SCIENTIFIC PROGRAMME, TITLES AND ABSTRACTS

- **Denis Benois.**

Title : Extra-zeros of Rankin-Selberg p-adic L-functions.

Abstract : We discuss extra-zeros of p-adic L-functions of motives having good reduction at p. An archetypical example is provided by the Kubota Leopoldt L-function associated to a character χ such that $\chi(p) = 1$ and the theorem of Ferrero and Greenberg. Other interesting examples arise from some modular forms of odd weight. In this situation, the special value of the p-adic L-function can be expressed in terms of an L-invariant defined using p-adic Hodge theory. In the both cases, trivial zeros appear in a critical point. In this talk, we are mainly interested in the non-critical case. The basic example we have in mind is provided by the Rankin-Selberg convolution of two modular forms of the same weight (joint work with S. Horte).

- **Athanasios Bouganis.**

Title : Quaternionic modular forms and the Rankin-Selberg method.

Abstract : The algebraic and p-adic properties of special L-values of Siegel and Hermitian modular forms are of central interest and have been extensively studied. In this talk, we will discuss another family of modular forms, which are associated to the isometry group of a quaternionic skew hermitian form. We will present some recent progress on the study of their standard L-function using the Rankin-Selberg method. This will lead us to discuss the existence of some theta series, a problem of which, in turn, is related to Howe duality and invariant theory.

- **George Boxer.**

Title : TBA.

Abstract : TBA.

- **Lassina Dembélé.**

Title: Abelian varieties with everywhere good reduction over certain real quadratic fields with small discriminant.

Abstract: Let $F = \mathbb{Q}(\sqrt{D})$, where $D = 53, 61$ or 73. There is a simple abelian surface A/F with everywhere good reduction. In this talk, we explain that, under GRH, every abelian variety with everywhere good reduction defined over F is isogenous to a power of A. This result extends previous work of Fontaine and Schoof.

• **Mladen Dimitrov.**

Title : Uniform irreducibility of Galois action on the ℓ-primary part of Abelian 3-folds of Picard type.

Abstract : Half a century ago Manin proved a uniform version of Serre's celebrated result on the openness of the Galois image in the automorphisms of the ℓ-adic Tate module of any non-CM elliptic curve over a given number field. Recently in a series of papers Cadoret and Tamagawa established a definitive result regarding the uniform boundedness of the ℓ-primary torsion for 1-dimensional abelian families. In a collaboration with D. Ramakrishnan we provide first evidence in higher dimension, in the case of abelian families parametrized by Picard modular surfaces over an imaginary quadratic field M. Namely, we establish a uniform irreducibility of Galois acting on the ℓ-primary part of principally polarized Abelian 3-folds with multiplication by M, but without CM factors.

• **Carl Wang Erickson.**

Title: Bi-ordinary modular forms.

Abstract : It is well-understood that p-ordinary Hecke eigenforms give rise to global Galois representations which become reducible with an unramified quotient after restriction to a decomposition group at p. We present a construction of "bi-ordinary" p-adic modular forms. These are p-adic modular forms whose associated 2-dimensional Galois representations are not only p-ordinary, but also split as a sum of two characters upon restriction to a decomposition group at p. It is well-understood that p-ordinary eigenforms with complex multiplication (CM) give rise to such forms, but recent joint work with Francesc Castella indicates that there are non-CM bi-ordinary forms as well. This is also joint work with Francesc Castella.

• **Toby Gee.**

Title : Moduli stacks of Galois representations

Abstract : I will discuss the construction and some basic properties of moduli stacks of Galois representations. This is joint work with Matthew Emerton.

• **Haruzo Hida.**

Title: Adjoint Selmer groups and cyclicity.

Abstract. For a given elliptic cusp form f, we have a 2-dimensional p-adic Galois representation r with coefficients in a p-adic integer ring. Having r act on SL(2)-Lie algebra by adjoint (conjugate action), we get a 3-dimensional representation Ad. We describe the formula of the order of the p-adic arithmetic cohomology group Sel(Ad) (called the adjoint Selmer group) via the L-value $L(1, \text{Ad}) = L(1, \text{Ad}(f))$ and explore the question when the Selmer group is cyclic (having one generator) over the coefficient ring?

• **Shin Hattori.**

Title : $\wp$-adic continuous families of Drinfeld eigenforms of finite slope

Abstract : Let p be a rational prime and $q > 1$ a p-power integer. Drinfeld modular forms are rigid analytic functions on the Drinfeld upper half plane over $\mathbb{F}_q((1/t))$ satisfying a similar transformation condition and holomorphy condition to elliptic modular forms. Though numerical computations suggest that they have interesting $\wp$-adic structures, we still have poor understanding of them. In this talk, I will explain how to construct $\wp$-adic continuous families of Drinfeld eigenforms of finite slope using Teitelbaum's description of Drinfeld cuspforms via the Steinberg module, and also what we can say about slope zero Drinfeld cuspforms.

• **Valentin Hernandez.**

Title : Families of automorphic forms for general PEL Shimura varieties

Abstract : Families of automorphic forms have proven to be a great tool in number theory in the past 30 years. To construct such families, we can use coherent cohomology and the theory of the canonical subgroup. Unfortunately, for some primes, Shimura varieties can have an empty ordinary locus and thus no canonical subgroup ! In this talk I would like to explain how we can use the rigid and integral geometry of Shimura varieties with higher level at p to bypass these difficulties. If times permit, I will try to explain some number theoretic applications.

