

## Claudia Landi

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CONTACT INFORMATION	Department of Sciences and Methods of Engineering University of Modena and Reggio Emilia Via Amendola, 2 - Pad. Buccola, 42122 Reggio Emilia (Italy) claudia.landi@unimore.it personale.unimore.it/rubrica/dettaglio/clandi
RESEARCH INTERESTS	Computational Topology, Combinatorial Topology, Pattern Analysis.
EMPLOYMENT	<b>University of Modena and Reggio Emilia</b> , Italy <ul style="list-style-type: none"><li>- Full Professor of Geometry Mar 2024 – today</li><li>- Associate Professor of Geometry Nov 2015 – Feb 2024</li><li>- Assistant Professor of Geometry (permanent position) Jan 2005 – Oct 2015</li><li>- Research Fellow (limited term position) Nov 2000 – Oct 2002</li></ul>
EDUCATION	<b>University of Pisa</b> , Italy 1995 – 1999 Ph.D. in Mathematics received March 2000 <ul style="list-style-type: none"><li>- Dissertation Title: The cohomology ring of Artin groups</li><li>- Advisor: Prof. Mario Salvetti</li></ul> <b>University of Bologna</b> , Italy 1989 – 1994 M.Sc. in Mathematics received with honors March 1994 <ul style="list-style-type: none"><li>- Dissertation Title: Size functions and morphological transformations</li><li>- Advisor: Prof. Massimo Ferri</li></ul>
PUBLICATIONS	<b>Journal papers (last five years)</b> <ol style="list-style-type: none"><li>J1. C. Bannwart and C. Landi, <i>Tagged barcodes for the topological analysis of gradient-like vector fields</i> arXiv:2401.08466 (to appear in the SIAM Journal on Applied Dynamical Systems)</li><li>J2. M. A. Batan, C. Landi, M. Pamuk, <i>A Closed Formula for the Interleaving Distance of Rectangle Persistence Modules</i> arXiv:2411.01430 (to appear in the Mediterranean Journal of Mathematics)</li><li>J3. A. Guidolin, C. Landi, <i>Morse inequalities for the Koszul complex of multi-persistence</i>, Journal of Pure and Applied Algebra, Volume 227, Issue 7, p. 107319 (2023) <a href="https://doi.org/10.1016/j.jpaa.2023.107319">https://doi.org/10.1016/j.jpaa.2023.107319</a></li><li>J4. W. Chachólski, B. Giunti, A. Jin, C. Landi, <i>Decomposing filtered chain complexes: Geometry behind barcoding algorithms</i>, Computational Geometry, vol. 109, p. 101938 (2023) <a href="https://dx.doi.org/10.1016/j.comgeo.2022.101938">https://dx.doi.org/10.1016/j.comgeo.2022.101938</a></li><li>J5. A. Bapat, R. Brooks, C. Hacker, C. Landi, B. I. Mahler, <i>Morse-based Fibering of the Persistence Rank Invariant</i>. In: Gasparovic, E., Robins, V., Turner, K. (eds) Research in Computational Topology 2. Association for Women in Mathematics Series, vol 30. Springer, Cham. (2022) <a href="https://doi.org/10.1007/978-3-030-95519-9_2">https://doi.org/10.1007/978-3-030-95519-9_2</a></li><li>J6. C. Landi, S. Scaramuccia: <i>Relative-perfectness of discrete gradient vector fields and multi-parameter persistent homology</i>, Journal of Combinatorial Optimization (2021) <a href="https://doi.org/10.1007/s10878-021-00729-x">https://doi.org/10.1007/s10878-021-00729-x</a></li><li>J7. W. Chachólski, B. Giunti, C. Landi, <i>Invariants for tame parametrised chain complexes</i>, Homology, Homotopy and Applications, vol. 23:2, p. 183–213 (2021)</li></ol>

- J8. U. Bauer, C. Landi, F. Mémoli: *The Reeb Graph Edit Distance is Universal*, Foundations of Computational Mathematics, vol. 21, p. 1441–1464 (2020)
- J9. U. Fugacci, C. Landi, H. Varli: *Critical Sets of PL and Discrete Morse Theory: a Correspondence*, Computers & Graphics, vol. 90 (2020), pp. 43–50.
- J10. S. Scaramuccia, F. Iuricich, L. De Floriani, C. Landi: *Computing multiparameter persistent homology through a discrete Morse-based approach*, Computational Geometry: Theory and Applications, vol. 89 (2020), 101623.

