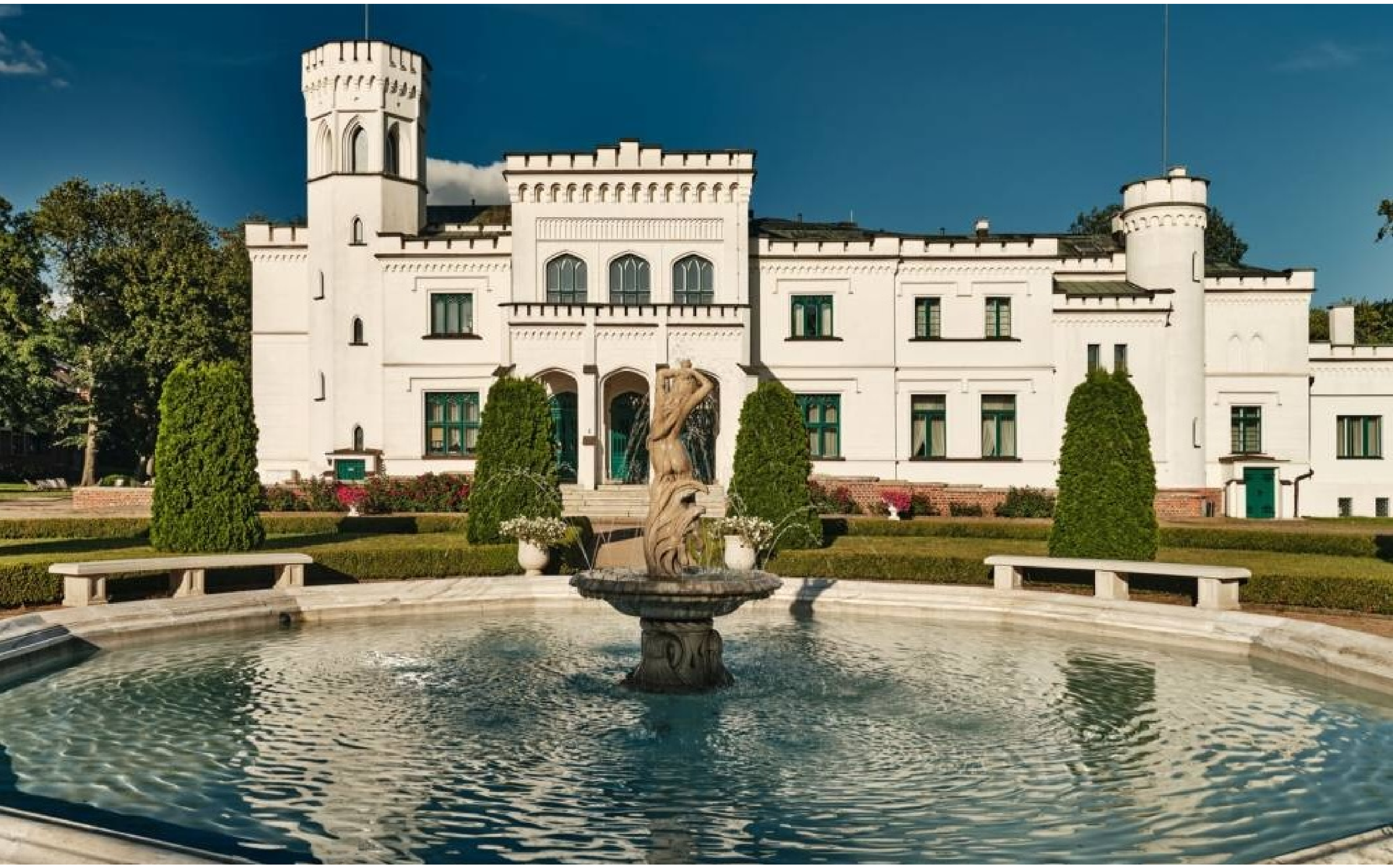
Building Bridges 7

Abstracts

Będlewo Palace, Poland, 10 – 21 August 2026



Sponsors

The conference was funded by the AMU Research University Excellence Initiative Programme, as part of the funding for a proposal No. 207/61/POB4/0002 in the competition No. 207 "Subsidy for participation of invited foreign speakers – outstanding foreign scientists in international congresses and conferences"

Dioscuri Centres of Scientific Excellence. A programme initiated by the Max Planck Society (MPG), managed jointly with the National Science Centre in Poland (NCN), and mutually funded by the Polish Ministry of Science and Higher Education (MNiSW) and the German Federal Ministry of Research, Technology and Space (BMFTR).

