

# Philadelphia Area Number Theory Seminar

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## Concentration properties of theta lifts

**Abstract:** The classical conjectures of Ramanujan{Pettersson and Sato{Tate on the Fourier coefficients of modular forms, or more generally on the Satake parameters of automorphic representations, are highly sensitive to questions of functoriality. For example, the coefficients of CM modular forms are equidistributed according to a very different law from that of non-CM forms, and the first historical counter examples to the naive generalization of the Ramanujan conjecture were found amongst the theta lifts on the group  $Sp_4$ .

A more recent analogue of these conjectures looks at the  $L^p$  norms of automorphic forms (with  $p = 1$  corresponding to Ramanujan). Their concentration properties, at points or along certain cycles, are of general interest from both an analytic and arithmetic viewpoint. I will describe in this talk a few new results on the subject, joint with Simon Marshall, which attempt to clarify the structure of the problem: the  $L^p$  norms of an automorphic form are closely related to the asymptotic size of certain of its periods which in turn reflect the form's functorial origin. In particular, in work in progress, we show the existence of Maass forms, defined on hyperbolic manifolds and in the image of the theta correspondence from  $Sp_4$ , which concentrate, in a microlocal sense, along closed geodesics.

Wednesday, April 4, 2018 2:40 { 4:00 PM

Bryn Mawr College, Department of Mathematics  
Park Science Center 328

Tea and refreshments at 2:20PM in Park 339