

Roberto Ognibene

Tenure-track researcher – Università degli studi di Milano-Bicocca

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Education

2017–2021	PhD in Mathematics (Dottorato di ricerca) <i>Università degli studi di Milano-Bicocca – Milano, Italy</i> Thesis title: "Monotonicity formulas and blow-up methods for the study of spectral stability and fractional obstacle problems" Supervisor: prof.ssa Veronica Felli
2014–2017	Master's Degree in Mathematics (Laurea Magistrale) <i>Università degli studi di Modena e Reggio Emilia – Modena, Italy</i>
2011–2014	Bachelor's Degree in Mathematics (Laurea triennale) <i>Università degli studi di Modena e Reggio Emilia – Modena, Italy</i>

Academic positions

Apr 2025 – now	Tenured assistant professor (Ricercatore Tenure-Track) <i>Università degli studi di Milano-Bicocca – Milan, Italy</i>
Feb 2022 – Mar 2025	Post-doc researcher (Assegnista di Ricerca) <i>Università di Pisa – Pisa, Italy</i> Whithin the ERC program VAREG “Variational approach to the regularity of the free boundaries”. Supervisor: prof. Bozhidar Velichkov.
Aug 2022 – Dec 2022	Junior fellow <i>Mittag-Leffler Institute, Royal Swedish Academy of Sciences – Stockholm, Sweden</i> Whithin the research program “Geometric Aspects of Nonlinear Partial Differential Equations” Website of the program.
Feb 2021 – Jan 2022	Post-doc researcher (Assegnista di Ricerca) <i>Università degli studi di Genova – Genova, Italy</i> Whithin the PRIN project: "Equazioni alle derivate parziali e metodi variazionali applicati alla scienza dei materiali" Supervisor: prof. Edoardo Mainini

Publications

Referred publications

1. Felli, V., Liverani, L. & **Ognibene, R.** Quantitative spectral stability for the Neumann Laplacian in domains with small holes. English. *J. Funct. Anal.* **288**, 59. doi:10.1016/j.jfa.2024.110817 (2025).
2. Mainini, E., **Ognibene, R.** & Volzone, B. Local multiplicity for fractional linear equations with Hardy potentials. English. *Calc. Var. Partial Differ. Equ.* **64**, 20. doi:10.1007/s00526-024-02914-2 (2025).

3. **Ognibene, R.** On asymptotics of Robin eigenvalues in the Dirichlet limit. *To appear in Communications in Partial Differential Equations*. <https://arxiv.org/abs/2407.19505> (2025).
4. Abatangelo, L. & **Ognibene, R.** Sharp behavior of Dirichlet–Laplacian eigenvalues for a class of singularly perturbed problems. *SIAM Journal on Mathematical Analysis* **56**, 474–500. <https://doi.org/10.1137/23M1564444> (2024).
5. Bianchi, F., Brasco, L. & **Ognibene, R.** On the spectrum of sets made of cores and tubes. English. *J. Convex Anal.* **31**, 315–358. www.heldermann.de/JCA/JCA31/JCA312/jca31022.htm#jca312 (2024).
6. Danielli, D. & **Ognibene, R.** On a weighted two-phase boundary obstacle problem. English. *Indiana Univ. Math. J.* **72**, 1627–1666. doi:10.1512/iumj.2023.72.9481 (2023).
7. Felli, V., Noris, B., **Ognibene, R.** & Siclari, G. Quantitative spectral stability for Aharonov-Bohm operators with many coalescing poles. *To appear in J. Eur. Math. Soc.* <https://arxiv.org/abs/2306.05008> (2023).
8. Cinti, E., **Ognibene, R.** & Ruffini, B. A quantitative stability inequality for fractional capacities. English. *Math. Eng. (Springfield)* **4**, 28. doi:10.3934/mine.2022044 (2022).
9. Felli, V., Noris, B. & **Ognibene, R.** Eigenvalues of the Laplacian with moving mixed boundary conditions: the case of disappearing Neumann region. English. *J. Differ. Equations* **320**, 247–315. doi:10.1016/j.jde.2022.02.052 (2022).
10. Mainini, E., **Ognibene, R.** & Percivale, D. Asymptotic behavior of constrained local minimizers in finite elasticity. English. *J. Elasticity* **152**, 1–27. doi:10.1007/s10659-022-09946-9 (2022).
11. Felli, V., Noris, B. & **Ognibene, R.** Eigenvalues of the Laplacian with moving mixed boundary conditions: the case of disappearing Dirichlet region. English. *Calc. Var. Partial Differ. Equ.* **60**, 33. doi:10.1007/s00526-020-01878-3 (2021).
12. Felli, V., Mukherjee, D. & **Ognibene, R.** On fractional multi-singular Schrödinger operators: positivity and localization of binding. English. *J. Funct. Anal.* **278**, 47. doi:10.1016/j.jfa.2019.108389. hdl.handle.net/10281/259020 (2020).
13. Felli, V. & **Ognibene, R.** Sharp convergence rate of eigenvalues in a domain with a shrinking tube. English. *J. Differ. Equations* **269**, 713–763. doi:10.1016/j.jde.2019.12.022. hdl.handle.net/10281/268385 (2020).

