TRENT UNIVERSITY

CHEMISTRY/PHYSICS SEMINAR SERIES

Dr. Bertrand Neyhouse

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Wednesday, November 4, 2026
11:00 a.m. to 11:50 a.m. in ENW 115

Reactor design strategies for next-generation electrochemical systems

ABSTRACT

Global decarbonization necessitates development of energy storage and chemical manufacturing technologies that facilitate the shift to renewable resources. Electrochemical systems are well-positioned to lead this transition, owing to their modularity, process safety, mild conditions, and facile integration with renewable electricity; however, continued adoption of these technologies will require marked improvements in reactor performance and cost. Moreover, the diverse application space across electrochemistry presents varied challenges for designing and studying next-generation systems. To this end, the Neyhouse Group seeks to leverage fundamental chemical and electrochemical engineering principles to advance design principles for electrochemical reactors.

In this seminar, I will first discuss the development of new electroanalytical methods for redox flow batteries, advancing characterization tools in this emerging grid-scale energy storage platform. Second, I will introduce an electrochemical approach for converting waste poly(vinyl chloride) into commodity chlorine, offering a sustainable pathway for plastics recycling. Taken together, my work will emphasize the unique challenges presented by electrochemical systems within varied development stages and diverse application spaces.

BIOGRAPHY

Bertrand is an Assistant Professor at the University of Toronto in the Department of Chemical Engineering & Applied Chemistry. His research group leverages fundamental chemical and electrochemical engineering principles to design and intensify electrosynthetic processes. Prior to joining the University of Toronto, he completed postdoctoral research at the University of Michigan with Prof. Anne McNeil, advancing electrochemical approaches for PVC recycling. He received his Ph.D. in Chemical Engineering from MIT, working under the supervision of Prof. Fikile Brushett developing rational design strategies for redox flow batteries. Prior to graduate school, he earned his B.S. in Chemical Engineering from Ohio University where he conducted research with Prof. Gerardine Botte and Prof. Travis White. Bertrand has published over 30 papers spanning electrochemical engineering, energy storage technologies, and sustainability, and he is a recipient of the NSF Graduate Research Fellowship and the Martin Fellowship for Sustainability. His passion lies in educating the next generation of chemical engineers and developing electrochemical technologies to address modern sustainability challenges.