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Matthew James Emerton* (emerton@math.northwestern.edu), Northwestern University, Department of Mathematics, 2033 Sheridan Rd., Evanston, IL 60208. *Topology, representation theory, and arithmetic: three-manifolds and the Langlands program.*

The Langlands program is an extensive web of theorems and conjectures concerning the existence of both automorphic forms (objects that are related to harmonic analysis and the representation theory of Lie groups) and representations of Galois groups, and the relationships between these two kinds of mathematical objects. In this talk, I will explain some ideas from the Langlands program, and will illustrate their (perhaps surprisingly) wide range of application by describing how they can be used (following Frank Calegari and Nathan Dunfield) to construct closed hyperbolic three-manifolds of arbitrarily large injectivity radius that are rational homology spheres. (Received September 16, 2008)