Preprints

1. Buttazzo, G. & **Ognibene, R.** *Asymptotics of nonlinear Robin energies* Preprint, arXiv:2506.06914 [math.AP] (2025). 2025. <https://arxiv.org/abs/2506.06914>.
2. **Ognibene, R.** & Velichkov, B. *Boundary regularity of the free interface in spectral optimal partition problems* Preprint, arXiv:2404.05698 [math.AP] (2024). 2024. <https://arxiv.org/abs/2404.05698>.
3. **Ognibene, R.** & Velichkov, B. *Structure of the free interfaces near triple junction singularities in harmonic maps and optimal partition problems* Preprint, arXiv:2412.00781 [math.AP] (2024). 2024. <https://arxiv.org/abs/2412.00781>.

Communications in Conferences and Workshops, Seminars

Invited talks in conferences and workshops

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| 12 September 2024 | On the stability of Robin eigenvalues,
Pisa-Freiburg School in Applied Analysis, Pisa, Italy |
| 24 July 2024 | Regularity of domain walls in optimal partition problems,
Joint AMS-UMI Meeting, Palermo, Italy |

24 June 2024	<i>Regularity of domain walls in optimal partition problems, Regularity Theory for Free Boundary and Geometric Variational Problems IV, Levico Terme, Italy</i>
13 June 2024	<i>Regularity of domain walls in optimal partition problems, Equadiff 2024, Karlstad, Sweden</i>
31 January 2024	<i>Free boundary regularity in an optimal partition problem, Regularity and Geometric Aspects of Nonlinear PDEs, Pisa, Italy</i>
13 January 2023	<i>Sharp spectral stability in domains with thin branches, PDEs in Cogne: a friendly meeting in the snow, Cogne (AO), Italy</i>
6 June 2022	<i>A two-phase obstacle problem for the fractional Laplacian, Nonlinear Meeting in Bologna, Bologna, Italy</i>
28 April 2022	<i>A two-phase obstacle problem for the fractional Laplacian, Proprietà Qualitative per Soluzioni di Equazioni Ellittiche Non-Lineari, Cosenza, Italy</i>

