

# **Journée Gretchen & Barry Mazur**

## **Report of Contributions**

Contribution ID: 1

Type: **not specified**

## Motivic Fundamental Group of CM Elliptic Curves and Geometry of Bianchi Hyperbolic Threefolds

*Friday, July 5, 2019 10:00 AM (1 hour)*

Let  $N$  be an ideal in the ring  $O$  of gaussian integers. We consider the action of the motivic Galois group on the motivic fundamental group of the elliptic curve with CM by the ring  $O$ , punctured at the  $N$ -torsion points, and relate it to the geometry of the Bianchi threefold obtained by taking the quotient of the hyperbolic space by a congruence subgroup of  $GL(2,O)$  determined by the ideal  $N$ .

**Presenter:** Prof. GONCHAROV, Alexander (Yale University & IHES)

Contribution ID: 2

Type: **not specified**

## Purity for Flat Cohomology

*Friday, July 5, 2019 11:30 AM (1 hour)*

The absolute cohomological purity conjecture of Grothendieck proved by Gabber ensures that on regular schemes étale cohomology classes of fixed cohomological degree extend uniquely over closed subschemes of large codimension. I will discuss the corresponding phenomenon for flat cohomology. The talk is based on joint work with Peter Scholze.

**Presenter:** Prof. ČESNAVIČIUS, Kęstutis (Université Paris-Sud)

Contribution ID: 3

Type: **not specified**

## Application of Functional Transcendence to Counting Rational Points on Curves

*Friday, July 5, 2019 2:00 PM (1 hour)*

With Philipp Habegger we recently proved a height inequality, using which one can bound the number of rational points on 1-parameter families of curves in terms of the genus, the degree of the number field and the Mordell-Weil rank (but no dependence on the Faltings height). This gives an affirmative answer to a conjecture of Mazur for pencils of curves. In this talk I will give a blueprint to generalize this method to an arbitrary family of curves. In particular I will focus on:

- (1) how establishing a criterion for the Betti map to be immersive leads to the desired bound;
- (2) how to apply mixed Ax-Schanuel to establish such a criterion.

This is work in progress, partly joint with Vesselin Dimitrov and Philipp Habegger.

**Presenter:** Prof. GAO, Ziyang (IMJ-PRG)

Contribution ID: 4

Type: **not specified**

## Sur le programme de Langlands p-adique

*Friday, July 5, 2019 3:15 PM (1 hour)*

Le programme de Langlands p-adique a pour origine les travaux de Serre et de Hida sur les familles p-adiques de formes modulaires et les représentations galoisiennes qui leur sont associées. Mazur, en collaboration avec Gouvéa et avec Coleman, a joué un grand rôle dans la maturation de ce programme, mais celui-ci n'a toujours pas de forme vraiment définitive. Je présenterai des travaux récents en lien avec ce programme.

**Presenter:** Prof. COLMEZ, Pierre (IMJ-PRG)

Contribution ID: 5

Type: **not specified**

## New Rational Points of Algebraic Curves over Extension Fields

*Friday, July 5, 2019 4:45 PM (1 hour)*

For  $L/K$  an extension of fields and  $V$  an algebraic variety over  $K$  say that  $V$  is Diophantine Stable for the extension  $L/K$  if  $V(L) = V(K)$ . That is, if ' $V$  acquires no new rational points' when one makes the field extension from  $K$  to  $L$ . I will describe some recent results joint with Karl Rubin regarding Diophantine Stability and give a survey of related recent statistics, heuristics, and conjectures.

**Presenter:** Prof. MAZUR, Barry (Harvard University)