Titles and Abstracts

• Yichao Tian **Morningside Center of Mathematics**
Title: Canonical subgroups for \pi-divisible O-modules
Abstract: The classical theory of overconvergent p-adic modular forms requires the base Shimura variety to have a non-empty ordinary locus. For many Shimura varieties (for instance those of Harris-Taylor), this condition is not satisfied. In this talk, I will explain how to generalize the classical theory of canonical subgroups to \pi-divisible O-modules.
This is a work in progress with Shen Xu

• Ken Ono **Emory University**
Title: Rogers-Ramanujan and Moonshine
Abstract: The Rogers-Ramanujan identities and Monstrous moonshine are among the deepest results which occur at the interface of number theory and representation theory. In the lecture the speaker will discuss these identities, and describe recent work with Duncan, Griffin on Warnaar on their recent generalizations. This includes new constructions of modular units and units in class fields arising from representation theory, and the proof of the Umbral Moonshine Conjecture, which is the analog of Borcherds' proof of Monstrous Moonshine to the setting of Maass forms.

• Cheng-Chiang Tsai **Harvard University**
Title: Shalika germs, hyperelliptic curves and endoscopic transfer
Abstract: A theorem of Shalika states that a regular semisimple orbital integral can be written as a linear combination of nilpotent orbital integrals as long as we restrict to a certain class of test functions. The coefficients are called Shalika germs. Endoscopic transfer of orbital integrals implies that the Shalika germs should also satisfy certain endoscopic identity. We discuss a special case where Shalika germs are given by counting points on specific covers of hyperelliptic curves over the residue field, and describe the endoscopic identity.

• Mingmin Shen **University of Amsterdam**
Title: On the motive of some hyperkahler manifolds
Abstract: In 1980’s, Beauville constructed a decomposition of the Chow ring of an abelian variety which respects the intersection product. A similar decomposition

for a K3 surface were discovered by Beauville—Voisin about ten years ago. In this talk, I will explain how to formulate such a decomposition for a hyperkahler manifold with the notion of a multiplicative Chow—K\”unneth decomposition. This is joint work with Charles Vial.

• Xin Wan Columbia University

Title: Iwasawa Main Conjecture for Supersingular Elliptic Curves
Abstract: We outline a proof for the plus/minus Iwasawa main conjecture formulated by Kobayashi. It uses the explicit reciprocity law for Beilinson-Flach elements to reduce it to a Greenberg-type main conjecture, which is more accessible to proof.

• David Loeffler University of Warwick

Title: Introduction to Euler systems
Abstract: The theory of Euler systems, due to Kolyvagin and Rubin, is a very powerful tool used to control the sizes of Galois cohomology groups. This is the key technical tool used in Kolyvagin's proof of the Birch--Swinnerton-Dyer conjecture for elliptic curves of ranks 0 and 1, as well as a number of other important results in algebraic number theory.

I will explain the idea of an Euler system, introduce three classical examples of Euler systems, and explain a general conjecture due to Perrin-Riou predicting what kind of Euler systems one should expect for a general geometric Galois representation. Then I will explain why Perrin-Riou's conjecture does not seem to capture all the possible Euler systems. I will describe a new, refined conjecture which predicts multiple Euler systems -- possibly of different ranks -- attached to a Galois representation, and explain how these additional Euler systems seem to be more accessible in some cases than those predicted by Perrin-Riou.
This is joint work with Sarah Zerbes.

• Ashay Burungale UCLA

Title: mathfrak{p}-rigidity and Iwasawa \mu-invariants
Abstract: Let F be a totally real field with ring of integers O and p be an odd prime unramified in F. Let \mathfrak{p} be a prime above p. A mod p Hilbert modular form associated to F is determined by its restriction to the partial Serre-Tate deformation space \widehat{\mathbb{G}}_m \otimes O_{\mathfrak{p}}. We give a brief overview of this \mathfrak{p}-rigidity and its application to the \mu-

invariant of certain anticyclotomic \mathfrak{p}-adic L-functions (joint work with Prof. H. Hida).

• **Minglun Hsieh** **National Taiwan University**
Title: Inner product formula for Yoshida lifts
Abstract: In this talk, we will present an explicit inner product formula for Yoshida lifts, which plays an important role in the study of Yoshida congruences and its application to Bloch-Kato conjecture for convolution of modular forms.
This is a joint work with Namikawa Kenichi.

