

A -ap d i c G a t h e r i n g

A Joint Workshop on p-adic Arithmetic

July 16-17, 2026

Morningside Center of Mathematics, CAS & Peking University

Titles and Abstracts

Dr. Deding Yang (The University of Chicago)

Title: On Galois Representations associated with mod p Hilbert eigenforms

Abstract: Given a modular eigenform of weight k , it is well known that there exists an associated l -adic Galois representation satisfying certain compatibility conditions away from l and the level. There are several natural questions to ask: What happens for the behavior at $p=l$? What about the converse? What about mod p cases? In the mod p world, the desired weight k of which ρ is modular is encoded in the weight part of Serre's conjecture (For the Hilbert case, this is the Buzzard-Diamond-Jarvis conjecture), also referred to as "algebraic modularity" by Diamond and Sasaki. They also defined "geometric modularity" for mod p Hilbert eigenforms, and conjectured that the two notions of "modularity" are equivalent when the weight k satisfies certain conditions. In this talk, we prove this conjecture for all quaternionic Shimura varieties. This is a joint work in progress with Siqi Yang.

Lucrezia Bertolotti (Université Paris-Saclay)

Title: TBA

Abstract: TBA

Prof. Lue Pan (Columbia University)

Title: Prescribed lifts of 2-dimensional representations

Abstract: Let p be a prime. I will discuss my recent work with Matt Emerton, Toby Gee, and Xinwen Zhu concerning lifts of irreducible, totally odd, 2-dimensional mod p representations of the absolute Galois group of a totally real field.

Changjiang Du (Université Paris-Saclay)

Title: Multivariable $(\varphi_q, \mathcal{O}_K^\times)$ -modules associated to p -adic Galois representations

Abstract: Let K be an unramified extension of $\mathbb{Q}_p$ with absolute Galois group G_K , and E a finite extension of K with ring of integers $\mathcal{O}_E$. In this talk, we will explain how to associate an étale $(\varphi_q, \mathcal{O}_K^\times)$ -module over A_{mv} to every continuous $\mathcal{O}_E$ -representation ρ of G_K of finite type, where A_{mv} is a certain multivariable coefficient ring. We will prove that this construction defines a fully faithful exact functor. The construction is based on

the theory of Lubin-Tate (φ, Γ) -modules and relies on two different descent arguments. We expect this functor to be related to p -adic Banach representations of $\mathrm{GL}_2(K)$.

Yang Chen (Tsinghua University)

Title: Homological branching laws for mod p representations of $\mathrm{GL}_2(F)$

Abstract: In this talk, we investigate the homological branching law for mod p representations of $\mathrm{GL}_2(F)$ restricted to the multiplicative group $L^\times$ of a quadratic extension L/F , as well as to the torus T , where F is a finite extension of $\mathbb{Q}_p$. We will present a complete solution to the homological branching problem for the case $F = \mathbb{Q}_p$. For a general field F , we resolve the problem for principal series and the special series. Time permitting, we will discuss the key techniques used, including the existence of adjoints for compact inductions in the derived category, translating the category of smooth representations into the category of pseudocompact modules via Pontryagin duality, and utilizing Mackey decompositions to reduce the problem to explicit calculations within the category of pseudocompact modules. Ultimately, this approach provides a unified theoretical framework for understanding branching laws in the mod p context.

Prof. Pierre Colmez (Université Sorbonne)

Title: Hodge-podge of (φ, Γ) -modules

Abstract: We will present various results about (φ, Γ) -modules and their cohomology.

Zhenghui Li (Université Sorbonne)

Title: Bernstein-Zelevinsky duality for equivariant vector bundles on Drinfeld spaces

Abstract: We show that Serre duality for equivariant vector bundles on the Drinfeld space induces a locally analytic Bernstein-Zelevinsky duality on the compactly supported cohomology. It is a generalization of the result of Fargues and Mieda in l -adic case. This is a joint work with Benchao Su and Zhixiang Wu.

Dr. Arnaud Vanhaecke (MCM, CAS)

Title: B o u n d e d v e c t o r s a n d s h e a v e s o n t h e c o v e r i n g s o f D r i n f e l d

Abstract: A fundamental construction in the p -adic Langlands correspondence for $\mathrm{GL}_2(\mathbb{Q}_p)$ is the universal unitary completion, which associates a Banach representation to a locally analytic representation. Unfortunately, this "functor" is often poorly behaved, especially beyond the case of $\mathrm{GL}_2(\mathbb{Q}_p)$. One of the first effective constructions of such a completion was given by Breuil and Mézard in their 2010 Astérisque paper. They constructed a Zariski sheaf on a formal model of the p -adic half-plane whose global sections are dual to the universal unitary completion of certain special series representations. This realizes the completion in terms of bounded vectors in the dual of the locally analytic representation. In this talk, I will explain how this idea can be used to derive the bounded vectors functor in specific settings where the representations arise from sheaves on coverings of Drinfeld's half-plane.

Dr. Yitong Wang (University of Toronto)

Title: Multivariable (ϕ, γ) -modules and local-global compatibility

Abstract: Let K be a finite unramified extension of $\mathbb{Q}_p$. Let π be an admissible smooth mod p representation of $\mathrm{GL}_2(K)$ occurring in some Hecke eigenspaces of the mod p cohomology of a Shimura curve, and r be its underlying global 2-dimensional Galois representation. When r is sufficiently generic, we prove that the associated multivariable (ϕ, γ) -module $D_A(\pi)$ defined by Breuil-Herzig-Hu-Morra-Schraen is completely determined by the restriction of r to the decomposition group at p in an explicit way, generalizing their results.

Note: Information extracted from the MCM event page linked above on July 10, 2026.