

FRANCESCO CAPORALI

📅 Last updated: May 20, 2026

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📷 francescocaporali

EDUCATION

Ph.D. in Operations Research and Financial Engineering

Princeton (NJ), USA

Princeton University

August 2024 – Ongoing

- *Advisor:* Prof. Boris Hanin.

M.Sc. in Stochastics and Data Science (Mathematics)

Turin, Italy

University of Turin

September 2022 – July 2024

- Final grade: 110/110 cum laude and special mention.
- **Thesis:** Student- t processes as infinite-width limits of posterior Bayesian Neural Networks
Advisor: Prof. Stefano Favaro and Prof. Dario Trevisan

M.Sc. in Statistics and Applied Mathematics

Turin, Italy

Collegio Carlo Alberto

September 2022 – July 2024

- *Allievi Honors Program* full scholarship. Competitive admission to a study program in applied mathematics and statistics. The Allievi are admitted after a nationwide selection.

B.Sc. in Mathematics (computational curriculum)

Pisa, Italy

University of Pisa

September 2018 – May 2022

- Final grade: 110/110 cum laude.
- **Thesis:** Deep Neural Networks: approximation capabilities and Gaussian behaviour
Advisor: Prof. Dario Trevisan

ACADEMIC INTERESTS

My research lies at the intersection of probabilistic ML and optimization dynamics. I am currently interested in analyzing the stability and implicit bias of GD/SGD and designing principled noise, clipping, and step-size schedules for reliable training. Previously, I studied Bayesian neural networks and their infinite-width/posterior limits to characterize uncertainty and robustness.

RESEARCH

Student- t processes as infinite-width limits of posterior Bayesian NNs

F. Caporali, S. Favaro, D. Trevisan

TASC workshop, COLT 2025

- Showed that Bayesian Neural Networks with Gaussian priors on weights and Inverse-Gamma priors on variances converge to Student- t processes in the infinite-width limit.

CONFERENCES AND WORKSHOPS

G-Research, Spring into Quant Finance

Palermo, Italy

G-Research

April 2026

38th Annual Conference on Learning Theory (COLT 2025)

Lyon, France

June 2025

Summer School “Topics in Modern Machine Learning”

Genoa, Italy

University of Genoa

June 2023

Winter School “Stochastic Processes, Analysis and Semigroups”

Trento, Italy

University of Trento/Wuppertal

December 2022

WORKING EXPERIENCE

Applied Scientist Intern

Santa Clara, CA, USA

AWS AI Labs

June – August 2026

PHC System administrator

Pisa, Italy

University of Pisa

December 2018 – May 2022

- Maintained Linux lab network and departmental *web server* serving mathematics students.

PROJECTS

Master's projects

University of Turin and Collegio Carlo Alberto

Turin, Italy

2022 – 2023

- *Machine Learning*: implementation of GANs from scratch for image generation.
- *Algorithms*: design of a text-based game on a graph with RL integration.

TEACHING

Teaching Assistant

Princeton University

Princeton, NJ, USA

September 2025 – Ongoing

- *Probability Theory (ORF526)*, Fall 2025.
- *Probability and Stochastic Systems (MAT380/ORF309/EGR309)*, Spring 2026.

Tutorial teaching

University of Turin

Turin, Italy

March – June 2023

- Tutorial Instructor, *Probability and Statistics* (B.Sc. Mathematics for Finance and Insurance).

SKILLS

Languages

- *Italian*: native.
- *English*: advanced level.

Programming languages

- Python (PyTorch, Pyro, pandas, scikit-learn, ...) | R | Matlab | C\C++ | SQL (basic) | Julia (basic)

Markup languages

- \LaTeX | HTML (basic)

Other computer skills

- Operating systems: Linux (all major distributions), Windows, macOS.
- Microsoft Office.