

PIGOLA Stefano

Research identifier

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Education and Career

- 2022 - , Full Professor, MATH-02/B Geometria, Università di Milano-Bicocca
- 2020 - 2021, Associate Professor, MAT/05 Analisi, Università di Milano-Bicocca
- 2014 - 2020, Associate Professor, MAT/03 Geometria, Università dell'Insubria
- 2005 - 2014, Assistant Professor, MAT/03 Geometria, Università dell'Insubria
- 2004, PhD in Mathematics, Università degli Studi di Milano. Thesis: "Maximum and comparison principles at infinity on Riemannian manifolds". Advisor: Marco Rigoli.
- 1998/99, B.A. in Mathematics, Università degli Studi di Milano.

Direction of research projects

- 2010: research project entitled *Teoria del potenziale nonlineare su varietà Riemanniane e applicazioni geometriche* funded by GNAMPA (Italy). Team: Stefano Pigola, Michele Rimoldi, Daniele Valtorta, Giona Veronelli. Visiting professors: Marc Troyanov (EPFL).
- 2011–2013: research project entitled *Geometria delle Varietà Riemanniane con Densità* inside the UNiversità-REgione, founded by Regione Lombardia (Italy) with a 2-years postdoc grant.
- 2021: research project entitled *Harmonic Analysis on Continuous and Discrete Structures* founded by Università degli Studi di Milano-Bicocca (Italy) with a 1 year post-doc grant.

Participation to research projects

- PRIN 2005, "Analisi armonica". PI: Fulvio Ricci
- PRIN 2007, "Analisi armonica". PI: Fulvio Ricci
- PRIN 2010-2011, "Varietà reali e complesse: geometria, topologia e analisi armonica". PI: Fulvio Ricci
- PRIN 2015, "Real and Complex Manifolds: Geometry, Topology and Harmonic Analysis". PI: Fulvio Ricci

Research and teaching assignments

- 2013-2014: visiting researcher, Laboratoire Analyse, Géométrie et Applications, Université Paris 13, France.

Research interests

- Geometric Analysis, Global Analysis, Riemannian Geometry

Preprints

1. S. Boldt, B. Güneysu, S. Pigola, *Lower bounds on the normal injectivity radius of hypersurfaces and bounded geometries on manifolds with boundary*. Preprint (2025) available at <https://arxiv.org/pdf/2504.02687>
2. D. Impera, S. Pigola, M. Rimoldi, G. Veronelli, *Isoperimetric and Michael-Simon inequalities on manifolds with asymptotically nonnegative curvature*. Preprint (2025) available at <https://arxiv.org/pdf/2503.08279>

Published papers

1. N. De Ponti, S. Pigola, G. Veronelli *Unique Continuation at Infinity: Carleman Estimates on General Warped Cylinders*. IMRN, Volume 2024, Issue 16 (2024), 11910-11932.
2. B. Güneysu, S. Pigola, P. Stollmann, G. Veronelli, *A new notion of subharmonicity on locally smoothing spaces, and a conjecture by Braverman, Milatovic, Shubin*. Math. Ann. 390 (2024), 4209-4243.
3. L. Marini, S. Meda, S. Pigola, G. Veronelli, *L^p gradient estimates and Calderón-Zygmund inequalities under Ricci lower bounds*. Rev. Mat. Iberoam. 40 (2024), no. 3, 803–826.
4. S. Pigola, D. Valtorta, G. Veronelli, *Approximation, regularity and positivity preservation on Riemannian manifolds*. Nonlinear Anal. 245 (2024), Paper No. 113570, 19 pp.
5. A. Bisterzo, A. Farina, S. Pigola, *L_p -loc positivity preservation and Liouville-type theorems*. J. Geom. Anal. 34 (2024), no. 4, Paper No. 117, 19 pp.
6. A. Bisterzo, S. Pigola *Symmetry of solutions of semilinear PDEs on Riemannian domains*. Nonlinear Anal. 234 (2023), Paper No. 113320.
7. S. Pigola, *Global Calderón-Zygmund inequalities on complete Riemannian manifolds*. Séminaire de théorie spectrale et géométrie, Volume 36 (2019-2021), p. 127-189.
8. D. Impera, S. Pigola, M. Rimoldi, *The Frankel property for self-shrinkers from the viewpoint of elliptic PDEs*. J. Reine Angew. Math. 773 (2021), 1–20.
9. S. Pigola, G. Veronelli, *The smooth Riemannian extension problem*. Annali Sc. Norm. Sup. Pisa 20 (2020), 1507–1551.
10. D. Bianchi, S. Pigola, A.G. Setti, *Qualitative properties of bounded subsolutions of nonlinear PDEs*. J. Math. Pures Appl. 144 (2020), 137–163.
11. B. Güneysu, S. Pigola, *L_p -interpolation inequalities and global Sobolev regularity results (with an appendix by Ognjen Milatovic)*. Ann. Mat. Pura Appl. 198 (2019), 83–96.
12. S. Pigola, G. Veronelli, *Sobolev spaces of maps and the Dirichlet problem for harmonic maps*. Commun. Contemp. Math. 21 (2019), 1750091, 22 pp.
13. B. Güneysu, S. Pigola, *Quantitative C^1 -estimates on manifolds*. Int. Math. Res. Not. IMRN Volume 2018, Issue 13 (2018), 4103–4119.
14. B. Güneysu, S. Pigola, *Nonlinear Calderón-Zygmund inequalities for maps*. Ann. Glob. Anal. Geom. 54 (2018), no. 3, 353–364.
15. D. Impera, J.H. de Lira, S. Pigola, A.G. Setti, *Height estimates for Killing graphs*. J. Geom. Anal. 28 (2018), no. 3, 2857–2885.
16. S.L. Cacciatori, S. Pigola, *Hurewicz fibrations, almost submetrics and critical points of smooth maps*. Forum Math. 29 (2017), 751–760.