AWARDS AND  
HONORS

- Chair of Scientific Committee of: Algebraic Topology: Methods, Computation, and Science - ATMCS 10, University of Oxford, 20-24 June 2022
- Chair of Scientific Committee of ATMCS (Algebraic Topology: Methods, Computation, and Science) at The Ohio State University 2020
- Best Paper Award at Shape Modeling International 2019 per l'articolo: R. Corbet, U. Fugacci, M. Kerber, C. Landi, B. Wang, A kernel for multiparameter persistent homology, Computers & Graphics: X, Vol. 2, 2019, 100005 2019
- Project Leader in the Second Collaborative Workshop for Women in Computational Topology, ANU, Canberra 2019
- Italian scientific habilitation to full professorship 2018

RESEARCH  
FUNDING

University of Modena and Reggio Emilia Research Funds:

- Project title: Stability of persistent chain complexes in Topological Data Analysis; 12 months, 1 participant, Eur 3.000. Role: Principal Investigator 2024
- Project title: Tools for the Topological Data Analysis of multivariate data; 12 months, 1 participant, Eur 3.000. Role: Principal Investigator 2023
- Project title: Persistent chain complexes for topological data analysis; 12 months, 4 participants, Eur 24.000. Role: Principal Investigator 2019
- Project title: *Multiscale modellazione in science, industry, society*; 24 months, 9 participants, Eur 9.284. Role: Principal Investigator 2017
- Project title: *Stable comparison of PL Reeb graphs*; 18 months, 4 participants, Eur 28.000. Role: Principal Investigator 2014

RECENT INVITED  
TALKS

- Tame functors from posets to chain complexes. In: CATA II, Centro E. De Giorgi, SNS, Pisa, 2-4 settembre 2024
- Tame functors from posets to chain complexes. In: SPIRES, Center for TDA, Oxford University, 7-9 agosto 2024
- Tagged barcodes for the topological analysis of gradient-like vector fields. In: 9th European Congress of Mathematics, "Applied and Combinatorial Topology" minisymposium, Seville, 15-19 luglio 2024
- Barcodes for the topological analysis of gradient-like vector fields, Dagstuhl Seminar 24092, Applied and Combinatorial Topology ( Feb 25 – Mar 01, 2024 )
- Barcodes for the topological analysis of gradient-like vector fields, AATRN (02/14/24)
- Morse-Smale quadrangulations and persistence of vector fields. In: ICIAM 2023, Minisymposium on Combinatorial topological dynamics, **Waseda University**, Tokyo, 20–25 agosto 2023
- Towards a Theory of Persistence for Gradient-Like Morse-Smale Vector Fields. In: Topological Data Analysis and Applications, Dagstuhl Seminar 23192, **Leibniz-Zentrum für Informatik**, 7–12 maggio 2023
- Computing the matching distance of 2-parameter persistence modules from critical values. In: Conference on Applied, Combinatorial and Toric Topology, 18-22 July 2022 (online event), **National University of Singapore**

- Computing the matching distance of multi-parameter persistence from Morse critical values. In: GETCO 2022 – 11th International Conference on Geometric and Topological Methods in Computer Science, May 30th – June 3rd 2022, Paris
- *Multi-parameter persistence from the viewpoint of discrete Morse theory*. In: Bridging applied and quantitative topology, May 9-13, 2022 (online)
- *Morse-based Fibering of the Persistence Rank Invariant*. In: Computational Persistence Workshop,
- *Morse-based Fibering of the Persistence Rank Invariant*. In: Computational Persistence Workshop, 1–5 Novembre 2021, **Purdue University** [J31].
- *Discrete Morse theory meets multi-parameter persistence*. In: Workshop on Algebraic and Applied Topology III, **Galatasaray U.** (Turkey), 9 Sept. 2021 [M2, J31]
- *Discrete Morse theory meets multi-parameter persistence*. In: Beyond TDA–Persistent functions and its applications in data sciences, August 28–30, 2021
- *Parametrised chain complexes*. In: Metrics in Multi-Parameter Persistence, **Lorentz Center**, The Netherlands, 27-31 July 2021
- *Invariants for tame parametrised chain complexes*. In: Applied Combinatorial and Geometric Topology, 8ECM, June 23–24, 2021
- *Invariants for tame parametrised chain complexes*. In: AMS Special Session on Applied Topology, Joint Mathematics Meetings, January 6-9, 2021

