

Martina Iannacito | Curriculum Vitae

Ph.D. in applied mathematics and scientific computing of the University of Bordeaux

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Research activities

Alma Mater Studiorum - University of Bologna

Italy

Postdoctoral researcher at the Mathematical Department

April 2024 - now

Member of V. Simoncini's research group

Keywords: matrix equations, tensor-based algorithms, iterative solver

Katholieke Universiteit Leuven

Belgium

Postdoctoral researcher at the Science, Engineering and Technology faculty May 2023 - March 2024

Member of L. De Lathauwer's research group

Keywords: canonical polyadic decomposition, blind source separation, algebraic algorithms

Inria center at the university of Bordeaux

France

Ph.D. student

October 2019 - December 2022

Member of the Concase and HiePACS team

Keywords: numerical linear algebra, tensor computation, low-rank compression, data science

University of Trento

Italy

Master's student

January 2019 - July 2019

Member of the Mathematical Department

Keywords: tensor computation, remote sensing, biodiversity estimate

Education

Inria center at the university of Bordeaux

France

Ph.D. in applied mathematics and scientific computing

October 2019 - December 2022

Thesis supervised by O. Coulaud and L. Giraud

Defence date December the 9th, 2022

University of Trento

Italy

Master's degree in mathematics for life and data science

December 2017 - July 2019

Thesis supervised by A. Bernardi and D. Rocchini

Defence date July the 17th, 2019, Summa Cum Laude

University of Parma

Italy

Bachelor degree in mathematics

October 2014 - December 2017

Thesis supervised by A. Bandini

Defence date December the 14th 2017, Summa Cum Laude

Scientific High School G. Aselli

Italy

Maturity diploma

September 2009 - July 2014

Defence date July the 4th, 2014, Summa Cum Laude

Teaching activities

Alma Mater Studiorum - University of Bologna

Adjunct lecturer, 15 hours

Bachelor degree in mathematics

Computational Mathematics: Matrix methods for Data Science

Italy

February 2025 - May 2025

Alma Mater Studiorum - University of Bologna

Tutor, 20 hours

Bachelor degree in architecture

Principles of Mathematics II

Italy

December 2025 - June 2025

KU Leuven - Bruges

Adjunct lecturer, 6 hours

Master's Degree of AI in business and industry

Applied AI: Academic Perspectives, AI & Tensors

Belgium

January 2024 - March 2024

ENSEIRB-MatMeca

Adjunct lecturer, 47 hours

Engineering degree in computer science

Numerical algorithms

France

March 2021 - May 2022

University of Trento

Tutor, 50 hours

Master's degree in data science

Statistical Learning: Statistical Models

Italy

January 2019 - June 2019

Evaluation activities

Final Education Project

External jury member

ENSEIRB Bordeaux

September 2022

Master's students supervision

Kobe Sauwens

Master's degree in mathematical engineering

Thesis supervised by L. De Lathauwer and V. Rijmen

"Exploration of Polyadic Tensor Decomposition as a tool for public key cryptography"

KU Leuven

September 2023 - March 2024

Andreas Devogel

Master's degree in mathematical engineering

Thesis supervised by L. De Lathauwer

"Algebraic algorithms for tensor-based signal separation "

KU Leuven

September 2023 - March 2024

Bachelor students supervision

Margherita Todesco

Bachelor degree in mathematics

Thesis supervised by V. Simoncini

"HOSVD: analysis and implementation"

University of Bologna

December 2024 - now

Internship students supervision

Léo Bertheas

Electrical and Electronics Engineering degree

2nd year stage supervised by O. Coulaud, L. Giraud, and J. R. Poirier

“Solving the heat equation in Tensor Train format”

ENSEEIH Toulouse

June 2021 - August 2021

Publications

Thesis

- [1] Iannacito, M. (Dec. 2022). “Numerical linear algebra and data analysis in large dimensions using tensor format”. PhD thesis. Inria center at the University of Bordeaux, France. URL: theses.fr/s349733.
- [2] – (July 2019). “HOSVD FOR MULTISPECTRAL IMAGES. A numerical approach to the plant biodiversity estimate.” thesis. University of Trento, Italy. URL: webapps.unitn.it/Biblioteca/it/Web/RichiestaConsultazioneTesi/365719.

