

TITLES & ABSTRACTS OF TALKS

Speaker: Reinier Broker

Title: Computing Fourier coefficients of theta series

Abstract: In this talk we explain Patterson's method to effectively compute Fourier coefficients of theta series on the n -fold cover of GL_2 . We detail the computational challenges that arise when applying this method for several small n . For the case $n = 6$ we present a precise conjecture for the coefficients at square level. Furthermore, we report on the ongoing computation in the quintic case.

Speaker: Ben Brubaker

Title: Whittaker coefficients of maximal parabolic Eisenstein series

Abstract: 30 years ago, Goldfeld and Hoffstein, followed by a series of papers by Bump, Friedberg, and Hoffstein, recognized that Whittaker coefficients of metaplectic Eisenstein series provide a rich source of multiple Dirichlet series. Their explicit evaluation has led to important non-vanishing and distribution results for arithmetic functions. In joint work with Friedberg, building on earlier work with Bump and Hoffstein, we discuss formulas for Whittaker coefficients of parabolic, metaplectic Eisenstein series.

Speaker: Alina Bucur

Title: Effective Sato-Tate

Abstract: Based on the Lagarias-Odlyzko effectivization of the Chebotarev density theorem, Kumar Murty gave an effective version of the Sato-Tate conjecture for an elliptic curve conditional on analytic continuation and Riemann hypothesis for the symmetric power L -functions. We use a stronger version of Chebotarev from the same Lagarias-Odlyzko paper to give a similar conditional effectivization of the generalized Sato-Tate conjecture for an arbitrary motive. As an application, we give a conditional upper bound of the form $O((\log N)^2)$ for the smallest prime at which two given rational elliptic curves with conductor at most N have Frobenius traces of opposite sign. Then we will talk about the corresponding result for higher dimensional abelian varieties.

Speaker: Daniel Bump

Title: Unique Models

Abstract: We will follow a thread of ideas and results beginning with older work of Hoffstein and his collaborators about various models such as the Whittaker, Bessel, spherical and Shalika models and their applications. The talks will culminate with recent work of Brubaker, Bump and Friedberg that relates several of these models on odd orthogonal groups in a unified way to representations of the affine Hecke algebra.

Speaker: Gautam Chinta

Title: Zeta functions of cubic rings

Abstract: We describe a double Dirichlet series constructed from zeta functions of cubic rings. This is a generalization of the double Dirichlet series constructed from quadratic characters studied by Goldfeld-Hoffstein. A novel feature of the present work is the use of Shintani zeta functions. This is a joint work with T. Taniguchi.

Speaker: YoungJu Choie

Title: Double Hecke L series

Abstract: We introduce two types of functional equations for double Hecke L series. The first one is a generalization of the functional equation for the Euler double zeta-function and the second one is more specific, which is proved when the coefficients are Fourier coefficients of cusp forms and the modular relation is essentially used in the course of the proof. As a consequence of functional equation we are able to determine trivial zero divisors. This is a joint work with Matsumoto.

Speaker: Adrian Diaconu

Title: Multiple Dirichlet series

Abstract: In this talk I will review some of Jeff Hoffstein's work on multiple Dirichlet series attached to quadratic twists of L-functions, and the relevance of studying these objects in number theory. If time allows, I will briefly discuss some recent work in the subject.

Speaker: William Duke

Title: Singular moduli of harmonic modular functions

Abstract: In this talk I will give some examples showing that special values at cm points of non-holomorphic, but harmonic, modular functions can be arithmetically interesting.

Speaker: Sol Friedberg

Title: Descent and theta functions for metaplectic groups

Abstract: We establish new relations for the Fourier coefficients of the theta functions on the 4 and 6-fold covers of $GL(2)$, as predicted by the conjectures of Patterson and Chinta-Friedberg-Hoffstein. These theta functions appear in the residual spectrum. To do so, we show that descent methods may be adapted to higher degree covers and show how they give relations between the Whittaker coefficients of theta functions on different groups. This is joint work with David Ginzburg.

Speaker: Paul Gunnells

Title: Modular forms and elliptic curves over number fields

Abstract: There have been many computational investigations into modularity of elliptic curves over number fields other than \mathbb{Q} , especially for imaginary quadratic fields (Cremona and his students, Dieulefait–Guerberoff–Pacetti) and real quadratic fields (Dembele). In this talk we present work that treats two very different examples: the CM complex quartic field of fifth roots of unity and the non-Galois cubic field of discriminant -23 . We will discuss our computational techniques and will give examples of elliptic curves over this field whose L-series apparently match those given by the Hecke data of eigenforms. We also discuss techniques to build tables of elliptic curves over these fields.

