Ilaria Trombini

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Personal Details

Born in 1997 in Portomaggiore (Italy). Italian citizen.
Languages: English (fluent), Italian (mother tongue)

Current position

Post-Doc position (October 2024–present), University of Ferrara, Italy.

Education and degrees completed

	Part-time Professor (1 CFU) University of Ferrara of Analisi Numerica I for the Bachelor's Degree in Mathematics	01 November 2025
PhD	**University of Parma**, Mathematical, Physical and Computer Sciences	21 March 2025
MS	**University of Ferrara**, Mathematics and Computer Science	23 July 2021
BS	**University of Ferrara**, Mathematics and Computer Science	26 July 2019

Research interests

Stochastic gradient-like methods for machine and deep learning applications: investigation about adaptive steplength selection rules, line-search procedures, reductions variance techniques by dynamic adaptive mini-batch size.

Previous work experience

University of Ferrara, Mathematics and Computer Science. Seminar on tensor calculus (8 hours) — September 2024

University of Ferrara, Mathematics and Computer Science. Seminar on tensor calculus (8 hours) — September 2023

University of Ferrara, Mathematics and Computer Science. Seminar on tensor calculus (8 hours) — October 2022

Meeo s.r.l, Internship — Apr 2021 – May 2021

- Study of the development of the locust and predictions of its movement

University of Ferrara, Mathematics and Computer Science. Tutoring of Calcolo numerico e laboratorio (27 hours) — Sep 2021 – Jan 2024

University of Ferrara, Civil engineering. Tutoring of Introduzione a Matlab (25 hours) — Sep 2022 – Nov 2023

University of Ferrara, Mathematics and Computer Science. Tutoring Progetto Lauree Scientifiche (76 hours) — Nov 2021 – Mar 2022

University of Ferrara, Mathematics and Computer Science. Tutoring of Analisi Numerica I (24 hours) — Oct 2019 - Jan 2025

Personal research funding and grants

5x1000 - Dipartimento di Matematica ed Informatica, Unife, "Algoritmi stocastici di ottimizzazione applicati all'ambito dei problemi inversi". Amount: 1990 euros. — 2025

INdAM - GNCS Projects 2025, "Metodi avanzati di ottimizzazione stocastica per la risoluzione — 2025

di problemi inversi di imaging". (PI: T. A. Bubba) (Participation)

Advanced MATHematical methods for Artificial Intelligence – MATH4AI, funded by the programma "Future Artificiale Intelligence, FAIR" PE0000013, CUP DJ33C22002830006 – Mission 4 Component 2, Investment 1.3 (MUR Directorial Decree no. 341 of 03/15/2022) (Participation) 2024

INdAM - GNCS Projects 2024, "Deep Variational Learning: a combined approach for image reconstruction". (PI: A. Benfenati) (Participation) 2024

INdAM - GNCS Projects 2023, "Data-driven optimization methods: new theoretical and practical perspectives". (PI: G. Franchini) (Participation) 2023

INdAM - GNCS Projects 2022, "Adaptive optimization for machine learning". (PI: S. Rebegoldi) (Participation) 2022

List of publications

Journal article

1. I. Trombini. On the hyperparameters setting for first order stochastic optimization methods in machine learning. PhD Thesis. (2025).
2. N. Krklec Jerinkić, F. Porta, V. Ruggiero, and I. Trombini. Variable metric proximal stochastic gradient methods with additional sampling. In: Comput Optim Appl (2025).
3. N. Krklec Jerinkić, V. Ruggiero, and I. Trombini. Spectral Stochastic Gradient Method with Additional Sampling for Finite and Infinite Sums. In: Comput Optim Appl 91 (2025), pp. 717–758.
4. G. Franchini, F. Porta, V. Ruggiero, I. Trombini, and Zanni L. A stochastic gradient method with variance control and variable learning rate for Deep Learning. In: Journal of Computational and Applied Mathematics 451 (2024), p. 116083.
5. G. Franchini, F. Porta, V. Ruggiero, and I. Trombini. Correction to: A Line Search Based Proximal Stochastic Gradient Algorithm with Dynamical Variance Reduction. In: Journal of Scientific Computing 96.48 (2023).
6. G. Franchini, F. Porta, V. Ruggiero, I. Trombini, and L. Zanni. Learning rate selection in stochastic gradient methods based on line search strategies. In: Applied Mathematics in Science and Engineering 31.1 (2023), p. 2164000.
7. G. Franchini, F. Porta, V. Ruggiero, and I. Trombini. A line search based proximal stochastic gradient algorithm with dynamical variance reduction. In: Journal of Scientific Computing 94.23 (2023).

