

# Seminário de sistemas dinâmicos e estocásticos

IMECC - UNICAMP

## Título: An introduction to synthetic Ricci curvature via Optimal Transport.

Matheus Yudi Maruyama

UNICAMP

### Resumo:

Ricci curvature is a central object in geometrical analysis, bounds for the Ricci curvature enables us to understand how volumes, geodesics and diffusion processes behave. However, classical definitions rely on the differential structure of the manifold, which is not always present. In this talk, I will present an introduction to the synthetic theory of Ricci curvature developed by Lott, Sturm, and Villani, that extends the notion of Ricci curvature to nonsmooth spaces in a satisfactory manner. After a brief overview of optimal transport and Wasserstein geometry, I will discuss how convexity of entropy functionals in the Wasserstein space along optimal transport paths encodes lower Ricci curvature bounds. This leads to the curvature-dimension condition  $CD(K,N)$ , a notion of Ricci curvature that applies to general metric measure spaces and recovers the classical Riemannian theory when smooth structures are present. Finally, I'll comment about how dynamical extensions of this concept can be used to characterize a synthetic notion of Ricci flow for time-dependent metric measure spaces.