Abstract: The Galois group is an algebraic object which is designed to capture the symmetries of polynomial equations in one variable. Somewhat miraculously, it ends up encoding lots of information about the solutions of polynomial equations in any number of variables (algebraic varieties). Cohomology allows us to obtain "motivic" information about the Galois group through this arithmetic-geometric interaction. Certain analytic objects known as modular, or automorphic, forms yield a perhaps even more surprising, source of Galois-theoretic information. Moreover, Galois representations often mediate the subtle and fruitful interaction between motivic and automorphic data, as in the celebrated Shimura-Taniyama-Weil conjecture proved in the 90s. Very recent work of Khare, Wintenberger, and Kisin has now yielded a complete solution to a deep conjecture of Serre on an automorphic-Galois correspondence of great import.

In this non-technical and expository talk suitable for graduate students, I will try to describe this web of interactions between algebraic, arithmetic, geometric, and analytic objects.

Thursday Apr 26, 4:00 pm
MSC Rm W201

Refreshments will be served at 3:30 in the Department Lounge.