INÉS GARCÍA-REDONDO

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ACADEMIC POSITIONS

Senior researcher (100%)   *November 2025 - October 2027*
Postdoctoral researcher at the AIDOS Lab, University of Fribourg

EDUCATION

Imperial College London   *2021 - 2025*
Fully funded PhD programme in Mathematics
Thesis: Topological Invariants for Data: Duality, Stability, and Applications to Machine Learning and Statistical Inference

Complutense University of Madrid   *2020 - 2021*
MSc in Advanced Mathematics   Average: 9.65/10

Complutense University of Madrid   *2015 - 2020*
Degree in Physics. Speciality of Theoretical Physics.   Average: 8.79/10

Complutense University of Madrid   *2015 - 2020*
Degree in Mathematics. Speciality of Pure Mathematics.   Average: 8.65/10

PUBLICATIONS[1]

- **García-Redondo, I.**, Monod, A., and Wang Q. *Confidence Bands for Multiparameter Persistence Landscapes.* International Conference on Geometric Science of Information (2025), pp. 22-31. Cham: Springer Nature Switzerland. `https://doi.org/10.1007/978-3-032-03921-7_3`. [Code]
- **García-Redondo, I.**, Landi, C., Percival, S., Skeja, A., Wang, B., and Zhou, L. *Finding the Cores of Higher Graphs Using Geometric and Topological Means: A Survey.* Accepted to Research in Computational Topology 3, Association for Women in Mathematics (AWM)-Springer series. ArXiv version (54 pages).
- Tan, C.*, **García-Redondo, I.***, Wang, Q.*, Bronstein, M., and Monod, A. *On the Limitations of Fractal Dimension as a Measure of Generalization.* The Thirty-eighth Annual Conference on Neural Information Processing Systems (2024). `https://openreview.net/forum?id=YO6GVPUrKN`.
- Wang, Q.*, **García-Redondo, I.***, Faugère, P., Henselman-Petrusek, G. and Monod, A. (2024), *Stability for Inference with Persistent Homology Rank Functions.* Computer Graphics Forum, 43: e15142. `https://doi.org/10.1111/cgf.15142`.
- **García-Redondo, I.**, Monod, A. and Song, A. *Fast topological signal identification and persistent cohomological cycle matching.* J Appl. and Comput. Topology (2024). `https://doi.org/10.1007/s41468-024-00179-4`. [Code]

PREPRINTS

- **García-Redondo, I.**, Landi, C., Percival, S., Skeja, A., Wang, B., Zhou, L. *Effective Resistance in Simplicial Complexes as Bilinear Forms: Generalizations and Properties.* ArXiv version (39 pages). Submitted.
- Fay, A.*, **García-Redondo, I.***, Wang, Q.*, Dubossarsky, H., and Monod, A. *The Shape of Adversarial Influence: Characterizing LLM Latent Spaces with Persistent Homology.* ArXiv version (54 pages). Submitted.

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[1]For author lists in alphabetical order, all authors contributed equally, otherwise authors marked with * have an equal contribution.

AWARDS

- **Best Student Paper Award** at The 7th international conference on Geometric Science of Information (2025).
- **Runner-up in the PhD Symposium Poster Competition** of the Department of Mathematics, Imperial College London. Poster title: *On the Limitations of Fractal Dimension as a Measure of Generalization.* (2024)
- **Excellence Scholarship** of the Community of Madrid 2019-2020 and 2016-2017 award given to undergraduate students based on their academic performance.
- Second prize at the local stage (Region of Murcia) of the **LI Spanish Mathematical Olympics** (2015)
- Second prize at the **XX Chemistry Olympics** of the Region of Murcia (2015)
- Third prize at the local stage (Region of Murcia) of the **XXV National Physics Olympics** (2015)
- Award of the Complutense University of Madrid for the **100 best access marks** (2015-2016)

