

Curriculum Vitæ of Giovanni Catino

Born: December 6th, 1981, in Vallo della Lucania (Salerno, Italy).

Position: *Professore di ruolo di I fascia*, Politecnico di Milano.

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Position

2021 - present. *Professore di ruolo di I fascia*, Department of Mathematics, Politecnico di Milano.

2017. *Abilitazione Scientifica Nazionale* as *Professore di I fascia* achieved in 01/A2 (Geometria e Algebra) and 01/A3 (Analisi Matematica, Probabilità e Statistica Matematica).

2015 - 2021 *Professore di ruolo di II fascia*, Department of Mathematics, Politecnico di Milano.

2011 - 2015. *Ricercatore a tempo indeterminato*, Department of Mathematics, Politecnico di Milano.

2011. Junior Visitor at Centro di Ricerca Matematica Ennio De Giorgi (Scuola Normale Superiore), Pisa.

2009 - 2011. Postdoc at Scuola Internazionale Superiore di Studi Avanzati (SISSA, Sector: Functional Analysis), Trieste.

Prizes

2020. "The Ferran Sunyer i Balaguer Prize" 2020, won with P. Mastrolia for the monograph *Perspective on Canonical Riemannian Metrics*, Progress in Mathematics, vol. 336 (2020), Birkhuser-Springer. The prize is assigned once a year by the Foundation "Ferran Sunyer i Balaguer".

2018. "Premio Guido Fubini" 2018. The prize is assigned once a year (for different topics every year) by the "Istituto Superiore Mario Boella".

Education

2004 - 2009. Ph.D. student in Mathematics at the University of Pisa. Title of the thesis: *Some Integral Pinching Results in Riemannian Geometry*. Supervisors: C. Mantegazza (Scuola Normale Superiore) and Z. Djadli (University of Grenoble). Defended in January 2009.

2000 - 2004. Undergraduate student in Mathematics at the University of Parma (supported by a scholarship of the Italian National Institute of High Mathematics, INDAM). Title of the thesis: *Risultati di Esistenza e Non-Esistenza per Problemi con Dati al Bordo Sovradeterminati*. Supervisor: A. Wagner. Defended (110/110 cum laude) in July 2004.

Mentoring

2020. Supervisor of the Master thesis *Einstein's Field Equations: derivations and solutions* of Mirko Baroni, Politecnico di Milano.

Academic Services

2018-present. Member of the Board of Professors of the PhD School Mathematical models and methods in engineering, Politecnico di Milano.

Teaching

2020/21. *Analisi Matematica II* held at Politecnico di Milano, Milano.

2020/21. *Analisi e Geometria 1* held at Politecnico di Milano, Sede Piacenza.

2019/20. *Analisi e Geometria 1* held at Politecnico di Milano, Milano.

2019/20. *Analisi e Geometria 1* held at Politecnico di Milano, Sede Piacenza.

2018/19. *Analisi e Geometria 1* held at Politecnico di Milano, Milano.

2018/19. *Analisi e Geometria 1* held at Politecnico di Milano, Sede Piacenza.

2017/18. *Analisi e Geometria 1* held at Politecnico di Milano, Milano.

2017/18. *Analisi e Geometria 1* held at Politecnico di Milano, Sede Piacenza.

2016/17. *Analisi e Geometria 1* held at Politecnico di Milano, Milano.

2016/17. *Analisi e Geometria 1* held at Politecnico di Milano, Sede Piacenza.

2015/16. *Analisi e Geometria 1* held at Politecnico di Milano, Milano.

2014/15. *Introduction to Riemannian Geometry*, Ph.D. reading course, held at Politecnico di Milano, Milano.

2014/15. *Analisi e Geometria 1* held at Politecnico di Milano, Milano.

2013/14. *Analisi e Geometria 1* held at Politecnico di Milano, Milano.

2012/13. *Differential Geometry*, Ph.D. reading course, held at Politecnico di Milano, Milano.

