On Certain L-functions

Titles and Abstracts

Jim Arthur (Toronto)

Title: The embedded eigenvalue problem for classical groups

Abstract: By "eigenvalue", I mean the family of unramified Hecke eigenvalues of an automorphic representation. Are there eigenvalues for the discrete spectrum that are embedded in those of the continuous spectrum? The answer is part of the classification of automorphic representations of classical groups. For general linear groups, it is provided by the classification theorem of Jacquet-Shalika. For the other classical groups, it leads to interesting combinatorial problems related to the endoscopic comparison of trace formulas.

Mahdi Asgari (Oklahoma State)

Title: Remarks on Kim's Exterior Square Transfer

Abstract: H. Kim has established Langlands Functoriality for the exterior square transfer from $GL(4)$ to $GL(6)$ over number fields. In this talk I will report on an ongoing project which aims to understand the image of this transfer. This is joint work with A. Raghuram.

Bill Casselman (UBC)

Title: The asymptotic behaviour of matrix coefficients

Abstract: An explicit formula for matrix coefficients of principal series, both real and p-adic groups, generalizing Macdonald's formula.

Laurent Clozel (Paris-Sud)

Title: Decomposition groups of minimally ramified extensions of $\mathbb{Q}$

Abstract: This is common work with Gaëtan Chenevier. Following a previous investigation of his, we study the decomposition group of extensions of $\mathbb{Q}$ ramified at two primes only. This relies on the construction of cohomological, cuspidal representations of $GL(2n)$ with minimal ramification. We prove unconditional results which, however, are predicted by Arthur's formalism for representations of classical groups. We also clarify the symplectic/orthogonal alternative for representations of $GL(2n)$.

Jim Cogdell (Ohio State)

Title: A report on functoriality

Abstract: Recently, with P-S and Shahidi, we have established the stability of certain of Shahidi's local coefficients for quasi-split groups G under highly ramified twists. This is used in the proof of functoriality from G to $GL(n)$ to finesse the lack of a full Local Langlands Conjecture for G. In this lecture I will review the ideas in the proof of functoriality from G to

$GL(n)$ via the converse theorem to place our stability result in context. Then I will outline what results we expect to follow from this stability in terms of functoriality and global and local applications. Finally, time permitting, I would like to speculate on what we need to be looking at if we expect to push these methods further.

Steve Gelbart (Weizmann)

Title: Shahidi's work "On certain L-functions"

Abstract: I shall survey Freydoon's life work by concentrating on ten papers. These papers were written over a thirty year period. All have to do with Langlands-Shahidi theory on the one hand, and functoriality on the other.

David Goldberg (Purdue)

Title: On Whittaker models for theta representations of higher coverings of classical and similitude groups

Abstract: We give a preliminary report of work in progress (jointly with S. Friedberg) on extending the methods of Kazhdan and Patterson to arbitrary degree metaplectic covers of classical and similitude groups. We examine the exceptional representation, the unique irreducible subrepresenation of a certain principal series, and parametrize its Whittaker space by free orbits of a certain action of the Weyl group. This allows us to determine when the exceptional representation admits a unique Whittaker functional.

Hervé Jacquet (Columbia)

Title: A relative trace formula approach to the Gross-Prasad conjecture for unitary groups.

Abstract: We outline a relative trace formula which could be used to prove the Gross-Prasad conjecture for unitary groups. For now, only the fundamental lemma (or rather its Lie algebra analogue) has been proved for the unitary group in 3 variables.

David Kazhdan (Hebrew U.)

Title: Hecke operators for affine Kac-Moody groups

Abstract: In joint work with A.Braverman we defined the ring of Hecke operators for affine Kac-Moody groups and identified it with the ring of integrable representations of the dual Kac-Moody group.

Henry Kim (Toronto)

Title: Langlands-Shahidi method and some exercises on exceptional groups

Abstract: I will review Langlands-Shahidi method for exceptional groups, with the assumption that the cuspidal representations have one spherical tempered component. I will divide into five different cases, and in two cases we can prove that the completed L-functions

are holomorphic except possibly at 0, 1/2, 1 under some local assumptions. I will give some examples.

Muthu Krishnamurthy (Iowa)

Title: A refined converse theorem for $GL(2)$

Abstract: In this talk I will discuss my work in progress with Andrew Booker. I will present a version of the "converse theorem" for $GL(2)$ where one can restrict the ramification of the twisting set at all finite places.

Phil Kutzko (Iowa)

Title: Understanding some results of Shahidi via the theory of types.

