Geometry, Groups and Dynamics/GEAR Seminar
(held at the Illinois hub of GEAR)

12:00 pm, 243 Altgeld, Tuesday, September 11, 2018

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From the dynamics of surface automorphisms to the computational complexity of 3-manifolds

Abstract: Every 3-manifold admits a Heegaard splitting, and many 3-manifold invariants admit formulas using Heegaard splittings. These facts are one starting point for a common theme in the study of 3-manifolds: one can relate various topological or geometric properties of 3-manifolds to dynamical systems in 1 or 2 dimensions. We'll explore this theme in the context of computational complexity. I'll start with two examples (coloring invariants and the Jones polynomial) that translate dynamical properties of mapping class group actions into complexity-theoretic hardness properties of 3-manifold invariants. I'll conclude with some brainstorming about future directions. I will introduce all of the necessary complexity theory as we go.