2012/13. *Analisi e Geometria 1* held at Politecnico di Milano, Milano.

2011/12. Collaboration to the course *Analisi e Geometria 2* held at Politecnico di Milano, Milano.

2010/11. Collaboration to the course *Analisi Superiore 1* held at SISSA, Trieste.

2009/10. Collaboration to the course *Analisi Superiore 2* held at SISSA, Trieste.

2006/07. Collaboration to the course *Analisi Matematica* held at the Department of Informatics, University of Pisa, Pisa.

Teaching Books

1. G. Catino, F. Punzo, *Esercizi Svolti di Analisi Matematica e Geometria 1*, Esculapio, 2020.
2. G. Catino, F. Punzo, *Esercizi Svolti di Analisi Matematica e Geometria 2*, Esculapio, 2020.
3. G. Catino, F. Punzo, *Esercizi Svolti di Analisi Matematica e Geometria 1 e 2*, Esculapio, 2020.
4. G. Catino, S. Mongodi, *Esercizi Svolti di Geometria e Algebra Lineare*, Esculapio, 2020.
5. G. Catino, F. Punzo, *Quesiti Teorici di Analisi Matematica e Geometria 1*, Esculapio, 2020.
6. G. Catino, F. Punzo, *Quesiti Teorici di Analisi Matematica e Geometria 2*, Esculapio, 2020.
7. G. Catino, F. Punzo, *Quesiti Teorici di Analisi Matematica e Geometria 1 e 2*, Esculapio, 2020.
8. G. Catino, C. Mantegazza, *Quesiti a Risposta Multipla di Analisi Matematica 1*, Esculapio, 2020.
9. G. Catino, C. Leone, *Quesiti a Risposta Multipla di Analisi Matematica 2*, Esculapio, 2020.

Research

Research Visits

2016. - Università degli Studi di Trento, Trento (1 week).
2015. - Scuola Normale Superiore, Pisa (1 week).
- Università degli studi di Napoli "Federico II" (Napoli) (1 week).
2014. - Scuola Normale Superiore, Pisa (2 weeks).
2013. - Scuola Normale Superiore, Pisa (2 weeks).
2012. - Scuola Normale Superiore, Pisa (2 weeks).
2011. - Scuola Normale Superiore, Pisa (2 weeks).
2009. - Max Planck Institute for Gravitational Physics, Potsdam (1 week).
- Institute for Advanced Study, Princeton (1 month).
- Scuola Normale Superiore, Pisa (1 month).
2008. - Centre de Recerca Matemàtica, Universidad Autònoma de Barcelona, Barcelona (3 months).
- Institut Henri Poincaré, Paris (supported by a Marie Curie fellowship) (3 months).
2007. - Institut Fourier, University of Grenoble I (1 month).

Invited Lectures

2020. - *Journe de Gomtrie*, Universit Paris Est Crteil.
2019. - *Brussels-London XVII*, University College of London, London, Great Britain.
- *Nonlinear Geometric PDE's*", BIRS, Banff, Canada.
- *International Conference on Elliptic and Parabolic Problems*, Gaeta, Italy.
2018. - *Nonlinear Analysis and PDEs*, Caserta, Italy.
- *Nonlinear PDEs in Geometry and Physics*, Cortona, Italy.
- *Variational methods in analysis, geometry and physics*", Centro di Ricerca Matematica "Ennio De Giorgi", Pisa, Italy.
2017. - *Nonlinear Analysis in Rome*, Roma.
- *Geometric Analysis on smooth and non-smooth Spaces*, SISSA, Trieste, Italy.
- *France-Italy meeting on Geometric Analysis*, Centro di Ricerca Matematica "Ennio De Giorgi", Pisa, Italy.
- *Geometry Day in Como*, Como, Italy.
2016. - *Convegno GNAMPA 2016*, Montecatini Terme, Italy.
- *Complex and Riemannian Geometry days*, Cagliari, Italy.
2014. - *Geometric Analysis in Roscoff*, Roscoff, France.
2013. - *Giornata di Geometria Milano-Torino*, Torino, Italy.
2010. - *Geometry of non-compact or singular Einstein manifolds*, Montpellier, France.
2009. - *Geometric Flows and Geometric Operators*, Pisa, Italy.
- *Problemes non lineaires avec perte de compacite: perspectives et applications*, Marseille, France.