Short communications

13 February 2025	<i>Fine regularity in optimal partition problems XXXIV Convegno Nazionale di Calcolo delle Variazioni, Riccione, Italy</i>
18 September 2023	<i>Spectral stability for the Neumann-Laplacian in domains with small holes, Shape Optimization and Isoperimetric and Functional Inequalities, Levico Terme (TN), Italy</i>
13 June 2022	<i>Sharp spectral stability upon perturbation of the boundary conditions, Shape Optimization, Related Topics and Applications, Roscoff, France</i>
27 May 2022	<i>Spectral stability of the Laplacian under perturbation of the boundary conditions: the case of disappearing Neumann region, First UMI Meeting of Ph.D. Students, Padova, Italy</i>
24 September 2021	<i>A quantitative fractional isocapacitary inequality, XII Forum of Partial Differential Equations, Będlewo, Poland</i>
22 June 2021	<i>Sharp asymptotics of eigenvalues of the Laplacian in a domain with a shrinking tube, Online Mini-courses in Mathematical Analysis 2021, Padova, Italy</i>
9 September 2019	<i>Eigenvalues of the Laplacian with moving mixed boundary conditions: sharp asymptotics in terms of Sobolev capacity, Workshop on Spectral Geometry and Analysis of Differential Operators, Padova, Italy</i>
21 May 2019	<i>Eigenvalues of the Laplacian with moving mixed boundary conditions: sharp asymptotics in terms of Sobolev capacity, International Conference on Elliptic and Parabolic Problems, Gaeta, Italy</i>
22 May 2018	<i>Sharp convergence rate of eigenvalues in a domain with a shrinking tube, Summer School: Nonlocal Interactions in PDE and Geometry, Stockholm, Sweden</i>

Posters

11 September 2018	<i>Sharp convergence rate of eigenvalues in a domain with a shrinking tube, Nonlinear Analysis and PDEs in Caserta, Caserta, Italy</i>
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Research seminars upon invitation

16 July 2025	<i>Spectral stability in domains with small holes</i> University of Würzburg, Würzburg, Germany
20 March 2025	<i>Regularity and singularities in optimal partition problems</i> Università di Pisa, Pisa, Italy
30 May 2023	<i>Spectral stability in domains with small holes,</i> Università degli Studi di Torino, Torino, Italy
5 April 2023	<i>Capacity and torsional rigidity: two measures of spectral stability,</i> Università di Pisa, Pisa, Italy
23 March 2023	<i>Capacity and torsional rigidity: two measures of spectral stability,</i> Università degli Studi di Ferrara, Ferrara, Italy
13 October 2022	<i>Capacity and torsional rigidity: two measures of spectral stability,</i> Mittag-Leffler Institute, Stockholm, Sweden
30 June 2021	<i>Spectral stability of the Laplacian under perturbation of the boundary conditions,</i> DEG1 Webinars, Online
14 May 2021	<i>Spectral stability of the Laplacian under perturbation of the boundary conditions,</i> Young Researchers Colloquium — Mathematical Institute of the Polish Academy of Sciences, Warsaw, Poland
13 February 2020	<i>Eigenvalues of the Laplacian under perturbation of the boundary conditions: a capacitary approach,</i> Purdue University, West Lafayette, IN, USA
17 June 2019	<i>An introduction to capacity. Basic notions and applications to PDEs,</i> Université de Picardie Jules Verne, Amiens, France
17 April 2019	<i>Eigenvalues of the Laplacian and their dependence on the domain: regular and singular perturbations,</i> Università degli Studi di Modena e Reggio Emilia, Modena, Italy
2 April 2019	<i>“Can one hear the shape of a drum?” and other related questions,</i> Università degli Studi di Milano-Bicocca, Milano, Italy
26 November 2018	<i>Eigenvalues of the Laplacian and their dependence on the domain: regular and singular perturbations,</i> Université de Picardie Jules Verne, Amiens, France

Awards, Scholarships, Fellowships, Grants

2024	Grant for the organization of <i>Young Researcher Meeting on PDEs II</i> (1000€), funded by INdAM-GNAMPA.
2021	Post-doc fellowship, funded by the ERC program VAREG “Variational approach to the regularity of the free boundaries”, P.I. prof. Bozhidar Velichkov.
2021	Kovalevskaya grant for participation to ICM2022, (supposed to be held in) St. Petersburg.
2021	Fellowship for the research program <i>Geometric aspects of nonlinear partial differential equations</i> (see Link) at Mittag-Leffler Institute, Sep–Dec 2022, funded by Royal Swedish Academy of Sciences.
2021	2nd place — “Enrico Jannelli” award for Ph.D. thesis.
2021	Post-doc fellowship (1 year), funded by <i>Università degli studi di Genova</i> .

