RAINICH LECTURE SERIES
OCT. 26-28, 2021

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Title: **Lecture #1: $3987^{12} + 4365^{12} = 4472^{12}$ (almost)**
Tuesday Oct 26, 4-5pm EH 1360

Abstract: Not quite! How do we produce such fake solutions? I will review work of several authors (Coppersmith, Elkies, Bombieri-Pila, Heath-Brown) about this, and the related question of bounding the number of integral solutions to a polynomial equation $P(x1, ..., xn) = 0$. I will then explain a recent result with Lawrence and Ellenberg (https://arxiv.org/abs/2109.01043) showing that integral points are "rare" on many natural moduli spaces.

Title: **Lecture #2: Symplectic L-Functions and Their Topological Analogues**
Wednesday Oct 27, 4-5pm EH 1324

Abstract: The topology of the symplectic group enters into many different areas of mathematics. After discussing a couple of "classical" manifestations of this, I will explain a new one, in the theory of L-functions, as well as a purely topological analogue of the statement. I am not going to assume any familiarity with the theory of L-functions for the talk. Joint work with Amina Abdurrahman.

Title: **Lecture #3: Relative Langlands duality**
Thursday Oct 28, 4-5pm EH 1324

Abstract: If we are given a compact Lie group G acting on a space X, a powerful tool in "approximately" decomposing the G-action on functions on X is the orbit method. I will describe this method and how it sometimes refines to an exact algebraic statement which involves a "dual" group G^ and dual space X^. This is part of a joint work with David Ben-Zvi and Yiannis Sakellaridis about duality in the relative Langlands program, and I will explain that viewpoint at the end and how it connects to lecture 2. I will do my best to make a large part of the talk comprehensible without familiarity with the framework of the Langlands program.

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