Contents

Monday

On the zeros of a variant of Ramanujan polynomials

Jaban Meher, National Institute of Science Education and Research, Bhubaneswar

The zeros of Ramanujan polynomials are related to the values of zeta function at odd positive integers. Similarly there is a variant of Ramanujan polynomials whose zeros are related to some power of values of zeta function at odd positive integers. Based on this relation, Maji and Sarkar (2023) made some conjecture on the location of the zeros of these polynomials. In this talk we will provide a proof of this conjecture. This is a joint work with M. Charan and S. Pathak.

Multiple zeta values, period polynomials of modular forms, and related topics

Jianbo Sun, Kyushu University

Multiple zeta values are natural generalizations of Riemann zeta values. In this talk, I will first recall the original work of Gangl, Kaneko, and Zagier, and explain how modular forms appear in relations among multiple zeta values. I will then briefly review several subsequent developments, including higher-level generalizations and connections with the Ihara bracket and special derivations. Finally, I will discuss some recent work in the higher-level setting, including joint work with Jiabao Hao.

Higher order derivatives of the Gram function

Raivydas Šiménas, Vilnius University

My talk is on the asymptotics of higher-order derivatives of the Gram function t_u. I also discuss the uniform distribution and continuous uniform distribution modulo one of t_u^n for $n = 1, 2, \ldots$ and make a conjecture that the Riemann zeta function shifted by powers of the Gram points exhibits discrete universality.

Selberg zeta functions have second moment at $\sigma = 1$

Jokūbas Putrius, Vilnius University

In this talk, I will present a recent result showing that the second moment of the Selberg zeta function for a Fuchsian group of the first kind exists at $\sigma = 1$. The argument extends to Beurling zeta functions satisfying a weak form of the Riemann hypothesis and to general Dirichlet series with positive coefficients whose partial sums satisfy suitable regularity conditions.

The proof builds on a recent approach of Broucke and Hilberdink and allows us to avoid the separation condition for general Dirichlet series originally introduced by Landau.

This is joint work with Ramūnas Garunkštis.

Zeros of the derivative of the Selberg zeta function

Ramūnas Garunkstis, Vilnius University

We present new upper bounds for the Selberg zeta function associated to finite volume Riemann surfaces. These bounds allow to improve error terms in asymptotic formulas related to the number of zeros of the Selberg zeta function derivative.

Zeros of the Koecher Maass series

Manish Kumar Pandey

In this talk, we will discuss the infinitude of zeros of the Koecher Maass series on the critical line. The talk is based on joint work with Japan Meher and Karamdeo Shankhadhar.

Exceptional poles of Archimedean Rankin–Selberg L-functions for principal series representations of $\mathrm{GL}_n(\mathbb{R})$

Akash Yadav, Ewha Womans University

We prove that for any pair of irreducible principal series representations (π_1, π_2) of $\mathrm{GL}_n(\mathbb{R})$ in general position, the notions of exceptional pole of type 1 and type 2 coincide. Using this identification, we express the Rankin–Selberg L-function $L(s, \pi_1 \times \pi_2)$ in terms of the exceptional L-factors attached to the irreducible constituents of the derivatives of π_1 and π_2.

Moments of symmetric square L-functions on $\mathrm{GL}(3)$

Félicien Comtat, Bonn Universität

In joint work with Valentin Blomer we give an asymptotic formula for the first moment of the symmetric square L-function on GL(3) in the level aspect. I will give some background on the symmetric square L-function on GL(3), followed by an overview of the method, which combine an approximate functional equation, the Kuznetsov formula for GL(3), and some ingredients of representation theory allowing to determine the sign of the functional equation in terms of the Fourier coefficients.

