

CURRICULUM VITÆ

MARIAPIA PALOMBARO

Personal data

Name: Mariapia Palombaro
Citizenship: Italian
Civil Status: Married, two children
Office Address: DISIM, University of L'Aquila, Via Vetoio, 67100 L'Aquila
E-mail: mariapia.palombaro@univaq.it

Languages

Italian (native), English, French

Education

Undergraduate studies in Mathematics

Defended: 14 March 2000
Università di Roma “La Sapienza”, Rome, Italy
Thesis title: “ $A(\alpha)$ -stabilità”
Thesis advisor: Prof. Claudio Baiocchi
Grade: 110/110 cum laude

PhD Student in Mathematical Analysis

Defended: 14 December 2004
Dipartimento di Matematica, Università di Roma “La Sapienza”, Rome, Italy
Thesis title: “Solenoidal Differential Inclusions and H -measures”
Advisor: Prof. Vincenzo Nesi
Grade: Eccellente

Career History

- January 2005 - August 2005: Post-doctoral fellowship at CMAP, Ecole Polytechnique (France).
- September 2005: Visiting position at Dipartimento di Matematica, Università di Roma “La Sapienza”, Rome (Italy).
- October 2005 - October 2008: Post-doctoral fellowship at the Max Planck Institute for Mathematics in the Sciences, Leipzig (Germany).
- November 2008 - October 2010: Post-doctoral fellowship at the Functional Analysis Sector of SISSA-ISAS, Trieste (Italy).
- November 2010 - October 2011: Post-doctoral fellowship at Centro di Ricerca Matematica “Ennio De Giorgi”, Scuola Normale Superiore, Pisa (Italy).

- January 2012 - August 2012: Post-doctoral fellowship at the University of Würzburg (Germany).
- October 2012: Post-doctoral fellowship at the Department of Information Engineering, Computer Science and Mathematics, University of L'Aquila.
- November 2012-December 2013: *Ricercatore Universitario* (Lecturer) in Mathematical Analysis at the Department of Information Engineering, Computer Science and Mathematics of the University of L'Aquila, Italy. (Maternity leave 8 December 2012 - 10 May 2013)
- January 2014 - August 2018: Lecturer/Senior Lecturer in Mathematics, University of Sussex, UK (Maternity leave 1 October 2017 - 31 August 2018).
- Post Graduate Certificate in Higher Education, University of Sussex, UK, 2016.
- September 2018 - March 2020: *Ricercatore Universitario* (Lecturer) in Mathematical Analysis at DSFC, University of L'Aquila, Italy.
- Since 1 April 2020: Associate Professor at DISIM, University of L'Aquila, Italy.
- November 2020: Abilitazione scientifica nazionale alle funzioni di professore universitario di prima fascia settore concorsuale 01/A3.

University contribution

- Member of the Teaching and Learning Committee, University of Sussex, 2014 - 2017.
- Member of the Athena Swann Committee, University of Sussex, 2014 - 2016.
- Chair of the Teaching and Learning Committee, University of Sussex, 2016 - 2017.
- Convenor of BSc/MMath Mathematics, University of Sussex, 2016 - 2017.

Professional service

- Co-organiser of “Intensive Research week on Calculus of Variations, Geometric Analysis and Partial Differential Equations”, University of Sussex, March 2014.
- Co-organiser of “Conference on Partial Differential Equations, Geometric Analysis, Calculus of Variations, Harmonic Analysis”, University of Sussex, September 2014.
- Co-organiser of “Intensive research week: New perspectives in Analysis and Probability”, University of Sussex, March 2015.
- Co-organiser of “Conference on Calculus of Variations, PDE, and Geometric Measure Theory”, University of Sussex, September 2015.
- Co-organiser of “Women in applied and computational Mathematics, GSSI (L'Aquila), May 2018.
- Referee for SIAM Journal on Mathematical Analysis, SIAM Multiscale Modeling and Simulations, Annali di Matematica Pura e Applicata, Annales de l'Institut Henri

Poincaré, Communications in Partial Differential Equations, Journal de l'Ecole Polytechnique, Archive for Rational Mechanics and Analysis, Asymptotic Analysis.

