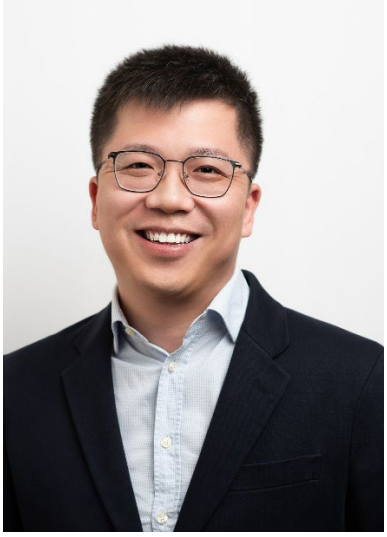
ENCS 8011 PhD Seminar – BCEE – Fall 2023
(a joint seminar with CEISCE)

Guest Lecture Series – October 19, 2023 10:20am-noon (EST)



Yazhou (Tim) Xie, Ph.D., P.Eng.

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Title: Advancing Seismic Resilience of Bridge Infrastructure: Innovations in Fragility Assessment, Risk Mitigation, and Machine Learning Applications

Location: EV2.184, Concordia University SDG Campus

Zoom link: https://concordia-ca.zoom.us/j/5921202120?pwd=MUE5UjA2eVFPaXArUnBWNkZhdjJZdz09

Speaker bio: Xie received his Ph.D. in Civil Engineering from UCLA (2017), M.S. in Bridge Engineering (2011), and B.S. in Civil Engineering (2008), both from Tongji University. Before joining McGill, Xie was a Postdoctoral Research Associate at Dr. Reginald DesRoches's lab at Rice University (2017-19). Xie's expertise contributes to the research and practice of promoting a hazard-resilient and sustainable built environment. As the leading author, Xie has published 35

papers in top-tier journals in structural and earthquake engineering. Two recent publications are among the top downloaded in the journal of Earthquake Engineering and Structural Dynamics (2018-19). In 2020, Xie published a machine learning review paper that is among the top downloaded, highly cited, and editors' monthly picks from Earthquake Spectra. Xie is currently leading ten research projects funded by NSERC, MITACS, and industry partners in the United States and Canada. Xie is an active member of several national and international technical committees within Canadian Society for Civil Engineering (CSCE) and American Society of Civil Engineers (ASCE). He is an associated editor, guest editor, grant reviewer, and technical reviewer for several prestigious journals in his field. Xie has been recognized through honors such as the 2014 Martin Rubin Scholarship, the 2017 UCLA Dissertation Year Fellowship Award, and McGill's Engineering Class of 1944 Teaching Award in 2023.

Abstract: This presentation will discuss recent efforts by the Hazard Mitigation and Infrastructure Resilience (HMIR) lab at McGill to tackle several challenges toward more reliable seismic fragility assessment and more effective seismic/hazard risk mitigation. First, a collaborative research effort will be presented to develop high-fidelity computational models of bridge-foundation-soil systems to assess the seismic fragility of California bridges statewide. Ongoing research needs are then pinpointed to (1) derive more useful seismic fragility models for irregular bridges and (2) conduct scenario-based regional seismic risk assessment of the bridge network in Los Angeles. Second, seismic risk-based approaches that build on the performance-based earthquake engineering framework will be discussed to promote the application of seismic protective devices to restore and upgrade deficient structural systems. Following this, ongoing machine learning research will be introduced to tackle previously intractable problems in structural and earthquake engineering. Emphasis will be placed on leveraging different deep learning techniques to minimize the significant computational cost required for seismic risk assessment. The presentation will also briefly discuss collaborative experimental studies on soil-structure-group interaction, self-centering braced building frames, and column protection against truck collisions. Together, research outcomes from these different themes bear the potential to significantly advance the state of the art in better safeguarding the built environment against earthquake hazards.