Generalisations of the Petersson/Kuznetsov formulas at finite places

Matteo Di Scipio, University College London

We develop a non-archimedean place analogue of the backward Kuznetsov formulas. Specifically, in analogy to the archimedean place versions, choosing a particular test function on the geometric side, one may express the spectral side in terms of transforms involving representation theoretic Bessel functions for an irreducible unitary admissible representation π of $\mathrm{PGL}_2(\mathbb{Q}_p)$. As a first application, we prove an upper bound to particular sums of generalised Kloosterman sums.

Extreme values of L-functions

Rashi Lunia, HUN-REN Alfréd Rényi Institute of Mathematics

In 2008, Soundararajan introduced the resonance method and showed the existence of a normalized Hecke eigenform f of weight k and level one such that

$$L(1/2, f) \;\geq\; \exp\left((1+o(1))\sqrt{\frac{2\log k}{\log\log k}}\right)$$

for sufficiently large $k \equiv 0 \pmod 4$. In this talk, we report on a joint work with Sanoli Gun, where we study how often $L(s, f)$ attains large values at $s = 1/2$. We further investigate this question for L-functions attached to quadratic twists of f. Finally we give applications of our results to the theory of half-integer weight modular forms.

On hypergeometric moments

Bidisha Roy, Indian Institute of Technology Tirupati

We begin with explicit formulas for first and second weighted moments of Gaussian hypergeometric functions ${}_{n+1}F_n$ over finite fields. These formulas express certain second moments of Frobenius traces in the Clausen family in terms of ${}_3F_2(-1)$. We then study power and symmetric moments of Frobenius traces in the Legendre and Clausen families from a geometric viewpoint, using symmetric-power sheaves and associated algebraic varieties. Finally, we relate the resulting moment identities to traces of Hecke operators and Fourier coefficients of modular forms.

A geometric model for the Appell hypergeometric function F_2

Thais Gomes Ribeiro, University of Birmingham

In this talk I would like to present a geometric model for the Appell hypergeometric function F_2. It consists of (a family of) algebraic varieties (over a finite field $\mathbb{F}_q$) whose number of points can be described in terms of finite-field Appell hypergeometric functions and other simpler terms such as finite-field Gaussian hypergeometric functions and Jacobi sums. A similar result previously known in the literature had some restrictive assumptions in order to guarantee that no degenerate hypergeometric parameters would appear in the point counts. We eliminate some of these assumptions and, using a reduction formula, end up with non-degenerate "terms" in the final expression for the number of points. In particular, our result recovers the previous one. I would like to explain how the model is constructed and how its stratification helps with counting the rational points.

Tuesday

On the vanishing and cuspidality of D_4 modular forms

Finn McGlade, University of Oklahoma

We develop vanishing and cuspidality criteria for quaternionic modular forms on $G = \mathrm{Spin}(4,4)$ using a theory of scalar Fourier coefficients. By analyzing a Fourier-Jacobi expansion for these forms, we prove that a level one quaternionic modular form on G vanishes if and only if its primitive Fourier coefficients are zero. We also study quaternionic modular forms in the more general setting of a group GJ associated to a cubic norm structure J. Here we establish a new relationship between the degenerate Fourier coefficients of quaternionic modular forms, and the Fourier coefficients of the holomorphic modular forms associated to their constant terms. As a consequence, we prove that in weights $\ell \geq 5$, a level one quaternionic modular form on G is cuspidal if and only if its non-degenerate Fourier coefficients satisfy a polynomial growth condition.

A Fourier-Jacobi Dirichlet series attached to modular forms of $\mathbf{SO}(2,4)$

Rafail Psyroukis

Kohnen and Skoruppa studied a Dirichlet series involving the Fourier–Jacobi coefficients of two Siegel modular forms of degree two and related it, under certain conditions, to the spin L-function attached to one of them. In this joint work with Thanasis Bouganis, we generalise

their result to the case of orthogonal modular forms of signature $(2,4)$, by demonstrating a connection of the analogous Dirichlet series with the standard L-function. Our result also extends a work of Gritsenko on Hermitian modular forms of degree two.