Erez Lapid (Hebrew U.)

Title: On a combinatorial problem connected to Arthur's trace formula

Colette Moeglin (Jussieu)

Title: Explicit description of Arthur's packets

Abstract: First of all, I will recall how we can obtain a fairly explicit description of tempered Langlands' packets using Harish-Chandra, Shahidi and Arthur's ideas at least for quasi split classical groups. By the way, I will explain the classification of the cuspidal representations.

Then I will use Arthur's definition of packets using stable transfer, to give an explicit description of these packets; this gives a parametrization which refines Arthur's data.

Goran Muić (Zagreb)

Title: The unramified unitary dual for split classical p-adic groups.

Abstract: Let F be a local non–Archimedean field of characteristic different than 2. Let S_n be one of the split classical groups $SO(2n+1,F)$, $Sp(2n,F)$, and $O(2n,F)$. We will describe the classification of unitarizable unramified representations of S_n in Zelevinsky type classification, a simple algorithm for testing unitarity of an unramified representation given by its Satake parameters, and describe the isolated points in the unramified unitary dual of S_n. This is a joint work with Marko Tadić.

Fiona Murnaghan (Toronto)

Title: Spherical characters of distinguished supercuspidal representations

Abstract: Let H be the fixed points of an involution of a connected reductive p-adic group G. An irreducible smooth representation of G is H-distinguished whenever there exists an

H-invariant linear functional on the space of the representation. If a representation is H-distinguished, and so is its contragredient, then we may associate to the representation a space of H-biinvariant distributions, called spherical characters. We will discuss some recent results concerning spherical characters of distinguished tame supercuspidal representations.

Dinakar Ramakrishnan (Caltech)

Title: Selfdual representations, globalization and signs

Abstract: This talk will discuss ongoing joint work with Dipendra Prasad concerning selfdual (and *-selfdual) representations of $GL(n, D)$, where D is a division algebra over local fields, and certain accompanying signs. The motivation and proofs are global. At a key point we use the transfer, due to Cogdell, Kim, Piatetski-Shaipro and Shahidi, of generic cusp forms on classical groups to $GL(2n)$.

Peter Sarnak (Princeton)

Title: Some classical applications sharp bounds towards the Ramanujan Conjectures

Chris Skinner (Princeton)

Title: Some p-adic aspects of Eisenstein series

Abstract: In the Langlands-Shahidi method Eisenstein series have proved to be a powerful tool for understanding the analytic behavior of various automorphic L-functions. This talk will focus on analogous results linking p-adic variation of Eisenstein series and properties of p-adic L-functions and the use of Eisenstein series to prove Birch-Swinnerton-Dyer-type results, linking special values of L-functions to orders of Selmer groups.

David Soudry (Tel Aviv)

Title: Poles of L-functions and theta lifts for orthogonal groups.

Abstract: We relate the first occurrence in the theta correspondence from an orthogonal group $O(m)$ to a symplectic or metaplectic group of rank j, such that $2j < m$, with the largest pole of certain Eisenstein series on $O(m + 2)$. This is an analogue of the work of Kudla and Rallis on the first occurrence for symplectic groups. There are two main ingredients in our characterization: one is due to Moeglin and the second is a formula for some period of a truncation of a certain Eisenstein series on $O(m + 2)$ related to the first occurrence. This is a joint work with D. Ginzburg and D. Jiang.

Birgit Speh (Cornell)

Title: Cohomology of arithmetic groups and modular symbols

Marie-France Vigneras (Jussieu)

Title: mod p representations of p-adic groups.

David Vogan (MIT)

Title: Special unipotent representations for E_8

Abstract: Arthur's conjectures point to representations of groups over local fields that are candidates to appear in the residual spectrum for automorphic forms. In particular, these representations are supposed to be unitary. In practice they are often extremely interesting unitary representations, difficult to understand or realize in other ways. (The term "special unipotent" singles out those of Arthur's representations most difficult to understand in more classical terms.) Arthur's formulation of his conjectures is indirect, and it is difficult even over the real numbers to identify his representations precisely (in the Langlands classification). In order to do that, one seems to need something close to character formulas for irreducible representations.

By a remarkable coincidence, character formulas for irreducible representations for the split real form of E_8 have turned up recently (thanks to Fokko du Cloux, Jeff Adams, and Marc van Leeuwen). It is therefore possible to make a complete list of the 144 special unipotent representations for this group. I'll talk about what we know about these representations, what is still mysterious, and whether unitary representations will ever make sense.