Department Colloquium

Speaker: Steven Frankel, Yale University
Date: Friday, November 11
Time: 2:30 p.m.
Place: Jeffery 234
Title: Hyperbolicity in dynamics and geometry

Abstract: A dynamical system, such as a flow or transformation, is called \emph{hyperbolic} if it tends to stretch and contract the underlying space in different directions. This behavior often appears for systems that are sufficiently mixing and/or volume preserving -- think of the striations that appear when mixing a drop of milk into coffee -- and it lends these systems a kind of rigidity that can be useful in understanding their long-term behavior. In this talk, we will look at a number of hyperbolic dynamical systems, including Anosov and pseudo-Anosov flows and transformations, and illustrate some of the uses and consequences of their hyperbolic behavior. In addition, we will see that the dynamics of a hyperbolic system can often be understood in terms of a simpler, lower-dimensional system that lies "at infinity." This is an important part of the proof of Calegari's Conjecture, which relates the dynamical hyperbolicity of a flow with the geometric hyperbolicity of its underlying space: It says that any flow on a closed hyperbolic 3-manifold whose orbits are coarsely comparable to geodesics is equivalent, on the large scale, to a hyperbolic flow.