

Curriculum Vitae

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Mario Santilli

Associate Professor
University of L'Aquila
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Scientific interests Geometric analysis, non-smooth geometry and geometric measure theory

Degrees

7/2010 Bachelor Degree, Mathematics, University of L'Aquila.
4/2013 Master Degree, Mathematics, University of L'Aquila.
7/2017 Phd Degree, Mathematics, University of Potsdam.
2/2023 Italian Habilitation Associate Professor in Geometry (Abilitazione II Fascia, settore concorsuale 01/A2).

Previous academic positions

10/2021-09/2024 Tenure Track Assistant Professor at the Department of Information Engineering, Computer Science and Mathematics, University of L'Aquila (Italy)
11/2017-9/2021 Wissenschaftlicher Mitarbeiter (PostDoc) at the Department of Mathematics, University of Augsburg (Germany).
6/2017- 9/2017 Wissenschaftlicher Mitarbeiter (PostDoc) at Max Planck Institute for Gravitational Physics in the Geometric Analysis Division.
10/2013-05/2017 Full-time doctoral student fellowship from the Max Planck Institute for Gravitational Physics, Albert-Einstein Institut Golm.

Research Funds

2023 Principal investigator of the one-year research project "Differential geometric structures arising in General Relativity, Physics of Interfaces and String Theory", funded by University of L'Aquila.
2023-2024 Member of the one-year research project INDAM-GNSAGA 2023 "Geometric Analysis: Partial Differential Equations and Theory of submanifolds".

2024-2025 Member of the research project PRIN 2022: "Differential-geometric aspects of manifolds via Global Analysis" (code: 20225J97H5).

Conference talks (since 2019)

- 28/11/19 *Winter School Gradient Flows and Variational Methods in PDEs*, Ulm University.
31/5/22 *Geometric Analysis in Castro*, Castro (Lecce).
14/06/22 *Recent trends in Geometric Analysis and spectral theory*, Università Sapienza (Roma).
21/07/22 *Differential geometry and its applications*, University of Hradec Kralove.
14/09/2022 *Another Pisan workshop in Geometric Analysis*, Centro De Giorgi, Pisa.
16/09/2022 *Workshop on Nonlinear and Stochastic Analysis*, University of Augsburg.
6/06/2023 *Geometric Analysis and PDE's*, Cortona.
22/06/2023 *Real and Complex Manifolds: Topology, Geometry and Holomorphic Dynamics*, Università di TorVergata (Roma).
5/09/2023 *XXII Congresso dell'Unione Matematica italiana*, Sezione di Topologia e Geometria differenziale, Pisa.
12/04/24 *A Spring Day in Geometric Analysis*, Università Sapienza, Roma.

Seminar talks (since 2019)

- 7/11/19 Trento University. *Seminario di Dipartimento*.
9/6/20 Taiwan NCTS. *Differential Geometry Seminar*.
2/3/21 University of Tennessee, Knoxville. *Geometric Analysis Seminar*.
18/3/21 University TorVergata. *Seminario di Equazioni Differenziali*
22/3/21 University of Copenhagen. *Research Seminar: Geometric Analysis*
3/5/21 University of Copenhagen. *Research Seminar: Geometric Analysis*
11/5/21 University of Augsburg. *Augsburger mathematisches Kolloquium*
6/10/22 University of Nice. *Seminaire d'algebre, topologie et geometrie*.
18/10/23 University of Texas at Austin. *Department Seminar*.
23/04/24 University of Frankfurt. *Department Seminar*.
18/09/24 University of Padova. *Department Seminar*.

Courses at doctoral and research schools

- July 2019 **Beihang University**. (Beijing, China).
Summer school: *Geometric Measure Theory and Related Fields*.
Organizer: Prof. Xiangyu Liang.
Minicourse: *Relating curvatures of geometric measure and convex geometry*. (12 hours)
February 2022 **University of L'Aquila**.
Doctoral course (Ciclo XXXVII). *Constant mean curvature hypersurfaces and critical points of the isoperimetric functional* (10 hours).
February 2024 **University of L'Aquila**.
Doctoral course (Ciclo XXXIX). *An introduction to geometric inequalities and constant mean curvature hypersurfaces* (16 hours).

