Schedule

Events for:
Monday, March 4th - Friday, March 8th

Monday, March 4th

9:30am **Paul Garrett (Overview) - SCGP 102**

Speaker: Paul Garrett

Title: Automorphic forms and representation theory

10:30am **Coffee - SCGP Cafe**

11:00am **Paul Garrett (Overview) - SCGP 102**

Speaker: Paul Garrett

Title: Automorphic forms and representation theory

12:00pm **Lunch - SCGP Cafe**

2:00pm **Dorian Goldfeld - SCGP 102**

Speaker: Dorian Goldfeld

Title: Fourier coefficients of Langlands Eisenstein series on $GL(n)$

Abstract: I will present a new algorithm to quickly and easily explicitly compute the Fourier coefficients of general Langlands Eisenstein series on GL(n). This is joint work with Mike Woodbury.

2:40pm **Freydoon Shahidi - SCGP 102**

Speaker: Freydoon Shahidi

Title: gamma-factors as distributions

Abstract: We look at two different distributions giving –factors for automorphic L–functions and discuss their generalizations: One is those defined through Langlands–Shahidi method whose generalization requires the use of Kac–Moody groups; and the other, the Godement–Jacquet theory of principal L–functions for GL(n), whose full gen- eralization is the subject matter of the recent program of Braverman–Kazhdan, Lafforgue, and Ngo. We will briefly discuss these methods and their generaliza- tions, and aspects they share.

3:20pm **Coffee - SCGP Cafe**

3:50pm **Marcus Berg - SCGP 102**

   Speaker: Marcus Berg

   Title: "Massive Automorphic Green's Functions"

6:00pm **Banquet - SCGP Cafe**

Tuesday, March 5th

9:30am **Shamit Kachru (Overview) - SCGP 102**

   Speaker: Shamit Kachru

   Title: BPS-states and modular forms

10:30am **Coffee - SCGP Cafe**

11:00am **Shamit Kachru (Overview) - SCGP 102**

   Speaker: Shamit Kachru

   Title: BPS-states and modular forms

12:00pm **Lunch**

2:00pm **Sarah Harrison - SCGP 102**

Speaker: Sarah Harrison

Title: Quantum Modularity in 3d QFT

2:40pm **Jan Manschot - SCGP 102**

Speaker: Jan Manschot

Title: Topological field theories and modular integrals

Abstract: Correlation functions on the Coulomb branch of certain topological field theories give rise to integrals over a modular fundamental domain. I will discuss the evaluation of such correlation functions. Motivated by the decoupling of BRST exact observables, I will put forward a new prescription for their regularization and renormalization,. Joint work with G. Korpas, G. Moore, and I. Nidaiiev.

3:20pm **Coffee - SCGP Cafe**

3:50pm **Stephen Kudla - SCGP 102**

Speaker: Stephan Kudla

Title: Modular and mock modular generating series in arithmetic geometry

Abstract: The fact that generating series constructed in many areas of geometry and number theory turn out to be modular forms or mock modular forms is a rather ubiquitous, but still striking, phenomenon. In this lecture I will describe certain examples arising from the geometry and arithmetic of Shimura curves — joint work with M. Rapoport and T. Yang. On the one hand, these examples are expected to be part of a more extensive theory of `arithmetic theta series', much of which is still only conjectural. On the other hand, they bear some resemblance to generating series that arise in string theory, and so may be of interest to people working in this area. In particular, I will describe a generating series for virtual arithmetic 0-cycles which can be identified as the central derivative of an incoherent Siegel-Eisenstein series of genus 2 and weight 3/2, which deserves to be better known.

Wednesday, March 6th

9:30am **Henrik Gustafsson (Overview) - SCGP 102**

Speaker: Henrik Gustafsson

Title: String theory and automorphic representations

10:30am **Coffee - SCGP Cafe**

11:00am **Henrik Gustafsson (Overview) - SCGP 102**

    Speaker: Henrik Gustafsson

    Title: String theory and automorphic representations

12:00pm **Lunch - SCGP Cafe**

2:00pm **Dmitry Gourevitch - SCGP 102**

    Speaker: Dmitry Gourevitch

    Title: Fourier coefficients of automorphic forms, and applications to minimal and next-to-minimal representations

    Abstract: We will define Fourier coefficients in wide generality, discuss important special cases and formulas expressing some of them through others. Then we will discuss how to express automorphic forms through their Whittaker coefficients, i.e. integrals against characters of maximal unipotent subgroups – generalizing the classical formula of Shalika and Piatetski-Shapiro. If time permits, we will also discuss maximal parabolic Fourier coefficients of minimal and next-to-minimal automorphic forms on simply-laced groups. The latter is important in string theory.

2:40pm **Solomon Friedberg - SCGP 102**

    Speaker: Solomon Friedberg

    Title: L-Functions and Unipotent Orbits

    Abstract: L-functions are critical objects in theory of automorphic forms -- they are key to describing the Langlands conjectures and of number-theoretic significance. However, L-functions have not appeared in physics. Instead, in physics the Fourier coefficients of certain automorphic representations attached to unipotent orbits play an important role. In this talk I explain a connection between the theory of L-functions and the unipotent orbits attached to automorphic representations, namely the dimension equation.

