Geometry–Topology Seminar

Ian Biringer

Yale University

will speak on

Geometric consequences of algebraic rank in hyperbolic 3–manifolds

ABSTRACT: Mostow's rigidity theorem states that a closed hyperbolic 3–manifold M is determined up to isometry by the algebra of its fundamental group. We will discuss how the geometry of M is constrained by the minimal number of elements needed to generate its fundamental group; this invariant is called the (algebraic) rank of M. In particular, we will explain how M can be decomposed into a number of geometric building blocks such that the complexities of the blocks and of the decomposition depend only on M's algebraic rank and on a lower bound for M's injectivity radius.

Our work links rank and injectivity radius to a number of other geometric invariants, including Heegaard genus, the Cheeger constant and the first eigenvalue of the Laplacian. One can also use the techniques involved to prove a finiteness statement for the number of commensurability classes of arithmetic closed hyperbolic 3–manifolds with bounded rank and injectivity radius.

Tuesday, 6 April 2010
Lecture at 3:30 pm
Room 617, Wachman Building
Department of Mathematics