Discrete Mathematics Seminar
November 12, 2014, 10:30 a.m., Ross N638

SPEAKER: Neal Madras, *York University*

TITLE: A Combinatorial Model of a Polymer Phase Transition

ABSTRACT: I shall first introduce some standard discrete models for configurations of a large polymer molecule: the self-avoiding walk for linear polymers, and lattice trees and lattice animals for branched polymers. I shall then consider the adsorption (adhesion) of a polymer onto a plane (within 3-space). The plane could represent an impenetrable surface (e.g. the wall of a container) or a penetrable surface (e.g. a layer in a liquid solution). We consider all lattice trees, say, of a fixed large size, and weight each one according to the number of its vertices that lie in the plane. This leads to a simple "phase transition": namely, the abrupt transition from "adsorbed" to "desorbed" as the weight parameter is decreased below a certain critical value. I shall show how combinatorial and analytic arguments shed mathematical light on the location of the critical value of the transition. The contrast between the penetrable and impenetrable cases will be highlighted.