



DEPARTMENT OF CIVIL ENGINEERING

SEMINAR

Revisiting Plant Wilting: Observational Evidence from Soil-Plant-Photosynthesis Interactions in Unsaturated Soil Condition

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Xi'an Jiaotong-Liverpool University, China

Date: June 24, 2025 (Tuesday)

Time: 1:00 p.m. - 2:00 p.m.

Venue: Room 616, 6/F Haking Wong Building, The University of Hong Kong

Abstract

The conventional interpretation of the Permanent Wilting Point (PWP) assumes a fixed soil suction value (1500 kPa), but this overlooks critical interactions between soil properties, root architecture, and plant physiology. This talk presents a new framework that establishes threshold (or wilting) based on soil-root-water-atmospheric interactions. Systematic experiments were conducted on a native grass (*Axonopus compressus*) grown in contrasting soils (clayey loam vs. silty sand), revealing that PWP is highly soil-dependent—occurring at 1600 kPa for clayey loam but only 300 kPa for silty sand. By integrating soil suction measurements with stomatal conductance and photosynthetic efficiency, we demonstrate that fine root hairs in silty sand enhance water uptake, doubling plant survival time during drought compared to clayey loam. These findings questions the traditional irrigation models and emphasize the need for soil and plant specific PWP frameworks to select suitable vegetation species for green infrastructure.

About the Speakers

Dr Ankit Garg is currently an Associate Professor at Department of Health and Environmental Science (HES), School of Science, Xi'an Jiaotong-Liverpool University, China. He obtained his PhD at Hong Kong University of Science and Technology in 2015. He is also former visiting scholar at University of Leeds (UK), University of Macau and former visiting faculty at ITMO University Russia. He was former Assistant Professor at IIT, Guwahati (2015-2017), Associate Professor at Shantou University (2017-2025) and part time World Bank Consultant (2016-2017) for monitoring transport infrastructure projects in Assam, India. His research focusses on Bio-geotechnics and application of AI in geotechnical engineering. He has been awarded prestigious “*Telford Premium Prize*” for 2020 from *British Civil Engineers Association* for publication in *Geotechnique letters*, ICE, UK. Also, his team was awarded the Best Research Paper Award Published in the *Central Asian Journal of Water Research*, conferred by UNESCO Chair Holder of Water Management in Central Asia. His research group has been also mentioned by Spanish researchers (*Green Infrastructure and Water: An Analysis of Global Research* by Spanish researchers (Caparrós-Martínez et al. 2020) for the highest citations in Web of Science in research related to green infrastructure from 2010-2019. He is also currently Associate Editor in various reputed International Journals such as *Journal of Smart Construction and Sustainable Cities*, *Indian Geotechnical Journal* and *Journal of Acta Geophysica*. Besides, he was awarded Talented Youth Scientist Program, Young Doctor Award from Ministry of Education Guangdong, and International Scientist Exchange Program. He is also awarded outstanding young alumni achiever award from Alma Institute by IIT Guwahati, India.

- ALL ARE WELCOME -