Speaker: Andrew Sutherland

Title: Sato-Tate distributions

Abstract: The Sato-Tate conjecture predicts the asymptotic distribution of normalized Frobenius traces of the reductions modulo primes p of a fixed elliptic curve over Q without complex multiplication. It was independently formulated by Mikio Sato and John Tate in the early 1960's; thanks to recent work by Richard Taylor and others, it is now a theorem. The Sato-Tate conjecture has a natural generalization to abelian varieties over number fields, due to Serre, in which one associates to each abelian variety A a compact Lie group G, the Sato-Tate group of A, together with a map that sends Frobenius elements to conjugacy classes of G; the conjecture then states that the images of Frobenius elements are equidistributed with respect to the Haar measure of G. For abelian varieties of dimension 1 and 2, the possible Sato-Tate groups have been completely determined: there are 3 that arise in dimension 1 (elliptic curves) and 52 that arise in dimension 2 (abelian surfaces). I will give an overview of these results and discuss the current state of progress in dimension 3.