Mathematics, Statistics, and Computer Science   **@ UIC**

Departmental Colloquium

Arithmeticity, superrigidity and totally geodesic submanifolds

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Abstract: This talk is part of the Midwest Dynamical Systems Conference - http://homepages.math.uic.edu/~hurder/mwds2019/

Totally geodesic submanifolds play an important role in the theory of hyperbolic manifolds. I will discuss a new rigidity theorem in this context: if a finite volume hyperbolic manifold M contains infinitely many closed totally geodesic hypersurfaces, then M is arithmetic. This answers a question asked by Reid and McMullen. I will explain why it is natural to think of arithmetic manifolds as rare or special in this context. I will also discuss a variant of the theorem for closed totally geodesic submanifolds of higher codimension and also an analogue where M is complex hyperbolic.

I hope to give some ideas of the proofs. The proof in the real hyperbolic case is a combination of homogeneous dynamics with a superrigidity theorem also proven by dynamical methods. The proof in the complex hyperbolic case is more complicated. In addition to using those tools, it draws on the theory of Higgs bundles and also on a theorem about incidence geometry proven by Pozzetti in her study of maximal representations.

This is joint work with Bader, Miller and Stover.

Friday, November 1 at 3:00 PM in 636 SEO