

Curriculum Vitae - Matteo Cozzi

Personal information

Date and Place of birth: April 22, 1987, Milan (Italy)

Citizenship: Italian

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Professional Webpage: <https://sites.unimi.it/mcozzi/>

Current position

May 2023 - present: **Associate Professor** at Università degli Studi di Milano (Italy).

Previous positions

- May 2020 - April 2023: **Assistant Professor (RTDb)** at Università degli Studi di Milano (Italy).
- November 2018 - April 2020: **Newton International Fellow** at University of Bath (UK).
- September 2018 - October 2018: **Postdoctoral Fellow** at UPC Barcelona (Spain).
- June 2016 - June 2018: **BGSMath Postdoctoral Fellow** at UPC Barcelona (Spain).
- January - May 2016: **Postdoctoral Fellow** at WIAS Berlin (Germany).

Education

- November 2012 - January 2016: **PhD in Mathematics**.
Università degli Studi di Milano (Italy) & Université de Picardie Jules Verne (France).
Graduation date: January 11, 2016.
Thesis title: *Qualitative Properties of Solutions of Nonlinear Anisotropic PDEs in Local and Nonlocal Settings*.
Advisors: E. Valdinoci & A. Farina (joint supervision).
- October 2010 - September 2012: **Master's Degree in Mathematics**.
Università degli Studi di Milano (Italy).
Graduation date: September 17, 2012.
Thesis title: *Plane-like minimizers for an Allen-Cahn-type functional with an extension to the non-local case*.
Final grade: 110/110 cum laude.
Advisor: E. Valdinoci.
- October 2006 - April 2010: **Bachelor's Degree in Mathematics**.
Università degli Studi di Milano (Italy).
Graduation date: April 12, 2010.
Thesis title: *Complex bundles and Chern classes* (in italian).
Final grade: 110/110.
Advisor: L. van Geemen.

Spoken languages

Italian (native speaker), English (fluent), Spanish (intermediate).

Scholarships and fellowships awarded

- 2-year **Newton International Fellowship**, funded by the Royal Society (UK) in September 2018. Total funds: 99.000£.
- 2-year **BGSMath-María de Maeztu Postdoctoral Fellowship**, funded by MINECO (Spain) in June 2016. Total funds: 52.500€.
- 1-year **Postdoctoral Fellowship**, funded by the ERC (EU) in January 2016. Total funds: 34.835€.
- 3-year **PhD Scholarship**, funded by MIUR (Italy) in November 2012. Total funds: 40.915€.

Participation in research projects and grants

- PI of the 1-year INdAM-GNAMPA Project *Equazioni nonlocali di tipo misto e geometrico*, funded by INdAM (Italy) in 2023. Total funds: 3.500€.
- 1-year INdAM-GNAMPA Project *Fractional and anisotropic PDEs arising from geometric and functional inequalities*, funded by INdAM (Italy) in 2022. Total funds: 4.500€. PI: G. Ciraolo, Università degli Studi di Milano (Italy).
- 4-year follow-on funding as part of the *Newton Fellowship Alumni* mobility programme, awarded by the Royal Society (UK) in October 2020 and renewed in August 2023. Total funds: \sim 7.000£.
- 1-year INdAM-GNAMPA Project *Equazioni ellittiche e disuguaglianze analitico/geometriche collegate*, funded by INdAM (Italy) in 2020. Total funds: 2.250€. PI: A. Alberico, IAC-CNR Napoli (Italy).
- 4-year MTM2017-84214-C2-1-P Project *Partial Differential Equations: reaction-diffusion, integrodifferential and geometric problems*, funded by MINECO (Spain) in 2017. Total funds: 101.761€. PI: X. Cabré, UPC Barcelona (Spain).
- 1-year INdAM-GNAMPA Project *Metodi variazionali per problemi nonlocali*, funded by INdAM (Italy) in 2017. Total funds: 1.400€. PI: E. Cinti, Università di Bologna (Italy).
- 3-year MTM2014-52402-C3-1-P Project *Partial Differential Equations: reaction-diffusion, integrodifferential and geometric problems*, funded by MINECO (Spain) in 2014. Total funds: 95.711€. PI: X. Cabré, UPC Barcelona (Spain).
- 5-year ERC Grant 2011-2015 277749 ε *Elliptic Pdes and Symmetry of Interfaces and Layers for Odd Nonlinearities*, funded by ERC (EU) in 2012. Total funds: 850.000€. PI: E. Valdinoci, Università degli Studi di Milano (Italy).
- 3-year PRIN-2012-74FYK7 Research Project *Variational and perturbative aspects of nonlinear differential problems*, funded by MIUR (Italy) in 2012. Total funds: 340.947€. PI: S. Terracini, Università di Torino (Italy).

