# Number theory days

Monday, June 23, 2014 - Friday, June 27, 2014

Université Lille 1

# Scientific Program

# Analytic-Additive Number Theory

There have been several startling developments in the recent past in relations between analytic number theory, additive combinatorics, ergodic theory and harmonic analysis . We have seen applications to arithmetic objects like progressions in primes, to algebraic structures like rational varieties and modular forms as well as to hard-core analytic tools like sieves. The meeting will be an opportunity to discuss newer trends as well as some historical ideas. We will continue with this process in a research school in September.

# Galois representations and modular forms

The study of modular forms and Galois representations has been the focal point of research of a large number of forefront mathematicians over the last few decades, in the frame of the ambitious Langlands program. The speakers in this section will present the state of art in that subject and a selection of recent advances and perspectives.

# Arithmetic geometry and Galois theory

This is a natural and classical combination in number theory, with the algebraic fundamental group at its center. The fourth day of the conference will be devoted to the recent progress in some of the big topics of this area: fundamental group approach to diophantine geometry, anabelian geometry, patching in algebra and Galois theory, local-global questions and approximation properties, perfectoid spaces, etc.

# Quadratic forms

A significant progress has been made in the algebraic theory of quadratic forms during the last few years. This is the consequence of various and sophisticated theories, as the theory of motives of quadrics, Chow groups, algebraic cobordism, unramified cohomology of quadrics, algebraic groups...etc. The aim of this session is to present recent results on quadratic forms and some related structures, with an emphasis on tools mentioned before.

# Noncommutative algebra

Noncommutative algebra is a branch of mathematics which has resulted since several decades in important developments and in many applications. Quantum groups, noncommutative algebraic geometry, noncommutative ring theory, coding theory are just a few of the prominent areas of this branch. The imbrications of these areas and their connections with other branches of mathematics are multiple. For example: quantum groups are at the base of the noncommutative algebraic geometry. These are Hopf algebras which, when finitedimensional, are themselves Frobenius algebras. These same Frobenius algebras are of paramount importance in coding theory on finite rings, they also appear for the solutions of the Yang-Baxter equations, in representation theory,...