

Speaker: Frank Calegari

Title: The modularity of genus two curves

Abstract: In his celebrated work on Fermat's Last Theorem, Wiles introduced a fundamental new idea (the Taylor-Wiles method) for relating objects in arithmetic geometry (genus one curves over \mathbb{Q} and their point counts modulo p for all primes p) to analysis (modular forms). In the last 25 years, the Taylor-Wiles method has been adapted and generalized to a multitude of different contexts, including to higher dimensional Galois representations (or motives) in the work of Clozel-Harris-Taylor. And yet, all of these generalizations came with an inherent limitation that meant (for example) that they did not apply to what one might naively consider to be the next case, namely, that of genus two curves. In this talk, I will describe joint work of George Boxer, Toby Gee, Vincent Pilloni, and myself in which we manage to overcome some of these obstacles, and prove the Hasse-Weil conjecture for genus two curves over \mathbb{Q} ?