Arithmetica Transalpina

Università di Genova, 23 May 2025

Università di Genova | DIMA DIPARTIMENTO DI MATEMATICA

Contents

Schedule

Friday, 23 May 2025

10:00–10:30: Welcome

☕ break

11:00–12:00: Antonio Cauchi

12:15–13:15: Giuseppe Ancona

Lunch break

15:00–16:00: Veronika Ertl-Bleimhofer

☕ break

16:30–17:30: Stefano Morra

Titles & Abstracts

Giuseppe Ancona (Université de Strasbourg)

Title: Ramified periods and field of definition

Abstract: In a joint work with Dragos Fratila and Alberto Vezzani, we construct hyperelliptic curves of large genus, defined over quadratic fields that are isomorphic to their Galois conjugates but do not descend to $\mathbb{Q}$. The obstruction to descent is new and we call it "ramified periods". These are p-adic numbers that arise from the comparison between de Rham cohomology and crystalline cohomology (hence the term periods). These numbers can reveal interesting information if p ramifies in the quadratic field.

Antonio Cauchi (University College Dublin)

Title: On periods and L-functions for $\mathrm{GU}(2,2) \times \mathrm{GL}(2)$

Abstract: The study of periods of automorphic forms is a key theme in the Langlands program and has become an important tool to tackle various problems in Number Theory and Arithmetic Geometry. For instance, Waldspurger formula and its generalisations have created a fertile ground for numerous arithmetic applications. In recent years, the conjectures of Sakellaridis and Venkatesh (and then Ben-Zvi, Sakellaridis, and Venkatesh) in the context of spherical varieties has led to a deeper understanding of automorphic periods and their relation to special values of L-functions. In this talk, I present work in progress aimed at looking at certain non-spherical cases. Precisely, I will describe a new integral representation of the degree 12 "exterior square $\times$ standard" L-function on generic cusp forms on $\mathrm{GU}(2,2) \times \mathrm{GL}(2)$ (or $\mathrm{GL}(4) \times \mathrm{GL}(2)$) and how it can be used to relate the non-vanishing of its central value to a certain cohomological period. If time permits, I will describe how the same strategy applies to the case of $\mathrm{GSp}(6) \times \mathrm{GL}(2)$. This is joint work with Armando Gutierrez Terradillos.

Veronika Ertl-Bleimhofer (Université de Caen Normandie)

Title: The v-Picard group of Stein spaces

Abstract: I will report on a joint project with S. Gilles and W. Nizioł studying the image of the Hodge–Tate logarithm map (defined by Heuer) in the case of smooth Stein varieties. Motivated by the computations for the affine space, Heuer raised the question

whether this image is always equal to the group of closed differential forms. We show that it always contains such forms but the quotient can be non-trivial. More precisely, it contains a $\mathbb{Z}_p$-module which maps to integral classes in the proétale cohomology via the Bloch–Kato exponential map.

Stefano Morra (Université Paris 8)

Title: Finite length for unramified GL_2

Abstract: Let p be a prime number and K a finite unramified extension of $\mathbb{Q}_p$. The smooth $\mathrm{GL}_2(K)$ representations appearing in the mod p local Langlands program are expected to satisfy desirable properties, in particular their "structure" should be predicted by the corresponding 2-dimensional mod p representations of $\mathrm{Gal}(\overline{K}/K)$ (e.g. they are irreducible if and only if the local Galois representation is). In joint work with C. Breuil, Y. Hu, F. Herzig, B. Schraen we show that the smooth mod p representations π of $\mathrm{GL}_2(K)$ appearing in Hecke eigenspaces of the cohomology of Shimura curves are of finite length and satisfy several further constraints coming from the structure of the local Galois representation. In this talk we focus on the special case when K is a quadratic extension of $\mathbb{Q}_p$, and introduce the main tools which appear in the proof of the general case, such as (φ, Γ)-modules and the Iwahori socle filtration of π. This is joint work with C. Breuil, F. Herzig, Y. Hu and B. Schraen.

Miscellaneous information

Conference venue

All talks will be given in room **509** (fifth floor) of the Department of Mathematics, whose address is the following:

Dipartimento di Matematica (DIMA)
Università degli Studi di Genova
Via Dodecaneso 35
16146 Genova

Coffee breaks and the buffet lunch will be served in front of the conference room (notice that the main entrance of DIMA is located on the sixth floor!).

Please bear in mind that the Department of Mathematics building closes at around **7:00 pm**. Of course, this does not mean that you cannot get out of the building later than that; however, once outside, you will not be able to enter the building again.

The offices of the local organizers are in room **805** (Maria Rosaria Pati) and in room **907** (Stefano Vigni), on the eighth and ninth floors of the building.

Conference dinner

A conference dinner will take place at 8:00 pm at

Ristorante Zeffirino, Via XX Settembre 20 – 16121 Genova.

The restaurant, which is located in the city centre, can be easily reached by public transport from the conference venue and nearby hotels. For info, you can have a look at `https://zeffirino-restaurant.com/en/` and `https://zeffirino.it/`.

General information on Genova

Genova has a lot to offer in terms of history, culture, art, food, ... If you would like to know more, the website `http://www.visitgenoa.it/en` is well worth a visit.