Research Interests

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I am currently working in the estimation of *simplicial volume*, which is a homotopy invariant of compact manifolds defined via a natural ℓ^1-seminorm on real singular homology. More precisely, for an oriented manifold it is the ℓ^1-seminorm of the real fundamental class of the manifold itself [2]. The simplicial volume was introduced by Gromov in his pioneering work *Volume and bounded cohomology* [1], published in 1982. The study of simplicial volume is most attractive because of its relation with the geometric structure of the manifold.

As a powerful tool for computing simplicial volume, Gromov himself developed the theory of *bounded cohomology* [1]. In particular the understanding of simplicial volume of manifolds with non-empty boundary could be increased developing some aspects of bounded cohomology of pairs of spaces.

Furthermore I am currently analyzing the relation between simplicial volume and other topological invariants. For instance Gromov conjectured that an aspherical oriented closed connected manifold with vanishing simplicial volume has zero Euler characteristic. Gromov himself suggested to use the *integral foliated simplicial volume* for which the corresponding statement is more accessible (later proved by Schmidt [3]). The simplicial volume is always not greater than the integral foliated simplicial volume, are they equal in the aspherical case? Hyperbolic manifolds could be the first case to approach.

References

[1] M. Gromov. *Volume and bounded cohomology.* Inst. Hautes Études Sci.Publ.Math. **56**, pp. 5–99, 1982.

[2] C. Löh. *Simplicial volume.* Bull. Man. Atl., pp. 7–18, 2011. Available online at http://www.map.mpim-bonn.mpg.de/Simplicial volume

[3] M. Schmidt. *L^2-Betti numbers of $\mathcal{R}$-spaces and the integral foliated simplicial volume.* Ph.D. thesis, University of Münster, 2005.