- 2020 | International mobility scholarship for Ph.D. students, funded by *Università degli studi di Pavia*, 9th edition.
- 2017 | Scholarship for the Ph.D. course (3 years), funded by *Università degli studi di Milano-Bicocca*.
- 2014 | Awarded by *Università degli studi di Modena e Reggio Emilia* for my Bachelor Degree (520€).

Research Projects

As principal investigator

- 2022 | Project: *Questioni di esistenza e unicità per problemi non locali con potenziale di tipo Hardy* (4500 €)
Institution: INdAM-GNAMPA.

As participant

- 2024 | Project: *Nuove frontiere nella capillarità non locale*
Institution: INdAM-GNAMPA. Principal investigator: Alessandra de Luca.
- 2022–2025 | Project: ERC VAREG — *Variational approach to the regularity of the free boundaries*
Institution: European Research Council. Principal investigator: Bozhidar Velichkov.
- 2023 | Project: *Regolarità e singolarità in problemi con frontiere libere*
Institution: INdAM-GNAMPA. Principal investigator: Giorgio Tortone.
- 2019 | Project: *Valeurs propres d'un opérateur Aharonov–Bohm avec pôle variable*
Institution: PICS. Principal investigator: Benedetta Noris.
- 2018 | Project: *Formula di monotonia e applicazioni: problemi frazionari e stabilità spettrale rispetto a perturbazioni del dominio*
Institution: INdAM-GNAMPA. Principal investigator: Alberto Ferrero.

Research Visits

- 15/07/2025–18/06/2025 | Institution: University of Würzburg, Würzburg, Germany
Host: Leon Bungert
- 13/05/2025–28/05/2025 | Institution: Università di Pisa, Pisa, Italy
Host: Bozhidar Velichkov
- 25/09/2024–3/10/2024 | Institution: Università degli studi di Milano-Bicocca, Milan, Italy
Host: Veronica Felli
- 29/05/2023–1/06/2023 | Institution: Università degli studi di Torino, Torino, Italy
Host: Stefano Vita
- 20/03/2023–24/03/2023 | Institution: Università degli studi di Ferrara, Ferrara, Italy
Host: Lorenzo Brasco
- 5/02/2023–12/02/2023 | Institution: Università degli studi di Milano-Bicocca, Milan, Italy
Host: Veronica Felli
- 2/02/2020–4/03/2020 | Institution: Purdue University, West Lafayette, IN, US
Host: Donatella Danielli

14/11/2019	Institution: Université de Picardie Jules Verne, Amiens, France
12/12/2019	Host: Benedetta Noris
7/06/2019	Institution: Université de Picardie Jules Verne, Amiens, France
23/06/2019	Host: Benedetta Noris
18/11/2018	Institution: Université de Picardie Jules Verne, Amiens, France
18/12/2018	Host: Benedetta Noris

