Faculty of Engineering and Applied Science

Chemical Engineering Seminar Series

Queen's University

Physics-based Modelling of Chemical Processes and Implications on Process Control

Dr. Nicolas Hudon/Queen's University

Thursday, September 15, 2016, 2:30pm

Dupuis Hall, Room 215

ABSTRACT

The objective of this talk is to present my main research projects and areas for applications. In the first part of the seminar, I will present on-going research carried with collaborators in Belgium and France and discuss the control, estimation, and observation problems associated with the operation of plasma fusion reactors (Tokamak). From this particular application problem, I will discuss some previously developed theoretical results on structured physically-based representation of systems and their applications to the Tokamak reactors. I will then discuss potential extensions of those theoretical results and link those to general problems of control, observation, optimization, and computation in Chemical Engineering in General. In the second part of the talk, I will present the problem of operating sustainable chemical processes, taking the example of a wastewater treatment plant as a motivating case study, and discuss how control and estimation techniques could improve real-time operation of such systems. In particular, I will discuss operation problems associated with processes intensification, time-varying effluents and user demands, and poorly known transfer coefficients, and discuss research projects associated with those problems.