
Blair Spearman Doctoral Prize
Prix de doctorat Blair Spearman

CHI HOI YIP, Georgia Institute of Technology
Some inverse problems in arithmetic combinatorics

In this talk, I will give a gentle introduction to some of my favorite problems in arithmetic combinatorics and highlight some recent progress. In particular, I will discuss:

- A question of Erdős on whether the set of perfect squares can be close to a sumset, and a multiplicative analogue by Hajdu and Sárközy.
- A conjecture of Van Lint and MacWilliams on the characterization of maximum subsets of a finite field of square order such that pairwise differences are all squares (also known as the Erdős-Ko-Rado theorem for Paley graphs), and its generalization.
- Inverse sieve problems (that have been studied by Green–Harper, Helfgott–Venkatesh, Shao, and Walsh), motivated by the inverse Goldbach problem.

Joint work with Shamil Asgarli, Ernie Croot, and Junzhe Mao.