Colloquium

January 30, 4:05 p.m. (9th Period)

(in the Atrium)

Speaker: Colin Defant

Title: Structure in Stack-Sorting

Abstract

The study of permutation patterns, an enormous area of research in modern combinatorics, began with Knuths analysis of a certain stack-sorting algorithm in 1968. In his 1990 PhD. Thesis, West investigated a deterministic variant of Knuths algorithm, which we can view as a map, s, that sends permutations to permutations. He defined the fertility of a permutation to be the number of preimages of that permutation under s. We will sketch a colorful method for computing the fertility of any permutation. Applications of this method will allow us to connect the stack-sorting map with free probability theory, set partitions, acyclic orientations of graphs, lattice paths, and several well-studied sequences. We will also discuss two operators on words that extend the stack-sorting map.