

**DISCRETE MATHEMATICS SEMINAR**  
CENTER FOR APPLIED MATHEMATICS AND SCIENCE  
DEPARTMENT OF MATHEMATICS  
UNIVERSITY OF WEST GEORGIA

**1:15 - 2:05 PM, Friday, January 27, 2017**

**BOYD 306**

Speaker: **Dr. Hemanshu Kaul** (Illinois Institute of Technology)

Title: **On the List Chromatic Number of the Cartesian Product of Graphs**

Abstract:

The list chromatic number of the Cartesian product of graphs is not well understood. The best result is by Borowiecki, Jendrol, Kral, & Miskuf (2006) who proved that the list chromatic number of the Cartesian product of two graphs can be bounded in terms of the list chromatic number and the coloring number of the factors, implying a bound exponential in the list chromatic number of the factors. We show how to improve this bound for certain large classes of graphs and by finding classes of chromatic-choosable Cartesian product of graphs.

We generalize the notion of strong critical graphs (Stiebitz, Tuza & Voigt, 2008) to strong  $k$ -chromatic choosable graphs, and, we show, it gives a strictly larger family of graphs that includes odd cycles, cliques, join of a clique with any other such graph, and many more families of graphs. Our main result gives a sharp bound on choosability of the Cartesian product of a strong  $k$ -chromatic choosable graph and a traceable graph. This result can be applied to find chromatic-choosable families of graphs improving the existing bounds. We use the notions of unique-choosability as a sufficient condition for list colorability (Akbari, Mirrokni & Sadjad, 2006) and list color function (list coloring analogue of the chromatic polynomial).

This is joint work with Jeffrey Mudrock (IIT).