• **Fan Gao** **National University of Singapore**
Title: The Langlands-Shahidi L-functions for Brylinski-Deligne extensions
Abstract: Many efforts have been made to extend the Langlands program to central covers of linear reductive groups. For this purpose, a theory of L-group for covering groups will play a pivotal role as in the linear algebraic case. In the recent foundational work of Martin Weissman, the L-group for Brylinski- Deligne (BD) covering groups is constructed functorially. In this talk, we will give a brief review of the construction. Moreover, for BD covers of arbitrary split reductive group, we show that the constant term of Eisenstein series could be expressed in terms of global (partial) Langlands-Shahidi type L- functions. As in the linear algebraic case, this relies crucially on the analogous of Satake isomorphism, Gindikin-Karpelevich formula and local Langlands correspondence. We will give a brief description of these. Meanwhile, we also indicate some applications and immediate questions arising from our result.

• **Lei Zhang** **National University of Singapore**
Title: Twisted Automorphic Descent and Module Construction
Abstract: In this talk, we will introduce a method to construct actual models for cuspidal automorphic representations in global Arthur packet with generic global Arthur parameters. This method, so called the twisted automorphic descent, extends the automorphic descent method of Ginzburg, Rallis and Soudry from quasisplit classical groups to much more general classes of classical groups. The main ideal is to apply the Fourier coefficients of certain automorphic representations to establish such descent. This is a joint project with Prof. Dihua Jiang.

• **Masato Kurihara** **Keio University**

Title: Tate sequences and Iwasawa theory
Abstract: I will discuss the Galois module structure of several arithmetic modules, using several Tate sequences (cohomology complexes), and describe the Iwasawa theoretic relationship of the modules with zeta values.
I will talk on a joint work with C. Greither, and on a joint work with
D. Burns and T. Sano.

• Yuk-Kam Lau University of Hong Kong
Title: Sign changes of the Fourier coefficients of modular forms
Abstract: When a modular form has real coefficients in its Fourier expansion at a cusp, one may ask the question how the signs of the coefficients distribute. This question is quite extensively studied. In this talk we shall give a survey, and moreover, discuss a recent work jointly with E. Royer and J. Wu on half-integral weight modular Hecke eigenforms.

• Ling Long Louisianna State University
Title: Hypergeometric series over finite fields and Galois representations
Abstract: Classical hypergeometric series initiated by Gauss and Euler satisfy a lot of nice properties and have wide applications including computing the periods of algebraic varieties. In this talk we will consider finite field analogues of hypergeometric series introduced by Greene and McCarthy and discuss their applications to computing the Galois representations of the corresponding algebraic varieties.

• Sarah Zerbes University College London
Title: Euler systems for Rankin convolutions and generalisations
Abstract: I will describe the construction of a new Euler system, attached to the Rankin--Selberg convolution of two modular forms. This is joint work with Guido Kings, Antonio Lei, and David Loeffler. This Euler system is related by an explicit reciprocity law to the values of Rankin--Selberg L-functions, and I will explain how this implies cases of the Bloch--Kato conjecture, and of the finiteness of Tate--Shafarevich groups for Artin twists of elliptic curves.

I will then describe some other settings in which one can construct an Euler system using similar techniques. In particular, I will explain the construction of an Euler system for the degree 4 Asai motive attached to a Hilbert modular form over a real quadratic field.

• **Wee Teck Gan** **National University of Singapore**
Title: Recent progress on theta correspondence
Abstract: I will discuss some recent progress on the theory of local theta correspondence, such as the proof of the Howe duality conjecture, the conservation relation, the explicit determination of the theta lifting in terms of the local Langlands correspondence and the application to the Gross-Prasad conjecture.

• **Xu Shen** **The Chinese Academy of Sciences**
Title: Perfectoid Shimura varieties of abelian type
Abstract: We prove that Shimura varieties of abelian type with infinite level at p are perfectoid. As a corollary, the moduli spaces of polarized K3 surfaces with infinite level at p are also perfectoid.

• **Yongqiang Zhao** **University of Waterloo**
Title: On the 2-torsion in the class group of number fields.
Abstract: In this talk, we will present the very recent work on the first nontrivial bounds of the sizes of the 2-torsion subgroups of the class groups of cubic and higher degree fields. This yields corresponding improvements to bounds on the sizes of the 2-Selmer groups, rank of elliptic curves, number of integral points on elliptic curves and bounds on the number of A_4 quartic fields of bounded discriminant.
This is a joint work with the AIM SQuaRE team.

• **Chan Ho Kim** **KIAS**
Title: Overconvergent construction of anticyclotomic p-adic L-functions
Abstract: This is work in progress. We sketch a rather simple construction of anticyclotomic p-adic L-functions of modular forms following the idea of overconvergent modular symbols a la Stevens. The key ingredient is ``the Gross points at infinite level", which can be understood as a non-Archimedian analogue of the cycle from infinity to 0 on the complex upper half plane.