TORA V Speakers

Moshe Adrian, University of Utah

Title: Jacquet's Conjecture on the Local Converse Problem for Epipelagic Supercuspidal Representations of GL(n,F)

Abstract: Let F be a non-archimedean local field of characteristic zero. For any irreducible admissible generic representation of GL(n,F), a family of twisted local gamma factors can be defined using Rankin-Selberg convolution or the Langlands-Shahidi method. Jacquet has formulated a conjecture on precisely which family of twisted local gamma factors can uniquely determine an irreducible admissible generic representation of GL(n,F). In joint work with Baiying Liu, we prove that Jacquet's conjecture is true for epipelagic supercuspidal representations of GL(n,F), supplementing recent results of Jiang, Nien, and Stevens.

Mahdi Asgari, Oklahoma State University

Title: Rankin-Selberg Theory for GSpin Groups

Abstract: I will report on joint work with J. Cogdell and F. Shahidi, developing a Rankin-Selberg integral for the product of general spin and a general linear group. This generalizes parts of results of D. Ginzburg and D. Soudry and Gelbart-Piatetski-Shapiro-Rallis for classical groups. Our results are applied in establishing full Langlands transfer of generic automorphic representations from GSpin to GL.

Dan Barbasch, Cornell University

Title: Hermitian Forms for Iwahori-Hecke Algebras

Abstract: This talk will discuss star operations for Iwahori-Hecke algebras, joint work with Dan Ciubotaru. Hecke algebras are structures which are used to study the representation theory of p-adic groups. In particular by results of Barbasch-Moy and subsequently Barbasch-Ciubotaru, there is a precise relation between the unitary dual of a block of representations of a p-adic group and a particular Iwahori-Hecke algebra. In order to talk about unitarity for an algebra, one needs a star operation. For semisimple Lie algebras, star operations are essentially parametrized by real forms. An analogous situation exists for Hecke algebras, but the situation is more rigid. I will discuss in particular an algorithm for computing the hermitian form of an irreducible module. This work is inspired by results in the real case by Adams-Trapa-Yee- vanLeuwen-Vogan.

Jennifer Beineke, Western New England University

Title: Oppenheim Summation and Moments of the Riemann Zeta Function

Abstract: In a 1927 paper, Oppenheim generalized Voronoi's summation formula to obtain a representation for $D_a(x) = \sum_{n \leq x} \sigma_a(n)$ in terms of Bessel functions. Different applications of Oppenheim summation can be used to provide estimates for moments of the Riemann zeta function. We will describe a smooth version of Oppenheim's formula, and we will discuss ways in which it can relate Eisenstein series to moments.

Kwangho Choiy, Oklahoma State University

Title: Formal Degrees and Multiplicities in Restriction.

Abstract: We shall discuss the multiplicity of a discrete series representation of a connected reductive p-adic group when restricted to its closed subgroup containing the derived group. Based on the work of Hiraga-Saito (2011) and Gan-Ichino (2013), we relate the multiplicity to the formal degree. In particular, for inner forms of $SL(n)$ we establish a relation between the multiplicity, the cardinalities of elliptic L-packets, and the dimension of the component group.

Matthew Douglass, University of North Texas

Title: Hecke algebras and generalizations of the Steinberg variety

Abstract: Generalizations of the Steinberg variety of a reductive group combined with product constructions in bivariant (co-)homology theories provide a method for geometrically constructing "Hecke" algebras that arise in representation theory. In this talk I will give an overview of the basic constructions and then focus on two specific examples, one with equivariant homology and the other with equivariant K-theory.

Dihua Jiang, University of Minnesota

Title: Automorphic Forms and Endoscopy

Abstract: We start with elementary introduction to automorphic forms and the Langlands functoriality. Then we briefly review the classification of the discrete spectrum for classical groups by J. Arthur and C.-P. Mok, which prove the existence of the endoscopy structure of automorphic forms that was discovered by R. Langlands in early 1980s, based on the fundamental work of B.-C. Ngo, J.-L. Waldspurger, and others.

The main point of this talk is to give a general framework of explicit construction of endoscopy correspondences vie integral transforms with automorphic kernel functions.

Luis Lomeli, University of Oklahoma

Title: Uniqueness of Rankin-Selberg factors

Abstract: We show the equality of the γ-factors defined by Jacquet, Piatetski-Shapiro and Shalika with those obtained via the Langlands-Shahidi method. Our results are new in the case of positive characteristic, where we establish a refined version of the local-global principle for GL_n which has independent interest. In characteristic zero, the results are due to Shahidi, and we will also comment on this very important case. The comparison of γ-factors is made via a uniqueness result for Rankin-Selberg γ-factors over a non-Archimedean local field of positive characteristic.

