Speaker: Victor Wang

Title: Sums of cubes and the Ratios Conjectures

Abstract: I will explain how the Ratios Conjectures of Conrey, Farmer, and Zirnbauer over a certain family of L-functions, when combined with other analytic and algebro-geometric ingredients, allow one to conditionally (on standard number-theoretic hypotheses) prove a conjectured asymptotic dichotomy of Hooley and Manin for the six-variable cubic equation

$$x_1^3 + \cdots + x_6^3 = 0$$

in the circle method. This is based on my thesis work under Peter Sarnak, and has statistical applications to sums of three cubes. The softest hypotheses in my work seem to lie just beyond what one might hope to prove unconditionally in the function-field setting by directly adapting recent works of Bui, Florea, and Keating (which build on works of Soundararajan and Harper on moments of zeta).