



**The Hong Kong Polytechnic University
Department of Applied Mathematics**

Colloquium

A reduction for spiking integrate-and-fire network dynamics ranging from homogeneity

by

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In this talk we provide a general methodology for systematically reducing the dynamics of homogeneously-structured integrate-and-fire networks down to an augmented 4-dimensional system of ordinary-differential-equations. Our reduction succeeds where most current firing-rate and population-dynamics models fail because we capture the emergence of 'multiple-firing-events' involving the semi-synchronous firing of many neurons. These multiple-firing-events are largely responsible for the fluctuations generated by the network and, as a result, our reduction faithfully describes many dynamic regimes ranging from homogeneous to synchronous. Our reduction is based on first principles, and provides an analyzable link between the integrate-and-fire network parameters and the 'dynamic-skeleton' underlying the 4-dimensional augmented ODE.

Date : 19 May, 2015 (Tuesday)

Time : 11:00a.m. – 12:00noon

Venue : TU817, The Hong Kong Polytechnic University

*** * * ALL ARE WELCOME * * ***