Geometry Day in Créteil

January 20, 2020

Giovanni Catino: Some canonical Riemannian metrics on four-dimensional manifolds: existence and rigidity

Abstract: In this talk I will present some results concerning rigidity and existence of canonical metrics on closed (compact without boundary) four-dimensional manifolds. In particular I will consider Einstein metrics, Harmonic Weyl metrics and some generalizations. These are joint works with P. Mastrolia (Universit degli Studi di Milano), D. D. Monticelli and F. Punzo (Politecnico di Milano).

David Tewodrose: A rigidity result for metric measure spaces with Euclidean heat kernel

Abstract: In this talk I will present a joint work with G. Carron from the University of Nantes where we prove the following rigidity result : a complete metric measure space equipped with a Dirichlet form having an Euclidean heat kernel is necessarily isometric to the Euclidean space. In a first part, I will explain how this result provides a new proof of Coldings almost rigidity theorem for Riemannian manifolds with non-negative Ricci curvature. In a second part, I will explain how to prove our rigidity result.

MÍanie Theillière: Convex Integration without Integration

Abstract: The Convex Integration Theory was developped by Gromov in the 70s. This theory allows to solve differential constraints seen as subsets of the jet space and called Differential Relations. In the case of a relation of order 1, it allows to build a solution F from a section $(x, f(x), L(x))$ of the bundle $J^1(M, W) \to M$ whose image lies inside the differential relation using an iteration of suitable integrations called "Convex Integrations". Recently this theory led to explicit constructions of C^1-isometric embeddings. In this talk, we will propose an alternative formula to the Convex Integrations called Corrugation Process and we will introduce the notion of Kuiper relations. For these relations, the formula is greatly simplified. As an application of this result, we will give an idea of the construction of a new immersion of $\mathbb{RP}^2$ and we will state a Nash-Kuiper C^1-isometric embedding theorem in the case of totally real maps.