Temple University Mathematics Colloquium

Jordan Ellenberg

University of Wisconsin

will speak on

New developments in homological stability and FI-modules

ABSTRACT: In topology and algebraic geometry one often encounters phenomena of *stability*. A famous example is the cohomology of the moduli space of curves M_g; Harer proved in the 1980s that the sequence of vector spaces $H^i(M_g, \mathbb{Q})$, with g growing and i fixed, has dimension which is eventually constant as g grows with i fixed. In many similar situations one is presented with a sequence $\{V_n\}$, where the V_n are not merely vector spaces, but come with an action of the symmetric group S_n. In such cases, the dimension of V_n does not typically become constant as n grows – but there is still a sense in which it is eventually "always the same representation of S_n" as n grows. The preprint *http://arxiv.org/abs/1204.4533* shows how to interpret this kind of "representation stability" as a statement of finite generation in an appropriate category; we'll discuss this set-up and some applications to the topology of configuration spaces, the representation theory of the symmetric group, and diagonal coinvariant algebras. As a sample result, we explain how to show that the i-th Betti number of the configuration space of n (ordered) points on a manifold M is, for large enough n, not constant, but rather a polynomial in n. This is joint work with T. Church, B. Farb, and R. Nagpal, and is in some sense a sequel to Church's talk at Temple in February 2012.

Monday, April 8, 2013
Lecture at 4:00 pm
Coffee, tea, and refreshments from 3:40 pm
Room 617, Wachman Hall
Department of Mathematics