Research Seminars

2020. - Web-Seminar on Geometric Analysis, Brasil.
2019. - Università degli Studi di Torino, Torino.
- Università di Roma "Tor Vergata", Roma.
- Università di Roma 3, Roma.
2018. - Leibniz Universität, Hannover.
- Université Libre de Bruxelles, Bruxelles.
- Università "La Sapienza" di Roma, Roma.
2016. - University of Münster, Münster.
2015. - Scuola Normale Superiore, Pisa.
- Università degli studi di Napoli "Federico II", Napoli.
2011. - Università dell'Insubria, Como.

- University of Münster, Münster.
- University of Bonn, Bonn.
- 2010. - *ICTP/SISSA Geometric Analysis Seminars*, ICTP, Trieste.
- 2009. - Max Planck Institute for Gravitational Physics, Potsdam.
- Institute for Advanced Study, Princeton.

Scientific Organization

- 2019. - *Analytic and Geometric Aspects of PDEs*, organized together with D.D. Monticelli, N. Soave and G. Verzini, Politecnico di Milano, May 27–30, Milano.
- 2015. - *Three days on Geometric PDE's*, organized together with G. Verzini, Politecnico di Milano, March 11–13, Milano.
- 2011. - *Ricci Solitons Days*, organized together with C. Mantegazza, L. Mazziere and R. Müller, Centro di Ricerca Matematica Ennio de Giorgi, April 4–8, Pisa.

Partecipazione to Workshops and Schools before 2012

- 2011. - Meeting *Geometric Analysis*, Marseille.
- Meeting *Geometric flows in finite or infinite dimensions*, Marseille.
- 2010. - Summer School *Ricci Flow and Geometric Applications*, Cetraro.
- Summer School *Gnampe-Erc Summer School*, Ischia.
- 2009. - Meeting *Geometrical Aspects of Partial Differential Equations*, Marseille.
- 2007. - Meeting *Geometric Analysis in Nice*, Nice.
- Summer School *Geometric Analysis and PDEs*, Cetraro.
- 2006. - Meeting *Recenti sviluppi della Geometria Complessa, Differenziale e Simplettica*, Pisa.
- Meeting *Geometric and Nonlinear Analysis*, Banff.
- Meeting *Nonlinear Evolutions Problems*, Pisa.
- 2005. - Meeting *Complex Analysis and Geometry*, Levico Terme.

Research Projects

- 2017 - 2020. Participant. PRIN. Coord. Prof. Andrea Malchiodi.
- 2016. Coordinator. GNAMPA *Strutture Speciali e PDEs in Geometria Riemanniana*.
- 2015. Participant. GNAMPA *Analisi Globale, PDEs e Strutture Solitoniche*.
- 2014. Coordinator. GNAMPA *Equazioni di evoluzione geometriche e strutture di tipo Einstein*.
- 2013. Participant. GNAMPA *Equazioni differenziali con invarianze in analisi globale*.
- 2012 - 2015. Participant. PRIN. Coord. Prof.ssa Susanna Terracini.

2012. Participant. GNAMPA *Flussi geometrici e soluzioni autosimilari*.
- 2009 - 2013. Participant. FIRB-IDEAS *Analysis and Beyond*. Coord. Prof. Andrea Malchiodi.
- 2009 - 2011. Participant. PRIN *Fenomeni di concentrazione e problemi di analisi geometrica*. Coord. Prof. Andrea Malchiodi.
- 2006 - 2008. Participant. PRIN *Metodi variazionali nella teoria del trasporto ottimo di massa e nella teoria geometrica della misura*. Coord. Prof. Luigi Ambrosio.

