Title:

Nonvanishing theorems for L-functions and cohomology

Abstract:

Starting from a cuspidal automorphic irreducible representation π of a unitary group and a character χ, I will, in the first part of the talk, recall how the doubling method of Piatetski-Shapiro and Rallis allows to construct an automorphic L-function $L(s, \pi, \chi)$ with expected local L-factors at finite unramified primes, meromorphic continuation and functional equation. I'll end by stating non-vanishing results for special values of these L-functions when π_∞ belongs to the holomorphic discrete series.

Historically, it was the theta correspondence that led to the doubling method, using Rallis inner product formula. In the second part of the talk I will explain how to relate the non-vanishing of some $L(s, \pi, \chi)$ at special points to the non-vanishing of some theta lifts to unitary groups. Using unitary groups with only compact factors at infinity I will then use this to prove the non-vanshing results explain in the first part of the talk.

In return the non-vanishing of these special values imply the non-vanishing of theta lifts to unitary groups with non-compact factors at infinity. This implies new non-vanishing results for the cohomology of some arithmetic quotients. Hopefully I'll finish by giving examples of these.