17. D. Impera, S. Pigola, A.G. Setti, *Potential theory on manifolds with boundary and applications to controlled mean curvature graphs*. J. Reine Angew. Math. 733 (2017), 121–159.
18. L.F. Pessoa, S. Pigola, A.G. Setti, *Dirichlet parabolicity and L^1 -Liouville property under localized geometric conditions*. J. Funct. Anal. 273 (2017), 652–693.
19. D. Impera, S. Pigola, *On the growth of supersolutions of nonlinear PDE's on exterior domains*. Nonlinear Anal. 146 (2016), 20–31.
20. S. Pigola, G. Veronelli, *On the Dirichlet problem for p -harmonic maps II: Cartan-Hadamard targets with special structure*. Proc. Amer. Math. Soc. 144 (2016), 3173–3180.
21. S. Pigola, G. Veronelli, *On the Dirichlet problem for p -harmonic maps I: compact targets*. Geom. Dedicata 177 (2015), 307–322.
22. B. Güneysu, S. Pigola, *The Calderón-Zygmund inequality and Sobolev spaces on noncompact Riemannian manifolds*. Adv. Math. 281 (2015), 353–393.
23. G.P. Bessa, J.H. de Lira, A.G. Setti, *Curvature estimates for submanifolds immersed into horoballs and horocylinders*. J. Math. Anal. Appl. 431 (2015), 1000–1007.
24. S. Pigola, A.G. Setti, M. Troyanov, *The connectivity at infinity of a manifold and $L_{q,p}$ -Sobolev inequalities*. Expositiones Math. 32 (2014), 365–383.
25. S. Pigola, A.G. Setti, *Global divergence theorems in nonlinear PDEs and Geometry*. Ensaios Matematicos 2014, Volume 26, 1–77.
26. S. Pigola, M. Rimoldi, *Complete self-shrinkers confined into some regions of the space*. Annals Global Anal. Geom. 45 (2014), 47–65.
27. G.P. Bessa, S. Pigola, A. G. Setti, *On submanifolds of highly negatively curved spaces*. Internat. J. Math. 25 (2014) 1450055 (15 pages)
28. G.P. Bessa, S. Pigola, A.G. Setti, *On the L^1 -Liouville property of stochastically incomplete manifolds*. Potential Anal. 39 (2013), 313–324.
29. G.P. Bessa, S. Pigola, A.G. Setti, *Spectral and stochastic properties of the f -Laplacian, solutions of PDEs at infinity and geometric applications*. Rev. Mat. Iberoam. 29 (2013), no. 2, 579–610.
30. S. Pigola, M. Rimoldi, *Characterizations of model manifolds by means of certain differential systems*. Canad. Math. Bull. 55 (2012), no. 3, 632–645.
31. S. Pigola, G. Veronelli, *Remarks on L^p -vanishing results in geometric analysis*. Internat. J. Math. 23 (2012), no. 1, 1250008, 18 pp.
32. S. Pigola, A.G. Setti, *The Feller property on Riemannian manifolds*. J. Funct. Anal. 262 (2012), no. 5, 2481–2515.
33. S. Pigola, M. Rigoli, M. Rimoldi, A.G. Setti, *Ricci almost solitons*. Ann. Sc. Norm. Super. Pisa Cl. Sci. (5) 10 (2011), no. 4, 757–799.
34. S. Pigola, M. Rimoldi, A.G. Setti, *Remarks on non-compact gradient Ricci solitons*. Math. Z. 268 (2011), no. 3-4, 777–790.
35. I. Holopainen, S. Pigola, G. Veronelli, *Global comparison principles for the p -Laplace operator on Riemannian manifolds*. Potential Anal. 34 (2011), 371–384.
36. S. Pigola, G. Veronelli, *Uniform decay estimates for finite-energy solutions of semi-linear elliptic inequalities and geometric applications*. Differential Geom. Appl. 29 (2011), 35–54.
37. S. Pigola, G. Veronelli, *Lower volume estimates and Sobolev inequalities*. Proc. Amer. Math. Soc. 138 (2010), 4479–4486.
38. S. Pigola, G. Veronelli, *On the homotopy class of maps with finite p -energy into non-positively curved manifolds*. Geom. Dedicata 143 (2009), 109–116.

