



Speaker: Anantharam Raghuram
Purdue University

Tuesday, October 31, 2017

1:00 PM

125 Hayes-Healy Hall

Title: Arithmetic of Automorphic L-functions.

Abstract:

An L-function is a function of a complex variable that is attached to some interesting arithmetic or geometric object. Various analytic properties of the L-function shed light about structural properties of the object to which it is attached. (A classical example to drive home this point would be that the value at $s = 1$ of a Dirichlet L-function being nonzero implies the existence of infinitely many primes in arithmetic progressions.) I will begin my talk by introducing some of the basic conjectures and results that drive much of current research about L-functions, using as illustrative examples the classical Riemann zeta function, Dirichlet L-functions and the L-functions of modular forms. An important working principle attempts to construe an analytic theory of an L-function in terms of maps in the cohomology of a locally symmetric space. In the second part of my talk I will explain this principle for the standard L-function for cusp forms on $GL(2n)$ in terms of a Poincaré pairing for the cohomology of a locally symmetric space for $GL(n) \times GL(n)$. This was done in collaboration with Harald Grobner (see our 2014 paper in the American Journal of Math) which led us to prove rationality results for these L-functions on $GL(2n)$. I will finally discuss an ongoing project with Mladen Dimitrov and Fabian Januszewski, on the p-adic interpolation properties of the special values of L-functions for $GL(2n)$ and how that leads to nonvanishing results of these L-functions.