Monomials of the Poincaré cusp forms of index 1

Divyanshu Kala, The Institute of Mathematical Sciences Chennai

The Poincaré series $G_k(z,m)$ of weight k and index $m \geq 0$ are very important objects in the study of modular forms as they span the space of weight k modular forms. Therefore, it is interesting to study the possible monomial relations among them. Eisenstein series are index 0 Poincaré series. Using the Rankin-Selberg method, Duke and Ghate independently proved that an Eisenstein series is not a product of two lower-weight Eisenstein series, unless it is forced by the dimension restrictions. Later, Griffin, Kenshur, Price, Vandenberg-Daves, Xue and Zhu generalised the above result to the monomials of Eisenstein series. In this talk, we will discuss the monomial relations among the Poincaré cusp forms of index 1 using the location and separation properties of the zeros.

q-analogues of Ramanujan's $1/\pi$-type formulas

Kam Cheong Au, University of Cologne

One of Ramanujan's most impressive discoveries is a type of formulas for $1/\pi$ that comes from modular parametrization of some hypergeometric series. In this talk, we focus on finding q-analogues of these formulas, which is not trivial. We will employ the combinatorial tool of Wilf-Zeilberger pairs, and provide several examples of such q-analogues, involving both ordinary modular forms and mock modular forms.

Schur functions and quasimodular forms

Jinbo Yu, Nagoya University

In this talk, we introduce two q-series indexed by partitions, which we call Schur MacMahon series and Schur Eisenstein series. These series can be seen as hybrids of Schur functions and classical MacMahon (resp. Eisenstein) series. We discuss the relationship between these series and the ring of quasimodular forms. In particular, we study the action of the operator q d/dq and discuss the arithmetic properties of their Fourier coefficients. We will also discuss how the sl_2-algebra structure of quasimodular forms can be described in terms of these Schur analogues.

The periodic sign changes of eta-quotients

Meenu, The University of Hong Kong, Hong Kong

We investigate sign changes in eta-quotients—modular relatives of the partition function—using the Hardy–Ramanujan–Rademacher circle method. By establishing asymptotics for their Fourier coefficients, we reveal structured oscillations and vanishing behavior, extending this classical tool's legacy to the arithmetic of modular forms.

On a conjecture of Andrews and almost alternating sign patterns

Jayashree Kalita, Vanderbilt University

In 1986, Andrews studied five mysterious q-series from Ramanujan's Lost Notebook and made six conjectures about the growth and sign behavior of their coefficients. The first two conjectures are on the q-series $\sigma(q)$, and their resolution by Andrews–Dyson–Hickerson marked the beginning of a celebrated story, continued through the work of Cohen, Zwegers, Zagier, and others. The next four conjectures concern the q-series $v_1(q), v_2(q), v_3(q)$, and $v_4(q)$. Recent independent work by Folsom–Males–Rolen–Storzer and Bachraoui resolved the conjectures for $v_1(q)$. In this talk, we will discuss the cases for $v_2(q), v_3(q)$, and $v_4(q)$, completing the resolution of all of Andrews' conjectures and their analogs for these five

q-series. We first explain how an adapted version of Wright's circle method yields precise asymptotic expansions for the coefficients, revealing an interplay between exponential growth and oscillatory behavior. These asymptotics are then used to show that the coefficients are alternating in sign outside a density-zero exceptional set, establishing an *almost alternating sign pattern*. We then discuss how a finer analysis of the oscillatory behavior reveals that this exceptional set is highly structured. Finally, we introduce a new family of q-series whose coefficients appear to exhibit similar sign phenomena, suggesting a broader underlying theory. The talk will emphasize the main ideas behind the proofs.

