# Titles and abstracts - Relative Langlands and Arithmetic

CIRM (Luminy), February 23-27, 2026

**Minicourses**

**Yiannis Sakellaridis** (Johns Hopkins)

Title: *Background on relative Langlands duality*

Abstract: The goal of this series of lectures will be to give an overview of the framework of relative Langlands duality introduced in my work with Ben-Zvi and Venkatesh, emphasizing translations that are of interest to number theorists (e.g., between numerical and geometric versions of the conjectures) and structures that are directly relevant, at least as motivation, to the mini-course by Zeyu Wang (such as the conjectural role of certain Clifford algebras).

**Zeyu Wang** (MIT)

Title: *Intersection Number of Rankin–Selberg Cycles on Shtukas*

Abstract: The classical Rankin–Selberg integral formula (for $G=GL(n) \times GL(n-1)$ and $H=GL(n-1)$) relates integrals of Hecke eigenforms on G along H to the Rankin–Selberg L-function of the associated Galois representation. In this talk, I will present a generalization of this formula over function fields in the everywhere unramified setting, relating the self-intersection numbers of some cycles on the moduli of G-Shtukas to the higher derivatives of the Rankin–Selberg L-function. This can be viewed as a higher-dimensional analogue of the higher Gross–Zagier formula of Yun–Zhang. The talk will be based on my joint work with Shurui Liu.
Main references:
 1  Shurui Liu and Zeyu Wang, Higher period integrals and derivatives of L-functions. https://arxiv.org/abs/2504.00275
 2  Zeyu Wang, Special cycle on Shtukas and categorical trace. https://arxiv.org/abs/2509.05526
Other references:
 1  Zhiwei Yun and Wei Zhang, Shtukas and the Taylor expansion of L-functions. https://arxiv.org/abs/1512.02683
 2  Dima Arinkin, Dennis Gaitsgory, David Kazhdan, Sam Raskin, Nikita Rozenblyum, Yakov Varshavsky, The stack of local systems with restricted variation and geometric Langlands theory with nilpotent singular support. https://arxiv.org/abs/2010.01906
 3  Sergey Lysenko, Local geometrised Rankin-Selberg method for GL(n). https://

arxiv.org/abs/math/9905033

 4  Edward Frenkel, Dennis Gaitsgory, Kari Vilonen, On the geometric Langlands conjecture. https://arxiv.org/abs/math/0012255
 5  Alexander Braverman, Michael Finkelberg, Victor Ginzburg, Roman Travkin, Mirabolic Satake equivalence and supergroups. https://arxiv.org/abs/1909.11492

**Talks**

**Amina Abdurrahman** (IHES)

Title: *A cohomological formula for the central value of symplectic L-functions and an arithmetic application*

Abstract: I give a cohomological obstruction for the central value of the L-function of a symplectic representation on a curve to be a square. This is partly motivated by a conjecture in BZSV describing the "square" of an L-sheaf in terms of a certain Clifford algebra and is joint work with A. Venkatesh.
I will sketch an analogous picture in topology that is crucial in the arithmetic proof.
I will also give a recent arithmetic application, giving a topological perspective on the order of the Tate-Shafarevich group up to squares.

**Paul Boisseau** (MPIM Bonn)

Title: *Non-tempered Gan-Gross-Prasad conjectures for general linear groups and residues of Zeta integrals*

Abstract: The original conjectures of Gan, Gross and Prasad link periods of cuspidal automorphic forms on classical groups to central values of L-functions. Recently, they proposed a generalization of these statements to periods of non-tempered forms. For general linear groups, their conjecture extends the results of Jacquet, Piatetski-Shapiro and Shalika on the Rankin-Selberg period to the non-generic spectrum.
In this talk, I will explain how to regularize this period integral and show that it computes the predicted special values of L-functions. This result can be interpreted as a non-tempered instance of relative Langlands duality. The strategy relies on the observation that residues of Rankin-Selberg Zeta integrals produce periods of non-generic forms. This method also applies in the local setting to prove the missing part of the local version of the conjecture, thus completing earlier works of K.Y. Chan, C. Chen and R. Chen.

**Ryan Chen** (Princeton)

Title: *Faltings heights and subleading terms of adjoint L-functions*

Abstract: Colmez's conjecture predicts that Faltings heights of CM abelian varieties appear in subleading terms of certain Artin L-functions.
An averaged version is known by the work of Andreatta--Goren--Howard--Madapusi and Yuan--Zhang.
We propose a generalized problem relating diagonal cycles on $(n - 1)$-dimensional unitary Shimura varieties and adjoint L-functions of certain automorphic representations of $U(n)$.
The case $n = 1$ is (a variant of) the averaged Colmez conjecture.
I will explain the origin of our conjecture, discuss our predictions in the general case, and report on our results in the case of n = 2, via trace formula.

This is joint work in progress with Weixiao Lu and Wei Zhang.

