Marco Picerni

PhD Candidate in Mathematics

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Research Interests

Elliptic PDEs, Calculus of Variations, Metric geometry, Lorentzian geometry, Magnetocardiography.

Education

2024–Present **PhD in Mathematics**, *International School for Advanced Studies*, Trieste
Supervisor: Nicola Gigli. Research on synthetic Lorentzian geometry and Lorentzian p-harmonic functions.

2022–2024 **MSc in Applied Mathematics**, *University of Rome La Sapienza*, Rome
Supervisor: Luigi Orsina. Thesis: Regularizing effect for solutions of elliptic and parabolic-elliptic nonlinear systems.

2019–2022 **BSc in Mathematics**, *University of Rome La Sapienza*, Rome
Supervisor: Lucio Boccardo. Thesis: Suriettività di operatori in spazi L^p.

Research Experience

July 2025 **Visiting Researcher**, *TU Wien*, Wien, Austria
Invited one-week research visit to collaborate with Prof. Elisa Davoli's group on extensions of the Maz'ya Shaposhnikova formula.

Publications

Mathematics

[1] L. Boccardo, M.A. Palladino, **M. Picerni**. *Mosco-Convergence of convex sets and unilateral problems for differential operators with lower order terms having natural growth. Journal of Convex Analysis*, in press. ArXiv preprint available.

[2] **M. Picerni**. *Analysis for non-local phase transitions close to the critical exponent $s = \frac{1}{2}$. Ricerche di Matematica*, 2025.

[3] L. Boccardo, **M. Picerni**. *Stability results for variational inequalities in Sobolev spaces under Mosco convergence of convex sets. Rendiconti di Matematica e delle sue Applicazioni*, in press (2026).

[0] **M. Picerni**. *Existence and summability of solutions to nonlinear X-elliptic equations with measurable coefficients. Annali di Matematica Pura e Applicata*, in press (2026).

Cardiovascular Modelling and Bioelectromagnetism

[1] D. Brisinda, **M. Picerni**, P. Fenici, R. Fenici. *Non-invasive mapping of ventricular action potential reconstructed from contactless magnetocardiographic recordings in intact and conscious guinea pigs. Journal of Cardiovascular Development and Disease*, 2025.

[2] D. Brisinda, **M. Picerni**, P. Fenici, R. Fenici. *Non-invasive mapping of ventricular action potential waveforms reconstructed from clinical unshielded magnetocardiography: Potential diagnostic application and current limitations. American Heart Journal Plus: Cardiology Research and Practice*, 2025.

[3] D. Brisinda, **M. Picerni**, P. Fenici, R. Fenici. *An advanced vision of magnetocardiography as an unrivalled method for a more comprehensive non-invasive clinical electrophysiological assessment. American Heart Journal Plus: Cardiology Research and Practice*, 2025.

[4] D. Brisinda, **M. Picerni**, P. Fenici, R. Fenici. *Automatic calculation of the parasympathetic, sympathetic and Baevsky stress indexes provides a more comprehensive assessment of cardiac autonomic modulation. European Heart Journal*, 2024.

[5] D. Brisinda, **M. Picerni**, P. Fenici, R. Fenici. *Synthetic assessment of cardiac autonomic modulation and Baevsky stress index in patients with synucleinopathies. European Heart Journal*, 2024.

[6] D. Brisinda, **M. Picerni**, P. Fenici, R. Fenici. *Rapid assessment of cardiac autonomic modulation and adaptive stress responses: Automatic calculation of time-varying parasympathetic, sympathetic, and Baevsky stress indexes. Brain & Heart*, 2024.

[7] D. Brisinda, **M. Picerni**, R. Fenici. *Quantitative assessment of autonomic nervous system responses induced by graded training workloads in healthy elderly, through indices obtained from heart rate variability analysis. European Heart Journal*, 2021.

Preprints and Manuscripts in Preparation

[1] E. Davoli, A. Fanizza, **M. Picerni**. *Maz'ya Shaposhnikova formula for functions with nonzero mass at infinity.* In preparation.

[2] L. Orsina, **M. Picerni**. *Characterization of capacity-diffuse measures and applications to X-elliptic operators.* In preparation.

[3] A. Braides, R. Oleinik, **M. Picerni**. *Analysis for high order nonlocal phase transitions in high dimension.* In preparation.

[4] **M. Picerni**. *Existence, uniqueness, regularity and stability of solutions to linear X-elliptic equations with measurable coefficients.* Under review - ArXiv preprint available.

[5] **M. Picerni**. *Existence and regularity of solutions to parabolic-elliptic nonlinear systems.* Under review.

Talks & Conferences

2025 *"Sobolev Inequality is all you need"* Young Analysts in Rome (1st edition), University of Rome La Sapienza.

2025 *"Analysis for nonlocal phase transitions close to the critical exponent"* Invited departmental seminar, Institute of Discrete Mathematics and Geometry, TU Wien.

2024 *"An introduction to Borel functional calculus and von Neumann algebras"*, North Atlantic Noncommutative Geometry seminar, SISSA.

2024 *"Regularizing effect of parabolic-elliptic nonlinear systems"*, Conference in honor of Luigi Orsina's 60th birthday, University of Rome La Sapienza.

Teaching

2023–2024 **Teaching Assistant**, *Mathematical Analysis I*, Department of Architecture, Sapienza University of Rome
Led exercise sessions and tutorials for the Design and GPE programmes.

Honors and Awards

2022–2024 **Excellence Track**, *Sapienza University of Rome*, Selected among top students in Applied Mathematics throughout MSc programme.

2019–2022 **Excellence Track**, *Sapienza University of Rome*, Selected among top students in Mathematics throughout BSc programme.

2019–2024 **Merit Scholarship**, *Sapienza University of Rome*, Awarded yearly for academic performance (5 consecutive years).