Graduate Seminar

First Speaker:

Mohammad Alamgir Hossain,
Memorial University

Thursday, February 6

1:00 p.m., HH-3017

Numerical Modelling of the Urban Heat Island Circulation

Abstract:

Human activities accumulate solar energy, making city areas significantly warmer than their surrounding rural areas. Air circulation due to this heat source is known as the urban heat island circulation, where warm air parcels rise upward in metropolitan areas, dragging colder air mass from the surrounding rural areas. Such a thermal convection interacts with clouds and moisture, and possibly enhances turbulence mixing in the lower atmospheric boundary layer. As a result, urban heat island influences local weather in several ways. In this talk, I will briefly present some of my research on the numerical modelling of the urban heat island flow over a flat terrain. In contrast to classical atmospheric models, which typically employ an explicit scheme, I have studied a Crank-Nicolson approach based on a Jacobian free Newton-Krylov methodology, where spatial derivatives are approximated with an iterative interpolation scheme. This approach was not fully investigated in the field of atmospheric modelling. I aim to focus on the verification of this numerical model, and will discuss some potential benefits of this novel atmospheric modelling approach.

Second Speaker:

Shaoxiong Hou,
Memorial University

Musielak-Orlicz BMO-Type Spaces

Abstract:

 Classic BMO (bounded mean oscillation) space introduced by John and Nirenberg has wide applications. For example, it play an essential role in the operator boundedness theory. Musielak-Orlicz functions are some interesting functions including not only spatial variable but also time variable, which is a natural generalization for the classic Muckenhoupt weight functions and Orlicz functions. In this talk, we will discuss how to use the Musielak-Orlicz functions to generalize the classic BMO space and its application.