

BOSTON UNIVERSITY NUMBER THEORY SEMINAR

# Sieve Methods for Prehomogeneous Vector Spaces

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Monday, Nov 9 at 4:15 pm  
111 Cummington Street, MCS B21  
Tea and cookies in MCS 144 at 4:00 pm

**Abstract:** Prehomogeneous vector spaces and their close relatives can often be used to count arithmetic objects. In particular, number field discriminants, Selmer groups of elliptic curves, and other arithmetic objects can be parametrized by integer orbits on such spaces under the action of an algebraic group – leading to an analytic number theory problem with good prospects for a solution.

I will give an overview of some of the ways in which this procedure has been carried out – including, but very much not limited to, work of Taniguchi and the speaker. I will conclude by saying a little bit about our ongoing work, where we develop a method to understand and compute Fourier transforms of singular orbits on these spaces over finite fields. These Fourier transform structures indicate a surprising amount of structure, and lead to “level of distribution” results, to the possibility of applying sieve methods, and to arithmetic applications.