39. S. Pigola, M. Rigoli, A.G. Setti, *Aspects of potential theory on manifolds, linear and non-linear*. Milan J. Math. 76 (2008), 229–256.
40. S. Pigola, M. Rigoli, A.G. Setti, *A finiteness theorem for the space of L^p harmonic sections*. Rev. Mat. Iberoam. 24 (2008), no. 1, 91–116.
41. S. Pigola, M. Rigoli, A.G. Setti, *Constancy of p -harmonic maps of finite q -energy into non-positively curved manifolds*. Math. Z. 258 (2008), 347–362.
42. S. Pigola, M. Rigoli, A.G. Setti, *Some characterizations of space-forms*. Trans. Amer. Math. Soc. 359 (2007), 1817–1828; 360 (2008), 3943–3944.
43. S. Pigola, M. Rigoli, A.G. Setti, *Maximum principles at infinity on Riemannian manifolds: an overview*. Workshop on Differential Geometry Mat. Contemp. 31 (2006), 81–128.
44. S. Pigola, M. Rigoli, A.G. Setti, *Some non-linear function theoretic properties of Riemannian manifolds*. Rev. Mat. Iberoam. 22 (2006), 801–831.
45. S. Pigola, M. Rigoli, A.G. Setti, *Vanishing theorems on Riemannian manifolds, and geometric applications*. J. Funct. Anal. 229 (2005), 424–461.
46. S. Pigola, M. Rigoli, A.G. Setti, *Maximum principles on Riemannian manifolds and applications*. Mem. Amer. Math. Soc. 174 (2005), no. 822.
47. S. Pigola, M. Rigoli, A.G. Setti, *Some applications of integral formulas in Riemannian geometry and PDE's*. Milan J. Math. 71 (2003), 219–281.
48. S. Pigola, M. Rigoli, A.G. Setti, *A remark on the maximum principle and stochastic completeness*. Proc. Amer. Math. Soc. 131 (2003), 1283–1288.
49. S. Pigola, M. Rigoli, A.G. Setti, *Maximum principles and singular elliptic inequalities*. J. Funct. Anal. 193 (2002), no. 2, 224–260.
50. S. Pigola, M. Rigoli, A.G. Setti, *Some remarks on the prescribed mean curvature equation on complete manifolds*. Pacific J. Math. 206 (2002), no. 1, 195–217.

Published books

1. S. Pigola, M. Rigoli, A.G. Setti, *Vanishing and finiteness results in geometric analysis. A generalization of the Bochner technique*. Progress in Mathematics, 266. Birkhäuser Verlag, Basel, 2008.

Selected talks and mini-courses

- *Volume and parabolicity for drifted Laplacians*. Differential Geometry, Analysis and Epistemology in Milan in honor of Marco Rigoli, Milan, June 16-20, 2025.
- *Global L^p elliptic estimates on Riemannian manifolds*. Real analysis and geometry. Minicourse held at CIRM, Luminy, June 12-16, 2023.
- *On the global $W^{2,p}$ regularity of solutions of the Poisson equation on complete manifolds*. Seminaire Théorie Spectrale et Géométrie, Grenoble, February 20, 2020.
- *Halfspace and intersection properties of weighted minimal hypersurfaces in the Gaussian space*. Recent Trends in Geometric Analysis and Applications. SNS Pisa, November 25-28, 2019.
- *Potential theory on Riemannian manifolds: some recent results and possible perspectives*. Workshop on Geometry, Analysis and Probability. Beijing, October 26-30, 2017.
- *Riemannian manifolds with boundary and smooth domains*. Geometric Analysis in Samothrace, a tribute to G_érard Besson. May 30-June 4, 2016.