3:20pm **Coffee - SCGP Cafe**

3:50pm **Siddhartha Sahi - SCGP 102**

Speaker: Siddhartha Sahi

Title: Metaplectic Representations of Hecke algebras

Abstract: We define certain families of representations of affine Hecke algebras, which we refer to as metaplectic representations, and we discuss two applications. (1) We use these representations to construct a family of Weyl group actions, which generalize the Chinta-Gunnells action on the p-parts of Weyl group multiple Dirichlet series. In particular, our construction gives a conceptual proof that the Chinta-Gunnells action and its generalizations are, in fact, group actions. (2) We use the representations to construct a family of polynomials, depending on several auxiliary parameters, which generalize the well-known Macdonald polynomials. This is joint work with Jasper Stokman and Vidya Venkateswaran.

Thursday, March 7th

9:30am **Pierre Vanhove (Overview) - SCGP 102**

    Speaker: Pierre Vanhove

    Title: Multi-zeta values and modular graph functions

10:30am **Coffee - SCGP Cafe**

11:00am **Pierre Vanhove (Overview) - SCGP 102**

    Speaker: Pierre Vanhove

    Title: Multi-zeta values and modular graph functions

12:00pm **Lunch - SCGP Cafe**

2:00pm **Oliver Schlotterer - SCGP 102**

Speaker: Oliver Schlotterer

Title: Open versus closed strings at one loop: From elliptic multiple zeta values to modular graph forms

Abstract: The goal of this talk is to relate one-loop amplitudes of open and closed strings at the level of their low-energy expansion. First, I will review the appearance of elliptic multiple zeta values in the open-string setup and introduce their canonical representation via iterated integrals over holomorphic Eisenstein series. Second, the modular graph functions in type-II closed-string scattering as introduced in Pierre's lecture will be written as a tentative single-valued image of elliptic multiple zeta values. Third, I will illustrate the appearance of modular graph forms of weight (2,0) in heterotic-string amplitudes and point out further connections with single-valued open-string quantities.

2:40pm **Daniel Bump - SCGP 102**

Speaker: Daniel Bump

Title: Solvable Lattice Models, Vertex Operators and Whittaker Functions

3:20pm **Coffee - SCGP Cafe**

4:00pm **Stephen Miller - SCGP 102**

Speaker: Stephen Miller

Title: Sphere packing, Fourier interpolation, and the Universal Optimality Theorem

Abstract: I will discuss recent work on the optimal arrangement of points in euclidean space. In addition to the solution to the sphere packing problem in dimensions 8 and 24 from 2016, the "Universal Optimality" conjecture has now been proved in these dimensions as well. This shows that E8 and the Leech lattice minimize energy for any completely monotonic function of distance-squared, a fact which was previously not known for any configuration of points in any dimension > 1. Beyond giving a new proof of these sphere packing results, Universal Optimality also gives information about long-range interactions. Another application is to find the global minimum of the log-determinant of the laplacian among flat tori in those dimensions. The techniques involve arranging both a function and its Fourier transform to vanish at certain points, which leads to a new interpolation formula that recovers a radial Schwartz function from the values of it, its Fourier transform, and their derivatives, at special arithmetic points. Finally, fitting with the theme of the "Automorphic Structure" workshop, the interpolation formula reduces to an identity involving modular forms. (joint with Henry Cohn, Abhinav Kumar, Danylo Radchenko, and Maryna Viazovska)

Friday, March 8th

9:30am **Anne Taormina - SCGP 102**

Speaker: Anne Taormina

Title: Superstrings on the SU(3) group manifold: beyond BPS

Abstract: The super Wess-Zumino-Witten model with target space the 8-dimensional quaternionic group manifold SU(3) exhibits N=4 superconformal symmetry, encoded in a 'large' N=4 superconformal algebra. The construction of modular invariant partition functions for this model is guided by the su(3) algebra structure, but a full understanding of how the physical states organise themselves in massless and massive representations of the large N=4 SCA is missing. In this talk I will explain the challenges this toy model presents while comparing and contrasting with models of strings compactified on K3, which enjoy the 'small' N=4 superconformal symmetry.

10:10am **Coffee - SCGP Cafe**

10:40am **Ralf Koehl - SCGP 102**

Speaker: Ralf Koehl

Title: The symmetric space of type E10, and the action of the arithmetic Kac-Moody group

Abstract: Freyn, Hartnick, Horn and myself constructed Kac-Moody symmetric spaces of non-affine type. A recent result by Grüning and myself states that, if the Dynkin diagram does not involve the label infinity, then any Kac-Moody symmetric space is a universal object of its sub-symmetric spaces of rank 1 and 2 embedded at a common base point; in fact, this result applies to Riemannian symmetric spaces of split non-compact type as well. In a certain sense this says that complete information about the geometry of a symmetric space is already contained in its sub-symmetric spaces of rank 1 and 2.

11:20am **Hermann Nicolai - SCGP 102**

Speaker: Herman Nicolai

Title: Some unexpected properties of maximal compact subalgebras of hyperbolic Kac-Moody algebras

1:00pm **Hitchin Systems Program Seminar: Katrin Wendland - SCGP 313**

Speaker: Katrin Wendland

Title: On Invariants shared by Geometry and Conformal Field Theory