

# Curriculum Vitae

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Associate professor

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## Education

- PhD in Mathematics, Università degli Studi di Milano, 2004. Thesis: “Maximum and comparison principles at infinity on Riemannian manifolds”. Advisor: Prof. Marco Rigoli.
- B.A. in Mathematics, Università degli Studi di Milano, 1998/99. Thesis “Il teorema di Bernstein e alcune sue generalizzazioni”. Advisor: Prof. Marco Rigoli.

## Research interests

My research activity is in the field of Geometric Analysis. So far, contributions have been given in the following topics.

- (A) Maximum and comparison principles at infinity for non-linear operators.
- (B) Functions and potential theory on Riemannian manifolds.
- (C) Vanishing and finiteness results for  $L^p$ -harmonic sections of vector bundles.
- (D) Qualitative behavior of solutions of semilinear elliptic PDEs of geometric nature.
- (E) Analytic and geometric aspects of  $p$ -harmonic maps.
- (F) Obata's type characterizations of Riemannian domains by means of differential systems.
- (G) Analytic and geometric aspects of Riemannian manifolds with densities with applications to gradient Ricci solitons and self-shrinkers.
- (H) Integral inequalities on Riemannian manifolds under curvature restrictions and corresponding rigidity results for the sharp constants.

- (I) Stochastic properties of Riemannian manifolds with applications to geometry and PDEs.
- (L) Geometric properties of prescribed mean curvature graphs over complete manifolds with boundary.

### Preprints

- *Hurewicz fibrations, almost submetries and critical points of smooth maps.* (Joint with S.L. Cacciatori)
- *Sobolev spaces of maps and the Dirichlet problem for harmonic maps.* (Joint with G. Veronelli) <http://arxiv.org/abs/1412.3429>
- *The Calderón-Zygmund inequality and Sobolev spaces on noncompact Riemannian manifolds.* (Joint with B. Güneysu). <http://arxiv.org/abs/1406.0747>
- *Curvature estimates for submanifolds immersed into horoballs and horocylinders.* (Joint with G.P. Bessa, J.H. Lira and A.G. Setti) <http://arxiv.org/abs/1308.5926>
- *On the Dirichlet problem for  $p$ -harmonic maps II: Cartan-Hadamard targets with special structure* (Joint with G. Veronelli). Expanded version at <http://arxiv.org/abs/1204.5430>

### Published papers

1. *Potential theory on manifolds with boundary and applications to controlled mean curvature graphs.* (Joint with D. Impera and A.G. Setti) *Crelle's Journal* (to appear).
2. S. Pigola, G. Veronelli, *On the Dirichlet problem for  $p$ -harmonic maps I: compact targets* (Joint with G. Veronelli) *Geom. Ded.* (to appear)
3. 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.
4. S. Pigola, A.G. Setti, *Global divergence theorems in nonlinear PDEs and Geometry.* *Ensaïos Matemáticos 2014, Volume 26*, 1–77.
5. S. Pigola, M. Rimoldi, *Complete self-shrinkers confined into some regions of the space.* *Annals Global Anal. Geom.* **45** (2014), 47–65.
6. G. P. Bessa, S. Pigola, A. G. Setti, *On submanifolds of highly negatively curved spaces.* *Internat. J. Math.* **25** (2014) 1450055 (15 pages)
7. G.P. Bessa, S. Pigola, A.G. Setti, *On the  $L^1$ -Liouville property of stochastically incomplete manifolds.* *Potential Anal.* **39** (2013), 313–324.
8. 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.
9. S. Pigola, M. Rimoldi, *Characterizations of model manifolds by means of certain differential systems.* *Canad. Math. Bull.* **55** (2012), no. 3, 632–645.

