Automorphic Forms, Mock Modular Forms and String Theory workshop Talk Schedule

Events for:
Monday, August 29th - Friday, September 2nd

Monday, August 29th

10:00am **Ken Ono - SCGP 102**

Title: Mock Modular Forms and Their Applications, I

Abstract: In these lectures the speaker will offer an overview of the theory of mock modular forms, and discuss explicit applications of the theory.

10:45am **Coffee**

11:15am **Ken Ono - SCGP 102**

Title: Mock Modular Forms and Their Applications, II

Abstract: In these lectures the speaker will offer an overview of the theory of mock modular forms, and discuss explicit applications of the theory.

12:00pm **Lunch**

2:00pm **Jeffrey Harvey - SCGP 102**

Title: Moonshine old and new

3:30pm **Tea Time**

4:00pm **Shamit Kachru - SCGP 102**

Title: Counting BPS states in N=4 string vacua

Abstract: I describe various automorphic forms which arise in answering the question, 'How many BPS states are there in an N=4 string compactification with given electric and magnetic charges?' These counting functions enjoy relations to enumerative and arithmetic algebraic geometry.

Tuesday, August 30th

10:00am **Michael B Green - SCGP 102**

Title: Some modular properties of string theory scattering amplitudes

10:45am **Coffee**

11:15am **Michael B Green - SCGP 102**

Title: Some modular properties of string theory scattering amplitudes

12:00pm **Lunch**

2:00pm **Stephen Miller - SCGP 102**

Title: Automorphic Representations and String Theory

3:30pm **Tea Time**

4:00pm **Eric D'Hoker - SCGP 102**

Title: Structure of modular graph identities

Wednesday, August 31st

10:00am **Boris Pioline - SCGP 102**

Title: BPS states, protected amplitudes and automorphic forms

10:45am **Coffee Break - SCGP Cafe**

11:15am **Boris Pioline - SCGP 102**

Title: BPS states, protected amplitudes and automorphic forms

12:00pm **Lunch**

1:50pm **Manish Patnaik - SCGP 102**

Title: Automorphic Forms on Loop Groups

Abstract: I will survey some constructions in the theory of automorphic forms on loop groups. I will begin by describing two (equivalent) proposals for Eisenstein series— one due to Kapranov constructed as geometric generating series involving bundles on an algebraic surface, and one due to Garland using the group theoretic techniques. Then I will describe variants of these constructions involving cusp forms on finite dimensional groups. Finally, I will explain the aspects of the theory of Hecke algebras and spherical functions on p-adic loop groups (i.e. "double" loop groups) which allow one to compute certain Fourier coefficients of Eisenstein series.

2:40pm **Kathrin Bringmann - SCGP 102**

Title: Regularized Petersson Inner Product

3:30pm **Tea Time**

4:00pm **Greg Moore - SCGP 102**

Title: Two Projects Using Lattices, Modular Forms, String Theory & K3 Surfaces

Abstract: Project one: Desperately Seeking Moonshine. Project two: Holography and Zamolodchikov Volumes Of Moduli Spaces Of Some Calabi-Yau Manifolds

5:30pm **Workshop Banquet - SCGP 102**

Thursday, September 1st

9:00am **Siddhartha Sahi - SCGP 102**

Title: Quasi-Whittaker models and Wave-front sets

9:50am **Coffee**

10:20am **Pierre Vanhove - SCGP 102**

Title: Single-valued elliptic multiple zetas and string theory

11:10am **Anirban Basu - SCGP 102**

Title: Some relations between modular graph functions

12:00pm **Lunch**

1:50pm **Daniel Bump - SCGP 102**

Title: A Yang-Baxter equation for metaplectic Ice.

Abstract: In this work of Brubaker, Buciumas and Bump (arXiv:1604.02206) we give new applications of quantum groups to the study of Whittaker functions on the metaplectic n-fold cover of $GL(r,F)$, where F is a nonarchimedean local field. Earlier Brubaker, Bump, Friedberg, Chinta and Gunnells had shown that these Whittaker functions can be identified with the partition functions of statistical mechanical systems. They postulated that a Yang-Baxter equation underlies the subtle properties of these Whittaker functions. We prove this, and identify the corresponding Yang-Baxter equation with that of the quantum group of the affinized Lie superalgebra $\widehat{\mathfrak{gl}}(1|n)$, modified by Drinfeld twisting to introduce Gauss sums. This is a modified Perk-Schultz equation that also appears in mathematical physics. Moreover, we interpret the standard intertwining integrals as R-matrices. The Whittaker models are not unique, so the scattering matrix for the standard intertwining operators is vector valued. For a simple reflection, it was computed by Kazhdan and Patterson, who applied it to generalized theta series, and it was also applied and generalized by Chinta--Offen and McNamara to the ""metaplectic Casselman-Shalika formula."" We will show that the scattering matrix on the space of Whittaker functions for a simple reflection coincides with the twisted R-matrix of the quantum group associated with affine $\widehat{\mathfrak{gl}}(n)$. This is a piece of the R-matrix for affine $\widehat{\mathfrak{gl}}(1|n)$ mentioned above.

2:40pm **Katrin Wendland - SCGP 102**

Title: Vertex operator algebras for K3

3:30pm **Tea Time**

4:00pm **Christoph Keller - SCGP 102**

Title: Mathieu Moonshine and Symmetry Surfing

Friday, September 2nd

9:00am **Scott Carnahan - SCGP 102**

Title: Generalized Monstrous Moonshine

Abstract: I will outline the recent proof of Norton's Generalized Moonshine conjecture following the Borcherds-Hoehn program.

9:50am **Coffee**

10:20am **Jan Manschot - SCGP 102**

Title: BPS States and Indefinite Theta Functions

11:10am **Roberto Volpato - SCGP 102**

12:00pm **Lunch**

1:50pm **Kyu-Hwan Lee - SCGP 102**

Title: Kac-Moody Eisenstein series

2:40pm **Guillaume Bossard - SCGP 102**

Title: Exceptional field theory loop amplitudes

Abstract: I will discuss automorphic properties of the low energy type II string theory effective action from the point of view of exceptional field theory. The threshold functions that appear are defined as manifestly G(Z) invariant sums, although they are not automorphic in general. I will exhibit the differential equations they satisfy and how the latter determine their wave front set.

3:30pm **Break**