Scientific publications and preprints

- [23] C. A. Antonini, M. Cozzi, *Global gradient regularity and a Hopf lemma for quasilinear operators of mixed local-nonlocal type*, preprint, available at arXiv:2308.06075.
- [22] G. Ciraolo, M. Cozzi, M. Perugini, L. Pollastro, *A quantitative version of the Gidas-Nirenberg Theorem*, preprint, available at arXiv:2308.00409.
- [21] L. Battaglia, M. Cozzi, A. J. Fernández, A. Pistoia, *Non-uniqueness for the nonlocal Liouville equation in \mathbb{R} and applications*, SIAM J. Math. Anal. **55** (2023), no. 5, 4816–4842.
- [20] M. Cozzi, A. J. Fernández, *Blowing-up solutions for a nonlocal Liouville type equation*, to appear in Ann. Sc. Norm. Super. Pisa Cl. Sci. (5), available at arXiv:2204.05837.
- [19] X. Cabré, M. Cozzi, G. Csató, *A fractional Michael-Simon Sobolev inequality on convex hypersurfaces*, Ann. Inst. H. Poincaré Anal. Non Linéaire **40** (2023), no. 1, 185–214.
- [18] M. Cozzi, L. Lombardini, *On nonlocal minimal graphs*, Calc. Var. Partial Differential Equations **60** (2021), article no. 136, 72 pp.
- [17] N. Abatangelo, M. Cozzi, *An elliptic boundary value problem with fractional nonlinearity*, SIAM J. Math. Anal. **53** (2021), no. 3, 3577–3601.
- [16] M. Cozzi, A. Farina, L. Lombardini, *Bernstein-Moser-type results for nonlocal minimal graphs*, Comm. Anal. Geom. **29** (2021), no. 4, 761–777.
- [15] M. Cozzi, J. Dávila, M. del Pino, *Long-time asymptotics for evolutionary crystal dislocation models*, Adv. Math. **371** (2020), 107242, 109 pp.
- [14] M. Cozzi, E. Valdinoci, *On the growth of nonlocal catenoids*, Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl. **31** (2020), no. 1, 237–248.

- [13] M. Cozzi, *Fractional De Giorgi classes and applications to nonlocal regularity theory*, Contemporary Research in elliptic PDEs and related topics, 277–299, Springer-INdAM Series, Vol. 33, Springer, Cham, 2019.
- [12] X. Cabré, M. Cozzi, *A gradient estimate for nonlocal minimal graphs*, Duke Math. J. **168** (2019), no. 5, 775–848.
- [11] M. Cozzi, E. Valdinoci, *Planelike minimizers of nonlocal Ginzburg-Landau energies and fractional perimeters in periodic media*, Nonlinearity **31** (2018), no. 7, 3013–3056.
- [10] M. Cozzi, A. Figalli, *Regularity theory for local and nonlocal minimal surfaces: an overview*, Nonlocal and nonlinear diffusions and interactions: new methods and directions, 117–158, Lecture Notes in Math., Vol. 2186, Fond. CIME/CIME Found. Subser., Springer, Cham, 2017.
- [9] M. Cozzi, *Regularity results and Harnack inequalities for minimizers and solutions of nonlocal problems: a unified approach via fractional De Giorgi classes*, J. Funct. Anal. **272** (2017), no. 11, 4762–4837.
- [8] M. Cozzi, S. Dipierro, E. Valdinoci, *Planelike interfaces in long-range Ising models and connections with nonlocal minimal surfaces*, J. Stat. Phys. **167** (2017), no. 6, 1401–1451.
- [7] M. Cozzi, E. Valdinoci, *Plane-like minimizers for a non-local Ginzburg-Landau-type energy in a periodic medium*, J. Éc. polytech. Math. **4** (2017), 337–388.
- [6] M. Cozzi, S. Dipierro, E. Valdinoci, *Nonlocal phase transitions in homogeneous and periodic media*, J. Fixed Point Theory Appl. **19** (2017), no. 1, 387–405.
- [5] M. Cozzi, *Interior regularity of solutions of non-local equations in Sobolev and Nikol'skii spaces*, Ann. Mat. Pura Appl. **196** (2017), no. 2, 555–578.
- [4] M. Cozzi, A. Farina, E. Valdinoci, *Monotonicity formulae and classification results for singular, degenerate, anisotropic PDEs*, Adv. Math. **293** (2016), 343–381.
- [3] M. Cozzi, T. Passalacqua, *One-dimensional solutions of non-local Allen-Cahn-type equations with rough kernels*, J. Differential Equations **260** (2016), no. 8, 6638–6696.
- [2] M. Cozzi, *On the variation of the fractional mean curvature under the effect of $C^{1,\alpha}$ perturbations*, Discrete Cont. Dyn. Syst. **35** (2015), no. 12, 5769–5786.
- [1] M. Cozzi, A. Farina, E. Valdinoci, *Gradient bounds and rigidity results for singular, degenerate, anisotropic partial differential equations*, Comm. Math. Phys. **331** (2014), no. 1, 189–214.