Published / Accepted Papers

1. G. Catino, Z. Djadli, *Conformal deformations of integral pinched 3-manifolds*, Adv. Math., **223** (2010), no. 2, 393–404.
2. M. Caldarelli, G. Catino, Z. Djadli, A. Magni, C. Mantegazza, *On Perelman's dilaton*, Geom. Ded., **145** (2010), 127–137.
3. G. Catino, C.B. Ndiaye, *Integral pinching results for manifolds with boundary*, Ann. Sc. Norm. Super. Pisa Cl. Sci., **9** (2010), no. 4, 785–813.
4. G. Catino, Z. Djadli, C.B. Ndiaye, *A sphere theorem on locally conformally flat even-dimensional manifolds*, Manuscripta Math., **136** (2011), no. 1-2, 237–247.
5. G. Catino, C. Mantegazza, *The evolution of the Weyl Tensor under the Ricci Flow*, Ann. Inst. Fourier, **61** (2011), no. 4, 1407–1435.
6. G. Catino, C. Mantegazza, L. Mazzieri, M. Rimoldi, *Locally conformally flat quasi-Einstein manifolds*, J. Reine Angew. Math., **2013** (2013), no. 675, 181–189.
7. G. Catino, *Generalized quasi-Einstein manifolds with harmonic Weyl tensor*, Math. Z., **271** (2012) no.3-4, 751–756.
8. G. Catino, L. Mazzieri, *Connected Sum Construction for σ_k -Yamabe metrics*, J. Geom. Anal., **23** (2013), no. 2, 812–854.
9. G. Catino, *Complete gradient shrinking Ricci solitons with pinched curvature*, Math. Ann., **355** (2013), no. 2, 629–635.
10. G. Catino, C. Mantegazza, L. Mazzieri, *On the global structure of conformal gradient solitons with nonnegative Ricci tensor*, Comm. Cont. Math., **14** (2012), no. 6, 1250045 (12 pages).
11. G. Catino, *A note on four dimensional (anti-)self-dual quasi-Einstein manifolds*, Differential Geom. Appl., **30** (2012), 660–664.
12. H.-D. Cao, G. Catino, Q. Chen, C. Mantegazza, L. Mazzieri, *Bach-flat gradient steady Ricci solitons*, Calc. Var. Partial Differential Equations, **49** (2014) no. 1-2, 125–138.
13. G. Catino, *Critical metrics of the L^2 -norm of the scalar curvature*, Proc. Amer. Math. Soc., **142** (2014), 3981–3986.
14. G. Catino, C. Mantegazza, L. Mazzieri, *A note on Codazzi tensors*, Math. Ann., **362** (2015), no. 1-2, 629–638.