Student supervision

- PhD advisor of Silvio Fanzon, University of Sussex, 2014-2017.
- Master Thesis advisor of: Cansu Tuna (University of Sussex, 2015), Taysir Alotaibi (University of Sussex, 2016), Sophie Mason (University of Sussex, 2017).

Grants

- Member of GNAMPA project 2009 *Methods and Variational Problems in Materials Science*, project funded by the Italian GNAMPA (National Group of Mathematical Analysis, Probability and their Applications), 03-03-2009 to 02-03-2010, PI: Massimiliano Morini.
- Member of PRIN 2008 *Variational problems with multiple scales*, 22-03-2010 to 22-09-2012, PI: Gianni Dal Maso.
- Member of GNAMPA project 2010 *Methods and Variational Problems in Materials Science*, project funded by the Italian GNAMPA (National Group of Mathematical Analysis, Probability and their Applications), 24-03-2010 to 23-03-2011, PI: Maria Giovanna Mora.
- Member of GNAMPA project 2011 *Variational multiscale models in elasticity and plasticity*, project funded by the Italian GNAMPA (National Group of Mathematical Analysis, Probability and their Applications), 27-04-2011 to 26-04-2012, PI: Marcello Ponsiglione.
- Member of GNAMPA project 2013 *Variational methods in the study of elastic and plastic properties of materials*, project funded by the Italian GNAMPA (National Group of Mathematical Analysis, Probability and their Applications), 13-05-2013 to 12-05-2014, PI: Marcello Ponsiglione.
- PI of “London Mathematical Society, Celebrating New Appointments - Scheme 1 grant”, 2015.
- Co-PI of “Innovative Training Network - Modelling and Computation of Shocks and Interfaces” 2015-2020.
- Member of GNAMPA project 2020 *Analisi Variazionale di materiali elastici: statica, dinamica e ottimizzazione*, project funded by the Italian GNAMPA (National Group of Mathematical Analysis, Probability and their Applications), PI: Riccardo Scala.

- Member of GNAMPA project 2022 *Un approccio geometrico-variazionale ad alcuni problemi singolari in Scienza dei Materiali*, project funded by the Italian GNAMPA (National Group of Mathematical Analysis, Probability and their Applications), PI: Riccardo Scala.
- Member of GNAMPA project 2023 *Anisotropic and nonlocal problems from a variational viewpoint*, project funded by the Italian GNAMPA (National Group of Mathematical Analysis, Probability and their Applications), PI: Giuliano Lazzaroni.

Research interests

- Differential inclusions and applications to relaxation problems.
- Homogenization of partial differential equations by multiscale convergence methods and Bloch spectral theory.
- Variational methods for the study of dislocations in crystals.
- Variational analysis of discrete systems.

Publications

1. M. Palombaro, M. Ponsiglione: The three divergence free matrix fields problem, *Asymptotic Analysis* 40(1) (2004), 37–49.
2. G. Allaire, M. Palombaro: Localization for the Schrödinger equation in a locally periodic medium, *SIAM J. Math. Anal.* 38 (2006), no. 1, 127–142.
3. S. Müller, M. Palombaro: Existence of minimizers for a polyconvex energy in a crystal with dislocations, *Calc. Var. Partial Differential Equations* 31 (2008), no. 4, 473–482.
4. G. Allaire, M. Palombaro, J. Rauch: Diffractive behavior of the wave equation in periodic media: weak convergence analysis, *Ann. Mat. Pura Appl.* 188 (2009) no. 4, 561–589.
5. M. Palombaro, V. P. Smyshlyaev: Relaxation of three solenoidal wells and characterization of three-phase H -measures, *Arch. Rational Mech. Anal.* 194 (2009), no. 3, 775–822.
6. M. Palombaro: Rank- $(n - 1)$ convexity and quasiconvexity for divergence free fields, *Advances in Calculus of Variations* 3 (2010), no. 3, 279–285.
7. G. Allaire, M. Palombaro, J. Rauch: Diffractive geometric optics for Bloch wave packets, *Arch. Rational Mech. Anal.* 202 (2011), 373–426.
8. S. Müller, M. Palombaro: Derivation of a rod theory for biphase materials with dislocations at the interface. *Calc. Var. Partial Differential Equations* 48 (2013), no. 3-4, 315–335.
9. G. Allaire, M. Palombaro, J. Rauch: Diffraction of Bloch wave packets for Maxwell’s equations. *Comm. Cont. Math.* 15(6), 1350040 (2013).
10. V. Nesi, M. Palombaro, M. Ponsiglione: Gradient integrability and rigidity results for two-phase conductivity in dimension two. *Ann. Inst. H. Poincaré Anal. Non Linéaire* 3 (2014), 615–638.

