Mathematics Department Colloquium

Organizer: Nicolai Reshetikhin

Thursday, 4:10–5:00pm, 60 Evans

Oct. 25 **Kenneth Ribet**, UC Berkeley

Serre's Modularity Conjecture

I will describe recent work of Khare, Wintenberger, Kisin and others that has led to the proof of a famous conjecture made by Serre in 1972 and then, in a much more precise form, in 1987. The conjecture proposed a precise relation between classical modular forms and certain 2-dimensional mod p representations of the absolute Galois group of the rational field. The proof may be viewed as an elaborate induction on the pair of numerical invariants that Serre associates to a given representation. It employs a number of clever new ideas, together with such inputs as the relative modularity theorems of Taylor–Wiles, Skinner–Wiles and Kisin; potential modularity theorems of Taylor; deformation theory à la Mazur.

The talk will focus on the history of the conjecture, numerical examples, and links with the circle of ideas that were used to prove Fermat's Last Theorem in the mid-1990s.