International journals

- [1] Coulaud, O., L. Giraud, and M. Iannacito (Jan. 2025). “A note on TT-GMRES for the solution of parametric linear systems”. In: *Electronic Transactions on Numerical Analysis* 62, pp. 163–187. doi: 10.1553/etna_vol62s163.
- [2] Thouverai, E., M. Marcantonio, G. Bacaro, D. D. Re, M. Iannacito, E. Marchetto, C. Ricotta, C. Tattoni, S. Vicario, and D. Rocchini (Apr. 2021). “Measuring diversity from space: a global view of the free and open source rasterdiv R package under a coding perspective”. In: *Community Ecology* 22.1, pp. 1–11. doi: 10.1007/s42974-021-00042-x.
- [3] Rocchini, D., M. Marcantonio, D. Da Re, G. Bacaro, E. Feoli, G. M. Foody, R. Furrer, R. J. Harrigan, D. Kleijn, M. Iannacito, J. Lenoir, M. Lin, M. Malavasi, E. Marchetto, R. S. Meyer, V. Moudry, F. D. Schneider, P. Šímová, A. H. Thornhill, E. Thouverai, S. Vicario, R. K. Wayne, and C. Ricotta (Mar. 2021). “From zero to infinity: Minimum to maximum diversity of the planet by spatio-parametric Rao’s quadratic entropy”. In: *Global Ecology and Biogeography* 30.5, pp. 1153–1162. doi: 10.1111/geb.13270.
- [4] Rocchini, D., E. Thouverai, M. Marcantonio, M. Iannacito, D. Da Re, M. Torresani, G. Bacaro, M. Bazzichetto, A. Bernardi, G. M. Foody, R. Furrer, D. Kleijn, S. Larsen, J. Lenoir, M. Malavasi, E. Marchetto, F. Messori, A. Monkeywordhi, V. Moudrý, B. Naimi, C. Ricotta, M. Rossini, F. Santi, M. J. Santos, M. E. Schaepman, F. D. Schneider, L. Schuh, S. Silvestri, P. Šímová, A. K. Skidmore, C. Tattoni, E. Tordoni, S. Vicario, P. Zannini, and M. Wegmann (Feb. 2021). “rasterdiv—An Information Theory tailored R package for measuring ecosystem heterogeneity from space: To the origin and back”. In: *Methods in Ecology and Evolution* 12.6, pp. 1093–1102. doi: 10.1111/2041-210X.13583.

National journals

- [1] Bernardi, A., M. Iannacito, and D. Rocchini (Dec. 2021). “High order singular value decomposition for plant diversity estimation”. In: *Bollettino dell’Unione Matematica Italiana* 14.4, pp. 557–591. doi: 10.1007/s40574-021-00300-w.

Under review

- [1] Palitta, D., M. Iannacito, and V. Simoncini (Jan. 2025). *A subspace-conjugate gradient method for linear matrix equations*. Tech. rep. URL: <https://arxiv.org/abs/2501.02938>.
- [2] Coulaud, O., L. Giraud, and M. Iannacito (Nov. 2022). *On some orthogonalization schemes in Tensor Train format*. Research Report RR-9491. Inria center at the University of Bordeaux. URL: hal.archives-ouvertes.fr/hal-03850387.
- [3] Agullo, E., O. Coulaud, L. Giraud, M. Iannacito, G. Marait, and N. Schenkels (Sept. 2022). *The backward stable variants of GMRES in variable accuracy*. Research Report RR-9483. Inria center at the University of Bordeaux, pp. 1–77. URL: <https://hal.science/hal-03776837>.

Preprints

- [1] Coulaud, O., A. Franc, and M. Iannacito (Nov. 2021). *Extension of Correspondence Analysis to multiway data-sets through High Order SVD: a geometric framework*. Research Report RR-9429. Inria center at the University of Bordeaux; INRAE. URL: <https://hal.science/hal-03418404>.

Invited talks at national conferences

- [1] Iannacito, M., O. Coulaud, and L. Giraud (June 2023). “Orthogonalization schemes in Tensor Train format”. In: *Approximate computing in numerical linear algebra*. Ed. by N. Higham, X. Liu, and B. Vieublé. University of Strathclyde Glasgow. Glasgow, United Kingdom: 29th Biennial Conference on Numerical Analysis.