Annegret Paul, Western Michigan University

Title: Unitarity versus non-unitarizability

Abstract: In this talk I will try to explain a small part of the theory and techniques for determining the unitary dual of a real reductive Lie group, starting with very basic definitions and classical results, making the case that proving non-unitarity of a given representation is easier than proving unitarity. I will conclude by giving an example of a non-unitarity result for the metaplectic group. This result represents joint work with A. Pantano and S. Salamanca-Riba.

Martha Precup, Baylor University

Title: Some geometric properties of Hessenberg varieties

Abstract: Hessenberg varieties are closed subvarieties of the full flag variety. In this talk, we discuss ways in which Hessenberg varieties encode combinatorial data. We'll state some of the results describing the geometry of these varieties and subsequent applications toward computing their cohomology and other basic properties.

Anna Puskás, Columbia University

Title: Metaplectic Demazure and Demazure-Lusztig operators

Abstract: This talk will cover some joint work with Gautam Chinta and Paul E Gunnells. We will review two different approaches to constructing p-adic metaplectic Whittaker functions. One approach, due to Chinta and Offen for GL_r and to McNamara in general, represents the spherical Whittaker function in terms of a sum over a Weyl group. The second approach, by Brubaker, Bump and Friedberg and separately by McNamara, expresses it as a sum over a highest weight crystal. The goal is to establish a direct connection between these two approaches. Demazure and Demazure-Lusztig operators appear in relevant formulas in the non-metaplectic setting: the Demazure Character formula, Tokuyama's theorem and the work of Brubaker, Bump and Licata in describing Iwahori-Whittaker functions. As a first step towards this goal, we define metaplectic analogues of Demazure and Demazure-Lusztig operators and present two character formulas involving the operators for the long word. Some work in progress, aiming to find similar formulas for metaplectic Iwahori-Whittaker functions will also be mentioned.

Olav Richter, University of North Texas

Title: Holomorphic projections and Ramanujan's mock theta functions

Abstract: In this talk, I will report on recent joint work with Ozlem Imamoglu and Martin Raum. We employ spectral methods of automorphic forms to establish a holomorphic projection operator for tensor products of vector-valued harmonic weak Maass forms and vector-valued modular forms. We apply this operator to discover simple recursions for Fourier series coefficients of Ramanujan's mock theta functions.

Loren Spice, Texas Christian University

Title: The effect of ramification on signs in supercuspidal character formulae

Abstract: The character formulae of Adler–Spice are stated in terms of (1) Yu's supercuspidal parameters, (2) Fourier transforms of orbital integrals, (3) indices of certain subgroups, and (4) fourth roots of unity. While (1) may be regarded as a 'basic', necessary ingredient, and the complexity of (2) is probably unavoidable, it is necessary for applications to have a precise understanding of (3) and (4). With proper normalisation of measures, (3) is just the 'discriminant blow-up' that Harish-Chandra describes. An understanding of (4) requires counting Galois orbits in root systems. In this talk, we discuss some Weyl-group combinatorics related to this counting problem.

Wan-Yu Tsai, University of Maryland

Title: Lift of the trivial representation to a nonlinear cover

Abstract: Let G be the real points of a simply laced, simply connected complex Lie group, and G be the nonlinear two-fold cover of G. We'll discuss a set of small genuine representations of G , denoted by Lift(C), which can be obtained from the trivial representation of G by a lifting operator. The representations in Lift(C) can be characterized by the following properties: (a) the infinitesimal character is rho/2; (b) they have maximal tau-invariant; (c) they have a particular associated variety O. When G is split, we will show that all representations in Lift(C) are parametrized by pairs (central character, real form of O) by examples.

Speed TORA Speakers

Jordan Alexander, Baylor University
Title: Quasi-dominance and the Wonderful Correspondence

Angela Berardinelli, University of North Texas
Title: Hyperplane arrangements and invariants of complex reflection groups

Juhyung Lee, Oklahoma State University
Title: A functional equation and degenerate principal series

Thomas Madsen, University of Oklahoma
Title: Types and covers for some quaternionic hermitian groups

Esteban Melendez, University of Texas-Pan American
Title: Symmetric representations for modular forms on congruence subgroups of level one, five, and seven

Hiro-aki Narita, Kumamoto University
Title: Epsilon dichotomy for some global theta lifts to GSp(1,1)

Aaron Yeager, Oklahoma State University
Title: Piatetski-Shapiro primes from almost primes

Justin Young, Ashland University
Title: Computing functions in non-unique local models