**Sanath Devalapurkar** (Chicago)

Title: *Equivariant homology and maps between affine homogeneous G-varieties*

Abstract: Relative Langlands duality proposes a duality between suitable Hamiltonian G-spaces and Hamiltonian G^-spaces. For a Hamiltonian G-space of the form T*(G/H) where H is a reductive subgroup of G, the dual Hamiltonian G^-space can be constructed directly using equivariant homology; I will motivate this construction via Hochschild cohomology (aka derived centers). This can be used to prove the relative derived Satake equivalence for homogeneous G-spaces with G simple; some of this is work in progress with Tsao-Hsien Chen, David Nadler,  and Mark Macerato.
The same ideas also describe how one might study "relative functoriality", i.e., given a Lagrangian correspondence between Hamiltonian G-spaces, what is the dual Lagrangian correspondence between Hamiltonian G^-spaces. I hope to present some examples of these calculations and suggest some generalizations.

**Wee Teck Gan** (Singapore)

Title: *Triality and Adjoint lifting for GL(3)*

Abstract: In this talk, we will discuss the proof of the adjoint lifting from GL(3) to GL(8), using  the twisted trace formula for the triality automorphism of PGSO(8), and a description of its image.
Some applications include improvement towards the Ramanujan bound for GL(3) and the determination of global multiplicities of cusp forms  of SL(3).

**Luis Garcia** (UCL)

Title: *Vertex algebras and special cycles*

Abstract: Shimura varieties of orthogonal and unitary type come equipped with a large collection of Shimura subvarieties giving rise to so-called special cycles. Classical work of Kudla and Millson relates these cycles to the theta correspondence, proving in particular that their cohomology classes can be arranged into generating series that turn out to be modular forms. One might wonder if underlying the modularity phenomenon is some vertex algebra. During the talk I will explain a construction of a relative vertex algebra over these Shimura varieties and will discuss some progress towards the character of its global sections with the Kudla-Millson generating series.

**Nadya Gurevich** (Ben-Gurion)

Title: *Generalized Fourier transforms and minimal representations*

Abstract: As part of their program, Braverman and Kazhdan introduced a family of generalized G-equivariant Fourier transforms (GFTs) acting on $L^2(X)$, where X is a basic affine space for a reductive group G. In this talk, we show that in certain cases these GFTs are closely related to the action of an involutive element in the minimal representation of a larger group H. This phenomenon generalizes the classical fact that the longest Weyl element in the Weil representation of $\sim Sp(2n)$ acts by the Fourier transform on an n-dimensional vector space. This observation allows to define local and adelic Schwarz spaces $S(X)$. The Poisson summation formula is equivalent to the fact that the minimal representation of $H(A)$ is automorphic.
The talk is based on joint works with David Kazhdan and with Wee Teck Gan.

**Spencer Leslie** (Boston College)

Title: *Unitary Friedberg-Jacquet periods and their twists*

Abstract: I discuss recent joint work with Jingwei Xiao and Wei Zhang, where we formulate a global conjecture relating periods associated to certain symmetric spaces of unitary groups to central values of standard L-functions on linear groups, generalizing a theorem of Waldspurger for GL(2). I will then discuss the family of relative trace formulas which we successfully compare under certain local assumptions to prove cases of the conjecture. A new feature of this comparison is the presence of relative endoscopy: we need to affect an endoscopic comparison of relative trace formulas to establish the global results. Time permitting, I will mention joint work in progress with Thomas Hameister in establishing the endoscopic fundamental lemmas required in the twisted cases.

**Dongwen Liu** (Zhejiang)

Title: *Relative completed cohomologies and p-adic L-functions*

Abstract: Generalizing Emerton's completed cohomologies, we define relative completed cohomologies of arithmetic manifolds and their modular symbols, which interpolate the nearly ordinary part of the classical automorphic cohomologies and classical modular symbols. As applications, we construct three families of nearly ordinary p-adic L-functions. The modifying factors at infinity and p are consistent with the conjectures given by Deligne, Blasius, Coates and Perrin-Riou, from which we can determine the exceptional zeros. This is a joint work with Binyong Sun.

## Yuta Takaya (Tokyo)

Title: *Categorification of local relative Langlands duality*

Abstract: The relation between period integrals and L-functions, studied since the work of Hecke and Tate, has recently been reformulated by Ben-Zvi–Sakellaridis–Venkatesh as relative Langlands duality. In this talk, I will present a version of this duality, the normalized period conjecture, in the framework of the categorical local Langlands correspondence à la Fargues-Scholze. I will describe computations for the Iwasawa-Tate and Hecke periods that support this conjecture, and discuss how it leads to a relation between distinguished representations and distinguished L-parameters. This talk is based on joint work with Milton Lin.

## Chen Wan (Rutgers)

Title: *A relative trace formula identity for non-tempered spherical varieties*

Abstract: In this talk, I will explain a relative trace formula identity that compares the period integral of any non-tempered spherical variety with the period integral of a tempered spherical variety associated to a Levi subgroup. I will also explain the relation between this comparison with the relative Langlands duality and propose a conjectural comparison for general Hamiltonian spaces.

## Danielle Wang (Duke)

Title: *Twisted Gan-Gross-Prasad conjecture*

Abstract: Let E/F and K/F be quadratic extensions of number fields, and let V be a skew-Hermitian space over E. The twisted Gan-Gross-Prasad conjecture considers the restriction of representations from the unitary group U(V_K) to U(V). We discuss the relative trace formula approach to the global twisted GGP conjecture, and prove it in the unramified case under some local assumptions. This is joint work with Weixiao Lu and Zhiyu Zhang.