

## Discrete Mathematics Seminar

Time: Friday, 26 April 2013, 1:00 – 2:00 PM

Location: 238 Derrick Hall

Title: Balanceable Oriented Hypergraphs: Unravelling The Lie Inside Hypernetworks

Speaker: Dr. Lucas Rusnak, Mathematics Department

### **Abstract:**

The classification of the minimally dependent columns, or circuits, of  $\{0, 1, -1\}$ -matrices have a natural division into three families – balanced, balanceable, and unbalanceable. The concepts of balance and balanceability have known applications in networking and social networking, while unbalanceability has received little attention.

First, we will review some introductory hypergraphic structures and discuss the balanced circuit classification as an extension of graph theory. We will then examine new hypergraphic concepts critical to understanding the structure of balanceable oriented hypergraphs before proving the balanceable circuit structure theorem which subsumes the balanced circuit theorem. Finally, we will discuss various open problems as time permits.