11. S. Müller, M. Palombaro: On a differential inclusion related to the Born-Infeld equation. *SIAM J. Math. Anal.* 46 (2014), no. 4, 2385–2403.
12. G. Lazzaroni, M. Palombaro, A. Schlömerkemper: A discrete to continuum analysis of dislocations in nanowires heterostructures. *Communications in Mathematical Sciences* 13 (2015), 1105-1133.
13. G. Allaire, M. Palombaro, J. Rauch: A bound on group velocity for Bloch wave packets. *Portugaliae Mathematica* 72 (2015), 119-123.
14. A. Braides, A. Garroni, M. Palombaro: Interfacial energies of systems of chiral molecules. *SIAM Multiscale Modeling and Simulation* 14 (2016), no. 3, 1037–1062.
15. G. Lazzaroni, M. Palombaro, A. Schlömerkemper: Rigidity of three-dimensional lattices and dimension reduction in heterogeneous nanowires. *Discrete and Continuous Dynamical Systems-S* 10 (2017), no. 1, 119–139.
16. R. Alicandro, G. Lazzaroni, M. Palombaro: On the effect of interactions beyond nearest neighbours on non-convex lattice systems. *Calc. Var. Partial Differential Equations* 56 (2017).
17. S. Fanzon, M. Palombaro, M. Ponsiglione: A variational model for dislocations at semi-coherent interfaces, *Journal of Nonlinear Science* 27 (2107), 1435–1461.
18. S. Fanzon, M. Palombaro: Optimal lower exponent for the higher gradient integrability of solutions to two-phase elliptic equations in two dimensions. *Calc. Var. Partial Differential Equations* (2017) 56:137.
19. R. Alicandro, G. Lazzaroni, M. Palombaro: Derivation of a rod theory from lattice systems with interactions beyond nearest neighbours. *NHM* 13 (1) (2018) 1–26.
20. R. Alicandro, G. Dal Maso, G. Lazzaroni, M. Palombaro: Derivation of a linearised elasticity model from singularly perturbed multiwell energy functionals. *Archive for Rational Mechanics and Analysis* (2018) 1–45.
21. S. Fanzon, M. Palombaro, M. Ponsiglione: Derivation of linearised polycrystals from a two-dimensional system of edge dislocations. *SIAM J. Math. Anal.* 51 (2019) no. 5, 3956–3981.
22. R. Alicandro, G. Lazzaroni, M. Palombaro: Derivation of linear elasticity for a general class of atomistic energies. *SIAM J. Math. Anal.*, 53 (2021) 5060–5093.
23. R. Alicandro, L. De Luca, G. Lazzaroni, M. Palombaro, M. Ponsiglione: Coarse-graining of a discrete model for edge dislocations in the regular triangular lattice. *Journal of Nonlinear Science* (2023).
24. R. Alicandro, L. De Luca, G. Lazzaroni, M. Palombaro, M. Ponsiglione: Γ -convergence analysis of the nonlinear self-energy induced by edge dislocations in semi-discrete and discrete models in two dimensions. *Advances in Calculus of Variations*, to appear.
25. N. Albin, V. Nesi, M. Palombaro: Optimal microstructures for the conductivity of polycrystalline materials. Preprint 2023.

Conference Proceedings:

1. G. Lazzaroni, M. Palombaro, A. Schlömerkemper: Dislocations in nanowire heterostructures: from discrete to continuum. *Proceedings in Applied Mathematics and Mechanics* 13 (2013), 541–544.