Conference proceedings

1. G. Franchini, F. Porta, V. Ruggiero, I. Trombini, and L. Zanni. Line Search Stochastic Gradient Algorithm with a-priori rule for monitoring the control of the variance. In: Sergeyev, Y.D., Kvasov, D.E., Astorino, A. (eds) Numerical Computations: Theory and Algorithms. NUMTA 2023. Lecture Notes in Computer Science. Springer, Cham. 14476 (2025).
2. G. Franchini, F. Porta, V. Ruggiero, I. Trombini, and L. Zanni. Diagonal Barzilai-Borwein Rules in Stochastic Gradient-Like Methods. In: Dorronsoro, B., Chicano, F., Danoy, G., Talbi, EG. (eds) Optimization and Learning. OLA 2023. Communications in Computer and Information Science. Vol. 1824. (2023), pp. 21–35.
3. G. Franchini, V. Ruggiero, and I. Trombini. Thresholding Procedure via Barzilai-Borwein Rules for the Steplength Selection in Stochastic Gradient Methods. In: Nicosia, G., et al. Machine Learning, Optimization, and Data Science. LOD 2021. Lecture Notes in Computer Science 13164 (2022).

Experience of organising scientific meetings

Organizer with G. Malaspina of Minisymposium "Optimization in Action: Advances in Stochastic and Deterministic Methods" **Young Applied Mathematicians Conference YAMC2025**, Padova September 2025

Member of the Scientific Committee: **Two-days follow on Advanced Numerical Methods for Machine** & **Deep Learning**, Ferrara February 2025

Referee activity for scientific journals

Reviewer for Mathematical Reviews.

Group member

Member of UMI - Matematica per l'intelligenza artificiale e il machine learning (**AI**&**ML**&**MAT**)	2025-Present
Member of UMI - Matematica delle Immagini, della Visione e delle loro Applicazioni (**MIVA**)	2025-Present
Member of Unione Matematica Italiana (**UMI**)	2025-Present
Member of Optimization Algorithms and Software for Inverse Problems (**OASIS**)	2021-Present
Member of National Group of Scientific Computing (**GNCS**)	2021-Present

Research visits to other Institutions

In years 2021-2025, **1 extended visit** (2 months in Spring 2023 at University of Novi Sad, Serbia).

Co-supervision

Thesis co-supervision of "Il problema inverso della ricostruzione di immagini sfocate", Carra Irene (**first level degree in Mathematics**)	2023-2024
Thesis co-supervision of "Metodi numerici per il calcolo di autovalori e autovettori", Fabbri Anna (**first level degree in Mathematics**)	2022-2023
Thesis co-supervision of "Addestramento automatico mediante regressione logistica e SVM", Bignozzi Dario (**first level degree in Mathematics**)	2021-2022

Conference talks

Conference "**Applied Inverse Problems (AIP 2025)**". FGV EMAp, Rio de Janeiro (invited talk)	Jul 2025
Conference "**International Conference On Continuous Optimization (ICOOPT 2025)**". University of Southern California (invited talk)	Jul 2025
Workshop "**Mathematics for Artificial Intelligence and Machine Learning**". University of Bari	Jan 2025
Conference "**25th International Symposium on Mathematical Programming (ISMP 2024)**". Montrèal (invited talk)	Jul 2024
Workshop "**GIMC SIMAI YOUNG 2024**". University of Napoli (invited talk)	Jul 2024
Workshop "**Algorithms' Impact on Artificial Intelligence (AiAi)**". University of Bari	Jun 2024
Conference "**Conference Young Applied Mathematicians (YAMC)**". University of Siena	Sep 2023
Conference "**Conference numerical computations: theory and algorithms (NUMTA2023)**". University of Calabria (invited talk)	Jun 2023
Workshop "**The mathematics of machine learning**". University of Pisa - Centro de Giorgi (invited talk)	Jan 2023

Poster session

Workshop "**Annual Meeting of EMS activity group on Scientific Machine Learning**". University of Milano	Mar 2025

Workshop "**Optimization Techniques for Inverse Problems (OIP 2024)**". University of Modena — Sep 2024

Public outreach

- Representative at the Mathematics booth during “European Researchers’ Night”.
- Representative at the Mathematics booth during “Unife Orienta”.
- Representative at the Mathematics booth during “Porte Aperte al Polo Scientifico Tecnologico”.
- Teacher for the mathematics internship reserved for 4th year high school classes.
- Student representative in the CdS and CdD of the Department of Mathematics and Computer Science at University of Ferrara.