香港科技大學
THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

土木及環境工程學系
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

SEMINAR

AI-EMPOWERED PERFORMANCE-BASED WIND ENGINEERING

Speaker

Prof. Teng Wu

University at Buffalo

Abstract

Recent advancements in performance-based wind engineering have placed new demands on wind characterization (e.g., duration consideration), aerodynamics modeling (e.g., transient feature) and structural analysis (e.g., nonlinear response). While conventional approaches in computational and experimental wind engineering provide valuable tools to overcome many of these emerging challenges, noticeable increase in use of artificial intelligence (AI) suggests its great promise in facilitating the implementation of performance-based wind design methodology. This talk will discuss state-of-the-art machine learning tools (e.g., knowledge-enhanced deep learning and deep reinforcement learning) that are successfully applied to wind climate analysis, transient aerodynamics, nonlinear structural dynamics, shape optimization and vibration control. The final part of this talk will extend the application of AI tools to enhance the coastal city resilience under hurricane hazards (wind, rain, and surge).

Biography

Dr. Teng Wu is a Professor in the Department of Civil, Structural and Environmental Engineering at the University at Buffalo (UB). Wu's research interest is the development of analytical and computational methods focusing on nonlinear and transient structural aerodynamics, performance-based wind design, and community resilience to hurricane (wind, rain and surge hazards). His contributions have been recognized through the 2013 American Society of Civil Engineers (ASCE) O.H. Ammann Research Fellowship, 2014 American Association for Wind Engineering (AAWE) Best Paper Award, 2016 ASCE Alfred Noble Prize, 2017 International Association for Wind Engineering (IAWE) Junior Award, 2017 AAWE Robert Scanlan Award, 2018 International Association for Bridge and Structural Engineering (IABSE) Prize, 2023 IABSE Outstanding Paper Award, 2023 AAWE Best Paper Award, and 2024 IABSE Outstanding Paper Award.

Wu currently serves as the Editor-in-Chief of two international journals (including Advances in Wind Engineering) and Associate Editor of eight international journals (including ASCE Journal of Bridge Engineering, ASCE Journal of Structural Engineering and IABSE Structural Engineering International). He is an Executive Board Member of IAWE, Member of AAWE Board of Directors, Member of IABSE-USA Board of Directors. Wu serves on a number of ASCE committees including ASCE/IRD (Infrastructure Resilience Division) Executive Committee, ASCE/EMI (Engineering Mechanics Institute) Fluid Dynamics Committee (Chair), ASCE/SEI (Structural Engineering Institute) 7 Main Committee and Wind Load Subcommittee, Cable-Supported Bridges Committee (Chair), ASCE/CC (Changing Climate) Technical Committee on Future Weather and Climate Extremes (Chair), and ASCE/T&DI (Transportation & Development Institute) AI in Transportation Committee (Co-Chair of Research Subcommittee). Wu has authored more than 110 articles published in highly respected journals of structural/wind engineering, and presented over 130 conference papers.

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3:00 pm – 4:00 pm

Room 3574 (Lift 27/28)
Civil Engineering
Conference Room

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