- *Extending manifolds past their boundaries*. A Differential Geometry Day in memory of Sergio Console. Torino, 13 May 2016.
- *The Dirichlet problem for harmonic maps into convex supporting balls*. Workshop 2015, Varietà reali e complesse: geometria, topologia e analisi armonica. SNS di Pisa, 5-7 March, 2015.
- *Geometric aspects of recurrence, non-explosion and Feller property of a Riemannian manifold*. XVIII Escola de Geometria Diferencial, Brasilia, July 28th-1st August 2014.
- *Some geometric aspects of parabolicity, stochastic completeness and Feller property*. Topics in Geometric Analysis, Potsdam, June 19th 2014.
- *Height estimates for graphs of constant mean curvature*. A meeting with Louis Nirenberg, Varese 10-13 June 2014.
- *Stochastic properties of manifolds: Liouville-type aspects*. Maceiò, February 2012. II workshop of Differential Geometry.
- *Global divergence theorems in nonlinear PDEs and Geometry*. Fortaleza, January 2012. Mini-course for the Summer School in Differential Geometry.
- *p -Laplacian and topology of manifolds*. Santiago de Compostela, December 2010. Conference in Geometry and Global Analysis.
- *Some analytic and geometric aspects of the p -Laplacian on Riemannian manifolds*. Bardonecchia, June 2009. Convegno Nazionale di Analisi Armonica.
- *Some vanishing and finiteness results on complete manifolds: a generalization of the Bochner technique*. Caramanico Terme, May 2007. Convegno Nazionale di Analisi Armonica.

PhD students under my direction

- Giona Veronelli, with a thesis entitled: *Some analytic and geometric aspects of the p -Laplacian on Riemannian manifolds*, thesis defended in 2010. Giona is now Full Professor in Analysis at the Università di Milano-Bicocca.
- Michele Rimoldi, with a thesis entitled: *Rigidity results for Lichnerowicz-Bakry-Emery Ricci tensors*, thesis defended in 2011. Michele is now Associate Professor in Geometry at Politecnico di Torino.
- Andrea Bisterzo, with a thesis entitled: *Qualitative properties of elliptic operators on Riemannian manifolds*, thesis defended in 2023. Andrea is now a Post-Doc at Scuola Normale Superiore in Pisa.

Post-doc students under my supervision

- Davide Bianchi, 2018-2019. Post-doc for 1 year working on the following project: *A nonlinear Feller property in complete manifolds with applications to the qualitative study of positive and bounded solutions at infinity of nonlinear PDEs driven by the p -Laplacian*.
- Leandro de Freitas Pessoa, 2015-2016. Post-doc for 10 months with Brazilian grant, working on the following project: *Localized geometric conditions for the validity of an L^1 Liouville property for superharmonic functions*.
- Michele Rimoldi, 2011-2013. Post-doc for 2 years working on the following project: *Analytic and geometric aspects of manifolds with density with applications to Ricci solitons*.

Professional services

- Referee for: *Note di Matematica*, *American Journal of Mathematics*, *Manuscripta Mathematica*, *Journal of Differential Equations*, *Journal of Mathematical Analysis and Applications*, *Journal of Geometry and Physics*, *Communications in Contemporary Mathematics*, *Monatshefte für Mathematik*, *Geometriae Dedicata*, *Journal of Geometric Analysis*, *Differential Geometry and its Applications*, *Publicationes Mathematicae Debrecen*, *Annali della Scuola Normale Superiore di Pisa*, *Potential Analysis*, *Journal of Differential Equations*, *Annals of Global Analysis and Geometry*, *Pacific Journal of Mathematics*, *Journal of Nonlinear Analysis*, *International Mathematics Research Notices*, *International Journal Of Mathematics*, *Analysis and PDEs*, *Communications in Analysis and Geometry*, *Journal of Functional Analysis*.
- Projects reviewer for: *Fondazione CARIPLO*, *National Science Center Poland*, *National Agency for Research and Development of Chile*.

Organization of scientific meetings and schools

- *Geometry in Bicocca*. A two days conference devoted to various aspects of geometry. September 2023, 2025, 2025 <https://geometryinbicocca.matapp.unimib.it>
- *A Geometry Day in Como*. A one-day Workshop that took place regularly from 2013 to 2019 in the first half of January at the Università dell'Insubria.
- *Geometric Analysis on Riemannian and Singular Metric Measure Spaces*. Summer School at Villa del Grumello in Como. Editions
 - 2013: <https://gams.lakecomoschool.org>
 - 2016: <https://arms.lakecomoschool.org>
 - 2019: <https://arms2019.lakecomoschool.org>
- *Einstein Equations: Physical and Mathematical Aspects of General Relativity*. Summer school at Collegio Rosmini in Domodossola. Editions
 - 2018: <http://www.univco.it/domoschool/Edition-2018>
 - 2019: <http://www.univco.it/domoschool/edition-2019>
- *Topologia e Geometria Differenziale*. Special Session, XXI Congresso UMI, 2019.

Memberships of scientific societies

- 2016–today: member of the *Unione Matematica Italiana*, Italy.
- 2009–today: member of the Italian group *GNAMPA*, *INdAM*, Italy.
- 2018–today: member of the scientific board of the *DOMOSCHOOL* - International Alpine School of Mathematics and Physics, Italy.