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Edward Frenkel* (frenkel@math.berkeley.edu), Department of Mathematics, University of California, Berkeley, CA 94720. *Langlands Program, Trace Formulas, and their Geometrization.*

The Langlands Program relates Galois representations and automorphic representations of reductive algebraic groups defined over number fields and the fields of functions on curves over finite fields. The trace formula is a powerful tool in the study of this connection. After giving an introduction to the Langlands Program and its geometric version, which applies to curves over finite fields as well as over the complex field, I will outline a conjectural framework of "geometric trace formulas" in the case that the curve is defined over the complex field. It exploits a categorical formulation of the geometric Langlands correspondence. The talk is based on my joint work with Robert Langlands and Ngo Bao Chau ([arXiv:1003.4578](https://arxiv.org/abs/1003.4578), [arXiv:1004.5323](https://arxiv.org/abs/1004.5323)). (Received September 18, 2011)