BiophysTO Lunchtime Seminar Series

Date

Thursday, November 15, 2018
12:00 pm

Location

McLennan Physical Labs, MP606
60 St George Street

Pizza and refreshments provided

Prof. Radhakrishnan Mahadevan

University of Toronto

Metabolic Modeling for Designing Microbes and Communities

Improved understanding of the organization of metabolic networks can enable the more effective control of metabolism for several applications ranging from metabolite overproduction to treatment of metabolic diseases. Advances in computational modeling techniques have allowed the development of genome-scale models of metabolism in several organisms. These models have become the basis for analysing the potential of metabolic networks and to understand their organization. Using such genome-scale metabolic models, we can understand and engineer microbial networks. In the first part of the talk, we will focus on the use of these models for engineering simultaneous sugar utilization in Escherichia coli using an bilevel optimization algorithm and in the second part, we will describe the application of these models for predicting inter species metabolite exchanges in a syntrophic community using mixed integer linear optimization problem. In the last part of the talk, we will focus on nonlinear phenomena such as bistability that cannot be captured by stoichiometric metabolic models and also discuss the identifiability of large scale kinetic models of metabolism to allow the development of genome-scale kinetic models for applications in metabolic engineering.

Bio:

Krishna Mahadevan is a Professor in the Department of Chemical Engineering & Applied Chemistry at the University of Toronto. He obtained his B. Tech from Indian Institute of Technology, Madras in Chemical Engineering in 1997 and then obtained his Ph.D. degree from the University of Delaware in Chemical Engineering in 2002.. His research interests are in the area of modeling, analysis and optimization of metabolism for applications in energy, environment and medicine.

Host: Prof. Sid Goyal

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