Discrete Mathematics Seminar

Time: Friday, 24 September 2010, 12:30-1:30 PM
Room: 238 Derrick Hall
Title: Representable matroids, oriented hypergraphs, and the circuit classification theorem
Speaker: Dr. Lucas Rusnak, Mathematics Department

Abstract:

A matroid is a combinatorial object that captures the essence of independence whose structure underlies linear algebra, graph theory, and many questions in combinatorial optimization. In this talk I will introduce the concept of a matroid and highlight some of the fundamental questions of matroid theory before introducing the concept of an oriented hypergraph as a matroidal model. I will discuss my results and the current state of the circuit classification theorem for representable matroids, along with some of my conjectures within this emerging theory.

Bio:

Lucas has spent the past nine years in mathematics and mathematics education, spending the past three years as a Lecturer at Binghamton University after being encouraged to complete a Ph.D. by his friend and advisor Thomas Zaslavsky. With his original focus on mathematics education at Binghamton Lucas taught over two dozen courses over all ranges of specialties, helped develop freshman learning communities, served as a faculty coordinator with the Educational Opportunity Program, helped introduce a new course on Mathematical Modeling, served as an academic standards reviewer, and worked as co-editor for three introductory text books now being used at Binghamton.

In 2006, his discovery of a coherent hypergraphic model of matroids was received with equal amounts of excitement and disbelief, and Lucas spent the next four years on the development of the theory of oriented hypergraphs. After being invited to speak at Cornell University and the Courant Institute of NYU the general acknowledgement of a new, but still incomplete, approach to matroid theory was emerging and Lucas was invited to speak at the Special Session of Matroid Theory at the 2010 Spring Southeastern AMS Sectional Meeting. It was at the Southeast Sectional where Lucas was encouraged by Neil Robertson to produce a short, intensive, graduate course on oriented hypergraphs and was subsequently invited to the *Second Workshop on Graphs and Matroids* at Maastricht University on August 2010.

His original work, *Oriented Hypergraphs*, is currently available in a 190 page monograph, while a more complete version is available as a preprint and should be appearing early 2011.