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Areas of Interests

Metric and Differential Geometry, Geometric Measure Theory, Geometric Analysis.
In particular:
Carnot groups, SubRiemannian Geometry, Analysis on Metric Spaces, Group Actions, Geometric Group Theory, Asymptotic Geometry, Embedding problems.

Research

If you are interested in knowing what has been proven in the special metric spaces given by **subRiemannian manifolds** and in particular **Carnot groups**, then I am your man!
For you I can characterize Carnot groups as special metric spaces satisfying only 4 simple axioms.
As current research, I am interested in the regularity, the structure and the classification of **isometries of subRiemannian** and **subFinsler** manifolds.
In subRiemannian geometry there are some geodesics called 'abnormal' for which the smoothness is not clear. I am working to prove that such abnormals are negligible in some settings.
I am interested in understanding a link between **asymptotic geometry of nilpotent groups** and **abnormal geodesics** of their asymptotic cones. This work is a collaboration with Emmanuel Breuillard.
In the setting of Carnot groups, I am also interested in proving **rectifiability results for sets of finite perimeter**. In particular, I wonder about the regularity of sets with **constant horizontal normal**, which are particular subRiemannian minimal surfaces.
Regarding abstract metric spaces, I am interested in studying spaces that are **isometrically homogeneous**. More generally, I research the properties of **biLipschitz homogeneous spaces**. Preferably, I assume the spaces to be geodesic.
I am also interested in Lipschitz and **path isometric embeddings** of metric spaces.