• **Krzysztof Klosin.**

Title: The Paramodular Conjecture for abelian surfaces with rational torsion.

Abstract: The Paramodular Conjecture can be viewed as an analog of the Taniyama-Shimura Conjecture for abelian surfaces asserting that they should correspond to certain (paramodular) Siegel modular forms. We will discuss recent progress on the conjecture and focus on the situation when the abelian surface has a rational torsion point. We will present a method that allows one to verify the conjecture in new cases. This is joint work with T. Berger.

- **Emmanuel Lecouturier.**

Title : Mazur's Eisenstein ideal, Sharifi's conjecture and Mazur-Tate's conjecture.

Title : In 1987, Barry Mazur and John Tate formulated refined conjectures of the "Birch and Swinnerton-Dyer type", and one of these conjectures was essentially proved in the prime conductor case by Ehud de Shalit in 1995. One of the main objects in de Shalit's work is the so-called refined L-invariant, which happens to be a Hecke operator. We consider the problem of determining to which power of the Eisenstein ideal the L-invariant belongs. We give a partial answer to this problem by making use of results of Jun Wang on a conjecture of Romyar Sharifi concerning Eisenstein ideals of level $\Gamma_1(N)$.

- **Zheng Liu.**

Title : p-adic L-functions and doubling archimedean zeta integrals for symplectic groups.

Title : In order to prove the desired interpolation properties of the p-adic standard L-functions for Siegel modular forms, one needs to calculate a doubling archimedean zeta integral for holomorphic discrete series on $\mathrm{Sp}(2n, \mathbb{R})$. When the holomorphic discrete series is of scalar weight, it has been computed by Bocherer-Schmidt and Shimura. I will explain a way to compute this archimedean zeta integral for general vector weight by using the theory of theta correspondence, and verify that the results are compatible with the conjecture of Coates-Perrin-Riou.

- **James Newton.**

Title: Vanishing of adjoint Selmer groups

Abstract : I will discuss some results on the vanishing of adjoint Selmer groups for (polarized) automorphic Galois representations. This is joint work in progress with Jack Thorne, motivated by an application to automorphy of symmetric powers of modular forms (see Jack's talk). The main novelty is that we do not impose any assumptions on the residual image of the representation (it can even be trivial).

Vincent Pilloni.

Title : TBA.

Abstract : TBA.

- **Alice Pozzi.**

Title : Rigid meromorphic cocycles at real multiplication points.

Abstract : A rigid meromorphic cocycle is a class in the rst cohomology of the group $\mathrm{SL}_2(\mathbb{Z}[1/p])$ acting on the non-zero rigid meromorphic functions on the Drinfeld p-adic upper half plane by Möbius transformation. Rigid meromorphic cocycles can be evaluated at points of real multiplication, and their RM values conjecturally lie in the ring class eld of real quadratic elds, suggesting a striking analogy with the classical theory of complex multiplication. In this talk, we discuss a special case of the conjecture, relating the RM value of the "Eisenstein" Dedekind-Rademacher cocycle to a Gross-Stark unit. We explain the connection with certain deformations of Hilbert Eisenstein series of weight one. This is work in progress with Henri Darmon and Jan Vonk.

- **Jack Thorne.**

Title : Symmetric power functoriality for $\mathrm{SL}_2(\mathbb{Z})$.

Abstract : I will explain the proof, using eigenvarieties, that Ramanujan's Δ function has infinitely many symmetric power liftings. This is joint work with Laurent Clozel and James Newton.

- **Jacques Tilouine.**

Title : Congruences and adjoint Selmer groups for Bianchi modular forms

abstract. In a work in progress with E. Urban, we generalize results by Galatius-Venkatesh in order to relate the cohomology of a Bianchi threefold to the adjoint Selmer group of the Galois representation over the Hecke algebra. This Galois representation was constructed by Scholze and al.

- **Chris Williams.**

Title : Parabolic eigenvarieties and p-adic L-functions for $\mathrm{GL}(2n)$.

Abstract: Let π be an automorphic representation of $\mathrm{GL}(2n)$ over a totally real field that admits a Shalika model (that is, it is a transfer from $\mathrm{GSpin}(2n+1)$. When π is ordinary at p, recent independent work of Gehrman and Dimitrov-Januszewski-Raghuram gives a p-adic L-function attached to pi, that is, a p-adic measure interpolating its classical critical L-values. I will report on ongoing joint work with Daniel Barrera and Mladen Dimitrov where we generalise this to the non-ordinary case using overconvergent cohomology. We also vary this construction in p-adic families. Rather than standard overconvergent cohomology, defined with respect to the maximal torus in $\mathrm{GL}(2n)$, our results use a more flexible definition defined with respect to the subgroup $\mathrm{GL}(n) \times \mathrm{GL}(n)$, allowing weaker non-criticality conditions. In the process, we

construct 'parabolic eigenvarieties' parametrising eigenpackets that are finite slope with respect to $\mathrm{diag}(p\mathrm{I}_n, \mathrm{I}_n)$ (rather than the full Hecke operator at p).