



Seminar/Talk

Arithmetic consequences of additive combinatorics

Katy Woo

ETH, Institute for Theoretical Studies

Host: Vivian Kuperberg

There is a long-standing history of using prime counting results to prove new theorems about arithmetic objects; Dirichlet's theorem on primes in arithmetic progressions was a key input in Hasse's original proof of the local-to-global principle for quadratic forms over $\mathbb{Q}$. In Corollary X.6.2.1 of Silverman's "The Arithmetic of Elliptic Curves", any elliptic curve of the form $y^2 = x^3 + px$ for p a prime number congruent to $7 \bmod 16$ is shown to have rank zero; Dirichlet's theorem can be applied to show that there are infinitely many such elliptic curves. The breakthrough work of Green, Tao, and Ziegler on simultaneously prime values of linear systems was applied both to study Brauer-Manin obstructions to local-to-global principles for certain conic bundles and to construct families of elliptic curves with rank 1. In this talk, we will build on the seminal work of Green and Sawhney to prove new instances of the multivariate Bateman-Horn conjecture; the key input will be methods from additive combinatorics. We will then discuss how to use these new prime counting results to study the Brauer-Manin obstruction to local-to-global principles for an expanded class of conic bundles and construct quadratic twist families of elliptic curves with rank 2. This talk is based on joint work with Niven Achenjang.

Wednesday, November 11, 2026 01:00pm - 02:00pm

Mondi 2, Central Building



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.

Please find a schedule of the ISTA Shuttle on our webpage:

<https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.