THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

Jointly organized by

RESEARCH INSTITUTE FOR SUSTAINABLE URBAN DEVELOPMENT
可持續城市發展研究院
RISUD

CNERC-Rail HK
National Rail Transit Electrification and Automation Engineering Technology Research Center (Hong Kong Branch)

ASCE
HONG KONG SECTION

RISUD PUBLIC LECTURE

Engineering Applications of Data Science:
Spatial Rainfall Characterization & Environmental Forensics

Time:
6:00p.m.-7:00p.m.

17
Nov
2017

FRIDAY

Dr. Chin Man "Bill" Mok

Fellow of ASCE
Vice President & Principal Engineer
GSI Environmental Inc., California

Venue:	**N001 Lim Por Yen Lecture Theatre, The Hong Kong Polytechnic University**
Medium:	English
Registration:	https://www.polyu.edu.hk/mysurvey/index.php/458933
	(Registration deadline: 16 November 2017, 12:00 n.n.)
Certificate:	Attendance certificate will be issued to registered participants only
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Abstract

In this seminar, two applications of data science techniques to advance engineering practice will be presented. One application is high-resolution rainfall characterization. Accurate spatial and temporal representation of rainfall intensity is critical to many engineering problems, such as flood and landslides. Rain gauges yield point information only. Extrapolation of sparse and infrequent data to other locations are highly uncertain. Although Doppler radar indirectly provides spatially continuous rainfall estimation based on reflectivity measurements, such empirically based estimation is also highly uncertain. A Bayesian data fusion technique that integrates gauge and radar data to improve rainfall characterization will be presented. Another application is environmental forensics. Many chemicals from contamination sources also occur naturally, such as metals. Samples collected at an impacted site contain naturally occurring constituents at unknown concentration levels and some of these samples might have been impacted by multiple contamination sources. It is challenging to identify naturally occurring component of the measured chemical concentrations as well as to identify the components due to individual contamination sources and their associated chemical signatures (fingerprints). Several machine-learning techniques, such as cluster analysis, discriminant analysis, principal component analysis, positive matrix factorization, independent component analysis, and Bayesian network, that effectively delineate the structure embedded in large multivariable environmental data set for background and source identification will be presented.

Speaker's Biography

Dr. Mok is a vice president of GSI Environmental Inc and an adjunct professor at several universities. He obtained his B.Sc.(Eng.) from HKU and his M.S./Ph.D. from the University of California at Berkeley. He is a Professional Engineer and Geologist with over 30 years of experience internationally. He has directed many special studies and research supporting complex transportation, water resources, and environmental projects. In addition, he has been teaching courses in academia. He is a board-certified Water Resources Engineer and Geotechnical Engineer; ASCE Fellow and EWRI Fellow; and a Rudolf Diesel Fellow of the Technical University of Munich.