honor of Professor Gerald A. Leonards, one of the giants of the geotechnical engineering profession.

Professor Gerald A. Leonards was born on April 29, 1921 in Montreal, Quebec, Canada. He obtained his BSCE at McGill University in 1943 and received both MSCE and PhD from Purdue in 1948 and 1952, respectively. He was a full-time faculty member at Purdue from 1952 to 1991, when he was named Professor Emeritus.

Professor Leonards’ research interests were very wide and he made pioneering contributions to knowledge on strength and compressibility of compacted clay soils, strength and consolidation of natural deposits, cracking of earth dams, frost action, analysis of buried conduits, pile foundations, stability of slopes and embankments on soft clays, stress-deformation and liquefaction of sand, and methodologies for investigating failures. He published extensively nationally and internationally. His 1962 book on “Foundation Engineering” quickly became a standard reference worldwide.

Throughout his career, Dr. Leonards’ insight and expertise was sought on earthwork and foundation projects all over the world, a number of which involved the investigation of failures. He was appointed as the only non-European to sit on an official government commission in Italy to investigate ways to stabilize the Tower of Pisa.

Over his career Dr. Leonards received numerous awards from professional societies. In 1980 he was honored by the American Society of Civil Engineers by being asked to present the Terzaghi Lecture and also received the Terzaghi Award in 1989. In 1988 he was elected to the National Academy of Engineering.

From the students’ perspective, “GAL” was a dedicated professor and researcher, who never missed an opportunity to learn more about his chosen field and to share his views on new developments. His influence continues to be felt through the lasting influence he had on his students and colleagues.

Adapted from text by V.P. Drnevich for Geotech Hall of Fame Web Site

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