Quatrième édition des Mat' du Labo

Jeudi 25 septembre 2025

10h15-12h15, salle de conférence

10h25-11h10 **Reda Chhaibi** : *Faster Entropic Optimal Transport using Low Frequency Data*

This talk is based on joint works with Anirban BOSE, Serge GRATTON and Samuel VAITER.

Optimal Transport is the general question of optimizing transport of mass between measures, in order to minimize a cost. The regularization using an entropy term has recently attracted a lot of attention because of its interesting structure, its computability via the famous Sinkhorn algorithm etc... In this talk, we will explain how the classical Sinkhorn algorithm can be accelerated using spectral data. In particular, it relies on qualitative understanding of the behavior of the spectrum of the Hessian for varying "temperatures". The phenomenon at hand and our intuition finds its source in spectral clustering of graph Laplacians, equilibrium of Markov chains, Courant's nodal domain theorem, and Schrodinger operators at small temperature. The goal at hand is to describe these phenomena. We hope to show how (abstract yet classical) spectral and geometric considerations lead to an efficient algorithm based on standard linear algebra. We shall also formulate conjectures and open questions.

11h15-12h **Ursula Ludwig** : *Global analysis on singular spaces*

The Leitmotiv of global analysis on a smooth manifold are comparison theorems between analytic invariants, invariants defined by solving a PDE on the manifold, and topological invariants. The most famous result of this type is the Atiyah-Singer index theorem. Another result of this type is the Cheeger-Müller theorem. In this introductory talk, after presenting basic classical ideas in global analysis, we will speak about generalisations of these results to singular space.

Elena Di Bernardino et Stella Krell