



DEPARTMENT OF CIVIL ENGINEERING

SEMINAR

Rethinking Structural Monitoring with Smart Construction Materials

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Time: 10:00 a.m. – 11:30 a.m.

Venue: Room 612B, 6/F Haking Wong Building, The University of Hong Kong

Abstract

Identifying and measuring localized damage across expansive structural systems remains a persistent challenge in structural monitoring of civil infrastructure. Traditional approaches depend on carefully positioning discrete sensors, which requires detailed prior knowledge of where deterioration is most likely to occur. Establishing reliable links between small-scale defects and variations in global response indicators like dynamic or vibration properties continues to be complex. Moreover, deploying dense networks of individual sensors over large areas is often economically and logistically unfeasible. To overcome these limitations, a shift from point-based sensing toward spatially continuous measurement strategies is essential. Established distributed sensing solutions include fiber optic technologies and vision-based monitoring systems. More recently, concepts inspired by biological skins have emerged as promising tools for large-area infrastructure assessment. After providing a review of artificial sensing skins designed for defect detection and strain-field mapping, this work highlights our latest advancements in multifunctional cementitious and elastomeric sensing skins. Such self-sensing construction materials offer transformative potential for infrastructure monitoring because they can be seamlessly integrated into the built environment. Nevertheless, widespread adoption will require substantial further development, and several key technical and practical challenges must still be addressed.

About the Speaker

Fae Azhari is an Associate Professor in the Departments of Mechanical & Industrial Engineering and Civil & Mineral Engineering at the University of Toronto. She completed her PhD in Structural Engineering and Mechanics at UC Davis and holds two master's degrees, one in Industrial Engineering and Operations Research from UC Berkeley and the other in Civil Engineering from UBC. She is a registered Professional Engineer with over five years of industry experience. Fae's research focuses on structural monitoring (SM) and prognosis of engineering systems. Her main areas of research are (I) sensor development and assessing the performance of novel sensing devices, and (II) developing decision-making frameworks that use probabilistic models to translate collected data into meaningful information and efficient remedial strategies for various engineering systems.

- ALL ARE WELCOME -