MATHEMATICAL SCIENCES

CRT/DISMA - Analytical and Geometric Aspects of Riemannian manifolds and submanifolds

Funded By	Dipartimento DISMA FONDAZIONE CRT CASSA DI RISPARMIO DI TORINO [P.iva/CF:06655250014]
Supervisor	IMPERA DEBORA - debora.impera@polito.it
Contact	
Context of the research activity	Riemannian manifolds and submanifolds whose curvatures satisfy specific equations, their evolution through geometric flows, classifications of geometric structures and geometric inequalities.
Objectives	This research project aims to understand the geometry of Riemannian manifolds and submanifolds through the lens of geometric analysis. The goal is to study how analytic tools - such as differential operators, spectral theory, and integral inequalities - can be employed to understand the geometric and topological properties of these spaces. Special attention will be given to: understanding the behavior of Riemannian manifolds and submanifolds under curvature constraints; investigating rigidity and stability of critical immersions for geometric functionals (including minimal submanifolds, constant mean curvature submanifolds, f-minimal submanifolds); analyzing singularities that may arise along geometric flows (such as Ricci flow and mean curvature flow); proving and applying geometric inequalities and comparison techniques; exploring spectral properties of geometrically significant differential operators in relation to the geometry of the underlying manifold.
Skills and competencies for the development of the activity	The ideal candidate should have a solid background in Riemannian Geometry, acquired for instance through a Master's thesis on this topic. In addition, familiarity with analytical tools- such as elliptic and parabolic partial differential equations, as well as variational methods- is highly desirable.