JOHN VOIGHT, Dartmouth College
Sato-Tate groups and modularity for atypical abelian surfaces

We discuss in detail what it means for an abelian surface A over a number field to be modular, organizing conjectures and theorems that associate to A a modular form with matching L-function. The explicit description of this modular form depends on the real Galois endomorphism type of A, or equivalently on its Sato–Tate group. For A defined over the rational numbers, this description can involve classical, Bianchi, or Hilbert modular forms; and for each possibility, we provide a genus 2 curve with small conductor from which it arises. This is joint work with Andrew Booker, Jeroen Sijsling, Andrew Sutherland, and Dan Yasaki.