

BIOGRAPHY

My background is in mathematics and statistics, and their application to machine learning. My research focuses on [optimization](#) for deep learning, especially on [benchmarking](#) optimization algorithms for training large language models, enhancing performance and efficiency. I very much enjoy developing machine learning codebases!

EXPERIENCE

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

📍 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](#).
- Developed open-source contributions to AlgoPerf [API](#), joined MLCommons.
- Mentored research interns in the CaCTuS program, researching LLM optimization and LLM watermarking.
- Released a simple PyTorch [codebase](#) for pretraining modern language models.

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 the 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 and transient kidney injury in ICU patients.
- Conducted statistical analyses and designed data visualization APIs to support product promotion.

EDUCATION

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

Mar. 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

Oct. 2015 - Mar. 2019

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

SELECTED PUBLICATIONS

[Ajroldi, N.](#), Orvieto, A., & Geiping, J. (2025). *When, where and why to average weights?* ArXiv preprint. [URL](#).

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

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