The cube and octahedron recurrences

Date Tuesday, March 3

Time 5:30 pm

Location 303 Mudd

Abstract: The cube and octahedron recurrences are two recurrences defined one a three dimensional lattice; they were first introduced to cominatorialists by Propp. If we fix a roughly two dimensional set of initial conditions, all of the other values of the reucrrence are rational expressions in the initial terms. Propp conjectured and Fomin and Zelevinsky proved that in each recurrence these rational expressions are actually Laurent polynomials. Propp additionally conjectured that the coefficients of these Laurent polynomials were all 1.

I will describe combinatorial proofs of these conjectures, due to myself in the octahedral case and joint work between myself and Gabriel Carroll in the cube case. I will then explain ongoing work with Andre Henriques and Dylan Thurston, attempting to generalize these results to lattices of higher rank. Expect to see perfect matchings, spanning trees, Grassmannians, spin groups and more!