Supervision of doctoral students

2021-2024 Paolo Valentini

Since 2024 Jacopo Parducci

Teaching activity at University of Potsdam (Germany)

- (1) Real Analysis (SS 14/15). **Exercises.**
- (2) Topics in elliptic partial differential equations (WS 15/16). **Exercises.**

Teaching activity at University of Augsburg (Germany)

- (1) Elements of Geometric Measure Theory (WS 17/18, Augsburg University, Germany)
- (2) Analysis II (SS 17/18, Augsburg University, Germany). **Exercises.**
- (3) Selected topics in Calculus of Variations (WS 18/19, Augsburg University, Germany)
- (4) Functional Analysis (SS 18/19, Augsburg University, Germany). **Exercises.**
- (5) Selected topics in nonlinear Analysis (WS 19/20, Augsburg University, Germany)
- (6) Functional Analysis (SS 19/20, Augsburg University, Germany). **Exercises.**
- (7) Ordinary differential equations (WS 20/21, Augsburg University, Germany)
- (8) Convex sets and convex functions (SS 20/21, Augsburg University, Germany)

Teaching activity at University of L'Aquila

- (1) Istituzioni di matematiche II-Cdl Chimica (SS 21/22)
- (2) Geometria e topologia algebrica (12 hours)-Cdl Matematica (SS 21/22)
- (3) Istituzioni di matematiche II-Cdl Chimica (SS 22/23)
- (4) Geometria C (28 hours)-Cdl Matematica (SS 22/23)
- (5) Istituzioni di matematiche II-Cdl Chimica (SS 23/24)
- (6) Geometria C (30 hours)-Cdl Matematica (SS 23/24)

Published papers

- (1) Mario Santilli. Rectifiability and approximate differentiability of higher order for sets. *Indiana Univ. Math. J.* 68 (2019), 1013–1046.
- (2) Ulrich Menne, Mario Santilli. A geometric second-order-rectifiable stratification for closed subsets of Euclidean space. *Ann. Sc. Norm. Super. Pisa Cl. Sci. (5)* 19(3) (2019), 1185–1198.
- (3) Mario Santilli. Fine properties of the curvature of arbitrary closed sets. *Ann. Mat. Pura Appl. (4)*, 199, (2020), no. 4, 1431–1456.
- (4) Mario Santilli. Normal bundle and Almgren's geometric inequality for singular varieties of bounded mean curvature. *Bull. Math. Sci.* 10(1) 2050008, 24, 2020.
- (5) Antonio De Rosa, Sławomir Kolasiński, Mario Santilli. Uniqueness of critical points of the anisotropic isoperimetric problem for finite perimeter sets. *Arch. Ration. Mech. Anal.* 238 (2020), no. 3, 1157–1198.
- (6) Mario Santilli. Distance functions with dense singular sets. *Comm. Partial Differential Equations.* 46 (2021), no. 7, 1319–1325.
- (7) Mario Santilli. Second order rectifiability of varifolds of bounded mean curvature. *Calc. Var. Partial Differential Equations.* 60 (2021), no. 2, Paper No. 81, 17 pp.
- (8) Sławomir Kolasiński, Mario Santilli. Regularity of distance functions from arbitrary closed sets. *Math. Ann.* 2023, 386(1-2), pp. 735–777.
- (9) Daniel Hug, Mario Santilli. Curvature measures and soap bubbles beyond convexity. *Adv. Math.* 411 (2022), part A, Paper No. 108802.

- (10) Mario Santilli, Bernd Schmidt. Two phase models for elastic membranes with soft inclusions. *Atti Accad. Naz. Lincei Cl. Sci. Fis. Mat. Natur.* 34 (2023), no. 2, pp. 401–431
- (11) Mario Santilli, Bernd Schmidt. A Blake-Zisserman-Kirchhoff theory for plates with soft inclusions. *J. Math. Pures Appl.* (9), 2023, 175, pp. 143–180.
- (12) Mario Santilli. Finite total curvature and soap bubbles with almost constant higher-order mean curvature. *International Mathematics Research Notices*, 2024, 2024(17), pp. 12111–12135.

Preprints

- (1) Francesco Maggi, Mario Santilli. Rigidity and compactness with constant mean curvature in warped product manifolds. arXiv:2303.03499
- (2) Mario Santilli, Paolo Valentini. Alexandrov Sphere Theorems for $W^{2,n}$ -hypersurfaces. arXiv:2409.01061