Analysis Spring School 2017, Clermont-Ferrand

The mini-courses will take place at **Amphi Hennequin** in the Mathematics Department building.

Abstracts

Catalin Badea (University Lille 1): What is Operator Theory Good For ?

The purpose of these six talks is to survey old and recent results displaying the efficiency of spectral theory of linear operators in solving various problems, in pure and applied mathematics. We shall discuss some topics in optimization, complex and harmonic analysis, ergodic and geometric group theory and topological dynamics. The first part of each talk is intended for a wide audience.

Zoltán Buczolich (University Eötvös Loránd, Budapest, Hungary): Almost everywhere convergence of ergodic averages

After some introduction I plan to discuss some tools used for studying almost everywhere convergence of ergodic averages. These include

- the Banach principle,
- maximal inequalities,
- the Calderón transference principle,
- Conze principle,
- the filling scheme, and as an application I plan to talk about

  the Hopf decomposition and

  the Cachon–Ornstein ergodic theorem.

In the end I would like to discuss some results related to my research concerning almost everywhere convergence of non-conventional ergodic averages of L^1 functions.
These topics include:

- divergence of ergodic averages along the squares;
- convergence along some sequences of zero Banach density;
- convergence for arithmetic weights: the prime divisor functions ω and Ω.

El Maati Ouhabaz (University Bordeaux): Riesz transforms on manifolds, old and new results

The aim of these lectures is to present some results on L^p-boundedness of the Riesz transform on Riemannian manifolds. Some of these results have been proved in recent years. The manifolds in consideration are smooth, complete and non-compact. We shall also discuss Riesz transforms associated with Schrödinger operators.

In order to treat the Riesz transform we discuss heat kernel bounds on manifolds, their weighted gradient estimates, singular integral operators on metric spaces of homogeneous type, the Hodge-de Rham Laplacian and Hardy spaces associated with operators.