CURRICULUM VITÆ ET STUDIORUM

Paolo Caldiroli

Personal information

Date and place of birth: February 1, 1966 – Busto Arsizio (Italy)

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Academic positions

September 1, 1994–October 31, 2000: Tenured Research Assistant (“Ricercatore”) in Mathematical Analysis, International School for Advanced Studies/Scuola Internazionale Superiore di Studi Avanzati (SISSA), Trieste.

November 1, 2000–June 2, 2015: Associate Professor of Mathematical Analysis, Dipartimento di Matematica “Giuseppe Peano”, University of Torino

Since June 3, 2015: Full Professor of Mathematical Analysis, Dipartimento di Matematica “Giuseppe Peano”, University of Torino.

Education

July 9, 1990: Degree “Laurea” in Physics, Università degli Studi di Milano (Mark: 110/110 cum laude).

June 30, 1992: Magister Philosophiæ in Functional Analysis and Applications, SISSA, Trieste (Mark: 30/30 cum laude). Thesis on “Some results about homoclinic orbits for a class of conservative second order Hamiltonian systems” (Supervisor: Prof. Vittorio Coti Zelati, Università di Napoli).

November 24, 1995: Doctor Philosophiæ in Functional Analysis and Applications, SISSA, Trieste. Thesis on “Homoclinic and heteroclinic orbits for some classes of second order Hamiltonian systems” (Supervisor: Prof. Vittorio Coti Zelati, Università di Napoli).

Research fellowships

1997, January 1–June 30: CEREMADE, Université de Paris IX Dauphine (France). “Marie Curie” Post-doc fellowship (Training and Mobility of Researchers) awarded by the European Commission.

1998, October 1–1999, March 31: Department of Mathematics, Stockholm University (Sweden). Research fellowship awarded by the Italian National Research Council (Consiglio Nazionale delle Ricerche).

Teaching

Academic years 1995/96 to 1997/98: lecturer of short courses at SISSA to PhD students in Functional Analysis and Applications on different topics of Nonlinear Analysis.

In 1995, graduate teaching assistant of a course on “Real Analysis”, Diploma Course in Mathematics, ICTP, Trieste.

Academic year 1999/2000: lecturer of a course of Calculus to Electronic Engineering students, University of Udine.

Since the academic year 2000/01 lecturer of several courses of:

- Calculus (Bachelor’s Degree in Computer Science, Bachelor’s Degree in in Physics),

- Mathematical Analysis and Differential Equations (Bachelor's Degree in Mathematics, Bachelor's Degree in Mathematics for Finance and Insurance),
- Linear Functional Analysis and Variational Methods (Master's Degree in Mathematics, PhD in Mathematics - University of Torino).

Author of Lecture Notes (Complex Analysis, Measure Theory, Elementary Partial Differential Equations). Author, with Marino Badiale and Sandro Coriasco, of an exercise book of Calculus 1.

Bachelor's advisor for 27 undergraduate students in Mathematics, Master's advisor for 14 graduate students in Mathematics, Advisor for two students of the PhD course in Mathematics.

Academic years 2008/2009 to 2016/17: member of the board of the PhD School in Mathematics of the University of Torino.

Academic years 2015/16 to 2017/18: head of the Undergraduate and Master Courses in Mathematics and of the Undergraduate Course in Mathematics for Finance and Insurance.

Research Activity

The scientific activity of Paolo Caldiroli concerns some topics in Nonlinear Analysis and in the Calculus of variations. In particular, main research subjects are: Hamiltonian systems (homoclinic and heteroclinic orbits, multi-bump solutions, chaotic dynamics). Steady states for the nonlinear Schrdinger equation. Singular and degenerate elliptic problems. Functional inequalities end extremal solutions. Some problems in Geometric Analysis: parametric surfaces with prescribed mean curvature, isoperimetric inequalities, etc.

He participated to more than fifty among schools, conferences and workshops, mostly international, and gave more that forty among talks at conferences, invited seminars, and short communications.

Regularly consulted as a reviewer for papers submitted to international scientific journals.

Member of the scientific committee of the international conferences: Turin Fortnight in Nonlinear Analysis, Sept. 23–28, 2001 (3rd edition), Sept. 30–Oct. 3, 2003 (4th edition), Sept. 13–16, 2005 (5th edition), Bruxelles-Torino Talks in PDE's, May 2-5, 2016.

Since May 2012: member of the Managing Committee of the journal "Rendiconti del Seminario Matematico dell'Università e del Politecnico di Torino".

Research projects

Member of the European Research Project ERC Advanced Grant 2013 "Complex Patterns for Strongly Interacting Dynamical Systems", supported by the European Research Council (P.I. Susanna Terracini).

Since 1998 member of several National Research Projects PRIN supported by the Italian Ministry of Research as a Project of National Interest. Currently, responsible of the Research Unity of the University of Torino of the National Research Project PRIN 2016-2019 "Variational methods, with applications to problems in mathematical physics and geometry" (P.I. Andrea Malchiodi).

