



Paolo Acampora

Postdoc at Università degli Studi di Napoli Federico II

Born in Naples, 11/04/1998

*Interests – Shape optimization, free boundary problems,
calculus of variations, real analysis, isoperimetric inequalities*

Education

- 2021 – 2025 **Ph.D. in Mathematics**, *Università degli studi di Napoli Federico II*, Napoli, SUPERVISOR: Prof. Cristina Trombetti.
Scientific research activities, teaching assistance, and attended Ph.D. courses in mathematical analysis.
- 2019 – 2021 **Master's degree in Mathematics**, *Università degli Studi di Napoli Federico II*, Napoli, Full mark with honors, SUPERVISOR: Cristina Trombetti.
Thesis title – Isoperimetric inequalities for eigenvalues of the Robin-Laplacian
- 2016 – 2019 **Bachelor's degree in Mathematics**, *Università degli Studi di Napoli Federico II*, Napoli, Full mark with honors, SUPERVISOR: Cristina Trombetti.
Thesis title – Sobolev spaces and applications

Experience

Positions

- 2025 – **Postdoc**, *Università degli studi di Napoli Federico II*, Napoli.
Present Scientific research activities, teaching assistance

Research activities

- Jan 2024 – **Abroad research period**, *IMJ-PRG Sorbonne Université*, Paris, SUPERVISOR: Prof. Jimmy Lamboley.
Apr 2024 Research about sharp quantitative Talenti inequality in some special cases

Teaching activities

- 2023 – 2024 **Tutoring "Istituzioni di Analisi Superiore"**, *Università degli Studi di Napoli Federico II*, Napoli.
Tutoring activity (60 hours) for students of Master's degree in Mathematics. Theory and exercises about measure theory and complex analysis.

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- 2022 – 2023 **Teaching assistance Calculus 1**, *Università degli Studi di Napoli Federico II*, Napoli.
Supplementary teaching (20 hours) for the course Calculus 1, for the Bachelor' degree in Mathematics, held by Prof. Cristina Trombetti. Theory and exercises.
- 2022 – 2023 **Tutoring Calculus 2**, *Università degli Studi di Napoli Federico II*, Napoli.
Tutoring activity (60 hours) for Calculus 2 students of Bachelor's degree in Mathematics. Theory and exercises.
- 2021 **Teaching assistance Calculus 2**, *Università degli Studi di Napoli Federico II*, Napoli.
Supplementary teaching (10 hours) for the course Calculus 2, for the Bachelor's degree in Physics, held by Prof. Francesco Chiacchio. Theory and exercises.
- 2020 – 2021 **Tutoring Calculus 1**, *Università degli Studi di Napoli Federico II*, Napoli.
Tutoring activity (50 hours) for Calculus 1 students of Bachelor's degree in Mathematics. Theory and exercises.

Organizing activities

- 2024 – **Junior seminars in Mathematical Analysis**, *Università degli Studi di Napoli*
Present *Federico II*, Napoli.
Series of seminars for PhD Students and post-doc speakers in mathematical analysis.

Research interests

My current research activity is focused on three main topics:

- Sharp quantitative estimates for symmetrization inequalities;
- Thermal insulation and approximation by Γ -convergence;
- Existence and regularity of solutions to free boundary problems governed by elliptic PDEs, with Dirichlet or Robin boundary condition.

Other fields of interests are the analysis of linear and nonlinear PDEs, spectral geometry and shape optimization problems.

Scientific communications

Talks as invited speaker

- 2 Dec 2024 **Geometric Analysis and PDEs in Sorrento II**, Sorrento, Recent developments in quantitative rearrangement inequalities.
- 23 Jul 2024 **2nd International AMS-UMI Joint Meeting**, *Università degli Studi di Palermo*, Palermo, On the approximation of optimal thin layers in thermal insulation.
- 22 Apr 2024 **GT CalVa**, *Université Paris-Cité*, Paris, On the existence and approximation of optimal insulation layers.
- 16 Mar 2023 **Invited**, *Friedrich-Alexander-Universität Erlangen-Nürnberg*, Erlangen, Shape optimization problems in thermal insulation with thin insulating layers.
- 13 Jan 2023 **Invited**, *Università degli Studi di Napoli Federico II*, Napoli, On the optimal shape of a thin insulating layer.
- 20 Dec 2022 **PhD Day**, *Università degli Studi di Napoli Federico II*, Napoli, Free boundary problems: examples and tools.