Talks at conferences and research seminars

- Invited talks at conferences:
 - September 2023: *XXII Congresso dell'Unione Matematica Italiana*, Pisa (Italy).
 - March 2023: *Nonlocal Equations: Analysis and Numerics*, Universität Bielefeld (Germany).
 - September 2022: *NonPUB - Nonlocal and Nonlinear PDE's*, Università di Bologna (Italy).
 - June 2022: *Nonlinear elliptic PDE in Hauts-de-France*, Valenciennes (France).
 - March 2022: *Nonlocality in Analysis, Probability and Statistics*, Oberwolfach (Germany).
 - February 2022: *PDEs in presence in Rome*, Sapienza Università di Roma (Italy).
 - June 2021: *Calculus of Variations and PDEs* (online), ETH Zürich (Switzerland).
 - September 2019: *Dynamics, Equations and Applications (DEA 2019)*, Kraków (Poland).
 - July 2019: *12th International ISAAC Congress*, Aveiro (Portugal).
 - June 2019: *BGSMath María de Maeztu 2015-2019: Closing Workshop*, UB Barcelona (Spain).
 - May 2019: *Partial Differential Equations in Analysis and Mathematical Physics*, Cagliari (Italy).
 - March 2019: *Analysis of nonlocal and nonsmooth models*, Universität Bielefeld (Germany).
 - December 2018: *Winter meeting on nonlocal PDEs and applications*, UAM Madrid (Spain).
 - July 2018: *Young PDEs at work*, IMPAN Warsaw (Poland).
 - October 2017: *BMS-BGSMath Junior Meeting*, Institut d'Estudis Catalans, Barcelona (Spain).
 - September 2017: *4º Congreso de Jóvenes Investigadores RSME*, Universitat de València (Spain).
 - June 2017: *Trobada d'edps i aplicacions*, Universitat de Girona (Spain).

- May 2017: *Contemporary Research in elliptic PDEs and related topics*, Università di Bari (Italy).
- October 2016: *Workshop on recent trends in the Analysis of PDEs*, Università di Pavia (Italy).
- February 2014: *Workshop on PDEs and applications*, Università di Pisa (Italy).
- Invited talks at seminars:
 - March 2023: *Seminario EDP UAM-ICMAT*, UAM Madrid (Spain).
 - August 2020: *Analysis Seminar* (online), UWA Perth (Australia).
 - February 2020: *Partial Differential Equations Seminar*, University of Oxford (UK).
 - December 2019: Politecnico di Milano (Italy).
 - June 2019: *Seminari d'edps i aplicacions*, UPC Barcelona (Spain).
 - March 2019: *Analysis Seminar*, University of Bath (UK).
 - January 2019: *Oberseminar Analysis*, Universität Bielefeld (Germany).
 - November 2018: *Seminario di equazioni differenziali e applicazioni*, Università di Padova (Italy).
 - October 2018: *Seminari d'Anàlisi de Barcelona*, UB Barcelona (Spain).
 - June 2018: *Séminaire Analyse non linéaire et EDP*, ULB Brussels (Belgium).
 - April 2018: *Difusión no lineal en Madrid*, UAM Madrid (Spain).
 - February 2018: *Seminari d'edps i aplicacions*, UPC Barcelona (Spain).
 - December 2017: Università degli Studi di Milano (Italy).
 - December 2016: *Seminari d'edps i aplicacions*, UPC Barcelona (Spain).
 - December 2016: *Séminaire Analyse non linéaire et EDP*, ULB Brussels (Belgium).
 - October 2015: *CAPDE Seminar*, Universidad de Chile, Santiago (Chile).
 - June 2015: *Analysis Seminar*, University of Edinburgh (UK).
- Contributed talks at conferences:
 - July 2016: *JISD2016*, UPC Barcelona (Spain).
 - September 2015: *Workshop in Nonlinear PDEs*, ULB Brussels (Belgium).
 - June 2015: *Mini-courses in Mathematical Analysis 2015*, Università di Padova (Italy).

