

**Neuvièmes “Journées Besançon-Neuchâtel”  
d’Analyse Fonctionnelle.**

**Besançon, les 27 et 28 mai 2019.**

**Antoine Bourquin (Université de Neuchâtel)  
“Chabauty’s topology on some easy examples.”**

In this talk, we will speak about the topology of Chabauty on some locally compact groups. First of all, we will recall what this topology is. After that, we will speak about some general facts about this kind of spaces. Finally, for the most part of the talk, we will treat some specific examples, like the space  $C_{p^\infty} \times S^1$ .

**François Dahmani (Université Grenoble Alpes)  
“Actions of relatively hyperbolic groups on  $\ell^p$  spaces.”**

For a finitely generated group, the existence of a proper action by affine isometries on a Hilbert space is one possible formulation of the Haagerup property. A weak form of this property consists in replacing the Hilbert space by some strictly convex Banach space. An argument by Yu shows that every hyperbolic group (possibly with property (T)) admits a proper action by affine isometries on an  $\ell^p$  space, for some  $p \in [2, \infty]$ ; so a similar result for relatively hyperbolic groups was expected. An argument by Guentner and Tessera actually showed the existence of such an action for groups hyperbolic relative to nilpotent subgroups. Adapting the argument by Alvarez and Lafforgue for hyperbolic groups, we show that such a proper action exists for a relatively hyperbolic group (for some  $p$ ) as soon as the peripheral subgroups admit such an action (possibly for a different  $p$ ).

**Laurent Hayez (Université de Neuchâtel)  
“Spectral measures, random walks and spectra of graphs.”**

The aim of the talk will be to introduce the so called spectral measures, their link with random walks on graphs and the spectra of said graphs. We will give criteria to compute the spectral measure of an arbitrary graph, and we will explicitly compute the spectral measures of specific graphs.

**Claus Koestler (University College - Cork)  
“Markovianity and the Thompson group  $F$ .”**

Markovianity is a stochastic phenomenon which does not care about the past - the presence 'dictates' the future. Unexpectedly this phenomenon is closely linked to representations of the Thompson group  $F$ . My talk will introduce to this new connection between randomness and symmetry in the wider context of noncommutative probability. I will discuss that a representation of the Thompson group  $F$  in the automorphisms of a  $W^*$ -algebraic probability space defines Markov shifts. Conversely, a representation of the Thompson group  $F$  is obtained from those Markov shifts which permit a coupling representation to a certain class of noncommutative Bernoulli shifts. These results motivate the introduction of 'partial spreadability' as a new distributional symmetry, aiming at a de Finetti type characterization of Markovianity. The presented results are based on ongoing research with Rajarama Bhat, Gwion Evans, Rolf Gohm, Arundhathi Krishnan, Vijaya Kumar, and Stephen Wills.

**Javier Parcet (Instituto de Ciencias Matemáticas - Madrid)**

**“Multipliers in  $SL_n(\mathbf{R})$ .”**

Connes rigidity conjecture for factors of  $PSL_n(\mathbf{Z})$  provides a strong motivation to study invariants on this class of von Neumann algebras. Lafforgue/de la Salle rigidity theorem opens a door to harmonic analysis in this direction. In this talk, we shall present the first sufficient conditions for  $L_p$ -boundedness of Fourier multipliers in the group algebra of  $SL_n(\mathbf{R})$  [in the spirit of Hörmander-Mikhlin criterium for Euclidean multipliers] and a major strengthening of Lafforgue/de la Salle rigidity theorem. Joint work with Éric Ricard and Mikael de la Salle.

**Yoël Perreau (Université Bourgogne France-Comté)**

**“On the embeddability of the family of countably branching trees into quasi-reflexive Banach spaces.”**

Equipped with the standard hyperbolic distance, the set  $T_N = \{\emptyset\} \cup \bigcup_{n=1}^N \mathbb{N}^n$  is called countably branching tree with  $N$  steps. In this talk, we look at the equi-Lipschitz embeddability of the family  $(T_N)_{N \geq 1}$  into Banach spaces. We give a complete characterization of this property in terms of Szlenk index in the quasi-reflexive setting. More precisely, we show that this family forms a metric invariant for a certain linear property. This work fits well in the so called Ribe Program which aims at characterizing local properties of Banach spaces using metric objects. It follows a well known result from Bourgain characterizing super-reflexivity in terms of (non)-equi-Lipschitz embeddability of the family of dyadic trees.

**Antonin Procházka (Université Bourgogne France-Comté)**

**“Extremal notions in Lipschitz free spaces and applications.”**

The Lipschitz free space  $\mathcal{F}(M)$  is a Banach space constructed “around” a given metric space  $M$  in such a way that the Lipschitz maps defined on  $M$  become linear maps on  $\mathcal{F}(M)$ . It is the canonical predual of the space of Lipschitz functions on  $M$  which vanish at some distinguished point  $0 \in M$  equipped with the best Lipschitz constant as a norm. A full description of the set of extreme points of the unit ball  $B_{\mathcal{F}(M)}$  is still eluding but for molecules, i.e. the elements of the free space of the form  $m_{xy} = \frac{\delta(x) - \delta(y)}{d(x,y)}$ , being extreme is equivalent to the triviality of the metric segment  $[x, y]$ . This is a recent result due to Aliaga and Pernecká. We will show that in this case the molecule in question is even exposed. These results can be used to obtain a simpler proof of a characterization of those metric spaces  $M$  for which  $\mathcal{F}(M) = \ell_1(\Gamma)$ . Joint work with C. Petitjean.

**Jared White (Université Bourgogne France-Comté)**

**“Measure algebras on locally compact groups and their left ideal.”**

Measure algebras are an important class of Banach algebras and as such it is natural to study their ideal structure. In this talk I shall discuss on going work which focusses on better understanding the maximal left ideals in these algebras. We shall discuss for example when such left ideals are weak\*-closed or finitely-generated.

**Alexandre Zumbrennen (Université de Neuchâtel)**

**“Haagerup property and actions on infinite measure spaces.”**

The Haagerup property is a useful and very interesting subject of study for locally compact second countable groups. During this talk, I will introduce this property, motivate its study and give a few examples of groups with the Haagerup property. Finally I will present a new characterization of the Haagerup property in terms of actions on sigma-finite measure spaces.