15. G. Catino, L. Mazzieri, S. Mongodi, *Rigidity of gradient Einstein shrinkers*, *Comm. Cont. Math.* **17** (2015), no. 6, 1550046.
16. G. Catino, C. Mantegazza, L. Mazzieri, *Locally conformally flat ancient Ricci flows*, *Anal. PDE.*, **8** (2015), no. 2, 365–371.
17. G. Catino, P. Mastrolia, D. Monticelli, M. Rigoli, *Conformal Ricci solitons and related integrability conditions*, *Adv. Geom.* **16** (2016), no. 3, 301-328.
18. G. Catino, *Some rigidity results on critical metrics for quadratic functionals*, *Calc. Var. Partial Differential Equations* **54** (2015), no. 3, 2921-2937.
19. G. Catino, P. Mastrolia, D. Monticelli, *A variational characterization of flat spaces in dimension three*, *Pac. J. Math.* **282** (2016), no. 2, 285-292
20. G. Catino, *On conformally flat manifolds with constant scalar curvature*, *Proc. Amer. Math. Soc.* **144** (2016), 2627-2634.
21. G. Catino, L. Mazzieri, *Gradient Einstein solitons*, *Nonlinear Anal.* **132** (2016), 66-94.
22. G. Catino, P. Mastrolia, D. Monticelli, M. Rigoli, *Analytic and geometric properties of generic Ricci solitons*, *Trans. Amer. Math. Soc.* **368** (2016), 7533-7549.
23. G. Catino, P. Mastrolia, D. Monticelli, *Classification of expanding and steady Ricci solitons with integral curvature decay*, *Geom. Topol.* **20** (2016), no. 5, 2665-2685.
24. G. Catino, *A remark on compact hypersurfaces with constant mean curvature in space forms*, *Bull. Math. Soc.* **140** (2016), no. 8, 901-907.
25. G. Catino, P. Mastrolia, D. Monticelli, *Gradient Ricci solitons with vanishing conditions on Weyl*, *J. Math. Pures Appl.* **108** (2017), no. 1, 1-13.
26. G. Catino, P. Mastrolia, D. Monticelli, M. Rigoli, *On the geometry of gradient Einstein-type manifolds*, *Pac. J. Math.* **286** (2017), no. 1, 39-67.
27. G. Catino, *Integral pinched shrinking Ricci solitons*, *Adv. Math.* **303** (2016), 279-294.
28. G. Catino, L. Cremaschi, Z. Djadli, C. Mantegazza, L. Mazzieri, *The Ricci-Bourguignon flow*, *Pac. J. Math.* **287** (2017), no. 2, 337-370.
29. G. Catino, P. Mastrolia, *Bochner type formulas for the Weyl tensor on four dimensional Einstein manifolds*, *Int. Math. Res. Not.* (2020) no. 12, 3794-3823.
30. G. Catino, *Rigidity of positively curved shrinking Ricci solitons in dimension four*, *Geom. Flows* **4** (2019), no. 1, 1-8.
31. G. Catino, P. Mastrolia, *Weyl scalars on compact Ricci solitons*, *J. Geom. Anal.* **29** (2019), no. 4, 3328-3344.
32. G. Catino, P. Mastrolia, *A potential generalization of some canonical Riemannian metrics*, *Ann. Glob. Anal. Geom.* **55** (2019), no. 4, 719-748.
33. G. Catino, D. Monticelli, F. Punzo, *The Poisson equation on manifolds with positive essential spectrum*, *Calc. Var. Partial Differential Equations* **58** (2019), no. 4, 146.

34. G. Catino, D. Monticelli, F. Punzo, *The Poisson equation on Riemannian manifolds with weighted Poincar inequality at infinity*, Ann. Mat. Pura Appl., to appear.
35. G. Catino, F. Belgiorno, *A Weyl Entropy of Pure Spacetime Regions*, Class. Quantum Grav. **37** (2020), 225014.
36. G. Catino, A. Roncoroni, L. Vezzoni, *On the umbilic set of immersed surfaces in three dimensional space forms*, Bull. Sci. Mat. **165** (2020), 102917.
37. G. Catino, F. Gazzola, P. Mastrolia, *A conformal Yamabe problem with potential in the Euclidean space*, Ann. Mat. Pura Appl., to appear.
38. G. Catino, D. Castorina and C. Mantegazza, *A triviality result for semilinear parabolic equations*, Math. Ing., to appear.

Submitted Papers

1. G. Catino, P. Mastrolia, D. Monticelli, F. Punzo, *Four dimensional closed manifolds admit a weak harmonic Weyl metric*, submitted.
2. G. Catino, D. Dameno, P. Mastrolia, *On Riemannian four-manifolds and their twistor spaces: a moving frame approach*, submitted.
3. G. Catino, *Metrics of constant negative scalar-Weyl curvature*, submitted.

Research Books

1. G. Catino, P. Mastrolia, *A Perspective on Canonical Riemannian Metrics*, Progress in Mathematics, vol. 336 (2020), Birkhuser-Springer.