10. S. Pigola, G. Veronelli, *Remarks on  $L^p$ -vanishing results in geometric analysis*. Internat. J. Math. **23** (2012), no. 1, 1250008, 18 pp.
11. S. Pigola, A.G. Setti, *The Feller property on Riemannian manifolds*. J. Funct. Anal. **262** (2012), no. 5, 2481–2515.
12. 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.
13. S. Pigola, M. Rimoldi, A.G. Setti, *Remarks on non-compact gradient Ricci solitons*. Math. Z. **268** (2011), no. 3-4, 777–790.
14. I. Holopainen, S. Pigola, G. Veronelli, *Global comparison principles for the  $p$ -Laplace operator on Riemannian manifolds*. Potential Anal. **34** (2011), no. 4, 371–384.
15. S. Pigola, G. Veronelli, *Uniform decay estimates for finite-energy solutions of semi-linear elliptic inequalities and geometric applications*. Differential Geom. Appl. **29** (2011), no. 1, 35–54
16. S. Pigola, G. Veronelli, *Lower volume estimates and Sobolev inequalities*. Proc. Amer. Math. Soc. **138** (2010), no. 12, 4479–4486.
17. S. Pigola, M. Rigoli, A.G. Setti, *Existence and non-existence results for a logistic-type equation on manifolds*. Trans. Amer. Math. Soc. **362** (2010), no. 4, 1907–1936.
18. 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.
19. S. Pigola, M. Rigoli, A.G. Setti, *Aspects of potential theory on manifolds, linear and non-linear*. Milan J. Math. **76** (2008), 229–256
20. 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.
21. 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.
22. 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), no. 2, 347–362
23. S. Pigola, M. Rigoli, A.G. Setti, *Some characterizations of space-forms*. Trans. Amer. Math. Soc. **359** (2007), no. 4, 1817–1828; **360** (2008), no. 7, 3943–3944
24. 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.
25. S. Pigola, M. Rigoli, A.G. Setti, *Some non-linear function theoretic properties of Riemannian manifolds*. Rev. Mat. Iberoam. **22** (2006), no. 3, 801–831.
26. S. Pigola, M. Rigoli, A.G. Setti, *Vanishing theorems on Riemannian manifolds, and geometric applications*. J. Funct. Anal. **229** (2005), no. 2, 424–461.
27. S. Pigola, M. Rigoli, A.G. Setti, *Maximum principles on Riemannian manifolds and applications*. Mem. Amer. Math. Soc. **174** (2005), no. 822

28. 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.
29. S. Pigola, M. Rigoli, A.G. Setti, *Volume growth, "a priori" estimates, and geometric applications*. Geom. Funct. Anal. **13** (2003), no. 6, 1302–1328.
30. S. Pigola, M. Rigoli, A.G. Setti, *A remark on the maximum principle and stochastic completeness*. Proc. Amer. Math. Soc. **131** (2003), no. 4, 1283–1288
31. S. Pigola, M. Rigoli, A.G. Setti, *Maximum principles and singular elliptic inequalities*. J. Funct. Anal. **193** (2002), no. 2, 224–260.
32. 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.

### Collaborators

- G. Pacelli Bessa, Federal University of Ceara, Brazil
- Batu Güneysu, Humboldt-Universität zu Berlin, Germany
- Ilkka Holopainen, University of Helsinki, Finland
- Debora Impera, Università di Milano Bicocca, Italy
- Jorge H. de Lira, Federal University of Ceara, Brazil
- Marco Rigoli, Università di Milano, Italy
- Michele Rimoldi, Università dell'Insubria, Italy
- Alberto G. Setti, Università di Milano, Italy
- Marc Troyanov, EPFL, Switzerland
- Giona Veronelli, Université Paris 13, France

### Ph.D. Students

- Giona Veronelli, *Some analytic and geometric aspects of the  $p$ -Laplacian on Riemannian manifolds*, academic year 2010–2011. Current position: Maître de conférences at Université Paris 13. Personal webpage: <http://gionaveronelli.altervista.org/>
- Michele Rimoldi, *Rigidity results for Lichnerowicz-Bakry- Emery Ricci tensors*, academic year 2011–2012. Current position: Post-doc at Università di Milano Bicocca. Personal webpage: <http://michelerimoldi.altervista.org/>

### Talks and mini-courses

- *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.
- *A survey of stochastic properties of Riemannian manifolds and their geometric applications.* VII Workshop on Geometric Analysis, Fortaleza 17-21 February 2014.
- *Geometric aspects of the potential theory on Riemannian manifolds.* Université Paris 13, December 10th, 2013.
- *Alcuni aspetti geometrici della teoria del potenziale su varietà Riemanniane.* Applied Mathematics Seminar, Pavia, April 23th, 2013.
- *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.
- *Geometric aspects of the  $p$ -Laplacian on complete manifolds.* Grenoble, September 2011. Workshop Geometric analysis II Institut Fourier - Brazil.
- *$p$ -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.
- *Some vanishing and finiteness results on complete manifolds: a generalization of the Bochner technique.* Università degli Studi di Roma “La Sapienza”, January 2007. Seminario di Topologia Algebrica e Differenziale.
- *Some topics in the theory of harmonic functions on complete Riemannian manifolds.* Università degli Studi di Milano Bicocca, July 2006.

#### Professional service

- 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.