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Talks

- 18-23 Sep 2023 **Shape Optimization, Isoperimetric and Functional Inequalities**, *BellaVista Relax Hotel*, Levico Terme, Thin insulating layers: results and techniques.
- 13-17 Jun 2022 **Advances in Calculus of Variations**, *Università degli Studi di Napoli Parthenope*, Napoli, A free boundary problem for the p -Laplacian with nonlinear boundary conditions.

Poster Sessions

- 22-24 May 2023 **International Conference on Elliptic and Parabolic Problems**, *Accademia Pontaniana*, Napoli, Neumann and Steklov principal eigenvalues in collapsing domains.
- 04-08 Jul 2022 **Summer School in Analysis and PDEs**, *Università degli Studi della Campania Luigi Vanvitelli*, Caserta, A free boundary problem in thermal insulation with a prescribed heat source.

Attended conferences, schools, and workshops

- 2-4 Sep 2024 **3 Days on Evolution PDEs**, *Hotel Serenella*, Agropoli.
- 13-14 Jun 2024 **II Meeting UMI for Doctoral Students**, *Università degli studi di Napoli Federico II*, Napoli.
- 26-29 May 2024 **Shape Optimization, geometric inequalities and related topics**, *Università del Salento*, Lecce.
- 15-18 Jan 2024 **OIST Workshop "Geometric Aspects of Partial Differential Equations"**, *OIST*, Okinawa.
- 27-29 Nov 2023 **Three days on Shape Optimization and PDEs**, *Centro Congressi Federico II / Accademia Pontaniana*, Napoli.
- 14-15 Sep 2023 **PDEs e Loro Applicazioni**, *Università del Salento*, Lecce.
- 09-12 May 2023 **XXXII Convegno Nazionale di Calcolo delle Variazioni**, *BellaVista Relax Hotel*, Levico Terme.
- 30-31 Jan 2023 **Shape Optimization, Geometric Inequalities, and Related Topics**, *Università degli Studi di Napoli Federico II*, Napoli.
- 09-13 May 2022 **XXXI Convegno Nazionale di Calcolo delle Variazioni**, *BellaVista Relax Hotel*, Levico Terme.

Research projects

- 2024 – Present **Modelli PDE-ODE nonlineari e proprieta' di PDE su domini standard e non-standard**, *Istituto Nazionale di Alta Matematica (INDAM)*, Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni (GNAMPA), real analysis, measure theory and probability.
- 2023 – 2024 **Symmetry and asymmetry in PDEs**, *Istituto Nazionale di Alta Matematica (INDAM)*, Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni (GNAMPA), real analysis, measure theory and probability.

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2022 – 2023 **Optimal estimates for some shape functional**, *Istituto Nazionale di Alta Matematica (INDAM)*, Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni (GNAMPA), real analysis, measure theory and probability.

Publications

Peer reviewed papers

- 2025 **Commun. Contemp. Math. (to appear)**, *P. Acampora, V. Amato, E. Cristoforoni*, Estimates on the Neumann and Steklov principal eigenvalues of collapsing domains.
- 2024 **SIAM J. Math. Anal.** **56**, *P. Acampora, E. Cristoforoni, C. Nitsch, C. Trombetti*, On the Optimal Shape of a Thin Insulating Layer.
- 2023 **Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl.** **34**, *P. Acampora, E. Cristoforoni*, An isoperimetric result for an energy related to the p -capacity.
- 2023 **Ann. Mat. Pura Appl.** **203**, *P. Acampora, E. Cristoforoni*, A free boundary problem for the p -Laplacian with nonlinear boundary conditions.
- 2023 **ESAIM Control Optim. Calc. Var.** **29**, *P. Acampora, E. Cristoforoni, C. Nitsch, C. Trombetti*, A free boundary problem in thermal insulation with a prescribed heat source.

Preprints

- 2024 **arXiv:2407.05987**, *P. Acampora, A. Celentano, E. Cristoforoni, C. Nitsch, C. Trombetti*, A spectral isoperimetric inequality on the n -sphere for the Robin-Laplacian with negative boundary parameter.
- 2024 **arXiv:2404.12054**, *P. Acampora, E. Cristoforoni*, On the asymptotic behavior of a diffraction problem with a thin layer.