Abstract:
Motivated by questions in pointwise ergodic theory, modern discrete harmonic analysis, as developed by Bourgain, has focused on understanding the oscillation of averaging operators – or related singular integral operators – along polynomial curves. In this talk we present the first example of a discrete analogue of polynomially modulated oscillatory singular integrals; this begins to unify the work of Bourgain, Stein, and Stein-Wainger. The argument combines a wide range of techniques from Euclidean harmonic analysis and analytic number theory.