Invited talks at international conferences

- [1] Iannacito, M., O. Coulaud, and L. Giraud (May 2024). “Orthogonalization schemes in tensor train format”. In: *Approximate Computing Techniques for Orthogonalization Processes*. Ed. by B. Vieublé and O. Balabanov. Paris, France: SIAM Conference on Applied Linear Algebra.
- [2] – (July 2023). “On Some Orthogonalization Schemes in Tensor Train Format”. In: *Geometry in Optimization and Numerical (Multi)Linear Algebra*. Ed. by U. Konstantin and Y. Qi. Eindhoven / Hybrid, Netherlands: SIAM Conference on Applied Algebraic Geometry.
- [3] Iannacito, M., O. Coulaud, and A. Franc (Sept. 2022). “Extension of Correspondence Analysis to multiway data-sets through HOSVD: a geometric framework”. In: *Tensor Decompositions for Data Science*. Ed. by R. Minster and N. Vannieuwenhoven. San Diego / Hybrid, United States: SIAM Conference on Mathematics of Data Science.

Invited talks at workshops

- [1] Iannacito, M., L. De Lathauwer, and I. Domanov (Sept. 2023). “An algebraic algorithm for blind source separation and tensor decomposition”. In: *Matrix Equations and Tensor Techniques X*. Ed. by P. Benner, H. Faßbender, L. Grasedyck, D. Kressner, B. Meini, and V. Simoncini. Aachen, Germany.
- [2] – (Aug. 2023). “An algebraic algorithm for blind source separation and tensor decomposition”. In: *New Directions in Applied Linear Algebra*. Ed. by J. Cockayne, J. Pearson, J. Pestana, D. Silvester, and V. Simoncini. Banff, Canada: Banff International Research Station.

- [3] Iannacito, M., E. Agullo, O. Coulaud, L. Giraud, G. Marait, and N. Schenkels (Sept. 2022). “GMRES in variable accuracy: a case study in low rank tensor linear systems”. In: *GAMM - Workshop on Applied and Numerical Linear Algebra 2022*. Ed. by E. Carson, I. Hnětynková, S. Pozza, P. Tichý, and M. Tůma. Prague, Czech Republic.

Invited talks at seminars

- [1] Iannacito, M. (Dec. 2024). “Tensor Train: description and applications”. In: *Course of Matrix and Tensor methods for Data Science*. Bologna, Italy: Department of Mathematics, Alma Mater Studiorum.
- [2] – (Apr. 2024). “Potential and applications of tensor-based algorithms”. In: *Scube*. Bologna, Italy: Department of Mathematics, Alma Mater Studiorum.
- [3] – (Dec. 2023). “Tensor-based algorithms: applications and challenges”. In: *Algorithmes Parallèles et Optimisation team*. Toulouse, France: ENSEEIHT.
- [4] – (Nov. 2023). “Introduzione ai tensori: dalle applicazioni alle sfide contemporanee”. In: *Pisan Young Seminars in Applied and Numerical Mathematics*. Pisa, Italy: Mathematical department of Pisa University.
- [5] – (Nov. 2023). “Discovering tensors: their challenges and applications”. In: *TensorDay 2023*. Trento, Italy: Mathematical department of Trento University.
- [6] Iannacito, M., L. De Lathauwer, and I. Domanov (Oct. 2023). “From blind source separation to tensor decomposition: an algebraic algorithm”. In: *NUMA seminars*. Leuven, Belgium: Computer science department of KU Leuven.
- [7] Iannacito, M., O. Coulaud, and L. Giraud (Feb. 2022). “Solving linear systems in high dimension with TT-GMRES”. In: *Working group on tensors*. Bordeaux, France: Inria center at the University of Bordeaux.
- [8] Iannacito, M., O. Coulaud, and A. Fran (May 2020). “Malabar dataset: data analysis in tensor format”. In: *Working group on tensors*. Bordeaux, France: Inria center at the University of Bordeaux.

Training activities

High Performance Numerical Simulation

Plenary courses and hands-on sessions

Simulation of an harmonic wave propagation,
from modelling to implementation in an HPC framework

Inria Bordeaux

2019

Software

Rasterdiv

Methods to calculate indices of diversity on numerical matrices based on information theory

2020

IT skills

Languages

python, MATLAB, R, C++

OS	Linux, Windows
Collaborative tools	GitHub, GitLab

Languages

English	Read, written, spoken	<i>Cambridge ESOL FCE (B2) in 2013</i>
French	Read, written, spoken	<i>Diplôme d'études en langue française (B1) in 2012</i>
Italian	Read, written, spoken	<i>Native</i>