

## BIOGRAPHY

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My background is in mathematics and statistics, and their application to machine learning. My research focuses on [optimization](#) for deep learning, understanding novel [sequence modelling](#) architectures, and improving [efficiency](#) in modern machine learning. I am particularly interested in benchmarking optimization algorithms for training large language models, enhancing performance and reducing computational costs. I very much enjoy developing machine learning codebases!

## EXPERIENCE

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### Research Engineer - [Max Planck Institute for Intelligent Systems, Ellis Institute Tübingen](#)

 Tübingen, DE

Jan. 2023 - Ongoing

- Research on novel sequence model architectures and optimization algorithms with Jonas Geiping and Antonio Orvieto.
- Developed submissions to AlgoPerf, a benchmark for optimization algorithms, scoring third in the competition leaderboard.
- Joined MLCommons Algorithmic Efficiency team, developed open source contributions to AlgoPerf API.
- Mentored research interns in the CaCTuS program, researching on LLM optimization and LLM watermarking.


### AI Resident - [Meta, FAIR Labs](#)

 Seattle, WA

July 2022 - Aug. 2023

- Research on hypergradient methods for adaptive hyperparameter tuning with Lin Xiao.
- Investigated loss spikes in language model optimization and Slingshot phenomenon.
- Gained experience in ML optimization, distributed training, and familiarity with vision and language models.

### ML Researcher - [U-Care Medical](#)

 Turin, IT

Dec. 2021 - June 2022

- Developed machine learning models to forecast Acute Kidney Injury in critically ill patients.
- Developed algorithms to discriminate persistent kidney injury from transient kidney injury in ICU patients.
- Conducted statistical analyses and designed APIs for data visualization to support product promotion.

## EDUCATION

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### Politecnico di Milano - [Master of Science in Mathematical Engineering & Statistical Learning](#)

March 2019 - Oct. 2021

- Thesis: [Functional Time Series Forecasting](#).
- Advisor: Simone Vantini.
- Teaching assistant for "Algorithms and Parallel Computing", covering C++, OOP, data structures, parallel programming.

### Politecnico di Milano - [Bachelor of Science in Mathematical Engineering](#)

March 2019 - Oct. 2021

- Thesis: [Deep Learning Optimization Algorithms and Saddle Points](#).
- Advisor: Danilo Ardagna.

## PUBLICATIONS

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Islamov, R., [Ajroldi, N.](#), Orvieto, A., & Lucchi, A. (2024). Loss landscape characterization of neural networks without over-parametrization. To appear in Advances in Neural Information Processing Systems 2024 ([NeurIPS 2024](#)). [ArXiv preprint](#).

[Ajroldi, N.](#), Diquigiovanni, J., Fontana, M., & Vantini, S. (2023). Conformal prediction bands for two-dimensional functional time series. Computational Statistics & Data Analysis (CSDA), 187, 107821. [Article URL](#).

Alfieri, F., Ancona, A., Tripepi, G., Rubeis, A., [Ajroldi, N.](#), Finazzi, S., Cauda, V., & Fagugli, R. M. (2023). Continuous and early prediction of future moderate and severe acute kidney injury in critically ill patients. PLOS ONE, 18, 1–22. [Article URL](#).