



Department of
Mechanical Engineering
The University of Hong Kong



SEMINAR

Development of Stochastic Prediction Method of Wind Speed within Urban Area for Wind Environmental Assessments

Date: 22 March 2023 (Wednesday)

Time: 4:30 pm

Venue: CPD1.24, Centennial Campus, The University of Hong Kong

Speaker: Associate Prof. Naoki Ikegaya
Urban Environmental Science laboratory
Department of Advanced Environmental Science and Engineering
Faculty of Engineering Sciences
Kyushu University
Japan

Abstract:

Urban geometry owing to various buildings significantly affects pedestrian-level wind (PLW) in urban areas for both pedestrian safety and comfort. PLW environmental assessments are commonly conducted to quantify the effect of urban morphologies on the PLW. The accurate prediction of extreme wind events such as gust and weak winds are required because the events have considerable impact on the PLW environment although they infrequently occur. Therefore, this presentation will introduce our recent work led by the wind engineering group at Urban Environmental Sciences Laboratory of Kyushu University. We have been developing the stochastic prediction framework of the prediction methods for low-occurrence but great-impact wind events using the probability density distributions of PLW. For the modelling of the probability density functions, we applied the Gram-Charlier series (GCS) to the dataset of the flow fields at the pedestrian level around an isolated block model and simplified block arrays using large-eddy simulations, as well as PLW obtained by full-scale field measurements. The study emphasises the importance of incorporating the stochastic prediction method of PLW for better prediction of low-occurrence but extreme wind events.

Biography:

Dr. Naoki Ikegaya is an Associate Professor in Faculty of Engineering Sciences, Kyushu University, Japan, the principal investigator of the wind engineering and urban climate research group at Urban Environmental Sciences laboratory. He received his Doctorate degree of Engineering from Kyushu University in 2011. His major is architectural environmental engineering and wind engineering by means of both wind-tunnel experiments and computational fluid dynamics approaches. He focuses on transport phenomena occurring in the turbulent urban boundary layer, wind



environmental assessments for pedestrian safety and comfort, and indoor-outdoor airflow interaction of the cross-ventilation flow. He also has experiences as a visiting researcher at Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia, National Center for Atmospheric Research (NCAR), the United States, and Universiti Teknologi MARA, Malaysia etc.

ALL INTERESTED ARE WELCOME

For further information, please contact Dr. C.H. Liu at 3917 7901 or chliu@hku.hk.