Other publications

- M. Palombaro, *Solenoidal Differential Inclusions and H-measures*, Ph.D. Thesis, Dipartimento di Matematica, Università di Roma “La Sapienza” (2004). (<http://padis.uniroma1.it/search.py?recid=113>).

Talks

- February 2004, Giornate di Lavoro su Questioni di Teoria Geometrica della Misura e Calcolo delle Variazioni, Levico Terme, Italy.
- December 2004, Università di Roma “La Sapienza”, Rome, Italy.
- February 2005, Giornate di Lavoro su Questioni di Teoria Geometrica della Misura e Calcolo delle Variazioni, Levico Terme, Italy.
- March 2005, CMAP - École Polytechnique, France.
- May 2005, Congrès National de Mathématiques Appliquées et Industrielles, Evian, France.
- December 2005, Max Planck Institute, Leipzig, Germany.
- February 2007, Giornate di Lavoro su Questioni di Teoria Geometrica della Misura e Calcolo delle Variazioni, Levico Terme, Italy.
- October 2007, Max Planck Institute, Leipzig, Germany.
- February 4 2008, Colloquium, Carnegie Mellon University, Pittsburgh, USA.
- February 5 2008, Carnegie Mellon University, Pittsburgh, USA.
- June 2008, Meeting on Applied Mathematics and Calculus of Variations, Rome, Italy.
- October 2008, Workshop on Complex Nanostructures, Dresden, Germany.
- July 2010, University of L’Aquila, Italy.
- February 2012, Institute for Mathematics, University of Würzburg, Germany.
- March 2013, ACMAC, University of Crete, Heraklion, Greece.
- April 2013, Hausdorff Center for Mathematics, Bonn, Germany.
- May 2013, University of Sussex, UK.
- November 2013, Università di Roma “La Sapienza”, Rome, Italy.
- November 2013, SISSA, Trieste, Italy.
- November 2013, Gran Sasso Science Institute, L’Aquila, Italy.
- February 2014, APDE seminar, University of Sussex, UK.
- March 2014, “Women in Nonlinear PDEs and Calculus of Variations”, University of Oxford, UK.
- March 2014, Intensive Research week on “Calculus of Variations, Geometric Analysis and Partial Differential Equations”, University of Sussex, UK.
- May 2014, “Young Applied Analysts in the UK”, University of Glasgow, UK.
- October 2014, Geometric Analysis and PDE seminar, DPMMS, University of Cambridge.
- February 2015, Cardiff University.
- March 2015, SIAM Workshop on Dimension Reduction: Mathematical Methods and Applications, Penn State University.
- May 2015, Centre for Nonlinear Mechanics seminar, University of Bath.
- June 2015, Mathematical Institute, University of Oxford.
- October 2015, “Spectral problems in mathematical physics”, Institut Henri Poincaré, Paris.
- December 2015, “The Paris-London Seminar”, Institut Henri Poincaré, Paris.

- December 2015, University of Athens.
- May 2016, “Young Applied Analysts in UK” conference, Bath.
- December 2016, University of Athens.
- January 2017, Mathematical Institute, University of Oxford.
- February 2017, University of Nottingham.
- April 2017, “Contemporary Microlocal Analysis, a conference in honour of Jeffrey Rauch”, Montpellier.
- May 2017, University of Surrey.
- June 2017, BIRS international workshop “Analysis of dislocation models for Crystal Defects”, BIRS Center of Casa Matematica Oaxaca, Mexico. (Cancelled)
- October 2017, “HomTAp 2017 – Homogenization Theory and Applications”, Weierstrass Institute Berlin. (Cancelled, maternity leave)
- December 2017, “Variational approaches to problems in Solid Mechanics”, University of Warwick. (Cancelled, maternity leave)
- February 2018, “Variational Methods for the Modelling of Inelastic Solids”, Oberwolfach. (Cancelled, maternity leave)
- June 2018, “PDEs friends workshop”, Politecnico, Torino.
- July 2018, “12th AIMS Conference on Dynamical Systems, Differential Equations and Applications”, Taipei, Taiwan. (Cancelled, maternity leave)
- October/November 2018, “Emergence of Structures in Particle Systems: Mechanics, Analysis and Computation”, Oberwolfach. (Cancelled, teaching commitments)
- September 2019, “Recent advances in the Calculus of Variations”, University of Münster. (Cancelled)
- October 2019, “Calculus of Variations and Applications in Trani”, Trani.
- November 2019, “Modeling of Crystalline Interfaces and Thin Film Structures: a Joint Mathematics–Physics Symposium”, Erwin Schrödinger International Institute for Mathematics and Physics (ESI), Vienna.
- December 2019, ICMS seminar, Edinburgh.
- May 2021, SIAM online conference.
- November 2021, Cardiff University analysis seminar (online).
- April 2023, BIRS Workshop “Compensated Compactness and Applications to Materials”, Banff.

