

Name: Nick Harvey

Title of talk: Randomized Algebraic Algorithms for Matching and Matroid Problems

Abstract:

The task of finding a maximum matching in a graph is one of the classical problems in the theory of algorithms, inspiring the definition of the class P. Until recently, the fastest algorithm for this task took $O(n^{2.5})$ steps in an n vertex (dense) graph. But an exciting development due to Mucha and Sankowski (FOCS '04) dropped the running time to $O(n^w)$ where $w < 2.38$ is the exponent of matrix multiplication. However, their result was quite complicated, relying on certain structural decompositions of graphs and complicated data structures to maintain certain properties dynamically.

In this talk, I will present two new results: The first is a simple randomized algorithm achieving the same result, allowing for a self-contained presentation of this result. The second is an extension of this algorithm to the task of matroid intersection (for linear matroids over any field).