Eloy Mosig García, Ph.D. Student in Mathematics

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Personal website

Ph.D. Student in Mathematics at Università di Pisa. My main research interests are statistical learning theory and topological data analysis.

Employment and education history

2026 – present ◇ **Research Fellow (Incarico di Ricerca), Università di Pisa** in the project **OTODDLE** – Optimal Transport and Large Deviations for Deep Learning Theory, FIS 3 Consolidator Grant funded by the Italian Ministry of University and Research (MUR), PI Prof. Dario Trevisan. Research on quantitative limit theorems and optimal transport methods for deep learning theory.

2023 – present ◇ **Ph.D., Università di Pisa** Mathematics.
On Sep 2026 I was invited by Professor E. Di Bernardino to do a research visit at **Laboratoire J. A. Dieudonné, Université Côte d'Azur**. During Apr 2025 – Jun 2025 and Sep 2025 – Dec 2025 I was invited by **IMSV, Universität Bern** to do a research visit with Professor A. Agazzi. During Jan 2026 – Aug 2026 I did an internship at **Qi4M, Rome**. I expect to discuss my thesis in summer 2027.

2021 – 2023 ◇ **Master's Degree, Università di Bologna** Mathematics.
Thesis title: *Some new results on the matching distance in biparameter persistent homology*.

2019 – 2021 ◇ **Bachelor's Degree, Universidad Complutense de Madrid** Mathematics.
Thesis title: *Results in persistent homology and application to the neo-riemannian Tonnetz*.

Research Publications

1. A. Agazzi, G. Bruno, E. Mosig García, S. Saviozzi, and M. Romito, *Stochastic scaling limits and synchronization by noise in deep transformer models*, 2026. arXiv: 2604.26898 [math.PR]. URL: https://arxiv.org/abs/2604.26898
2. A. Agazzi, E. Mosig García, and D. Trevisan, *Quantitative gaussian-process limits of tensor programs*, 2026. arXiv: 2607.06290 [cs.LG]. URL: https://arxiv.org/abs/2607.06290
3. F. Conti et al., *The convex matching distance in multiparameter persistence*, 2026. arXiv: 2512.02944 [math.AT]. URL: https://arxiv.org/abs/2512.02944
4. P. Frosini, E. Mosig García, N. Quercioli, and F. Tombari, "Matching distance via the extended pareto grid," *SIAM Journal on Applied Algebra and Geometry*, vol. 9, no. 3, pp. 554–576, 2025. DOI: 10.1137/24M1680398 eprint: https://doi.org/10.1137/24M1680398.
5. E. Mosig García, A. Agazzi, and D. Trevisan, "Quantitative convergence of trained neural networks to gaussian processes," in *Advances in Neural Information Processing Systems*, D. Belgrave et al., Eds., vol. 38, Main Conference, Curran Associates, Inc., 2025, pp. 164 679–164 726. DOI: 10.52202/085713-5492

Talks

Jun 2026 ◇ **5th Italian meeting on Probability and Mathematical statistics, Palermo** Quantitative Master Theorems for Tensor Programs via the Wasserstein distance

Mar 2026 ◇ **Topology seminar, CUNEF (Madrid)** The Pareto grid in multiparametric persistence

Talks (continued)

Feb 2026 ◇ **TDA days, Universidad de Sevilla** The convex matching distance in multiparametric persistence

Jan 2026 ◇ **Mathematics for AI and ML, UMI Workshop, Università di Roma Sapienza** Quantitative convergence of trained single layer deep neural networks to Gaussian processes.

Oct 2025 ◇ **CVG Seminar, Bern** Quantitative convergence of trained single layer deep neural networks to Gaussian processes.

Sep 2025 ◇ **Is AI Intelligence? A Dialogue Between Neuroscience and Physics, Università di Roma Sapienza** Neural Manifold Learning through AI.

Jan 2025 ◇ **IMSV Retreat, Münchenwiler** Quantitative convergence of trained deep neural networks to Gaussian processes.

◇ **Gazteak RSME 2025, Universidad de Bilbao** The extended Pareto grid in multiparameter persistent homology.

