Abstract: This is the first of two colloquia highlighting our new Research Assistant Professors. Titles/abstracts are as follows:

(Michelle) Title: Arithmetic hyperbolic 3-manifolds

Abstract: The study of virtual properties of 3-manifolds groups has played a key role in major recent developments in 3-manifold topology. In this talk I will motivate and introduce the study of arithmetic hyperbolic manifolds and discuss some recent results on quantifying their virtual properties.

(Marcus) Title: Zeros of Polynomials and Central Limit Theorems

Friday, September 20 at 3:00 PM in 636 SEO
Abstract: Let \( f \) be a polynomial with non-negative real coefficients. Pemantle conjectured that if \( f \) has no roots close to \( 1 \in \mathbb{C} \), then the coefficients of \( f \) roughly trace out a Gaussian bell curve. In the language of probability, this says that the random variable \( X \) defined by \( \frac{f(z)}{f(1)} = \sum_k P(X = k)z^k \) is close to a normal variable provided the variance of \( X \) is large and \( f \) has no roots near 1. I will discuss a complete resolution of this conjecture in a strong quantitative form. Additionally, if \( f \) has no roots with small argument, then \( X \) must be approximately normal, again in a sharp quantitative form. Time permitting, I will discuss an application of these results to probability and combinatorics. This talk is based on joint work with Julian Sahasrabudhe.