#### SERVICE

- Organizer of workshop *Computational Topology: Foundations, Algorithms, and Applications*, Special session of the 2nd edition of the "AMS-UMI International Joint Meeting", con H. Adams (Florida U.) and Nicolò Zava (IST Austria), Università di Palermo, July 23-24, 2024
- Organizer of workshop *Women in Computational Topology 3*, con E. Wolf Chambers (St. Louis University), H. Harrington (University of Oxford), K. Hess (EPFL), Bernoulli Center, Lausanne (Switzerland), 17–21 luglio 2023
- Organizer of workshop *Geometric Topology, Art, and Science*, con M.R. Casali, P. Cristofori, G. Rinaldi (UniMORE), M. Mulazzani (U. Bologna) 8–10 giugno 2023, Modena e Reggio Emilia
- Organizer of workshop; *10th Annual Minisymposium on Computational Topology*, con D. Giorgi, U. Fugacci, S. scaramuccia, in Computational Geometry Week 2022, 7–10 June 2022, Berlin, Germany
- Organizer of workshop: *Geometric Interpretation and Visualization of Multi-Parameter Persistent Homology*, con R. Brooks (Boston College), C. Hacker (Ecole polytechnique federale de Lausanne), B. I. Mahler (KTH), Research in Teams program, Banff International Research Station for Mathematical Innovation and Discovery (BIRS), 5–19 June 2022
- Guest Editor of the *Special section on computational topology in image context*. In: Computer Vision and Image Understanding, vol. 121 (2014) .
- Guest Editor of the volume *Computational Topology in Image Context*, Lecture Notes in Computer Science, Vol. 7309
- Organizer of the session *Geometric Aspects of Applied Topology*, UMI-SIMAI-PTM Joint Meeting 2018, 17-20 settembre 2018, Wroclaw, Polonia.
- Organizer of session *Topological Image Analysis: Methods, Algorithms, Applications*, SIAM Conference on Imaging Science, 5-8 giugno 2018, Bologna.
- Organizer of workshop *The 4th International Workshop on Computational Topology in Image Context - CTIC 2012*
- Organizer of the *Applied and Computational Algebraic Topology (ACAT) School*, 2012.

#### TEACHING (LAST FIVE YEARS)

A.A.	nome corso	ore	Corso di Laurea di UniMORE
2024-2025	Geometria e Algebra Lineare	41	CdL in Ingegneria Meccatronica
	Geometria e Algebra Lineare	81	CdL in Ingegneria Gestionale
	Matematica	24	CdLM in Scienze e tecnologie agrarie e degli alimenti
	Elementi di topologia applicata all'analisi dei dati	5	Centro multidisciplinare per la formazione degli insegnanti Classe A047
2023-2024	Geometria e Algebra Lineare	81	CdL in Ingegneria Meccatronica
	Geometria e Algebra Lineare	40	CdL in Ingegneria Gestionale
	Computational Topology	42	CdLM in Matematica
2022-2023	Geometria e Algebra Lineare	81	CdL in Ingegneria Meccatronica
	Geometria e Algebra Lineare	40	CdL in Ingegneria Gestionale
2021-2022	Geometria e Algebra Lineare	81	CdL in Ingegneria Meccatronica
2020-2021	Geometria e Algebra Lineare	40	CdL in Ingegneria Gestionale
	Geometria e Algebra Lineare	81	CdL in Ingegneria Meccatronica
	Geometria e Algebra Lineare	40	CdL in Ingegneria Gestionale

### B.Sc. and M.Sc. thesis supervision

- 2025: Supervisor of the MSc thesis in Mathematics of Mr. Giuseppe Pino (Univ. Catania)
- 2022: Supervisor of the BSc thesis in Management Engineering of Mr. Niccolò Dovesi
- 2022: Supervisor of the MSc thesis in Management Engineering of Mr. Rocco Negro.
- 2019: Supervisor of the BSc thesis in Management Engineering of Mr. Luca Paganelli su “Analisi topologica dei dati mediante omologia persistente”
- 2019: Supervisor of the BSc. thesis in Management Engineering of Mr. Matteo Pigni su “Metodi per l’analisi topologica dei dati: l’algoritmo Mapper”

### Ph.D. thesis supervision

- 2021- 2025: Supervisor of the PhD thesis in Mathematics of dr. Clemens Bannwart
- 2019 – 2024: coadvisor, with Prof. Mehmetcik Pamuk, of Mehmet Ali Batan, Ph.D. in Mathematics at Middle East Technical University).
- 2017–2019: coadvisor, with Prof. Wojciech Chachólski (KTH) of Barbara Giunti, Ph.D. in Mathematics at Università di Pavia on “Tame Parametrized Chain Complexes”.
- 2015–2018: coadvisor, with Prof. Leila De Floriani (U. Maryland) of Sara Scaramuccia, Ph.D. in Computer Science at Università di Genova) on “Computational and Theoretical Aspects of Multidimensional Persistent Homology in Data Analysis”.
- 2005–2008: coadvisor, with Prof. Massimo Ferri (U. di Bologna), of Barbara Di Fabio, Ph.D. in Mathematics at Università di Bologna on “Shape from functions: enhancing geometrical-topological descriptors”.

Last update: May 2025