Mentoring activity

- Master's students:
 - Michele Gatti, Università degli Studi di Milano (co-advised with G. Ciraolo), 2023.
- PhD students:
 - Luigi Pollastro, Università degli Studi di Milano (co-advised with G. Ciraolo), 2020-2024.
- Postdocs:
 - Matteo Perugini, Università degli Studi di Milano (co-advised with G. Ciraolo), 2022-2024.
 - Federico Bernini, Università degli Studi di Milano (co-advised with C. Tarsi), 2023-2025.

Teaching activity

- Fall 2023: Lecturer for the course *Mathematics for imaging and signal processing*, Bachelor's Degree in Artificial Intelligence, Università degli Studi di Milano (Italy).
- Fall 2023: Lecturer for the course *Fundamentals of Mathematics*, Bachelor's Degree in Chemistry, Università degli Studi di Milano (Italy).
- Fall 2023: Teaching assistant for the course *Mathematical Analysis 1*, Bachelor's Degree in Physics, Università degli Studi di Milano (Italy).
- Fall 2022: Teaching assistant for the course *Mathematical Analysis 3*, Bachelor's Degree in Physics, Università degli Studi di Milano (Italy).
- Fall 2022: Teaching assistant for the course *Mathematical Analysis 1*, Bachelor's Degree in Physics, Università degli Studi di Milano (Italy).
- Fall 2021: Teaching assistant for the course *Mathematical Analysis 3*, Bachelor's Degree in Physics, Università degli Studi di Milano (Italy).

- Fall 2021: Teaching assistant for the course *Mathematical Analysis 1*, Bachelor's Degree in Physics, Università degli Studi di Milano (Italy).
- Spring 2021: Lecturer for the course *Analytical aspects of local and nonlocal minimal surfaces* (12 hours), PhD in Mathematics, Università degli Studi di Milano (Italy).
- Fall 2020: Teaching assistant for the course *Mathematical Analysis 3*, Bachelor's Degree in Physics, Università degli Studi di Milano (Italy).
- Fall 2020: Teaching assistant for the course *Mathematical Analysis 1*, Bachelor's Degree in Physics, Università degli Studi di Milano (Italy).
- Spring 2020: Teaching assistant for the course *Complex Analysis*, Master's Degree in Mathematics, Università degli Studi di Milano (Italy)
- Spring 2018: Lecturer for the minicourse *Introduction to minimal surfaces* (5 hours), PhD in Mathematics, UPC Barcelona (Spain).
- Spring 2018: Teaching assistant for the course *Advanced Course in Partial Differential Equations*, Master's Degree in Advanced Mathematics and Mathematical Engineering, UPC Barcelona (Spain).
- Fall 2017: Lecturer for the course *Mathematical Modeling with Partial Differential Equations*, Master's Degree in Advanced Mathematics and Mathematical Engineering, UPC Barcelona (Spain).
- Spring 2017: Teaching assistant for the course *Advanced Course in Partial Differential Equations*, Master's Degree in Advanced Mathematics and Mathematical Engineering, UPC Barcelona (Spain).
- Summer 2014: Teacher for the high school summer remedial course in *Mathematics*, Liceo Scientifico "G. Galilei", Legnano (Italy).
- Summer 2013: Teaching assistant for the minicourse *Allen-Cahn equations in periodic media*, Summer school "Periodic structures in Applied Mathematics", Universität Göttingen (Germany).
- Fall 2012: Tutor for the course *Mathematical Analysis 1*, Bachelor's Degree in Physics, Università degli Studi di Milano (Italy).

