

RYERSON UNIVERSITY  
DEPARTMENT OF MATHEMATICS  
COLLOQUIUM

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Date: Thursday, November 7, 2019

Time: 12:10 pm

Location: ENG-LG12

**Mean Field Analysis and the Dynamics of  
Large Networks of Neurons**

**Abstract:** We use mean field analysis to study bursting in networks of all-to-all coupled, pulse-coupled neurons. The individual neurons are represented using a class of two-dimensional integrate and fire model. The mean field model is derived using a population density approach, moment closure assumptions and a quasi-steady state approximation. The resulting model is a system of switching ordinary differential equations and the transition to bursting involves both standard and nonsmooth bifurcations. We show that the results of the mean field analysis are a reasonable prediction of the behaviour seen in numerical simulations of large networks and how the presence of parameter heterogeneity and noise affects the results.

ALL FACULTY, STAFF, STUDENTS AND GUESTS ARE WELCOME TO ATTEND