Jul 2024 ◇ **9th European Congress of Mathematics, Sevilla** Computation of the 2-parameter matching distance via the extended Pareto grid.

Nov 2023 ◇ **ICMAT, Madrid** A Morse Theory approach to the computation of the matching distance.

Poster sessions

Dec 2025 ◇ **NeurIPS 2025, San Diego** Quantitative convergence of trained single layer deep neural networks to Gaussian processes.

Aug 2024 ◇ **SPIRES, University of Oxford** Matching distance via the extended Pareto grid.

Feb 2024 ◇ **Universitat de Barcelona** Extended Pareto grid in multiparameter persistent homology.

Nov 2023 ◇ **AATRN, 9th Mexican Workshop on Applied Geometry and Topology** Computing biparameter matching distance via the extended Pareto grid.

Organization of academic events

Jun 2026 ◇ **PiBe de oro workshop, Pisa** Pisa/Bern meeting on Probability and Statistics.

Attendance to academic events

Sep 2025 ◇ **Centro di Ricerca Ennio di Giorgi, Pisa** Workshop in combinatorial algebraic topology and applications III.

May 2025 ◇ **Centre de recherches Mathématiques, Montréal** Mathematical foundations of data science.

◇ **Isaac Newton Institute, Cambridge** Uncertainty in multivariate, non-Euclidean, and functional spaces: theory and practice.

Jan 2025 ◇ **Bari, Italy** UMI Workshop: Mathematics for AI and machine learning.

Dic 2024 ◇ **Centro di Ricerca Ennio di Giorgi, Pisa** Optimal transportation and applications.

Nov 2024 ◇ **Centro di Ricerca Ennio di Giorgi, Pisa** Workshop in combinatorial algebraic topology and applications II.

Sep 2024 ◇ **Cetraro, Italy** CIME summerschool: High-dimensional approximation: from theoretical foundations to machine learning and PDEs.

◇ **Cortona, Italy** Mathematics of machine learning in Cortona.

Jun 2024 ◇ **Rome** 4th Italian meeting on probability and mathematical statistics.

Jan 2024 ◇ **Università Bocconi, Milan** UMI Workshop: Mathematics for AI and machine learning.

Attendance to academic events (continued)

Nov 2023 ◇ **Centro di Ricerca Ennio di Giorgi, Pisa** Workshop in combinatorial algebraic topology and applications I.

Sep 2023 ◇ **Universitatea din Bucuresti** Moduli and Friends conference.

Theses supervised

I supervised together with Prof. A. Agazzi the master thesis of Karl-Joan Alesma at University of Bern.

Skills

Languages	◇ English (C1), Italian (C1), French (A2), Spanish (native).
Programming languages	◇ Python, C++, Java, HTML.
Mathematical software	◇ SageMath, MatLab.
Document preparation	◇ LaTeX, Microsoft Office Package, Libre Office Package.

Employment History

Jan 2026 – Aug 2026 ◇ **Qi4M, Rome, Internship** Fine-tuning of visual language models for table recognition.

Feb 2024 - Jun 2024 ◇ **Università di Pisa, Teaching Assistant** Teaching Assistant for the course of "Mathematical Statistics" for Mathematics Bachelor students.

Nov 2023 - Dic 2023 ◇ **Online** Support lessons to Mathematics Bachelor students.

Nov 2022 - Apr 2023 ◇ **Università di Bologna, Internship** Programming of a Python-based visualisation tool to be used in research on persistent homology.

Jun 2018 - Sep 2018 ◇ **UNED, Madrid, Internship** Programming and design of a telegram bot managed by UNED Abierta to be used in the prevention of gender-based violence.

Personal interests

◇ I am a piano player, and during my university years, I participated in some music groups playing diverse genres, from jazz and funk to classical music. I am also a passionate reader and during my bachelor years organised weekly informal literature encounters and debates in Madrid.

Awards and Achievements

2020 ◇ Publication of two short stories, under La Gota de Leche.

2015 ◇ **II Philosophy Olympiad of Spain, First Award**, Dissertation published under Ediciones La Torre.