Organization of scientific events

- June 2022: *Geometric Analysis and PDE on Garda Lake*, Palazzo Feltrinelli, Gargnano (Italy).
- June 2018: *16th School on Interactions between Dynamical Systems and Partial Differential Equations (JISD 2018)*, Centre de Recerca Matemàtica, Bellaterra (Spain).
- June 2017: *15th School on Interactions between Dynamical Systems, Geometry, and Partial Differential Equations (JISD 2017)*, Centre de Recerca Matemàtica, Bellaterra (Spain).

Services for the community

- Referee for:
 - *Advances in Calculus of Variations*.
 - *Advances in Mathematics*. (x2)
 - *Advances in Nonlinear Analysis*.
 - *Annali della Scuola Normale Superiore di Pisa. Classe di Scienze*.
 - *Canadian Journal of Mathematics*.
 - *Calculus of Variations and Partial Differential Equations*. (x3)
 - *Communications on Pure and Applied Analysis*.
 - *Communications on Pure and Applied Mathematics*.
 - *Discrete and Continuous Dynamical Systems. Series A*. (x3)
 - *ESAIM. Control, Optimisation and Calculus of Variations*.
 - *International Mathematics Research Notices*.
 - *Journal für die reine und angewandte Mathematik*.
 - *Journal of Differential Equations*.
 - *Journal of Functional Analysis*.

- *Journal of the London Mathematical Society.*
- *Mathematical Modelling of Natural Phenomena.*
- *Mathematics in Engineering.*
- *Mathematische Annalen.*
- *Nonlinear Analysis.*
- *Physica D: Nonlinear Phenomena.*
- *Proceedings of the London Mathematical Society.* (x2)
- *Rendiconti del Seminario Matematico della Università di Padova.*
- *SIAM Journal on Mathematical Analysis.* (x3)
- *Transactions of the American Mathematical Society.* (x2)
- Reviewer for *Mathematical Reviews.*
- External reviewer for 2 Regular Grant applications submitted to FONDECYT (Chilean main public research funding agency).
- External reviewer for a Humboldt Research Fellowship application, funded by the Alexander von Humboldt Foundation (German public research funding agency).
- Internal member of the selection committee for a postdoctoral fellowship awarded by Università degli Studi di Milano (Italy), Summer-Fall 2022.

Visiting and research experiences

- March 2023 (1 week): UAM Madrid (Spain). Invited by A. J. Fernández and T. Sanz.
- September 2021 (1 week): University of Bath (UK). Invited by M. del Pino.
- June 2019 (1 week): UPC Barcelona (Spain). Invited by X. Cabré.
- January 2019 (1 week): Universität Bielefeld (Germany). Invited by M. Kassmann.
- November 2018 (1 week): Università di Padova (Italy). Invited by L. Martinazzi.
- June 2018 (1 week): ULB Bruxelles (Belgium). Invited by N. Abatangelo.
- April 2018 (1 week): UAM Madrid (Spain). Invited by M. Bonforte and M. d. M. González.
- April 2017 (1 week): Università degli Studi di Bari (Italy). Invited by S. Dipierro.
- January 2017 (1 week): Università degli Studi di Milano (Italy). Invited by E. Valdinoci.
- December 2016 (1 week): ULB Bruxelles (Belgium). Invited by N. Abatangelo.
- October 2016 (2 weeks): Universidad de Chile, Santiago. Invited by M. del Pino.
- September 2016 (1 week): University of Edinburgh (UK). Invited by A. Karakhanyan.
- September-October 2015 (1 month): Universidad de Chile, Santiago. Invited by M. del Pino.
- June 2015 (1 week): University of Edinburgh (UK). Invited by A. Karakhanyan.
- 2014-2015 (multiple times): WIAS Berlin (Germany). Invited by E. Valdinoci.

Awards and distinctions

- Italian Academic Qualification as Associate Professor (valid from July 27, 2018 to July 27, 2024).
- Participant to the 2017 edition of the Heidelberg Laureate Forum.
- Recipient of a scholarship funded by the Italian association “Famiglia Legnanese” as a high-school graduate with top grades, in the year 2006. Total funds: $\sim 2.000\text{€}$.
- Participant in the national final stage of the Italian Mathematical Olympiad for the year 2003.

Scientific interests

Nonlinear PDEs, Calculus of variations, Nonlocal operators, Minimal surfaces, Functional inequalities.