Since March 2017 responsible of the Research Unity of the University of Torino of the Istituto Nazionale di Alta Matematica (INdAM).

Publications

- P. Caldiroli, A. Iacopetti: Existence of isovolumetric S2-type stationary surfaces for capillarity functionals, *Revista Matem. Iberoamer.* (2018) to appear.
- P. Caldiroli, M. Musso: Embedded tori with prescribed mean curvature, *Adv. Math.* **340** (2018), 406–458.

- P. Caldiroli, A. Iacopetti: Existence of stable H-surfaces in cones and their representation as radial graphs, *Calc. Var.* **55** (2016), 131–152.
- P. Caldiroli: Isovolumetric and isoperimetric problems for a class of capillarity functionals, *Arch. Rational Mech. Anal.* **218** (2015), 1331–1361.
- P. Caldiroli, G. Cora: Entire Solutions for a Class of Fourth-Order Semilinear Elliptic Equations with Weights, *Mediterr. J. Math.* **13** (2016), 657–675.
- P. Caldiroli: Radial and non radial ground states for a class of dilation invariant fourth order semilinear elliptic equations on $\mathbb{R}^n$, *Comm. Pure Appl. Anal.* **13** (2014), 811–821.
- P. Caldiroli, R. Musina: Symmetry Breaking of Extremals for the Caffarelli-Kohn-Nirenberg Inequalities in a Non-Hilbertian Setting, *Milan J. Math.* **81** (2013), 421–430.
- P. Caldiroli, G. Gullino: Radial graphs over domains of $\mathbb{S}^n$ with prescribed mean curvature, *J. Fixed Points Theory Appl.* **13** (2013), 151–161.
- P. Caldiroli, R. Musina: A class of second-order dilation invariant inequalities, in: *Concentration Analysis and Applications to PDE*, ICTS Workshop, Bangalore, January 2012 (Adimurthi , K. Sandeep, I. Schindler and K. Tintarev, eds.) Trends in Mathematics series, Birkhäuser (2013)
- P. Caldiroli, R. Musina: Rellich inequalities with weights, *Calc. Var.* **45** (2012), 147–164.
- P. Caldiroli, R. Musina: On Caffarelli-Kohn-Nirenberg type inequalities for the weighted biharmonic operator in cones, *Milan J. Math.* **79** (2011), 657–687.
- P. Caldiroli, R. Musina: Bubbles with prescribed mean curvature: the variational approach, *Nonlinear Anal., Theory Methods Appl., Ser. A* **74** (2011), 2985–2999.
- P. Caldiroli: Blow-up analysis for the prescribed mean curvature equation on $\mathbb{R}^2$, *J. Funct. Anal.* **257** (2009), 405–427.
- P. Caldiroli, R. Musina: Weak limit and blow up of approximate solutions to H-systems, *J. Funct. Anal.* **249** (2007), 171–198.
- P. Caldiroli, M. Guida: Helicolidal trajectories of a charge in a nonconstant magnetic field, *Adv. Diff. Eq.* **12** (2007), 601–622.
- P. Caldiroli, M. Guida: Closed curves in R3 with prescribed curvature and torsion in perturbative cases. Part 2: Sufficient conditions, *Rend. Lincei Mat. Appl.* **17** (2006), 291–307.
- P. Caldiroli, M. Guida: Closed curves in R3 with prescribed curvature and torsion in perturbative cases. Part 1: Necessary condition and study of the unperturbed problem, *Rend. Lincei Mat. Appl.* **17** (2006), 227–242.
- P. Caldiroli, R. Musina: The Dirichlet Problem for H-Systems with Small Boundary Data: BlowUp Phenomena and Nonexistence Results, *Arch. Rational Mech. Anal.* **181** (2006), 1–42.
- P. Caldiroli, R. Musina: On Palais-Smale sequences for H-Systems: some examples, *Adv. Diff. Eq.* **11** (2006), 931–960.
- P. Caldiroli, R. Musina: On the Dirichlet problem for H-systems on the disc with prescribed mean curvature, in: *Equadiff 2003, Proceedings of the International Conference on Differential Equations.* Hasselt, Belgium, July 22–26, 2003 (F. Dumortier, H.-W. Broer, J. Mawhin, A. Vanderbauwhede, S.V. Lunel, Eds.) World Scientific, 2005.
- P. Caldiroli: H-bubbles with prescribed large mean curvature, *manuscripta math.* **113** (2004), 125–142.
- P. Caldiroli, R. Musina: H-bubbles in a perturbative setting: the finite-dimensional reduction's method, *Duke Math. J.* **122** (2004), 457–484.