RESEARCH TALKS

- **EWM-EMS Summer School: Stability in topological data analysis** *July 2025*
  Invited talk: *"Stability for Inference with Persistent Homology Rank Functions"*
- **Erlangen AI Hub: Mathematical Foundations of Intelligence Conference** *June 2025*
  Invited talk: *"On the Limitations of Fractal Dimension as a Measure of Generalization"*
- **RSME's 7th Congress of Young Researchers** *January 2025*
  Invited talk: *"On the Limitations of Fractal Dimension as a Measure of Generalization"*
- **Applied Topology Seminar (University of Oxford)** *November 2024*
  Invited talk: *"On the Limitations of Fractal Dimension as a Measure of Generalization"*
- **ELBE Symposium (Center for Systems Biology Dresden)** *November 2024*
  Invited talk: *"Topological Approaches for Data Analysis and Machine Learning"*
- **VI Encuentro Conjunto de la Real Sociedad Matemática Española y la Sociedad Matemática Mexicana (Universidad Politécnica de Valencia)** *July 2024*
  Invited talk: *"On the Limitations of Fractal Dimension as a Measure of Generalization"*
- **Women in Geometry and Number Theory Retreat** *April 2024*
  Contributed talk: *"Computable Stability for Persistence Rank Function Machine Learning"*
- **Topological Data Analysis Seminar (Universidad Autónoma de Madrid)** *March 2024*
  Invited talk: *"Cycle Matching and Rank functions stability: two stories about Persistent Homology"*
- **KCL/UCL Junior Geometry Seminar** *December 2023*
  Invited talk: *"What is Persistent Homology?"*
- **Applied Algebraic Topology Research Network Seminar** *November 2023*
  Invited talk: *"Computable Stability for Persistence Rank Function Machine Learning"* (video)
- **Global Doctoral Academy - JADS Annual Symposium** *November 2023*
  Invited talk: *"Geometric and Topological Methods in Data Analysis and Machine Learning"*
- **Algebraic Topology in Albany (ATiA) seminar** *October 2023*
  Invited talk: *"Computable Stability for Persistence Rank Function Machine Learning"*
- **Spatial Analysis for Biological Imaging Workshop: SABI 2023** *March 2023*
  Invited talk: *"Fast Cohomological Cycle Matching"*
- **London TDA Seminar** *November 2022*
  Contributed talk: *"Fast Cohomological cycle matching"*
- **KCL/UCL Junior Geometry Seminar** *November 2022*
  Invited talk: *"An Introduction to Topological Data Analysis"*
- **Imperial Junior Geometry Seminar** *November 2022*
  Invited talk: *"Du Val Singularities"*
- **Women in Geometry and Number Theory Retreat** *June 2022*
  Contributed talk: *"Identifying topological signals and matching cycles in image persistent homology"*

- **Workshop of Young Researchers in Mathematics** *September 2021*
  Invited talk: *"Monodromy of isolated singularities in complex hypersurfaces"*

TEACHING

- **LSGNT Computing Course** (Imperial College, Lecturer and Senior TA) *Winter 2024, 2023*
- **MSc Project Co-supervision** (Imperial College, 4 projects) *Summer 2024*
- **MATH40004 - Calculus and Applications** (Imperial College, TA) *Spring 2024, 2025*
- **MATH40012 - Linear Algebra and Groups** (Imperial College, Senior TA) *Winter 2023*
- **MATH40001/40009 - Introduction to University Mathematics** *Winter 2023, 2022*
  (Imperial College, Senior TA and TA)
- **MATH40002 - Analysis 1** (Imperial College, Senior TA) *Spring 2023*
- **MATH50003 - Linear Algebra** (Imperial College, TA) *Winter 2022*
- **Basic Mathematics** (Complutense University, Undergraduate TA) *September - October 2018*

PROFESSIONAL EXPERIENCE

- **Research assistant under a collaboration grant** *November 2020 - July 2021*
  - *Complutense University of Madrid*
  - Grant awarded by the Complutense University to carry out a research project supervised by María Pe Pereira concerning the monodromy of isolated singularities.
- **Debating and public speaking trainer** *2020 - 2021*
  - *Colegio Mayor Juan XXIII Roncalli*
  - Activity based on giving courses in public speaking to the residents of the College, and preparing them to participate in debating tournaments.

SERVICE

- **Co-organiser of a parallel session** (RSME's 7th Congress of Young Researchers) *2024*
- **Reviewer for the Association for Women in Mathematics Springer Series** *2024*
- **Co-organiser of the Imperial Junior Geometry Seminar** *2023-2024*
- **Co-organiser of the Lunch Seminars** *2023-2023*
- **Social Representative LSGNT** *2021 - Present*

EXTRA-CURRICULAR

- **Committee member of the Imperial College Choir** *Present*
  Year 2024-2025: Publicity Officer.
  Year 2023-2024: Tour manager. Organised a tour for 100 people to the North of Spain.
- **Student representative on the Faculty Board** (UCM) *2016 - 2018*
- **University Debating**
  Speaker at the World Universities' Debating Championship in Spanish (2018 and 2019); winner and best speaker across various tournaments in Spain.

LANGUAGES AND TECHNICAL SKILLS

Languages	English (CAE: 196/210, 2018), French (5 years of study), Spanish (native)
Programming languages	Matlab, Python, Julia.