Academic visits

(The period, the hosting person and institute are indicated)

- 13-22 July 2004, J. R. Willis, Cambridge University (UK).
- 22-29 July 2004, V. P. Smyshlyaev, University of Bath (UK).
- September 2005, V. Nesi, Università di Roma “La Sapienza”, Rome (Italy).
- 20-27 February 2006, 23-28 February 2007, 18-25 November 2007, G. Allaire, CMAP, École Polytechnique (France).
- 27-31 July 2009, S. Müller, Institute for Applied Mathematics, Universität Bonn (Germany).
- 7-13 February 2011, G. Allaire, CMAP, Ecole Polytechnique (France).

- 3-9 October, 15-22 December 2011, V. Nesi and M. Ponsiglione, Università di Roma “La Sapienza”, Rome (Italy).
- 18-21 January 2012, G. Allaire, CMAP, École Polytechnique (France).
- 26-28 September, 24-26 October 2012, A. Garroni, Università di Roma “La Sapienza”.
- June-August 2013, A. Tzavaras, University of Crete, Greece.
- 25-27 June 2014, A. Garroni, University of Oxford, UK.
- 21-22 July 2014, M. Ponsiglione, Università di Roma “La Sapienza”, Rome (Italy).
- 15-19 December 2014, M. Ponsiglione and A. Garroni, Università di Roma “La Sapienza”, Rome (Italy).
- August 2015, A. Braides, A. Garroni and R. Alicandro, Università di Roma “La Sapienza”, Rome (Italy).
- May 2016, R. Alicandro, Università di Roma “La Sapienza”, Rome (Italy).
- October 2016, G. Dal Maso and G. Lazzaroni, SISSA, Trieste (Italy).
- June 2019, G. Lazzaroni, University of Florence (Italy).
- September 2023, A. Garroni, University of Rome “Sapienza”, Italy.

Teaching experience

2001-2002	Mathematical Analysis I, Mathematical Analysis II, tutorials Facoltà di Ingegneria Civile, Università di Roma “La Sapienza”
2008-2009	Functional Analysis, tutorials Laurea Magistrale in Matematica, SISSA, Trieste
2012-2013	Mathematical Analysis I, tutorials, University of L’Aquila, Italy
2013-2014	Linear Algebra, University of Sussex, UK
2014-2015	Linear Algebra, University of Sussex, UK
2015-2016	Linear Algebra, Continuum Mechanics, University of Sussex, UK
2016-2017	Linear Algebra, University of Sussex, UK
2018-2019	Mathematical Analysis I for “Ingegneria Civile ed Edile-Architettura”, University of L’Aquila
2019-2020	Mathematical Analysis I, Mathematical Analysis II for “Ingegneria Civile ed Edile-Architettura”, University of L’Aquila
2020-2021	Istituzioni di Matematiche I, Corso di Laurea in Chimica, DSFC Complex Analysis, Ingegneria Matematica, DISIM
2021-2022	Istituzioni di Matematiche I, Corso di Laurea in Chimica, DSFC Functional and Complex Analysis, Ingegneria Matematica, DISIM

2022-2023

Istituzioni di Matematiche I, Corso di Laurea in Chimica, DSFC
Functional and Complex Analysis, Ingegneria Matematica, DISIM