



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

Seminar

On

Noise Attenuation during the Development of Spatial Pattern

by

**Dr. Zhang Lei
Department of Mathematics
City University of Hong Kong**

Abstract

Morphogens provide positional information for spatial patterns of gene expression during development. However, stochastic effects such as local fluctuations in morphogen concentration and noise in signal transduction make it difficult for cells to respond to their positions accurately enough to generate sharp boundaries between gene expression domains. In this talk, I will present a multiscale stochastic model to investigate a novel noise attenuation mechanism during the development in the zebrafish hindbrain. Computational analyses of spatial stochastic models show, surprisingly, that a combination of noise in RA concentration and noise in *hoxb1a/krox20* expression promotes sharpening of boundaries between adjacent segments. In particular, fluctuations in RA initially induce a rough boundary that requires noise in *hoxb1a/krox20* expression to sharpen. This finding suggests a novel noise attenuation mechanism that relies on intracellular noise to induce switching and coordinate cellular decisions during developmental patterning.

Date : 30 April, 2013 (Tuesday)

Time : 11:00 a.m. – 12:00 noon

Venue : HJ610, The Hong Kong Polytechnic University

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