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

SMART RAILWAY: CHALLENGES AND OPPORTUNITIES OF PRACTICE INNOVATIONS AND INTEGRATIVE PREDICTIVE MAINTENANCE AT MULTI-SCALE

Speaker

Prof. Yili Tang

University of Western Ontario

Abstract

Railway systems have been crucial for regional and national mobility, but modernization poses significant challenges and opportunities due to rapid advancements in sensing technologies, digitalization, and multi-scale computing. Traditional maintenance and inspection methods are often reactive, fragmented, and labor-intensive, struggling to meet the demands of today's high-frequency rail operations. This seminar introduces innovative practices in railway predictive maintenance, utilizing multi-sensing data fusion and advanced machine learning frameworks based on real-world deployments. It presents an integrative framework for railway system maintenance, covering AI monitoring aspects such as track geometry and vehicle defects. Additionally, the seminar proposes scalable data governance and computing pipelines to efficiently manage the extreme data volumes typical of modern rail systems. By highlighting next-generation smart railways, the seminar demonstrates how AI-enabled approaches can enhance multi-scale maintenance and operations while addressing data and computing challenges with practical innovations.

Biography

Dr. Yili Tang is an Assistant Professor at the University of Western Ontario, leading the Mobility Technology Research Group, which focuses on travel mobility, human behavior, artificial intelligence, and game theory. She earned her PhD from the Hong Kong University of Science and Technology and completed a postdoctoral fellowship at UC Berkeley. Dr. Tang supervises over 40 students and engineers and is active in transportation, AI, automation, and robotics research.

She has secured over 37 million HKD in collaborative research grants, with her work published in top-tier journals across economics, transportation engineering, and energy. Dr. Tang serves as a guest editor for Travel Behaviour and Society and Transportmetrica A: Transport Science. She is also a board member of international organizations, including Vice President of the Institute of Transportation Engineers (ITE) Saskatchewan Section and Treasurer of the INFORMS Railway Application Section. Dr. Tang is an affiliate member of the Centre for Multi-Hazard Risk and Resilience at the University of Western Ontario and the Center for Smart Infrastructure at UC Berkeley.

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4:30pm – 5:30pm

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

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