Related papers:

- *On a conjecture of Andrews and almost alternating sign patterns*, arXiv:2607.01210
- *On $v_2(q), v_3(q), v_4(q)$, and Andrews' Conjectures 5 and 6*, arXiv:2607.20858

Atkin and Swinnerton-Dyer congruences for meromorphic modular forms

Michael Allen, Wesleyan University

In the 1970's, Atkin and Swinnerton-Dyer conjectured that Fourier coefficients of holomorphic modular cusp forms on noncongruence subgroups of $\mathrm{SL}_2(\mathbb{Z})$ satisfy certain p-adic recurrence relations which are analogous to Hecke's recurrence relations for congruence subgroups. In 1985, this was proven in seminal work of Scholl and it was recently extended to weakly holomorphic modular forms by Kazalicki and Scholl. We show that Atkin and Swinnerton-Dyer type congruences extend to the setting of meromorphic modular forms and that the p-adic recurrence relations arise from Scholl's congruences in addition to a contribution of fibers of universal elliptic curves at the poles. Moreover, when the poles are located at CM points, we exploit the CM structure to reduce these p-adic recurrence relations to 2-term relations and we give explicit examples. Using this framework, we partially prove conjectures that certain meromorphic modular forms are magnetic. This is joint work with Ling Long and Hasan Saad.

Supercongruences arising from meromorphic modular forms

Pengcheng Zhang, MPIM Bonn

We will start with the 'magnetic modular form' E_4/j and present the supercongruence of its coefficients. We will then fit this example into the general theme of the (conjectural) supercongruences arising from meromorphic modular forms (of level 1 and weight 4) with CM poles, which are characterized by the p-adic analogue of the Chowla–Selberg period. Motivated by meromorphic modular forms, we will also provide predictions on the (conjectural) supercongruences arising from certain truncated ${}_3F_2$ hypergeometric sums.

Reciprocal of subsum polynomials

Kathrin Maurischat, RWTH Aachen Uniersity

We introduce the subsum polynomial of a partition $\lambda = (\lambda_1, \lambda_2, \ldots, \lambda_k)$ defined by ${}^{(}\lambda, x) = \prod_{i=1}^{k}(1 + x^{\lambda_i})$. We study the sum of reciprocals of ${}^{(}\lambda, x)$ over all partitions of n. We prove arithmetic properties of related polynomials and offer connections to other combinatorial objects. This is on joint work with Cristina Ballantine, George Beck, and Brooke Feigon.

Wednesday

From Tate's thesis to dynamical structures on the idele group

Alok Shukla, Ahmedabad University Harmonic analysis on adelic groups, beginning with Tate's thesis, provides a powerful framework for understanding analytic structures associated with global fields and L–functions. In particular, multiplicative symmetries on the idele group give rise to spectral decompositions closely related to Mellin transforms and play a fundamental role in the analytic theory of automorphic forms.

In this talk I will describe a dynamical viewpoint on these adelic structures, motivated by analogies with operator theory and quantum dynamical systems. From this perspective, scaling symmetries on the idele group lead naturally to spectral frameworks that parallel structures appearing in quantum theory.

The emphasis will be on the conceptual aspects of this viewpoint and on how it may provide a new way to organize certain analytic structures familiar from the theory of automorphic forms and L–functions. Possible extensions toward automorphic representations and related spectral problems will also be briefly discussed.

The correlation coefficient in representation theory

U. K. Anandavardhanan, Indian Institute of Technology Bombay

Given a group G and two Gelfand subgroups H and K of G, associated to an irreducible representation π of G, there is a notion of H and K being correlated with respect to π in G (introduced by Benedict Gross in 1991). We discuss this theme and give some details in some specific examples.

A GGP type map of $\mathfrak{n}$ cohomology relating the totally degenerate limit of discrete series of $\mathrm{SU}(2,1)$ and $1/4$ Casimir eigenvalue Maass forms.

Jin Lee, Duke University

We discuss the n cohomology of limits of discrete series with vanishing (g, K) cohomology. Instead, these representations appear in the cohomology of line bundles over Griffiths Schmid manifolds. We then link the $\mathrm{SU}(2,1)$ totally degenerate limit of discrete series studied by Carayol, to Maass forms of Casimir eigenvalue $1/4$. This is done by constructing an intertwining map that induces a non-zero restriction of n cohomology. This suggests an application of the GGP conjectures to the study of degenerate limits of discrete series. The main difference from discrete series is that the degeneracy forces intertwining maps to vanish on minimal K types.

