RAVI VAKIL, Stanford University, Stanford, CA 94305, USA
Double Hurwitz numbers and the intersection theory of the moduli spaceof curves

The moduli space of genus g curves, the "parameter space" of all genus g Riemann surfaces, is a central object in geometry. Its topology exhibits some remarkable structure. As an important example, Faber's "intersection number conjecture" predicts that its cohomology ring exhibits unsuspected combinatorial structure, related to the symmetric group. This conjecture will soon be a theorem, thanks to Givental's proof of the "Virasoro conjecture for projective space" and the details soon to be provided in a book by Lee and Pandharipande. However, this proof does not "explain" why this combinatorial structure should be there. Ian Goulden, David Jackson, and I hope to do this by exploiting a relationship of these intersection numbers with double Hurwitz numbers; this programme is complete in a large class of cases ("up to three points"). In this lecture I will give an introduction to the moduli space of curves and Faber's conjecture, and I will give some impression of how to translate these geometric questions into combinatorics.

The translation uses joint work with Tom Graber.