

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

Thursday, January 29, 2015, 1:00 pm in 243 Altgeld Hall

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Certifying the Thurston norm via twisted homology

Abstract: From the very beginning of 3-manifold topology, a fundamental task has been to find the simplest surface in a given 2-dimensional homology class, e.g. the Seifert genus of a knot in the 3-sphere. The behavior of the minimal topological complexity as the homology class varies is encapsulated in the Thurston norm. In this talk, I will discuss tools for proving that a particular surface has minimal genus. These are generalizations of the classical Alexander polynomial, but are defined using homology with coefficients twisted by some finite-dimensional representation of the fundamental group of the manifold. I will discuss recent work with Ian Agol on situations where using representations coming from hyperbolic geometry suffices to provide such certificates. If time permits, I will sketch how all of this relates to fundamental questions about the computational complexity of finding the Thurston norm. Only basic facts about manifolds and homology will be assumed.

[Video](#)