Department of Mathematics and Statistics

Special Colloquium

Dr. Elizabeth Field
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From geometry and topology to algebra and back again

Abstract: In this talk, I will discuss some results which make use of and build upon the rich connections between the fields of algebra, geometry, and topology. I will begin by discussing surfaces and will explore some connections between algebraic properties of their groups of symmetries and the underlying topological properties of the surface. I will then discuss the interplay between the topology of surfaces, the dynamics of their homeomorphisms, and the geometry of 3-manifolds. In particular, I will build upon works of Thurston, Brock, and Agol to give volume bounds for certain hyperbolic 3-manifolds. Finally, I will give a classical result of Cannon and Thurston which links the geometry and dynamics of fibered 3-manifolds to algebraic properties of their fundamental groups, and will discuss how this result can be extended to better understand the algebra and geometry of more general hyperbolic groups and their subgroups.

Keywords: surfaces, 3-manifolds, topological groups, mapping tori, hyperbolic groups.

Monday, Feb. 5, 1:05 − 1:50 pm - Zoom meeting