Schwartz kernel theorems, categorical tensor products, and nuclear spaces of automorphic forms

Paul Garrett, University of Minnesota

The goal is specification of topological vector spaces (TVS's) of automorphic forms/functions admitting a Schwartz kernel theorem. To this end, first recall a notion of (genuine, categorical) tensor products, and observe that a Schwartz kernel theorem is an easy corollary of existence.

Hilbert spaces do not admit tensor products, especially not ones alleged to be Hilbert

spaces, essentially because not every continuous linear operator is Hilbert-Schmidt. That is, the Hilbert-Schmidt norm completion of $V^* \otimes_{\text{alg}} W$, a Hilbert space, cannot give all continuous operators.

The simplest class of topological vector spaces (TVS's) admitting genuine, categorical tensor products, is the class of Fréchet spaces which are (categorical) limits of countably-many Hilbert spaces, with Hilbert-Schmidt transition maps. We then call these *nuclear Fréchet*.

The simplest application to TVS's of automorphic forms asks for a potential q such that $-\Delta + q$ has Hilbert-Schmidt resolvent. As a simple example for $\mathrm{SL}_2(\mathbb{Z})\backslash\mathfrak{h}$ (and analogously for rank-one arithmetic quotients), we show that $-\Delta + y^2$ meets this requirement.

Automorphic differential operators

Marcella Manivel, University of Minnesota

Around 1915, Polya and Hilbert independently speculated that self-adjoint operators on spaces of automorphic forms could explain zeros of L-functions. Reincarnating this idea, Colin de Verdière in the 1980's suggested a physics-oriented way of making inhomogeneous equations into homogeneous ones, i.e. ones with genuine eigenvalues. To make this line of inquiry rigorous, Bombieri and Garrett showed that the discrete spectrum (if any) of a Friedrichs' extension of a suitable restriction of the Laplacian on $\Gamma\backslash\mathfrak{H}$ is $s(s-1)$ for s a zero of the Riemann zeta function or another L-function. However, they proved that the discrete spectrum is small: at most 94% of the zeros of the Riemann zeta function participate in the spectrum of that operator. This motivates understanding analogous operators with demonstrably large discrete spectrum. One such operator is Sands' Hamiltonian. In this talk, I explain the significance of this operator and discuss how to understand analogous higher-rank differential operators.

A revisit to Ramanujan-Serre derivative map on quasi-modular forms and some applications.

Raveena Ganash, National Institute of Science Education and Research

We revisit the Ramanujan-Serre derivative map on the space of mod- ular forms, give a re-interpretation as a differential operator on the space of quasimodular forms. We study various algebraic properties of the differential operator, give applications in the direction of the study of the Chazy equation, Niebur's identity, van der Pol's identity and evaluation of convolution sums of divisor functions

Alternative Hecke operators and their applications

Gyucheol Shin, Kangwon National University

In this talk, we introduce two alternative types of Hecke operators, called multiplicative Hecke operators and generalized Hecke operators. The former arose from Guerzhoy's work in response to a question posed by Borcherds concerning the construction of a Hecke operator that commutes with the Borcherds product. The latter arose from the replication formula appearing in Monstrous Moonshine. We discuss several properties of these operators, including their algebraic structures. This is joint work with Chang Heon Kim and Kyeong Seok Min.

Thursday

Theta integrals and Siegel Eisenstein series of low weight

Jens Funke, Durham University

Eisenstein series are a critical component in the theory of modular forms. In the elliptic case, we easily construct holomorphic forms in weights larger than 2, whereas Hecke summation can yield non-holomorphic forms for the low weights 3/2 and 2.

On the other hand, the Siegel-Weil formula relates (integrals of) theta series associated to orthogonal groups to Siegel Eisenstein series. In the positive definite case one obtains holomorphic forms but for indefinite quadratic forms the situation is considerably more complicated.

In this talk, we give an introduction to the problem and then discuss theta lifts for signature (n,2) to Siegel modular forms of degree n and weight (n+1)/2 from both a geometric and a modular perspective.