Speaker: David Hansen

Title: Towards level-aspect subconvexity for multiple Dirichlet series

Abstract: I'll discuss a possible relationship between subconvexity results for classical L-functions and for a certain multiple Dirichlet series. This would imply, for example, an upper bound of $N^{1-\delta}$, $\delta > 0$, for the minimal conductor of a quadratic character χ such that $L(1/2, f \otimes \chi)$ is nonzero; here f is a cuspidal newform of weight 2 and conductor N .

Speaker: Winfried Kohnen

Title: Sign changes of Fourier coefficients of cusp forms

Abstract: This will be a survey talk about recent results regarding sign changes of Fourier coefficients of cusp forms, both in one and in several variables.

Speaker: Ozlem Imamoglu

Title: Modular cocycles and linking numbers

Abstract: It is a remarkable fact that the homogeneous space $SL(2, \mathbb{Z}) \backslash SL(2, \mathbb{R})$ is diffeomorphic to the complement of a trefoil knot in the 3-sphere. E. Ghys gave a beautiful result which relates the linking number of geodesics with the trefoil knot to the well-known arithmetical functions, namely the Dedekind sums and the Rademacher symbol. In this talk after reviewing the classical case, I will give a generalization of some of the results to the linking numbers of two geodesics. This is joint work with W. Duke and A. Toth.

Speaker: Min Lee

Title: Shifted multiple Dirichlet series and spectral moments of Rankin-Selberg L-functions

Abstract: In this talk, we develop certain aspects of the theory of shifted multiple Dirichlet series and study their meromorphic continuations. These continuations are used to obtain explicit spectral second moment formulas for Rankin-Selberg L-functions of automorphic forms. This is a joint work with Jeff Hoffstein.

Speaker: Winnie Li

Title: Combinatorial zeta and L-functions

Abstract: Combinatorial zeta functions are discrete analogue of the Selberg zeta function. Ihara generalized the Selberg zeta function from $PGL(2, \mathbb{R})$ to $PGL(2, \mathbb{Q}_p)$, and Serre realized that Ihara's zeta function can be defined for all finite graphs. Zeta functions for finite simplicial complexes were studied in a joint work with Kang for finite quotients of the building attached to $PGL(3)$, and with Fang and Wang for finite quotients of the building attached to $SL(4)$. Such zeta function is a rational function with a closed form expression which gives both topological and spectral information of the underlying combinatorial object.

The Artin L-functions for graphs were considered by Ihara, Hashimoto, Stark and Terras, respectively. Very recently in a joint work with Kang we obtained a closed form expression for the Artin L-functions attached to finite quotients of the building of $PGL(3)$.

In this talk we shall survey the progress of the combinatorial zeta and L-functions, and compare them with the zeta and L-functions in number theory.

Speaker: Wenzhi Luo

Title: Hecke eigenvalues of Maass forms

Abstract: Let ϕ be a primitive Hecke-Maass eigenform with level N and Laplacian eigenvalue $\lambda_\phi = \frac{1}{4} + t_\phi^2$, which corresponds to a cuspidal unitary automorphic representation $\pi = \otimes \pi_p$ of $GL(2, \mathbb{A}_Q)$. In this talk, I'd like to sketch part of my ongoing joint work with Fan Zhou, which among other things establishes the following two results:

1. The natural density of rational primes p such that π_p is tempered is at least $34/35$;
2. There exists a rational prime $p \ll (N(1 + |t_\phi|))^{0.27332}$ such that π_p is tempered.

Speaker: Samuel Patterson

Title: Metaplectic forms, in particular the rational function-field case

Abstract: The purpose of this talk is two-fold. First of all I shall report on calculations of Fourier coefficients of metaplectic theta functions in the case of a rational function field. In particular Selberg sums, which were introduced by R.J.Evans and investigated by him, G.W. Anderson and P.B.v.Wamelen, play a remarkable role in this investigation.

Secondly I shall concentrate on the cases of 4- and 6-fold covers and the conjectures of Eckhardt-Patterson and Chinta-Friedberg-Hoffstein and discuss the recent results of S. Friedberg and D. Ginzburg and how they apply to the function- field case.

Speaker: Dinakar Ramakrishnan

Title: Bounds for Dedekind Zeta functions and Trace inequalities

Abstract: A beautiful result of Hoffstein from 1979 gives sharp upper and lower bounds for the residues of Dedekind zeta functions, building on earlier works of Stark and Odlyzko. The subtlety comes from the possible existence of real zeros near $s = 1$. This talk will discuss an application for comparing traces of certain special functions of positive type on $GL(2)$ over extension fields.

Speaker: Jyoti Sengupta

Title: Nonvanishing and sign changes of Hecke eigenvalues of Siegel cusp forms of genus two.

Abstract: In this talk we will derive some asymptotic formulae for the number of sign changes of Hecke eigenvalues of Siegel cusp forms of genus two.

Speaker: Harold Stark

Title: Modular forms and Poincare series

Abstract: An update on my long running attempt to construct explicit modular forms from Poincare series.