Discrete Mathematics Seminar

Time: Friday, 1 October 2010, 12:30–1:30 PM
Location: 238 Derrick Hall
Title: Diamonds Are Forever: on the largest collection of subsets without $A \subset B, C \subset D$
Speaker: Dr. Jacob Manske, Mathematics Department

Abstract:

For a positive integer n, let $[n]$ denote the integer set $\{1, 2, \ldots, n\}$. We try to find the largest collection of subsets $\mathcal{F}$ of $[n]$ which does not contain a specified configuration of subsets. For instance, the classical theorem of Sperner concerns the largest collection of subsets of $[n]$ such that no two sets are comparable (such a collection is called an *antichain*). We will focus on finding the largest collection of subsets of $[n]$ which does not contain four distinct sets A, B, C, and D such that $A \subset B, C \subset D$ (such a configuration is called a *diamond*, or Q_2). We reduce the best known upper bound on the size of such a collection, and examine a special case where we can reduce the bound further. This represents joint work with Maria Axenovich and Ryan Martin.

Bio:

Jacob Manske is a recent PhD graduate from Iowa State University. His thesis concerned problems from many different areas of combinatorics and related fields, such as relation algebras, Ramsey theory, coloring problems on the integer grid, and extremal problems on posets. In Spring of 2009, he received the Alberta Wolfe Research Fellowship award for his paper concerning representations of relation algebras.

He continues to do work on coloring problems on the Boolean lattice and extremal problems on posets. His collaborators include Jeremy Alm, Maria Axenovich, Ryan Martin, and Roger Maddux.