This is joint work in progress with J Bruinier, P Kiefer, E. Rosu.

Twisted Siegel-Weil formulas for GL_2 over non-Galois quartic CM fields

Mingkuan Zhang, TU Darmstadt

Siegel-Weil formulas establish a relation between the theta lift of trivial representations and Eisenstein series. In this talk, I will introduce a twisted Siegel-Weil formula for non-

Galois quartic CM fields, which shows the twisted theta integral against a quadratic character can be realized as the Doi-Naganuma lift. This can also be interpreted as the base change of Jacquet-Langlands correspondence. As an application, we show the twisted CM values of Borcherds forms are logarithm of algebraic numbers under certain assumptions.

Regularized inner products and modular invariants for real quadratic fields

Vaibhav Kalia, National Institute od Science Education and Research

In this talk, we discuss regularized inner products of Borcherds basis of the space of weakly holomorphic modular forms of weight 1/2. We show that these inner products can be expressed in terms of traces of integrals of Klein's j-function over real quadratic geometric invariants and Hurwitz-Kronecker class numbers. This is a joint work with Balesh Kumar.

A decomposition of Artin L-functions over complex cubic fields

Robin Zhang, IHES

In studying Stark's conjectures on the leading term of Artin L-functions at $s = 0$ for a cyclotomic extension K of a complex cubic field k, there is a particularly useful decomposition $L_S(s, \chi_K) = L_S(s, \chi_F) \cdot L_S(s, \chi_{\mathbb{Q}})$ in terms of L-functions of characters of (the absolute Galois group of) the field $\mathbb{Q}$ of rational numbers and an imaginary quadratic field F. This allows one to apply the theory of elliptic units and cyclotomic units in the complex cubic setting.

Twists of elliptic curves with CM

Eugenia Rosu, Leiden University

For the family of cubic twists of elliptic curves E_D: $X^3 + Y^3 = D$ with D an integer, I compute an explicit formula for the central values of the L-functions $L(E_D, 1)$ using values of theta functions at CM points. Using intertwining operators of the Weil representation, we get new formulas for the square root of $L(E_D, 1)$, generalizing the case of quadratic twists from the work of Yang. These values give explicit formulas for the analytic Tate-Shafarevich order.

Plectic construction of the Bertolini-Darmon-Green periods

Carlos Caralps, Universität Bielefeld

The p-adic uniformization of Shimura curves can be used to obtain rational points on elliptic curves via line integrals on the p-adic upper half plane. Bertolini, Darmon, and Green introduced a variant of this construction in which the p-adic upper half plane is replaced by a product of two upper half planes at distinct primes. We extend this approach to finite products of upper half planes and discuss its connection to plectic Heegner points.

Solving Diophantine equations via modular method

Yasemin Kara, Bogazici University

Understanding solutions of Diophantine equations over the rational numbers, or more generally over number fields, is one of the central problems in number theory. Wiles's 1995 proof of Fermat's Last Theorem was not only a major breakthrough in mathematics but also introduced the powerful modular method, which relates elliptic curves to modular forms. Since then, this approach has been generalized and successfully applied to many other Diophantine equations.

In this talk, we will explain the main ideas behind the modular method and present some recent asymptotic results for Diophantine equations of the form $Ax^p + By^q = Cz^r$ over number fields, assuming standard modularity conjectures. Moreover, we will illustrate how the asymptotic bound can be computed explicitly for certain number fields.

Integrals of Green Forms on Unitary Shimura Varieties

Samuel Shepherd, Durham University

In recent work of Funke–Hofmann, generalised Borcherds lifts were constructed for unitary dual pairs of type $\mathrm{U}(p,q) \times \mathrm{U}(1,1)$, providing Green currents for special cycles on unitary Shimura varieties. Motivated by applications in arithmetic intersection theory on integral models of these Shimura varieties, we compute integrals of such Green forms over Shimura varieties, as well as over other cycles. We mention the relevance of such computations within the broader landscape of the Kudla programme.