Teaching Activities

Undergraduate and Master's Courses

2025/2026	Teaching assistant for the course <i>Analisi 1</i> , Undergraduate studies in Mathematics, Università di Milano-Bicocca
2025/2026	Teaching assistant for the course <i>Matematica 1</i> , Undergraduate studies in Environmental Science, Università di Milano-Bicocca
2024/2025	Lecturer for the course <i>Istituzioni e didattica della matematica</i> , Undergraduate studies in Primary Teacher Education, Università di Milano-Bicocca
2021/2022	Remedial course (<i>precorso</i>) in Mathematics for architecture students, Università degli studi di Genova.
2020/2021	Remedial course (<i>precorso</i>) in Mathematics for science students, Università degli studi di Milano-Bicocca.
2019/2020	Teaching assistant (<i>esercitazioni</i>) for the course <i>Matematica 2</i> , Undergraduate studies in Material Science, Università degli studi di Milano-Bicocca.
2018/2019	Teaching assistant (<i>esercitazioni</i>) for the course <i>Matematica 2</i> , Undergraduate studies in Material Science, Università degli studi di Milano-Bicocca.
2017/2018	Teaching assistant (<i>esercitazioni</i>) for the course <i>Matematica 2</i> , Undergraduate studies in Material Science, Università degli studi di Milano-Bicocca.
2016/2017	Teacher of the course <i>Analisi Matematica 1</i> , Fondazione Collegio San Carlo, Modena.
2016/2017	Teaching assistant (<i>esercitazioni</i>) for the course <i>Analisi Matematica 1</i> , Undergraduate studies in Computer Science, Università degli studi di Modena e Reggio Emilia.
2015/2016	Teaching assistant (<i>esercitazioni</i>) for the course <i>Analisi Matematica 1</i> , Undergraduate studies in Computer Science, Università degli studi di Modena e Reggio Emilia.

Ph.D. Courses

2025	Teacher for the Ph.D. course <i>Harmonic maps and applications</i> , held at Università di Pisa during spring 2025.
2023	Teacher for the Ph.D. course <i>Monotonicity formulas in free boundary and geometric variational problems</i> , held at Università di Pisa during spring 2023.

Referee Activities

Referee for the journals *Journal of Differential Equations*, *Mathematica Bohemica*, *Mathematics in Engineering*, *Communications in Partial Differential Equations*, *Mathematical Methods in the Applied Sciences*, *Nonlinear Analysis*, *Calculus of Variations and Partial Differential Equations*, *Nonlinear Analysis: Real World Applications*, *Discrete and Continuous Dynamical Systems – Series S*.

Organization of Seminars, Conferences, Workshops

- 2026 | Member of the organizing committee of the winter school *GeoVar* (Incontro INdAM), to be held in Rome from 2/2/2026 to 6/2/2026.
- 2025 | Member of the organizing committee of the conference *Young Researchers Meeting on PDEs II*, held at Università di Milano-Bicocca (Milan, Italy) from 9/9/2025 to 12/9/2025. Website
- 2025 | Member of the organizing committee of the conference *Regularity Theory for Free Boundary and Geometric Variational Problems V*, held in Rimini, Italy, from 3/6/2025 to 7/6/2025. Website
- 2025 | Member of the organizing committee of the workshop *Calculus of Variations and Free Boundary Problems X*, held in Pisa on 9-10/1/2025. Website
- 2024 | Member of the organizing committee of the workshop *Calculus of Variations and Free Boundary Problems VIII*, held in Pisa on 11-12/04/2024. Website
- 2024 | Member of the organizing committee of the conference *Young Researchers Meeting on PDEs*, held at Università di Milano-Bicocca (Milan, Italy) from 25/9/2024 to 27/9/2024. Website
- 2023 | Member of the organizing committee of the workshop *Calculus of Variations and Free Boundary Problems V*, held in Pisa on 28/03/2023. Website
- 2018–2020 | Member of the organizing committee of the series of seminars *Insalate di Matematica* (based at Università degli studi di Milano-Bicocca), which are held by and addressed to PhD students or young researchers.
- 2019–2020 | Member of the organizing committee of the series of thematic mini-workshops *PDEs Sessions in Bicocca*. We held 2 events (the third one was cancelled due to Covid-19), Website

Memberships

- 2019 – now | Member of UMI (Italian Mathematical Union).
- 2018 – now | Member of GNAMPA (INdAM group).

Other

- 2016/2017 | Tutor at Fondazione Collegio San Carlo (Modena, Italy) for approximately 1 year.