Speaker: Wei Ho

Title: Coregular Representations and Elliptic Curves

Abstract: Representations of reductive groups with polynomial rings of invariants are called coregular. In this talk, we show how the orbits of most of these representations are closely related to moduli spaces of genus one curves with extra data, such as line bundles, vector bundles, or points on their Jacobians. Using these descriptions of the moduli spaces as orbit spaces, together with some counting techniques, we may compute the average size of the 2-Selmer and/or 3-Selmer group in certain natural families of elliptic curves over the rational numbers. In particular, this allows us to prove that (the limsup of) the average rank is bounded in these various families of elliptic curves.

This is joint work with Manjul Bhargava.