

Graduate Seminar in Mathematics

Dr. Jahrul Alam,
Memorial University

Thursday, October 4, 2012
3:00p.m., HH-3026

An introduction to modelling nanofluidics technology

Abstract:

Nanofluidics is often defined as the study and application of fluid flow containing nanoparticles (1 nm-100 nm), and is a classical problem of multiphysics modelling. For example, a nanofluid may be composed of water and carbon nanotubes, where multiple physical phenomena occurs simultaneously. There are growing interests with the nanofluid technology in many industrial applications. Two objectives of this talk include – exploring fundamental concepts of nanofluidics modelling and a brief introduction to a novel Lagrangian approach for computing nanofluid dynamics.

Simultaneous presence of multiple physics makes the computation of nanofluidics a challenging endeavor. A stable numerical method that converges quickly may not resolve heat and mass transfer sufficiently when advection and diffusion occurs simultaneously at various rates. In this talk, I will briefly outline a model of heat and mass transfer in nanofluidics, where I will use basic concepts from dynamical systems and partial differential equations. Finally, I will outline the idea of the Lagrangian modelling approach, exploring some bio-medical engineering applications of nanofluidics.