Integration formulas over spaces of symplectic lattices

Kristian Holm, Christian-Albrechts-Universität zu Kiel

The homogeneous space $\mathsf{Y}_{2n} := \mathrm{Sp}(2n, \mathbb{R})/\mathrm{Sp}(2n, \mathbb{Z})$ can be identified with the collection of all symplectic lattices in $\mathbb{R}^{2n}$: If ω denotes the usual symplectic bilinear form on $\mathbb{R}^{2n}$, then these are precisely the lattices Λ with the property that $\omega(\Lambda, \Lambda) \subseteq \mathbb{Z}$. In the case of the space $\mathsf{X}_n := \mathrm{SL}(n, \mathbb{R})/\mathrm{SL}(n, \mathbb{Z})$, which can be identified with the set of unit-covolume lattices in $\mathbb{R}^n$, classical results of Siegel (1945) and Rogers (1955) provide formulas for the first and higher moments of Siegel transforms (essentially, pseudo-Eisenstein series) over X_n. I will talk about such moment formulas for the space Y_{2n} and present a new and particularly explicit second-moment formula proved in joint work with Jiyoung Han and Seungki Kim.

Linking numbers in hyperbolic manifolds

Mads Christensen, MPIM Bonn

I will explain some relations between invariants of arithmetic hyperbolic n-folds, and non-holomorphic Siegel modular forms of genus g. Previously we had studied these relations for $(n, g) = (3, 2)$, and I want to report on results for more general values of n and g.

Friday

Local average in the hyperbolic lattice counting problem

Christos Katsivelos, University of Patras

Starting from the description of the classical Euclidean circle problem, we pass to the hyperbolic analogue, where we count points in the orbit of a discrete group Γ acting on the hyperbolic space $\mathbb{H}^n$ within a ball of radius $\log X$. We will discuss our results for the local average of the error term of the counting function over compact sets of the orbifold $\Gamma\backslash\mathbb{H}^n$. The case $n = 3$ for the Picard manifold $\mathrm{PSL}_2(\mathbb{Z}[i])\backslash\mathbb{H}^3$ is a joint work with G. Cherubini.

Counting and equidistribution of orthogeodesics in the hyperbolic plane

Marios Voskou, Alfréd Rényi Institute of Mathematics

In this talk, we use the spectral theory of automorphic forms to study the distribution of orthogeodesics in the hyperbolic plane. We also present arithmetic applications concerning the distribution of pairs of ideals of linearly dependent norms in certain real quadratic number fields.

A decomposition result for Weyl group multiple Dirichlet series

Jack Walsh, Simion Stoilow Institute of Mathematics of the Romanian Academy

I will introduce twisted Weyl group multiple Dirichlet series attached to infinite dimensional Kac-Moody algebras. These can be constructed in terms of local parts, known as Chinta-Gunnells averages, which satisfy a combinatorial decomposition result by a work of Friedlander. I will present a generalization of this result in the Kac-Moody algebra setting.

In the affine case, there are new features not present in the finite case. As an application, I will present a deformation of the classical Jacobi triple product identity that follows from the explicit computation of Chinta-Gunnells averages associated to the affine A_1 algebra.

Fourier interpolation and Kloosterman sums

Qihang Sun, IHES, France

From 2016, Radchenko and Viazovska used modular forms to construct special functions for solving the sphere packing problem in dimensions 8 and 24 following theorems by Cohn and Elkies. They developed the theory of Fourier interpolation. In this talk, we use Maass-Poincare type series to give another construction in dimensions 3 and 4, and show the new relations between the Fourier interpolation basis functions and real-variable Kloosterman sums.

$d_4(n)$ in arithmetic progressions

Tomos Parry, Alfréd Rényi Institute of Mathematics

An important problem in number theory is "how large can we take q so that we can evaluate $\sum_{\substack{n<x \\ n=a \bmod (q)}} f(n)$, for various functions f. For example, for the primes the Bombieri-Vinogradov theorem says we can take q up to almost $\sqrt{x}$ on average. The threshold $\sqrt{x}$ is often important.

After the primes, the divisor functions are particularly important. Only for d_2 and d_3 was it known that you we can go past $\sqrt{x}$, even on average, but we will do d_4 on average.