

Mar del Plata (Sep 2026)

Geometry and Regularity in Singular Variational Problems

Singular variational problems arise in a wide range of models from nonlinear partial differential equations, calculus of variations, and free boundary problems. Their study reveals a rich interplay between singular energies, nonlinear diffusion, and the emergence of geometric structures. This lecture presents recent developments illustrating how singular variational energies lead to sharp regularity results, singular absorption, dead-core structures, and free boundary behavior. Emphasis will be placed on the geometric ideas that connect these seemingly different problems and on a unified perspective that opens new directions in regularity theory and nonlinear analysis.