- F. Bethuel, P. Caldiroli, M. Guida: Parametric surfaces with prescribed mean curvature, *Rend. Sem. Mat. Univ. Poli. Torino* **60** (2002), 175–231.
- P. Caldiroli, R. Musina: Existence of H-bubbles in a perturbative setting, *Rev. Mat. Iberoamer.* **20** (2002), 611–626.
- P. Caldiroli, R. Musina: S2-type parametric surfaces with prescribed mean curvature and minimal energy, in: *Nonlinear Equations: Methods, Models and Applications, Progress in Nonlinear Differential Equations and Their Applications,* Vol. 54, 2003 Birkhäuser Verlag Basel/Switzerland.
- P. Caldiroli, R. Musina: Existence of minimal H-bubbles, *Commun. Contemp. Math.* **4** (2002), 177–209.
- P. Caldiroli, A. Malchiodi: Singular elliptic problems with critical growth, *Comm. Part. Diff. Eq.* **27** (2002), 847–876.
- P. Caldiroli, R. Musina: Existence and non existence results for a class of nonlinear singular Sturm-Liouville equations, *Adv. Diff. Eq.* **6** (2001), 303–326.
- P. Caldiroli, R. Musina: Stationary states for a two-dimensional singular Schrdinger equation, *Boll. Un. Mat. Ital. (8)* **4-B** (2001), 609–633.
- P. Caldiroli, R. Musina: On a class of 2-dimensional singular elliptic problems, *Proc. Roy. Soc. Edinburgh Sect. A* **131** (2001), 479–497.
- P. Caldiroli, R. Musina: On the Existence of Extremal Functions for a Weighted Sobolev Embedding with Critical Exponent, *Calc. Var.* **8** (1999), 365–387.
- P. Caldiroli, R. Musina: On a variational degenerate elliptic problem, *Nonlinear Diff. Eq. Appl.* **7** (2000), 187–199.
- F. Alessio, P. Caldiroli, P. Montecchiari: Infinitely many solutions for a class of semilinear elliptic equations in $\mathbb{R}^N$, *Boll. Un. Mat. Ital. (8)* **4-B** (2001), 311–318.
- F. Alessio, P. Caldiroli, P. Montecchiari: Genericity of the multibump dynamics for almost periodic Duffing-like systems, *Proc. Roy. Soc. Edinburgh Sect. A* **129** (1999), 885–901.
- F. Alessio, P. Caldiroli, P. Montecchiari: Genericity of the existence of infinitely many solutions for a class of semilinear elliptic equations in $\mathbb{R}^N$, *Ann. Scuola Norm. Sup. Pisa Cl. Sci. (4)* **27** (1998), 47–68.
- P. Caldiroli: Existence and multiplicity of soliton-like solutions for a class of nonlinear Klein-Gordon equations, *Nonlinear Anal.* **38** (1999), 471–483.
- F. Alessio, P. Caldiroli, P. Montecchiari: On the existence of homoclinic orbits for the asymptotically periodic Duffing equation, *Top. Meth. Nonlinear Anal.* **12** (1998), 275–292.
- F. Alessio, P. Caldiroli, P. Montecchiari: On the existence of infinitely many solutions for a class of semilinear elliptic equations in $\mathbb{R}^N$, *Atti Accad. Naz. Lincei Rend. Cl. Sci. Fis. Mat. Natur. (9)* **9** (1998), 157–165.
- P. Caldiroli, C. De Coster: Multiple homoclinics for a class of singular Hamiltonian systems, *J. Math. Anal. Appl.* **211** (1997), 556–573.
- P. Caldiroli, L. Jeanjean: Homoclinics and heteroclinics for a class of conservative singular Hamiltonian systems, *J. Diff. Eq.* **136** (1997), 76–114.
- P. Caldiroli, M. Nolasco: Multiple homoclinic solutions for a class of autonomous singular systems in $\mathbb{R}^2$, *Ann. Inst. H. Poincaré, Analyse non linéaire* **15** (1998), 113–125.
- P. Caldiroli: A new proof of the existence of homoclinic orbits for a class of autonomous second order Hamiltonian systems in $\mathbb{R}^n$, *Math. Nachr.* **187** (1997), 19–27.
- P. Caldiroli, G. Treu: Measure properties of the set of initial data yielding non uniqueness for a class of differential inclusions, *Nonlinear Diff. Eq. Appl.* **3** (1996), 499–507.

- S. Abenda, P. Caldiroli, P. Montecchiari: Multibump solutions for Duffing-like systems, *Rend. Ist. Mat. Univ. Trieste* **28** (1996), 115–143.
- P. Caldiroli, P. Montecchiari, M. Nolasco: Asymptotic behavior for a class of multibump solutions to Duffing-like systems, in: *Variational and local methods in the study of Hamiltonian systems* (ICTP, Trieste, 1994), 137–145, World Sci. Publishing, River Edge, NJ, 1995.
- P. Caldiroli, P. Montecchiari: Homoclinic orbits for second order Hamiltonian systems with potential changing sign, *Comm. Appl. Nonlinear Anal.* **1** (1994), 97–129.
- P. Caldiroli: Existence and multiplicity of homoclinic orbits for potentials on unbounded domains, *Proc. Roy. Soc. Edinburgh Sect. A* **124** (1994), 317–339.

Torino, December 15, 2018 Paolo Caldiroli