



*The University of Western Ontario*

Faculty of Science

Department of Applied Mathematics

## APPLIED MATHEMATICS COLLOQUIUM

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Date: Thursday, September 25, 2008

Time: 2:30 pm

Location: Middlesex College, Room 204

### **Multi-group Models, Graph Theory, and Global Lyapunov Functions: a Showcase of Applied Mathematics?**

**Michael Li**

**Applied Math Institute  
University of Alberta**

#### **Abstract:**

Mathematical modeling in epidemiology has been an excellent source for challenging mathematical problems, among them is the global-stability problem for multi-group models, an thirty-year-old open problem. In this talk, I will show a recent result in which we apply a new global Lyapunov function for single-group models due to Korobeinikov, combined with the power of Kirchhoff's Matrix Tree Theorem in graph theory, to resolve completely this open problem for a large class of multi-group models. I will also demonstrate that the Kirchhoff's Matrix Tree Theorem, which was invented for electrical circuits in 1847, is of interest for mathematicians in its own right. The talk will be aimed at a general audience including graduate and senior undergraduate students.