

Gianluca Covini

PhD Student in Statistics and Computer Science | Optimal Transport and Sinkhorn Geometry

✉ gianluca.covini@phd.unibocconi.it 🌐 gianlucacovini.github.io 🔄 gianlucacovini 📍 Milan / Pavia, Italy

Education

PhD in Statistics and Computer Science

Bocconi University

📅 Sep 2025 – Jan 2030

📍 Milan, Italy

- Advisor: Prof. Hugo Lavenant. Topic: variational problems in Sinkhorn geometry.
- MPhil coursework: measure theory, probability, statistical theory, Bayesian statistics, stochastic processes, stochastic differential equations, optimal transport, optimization, theoretical CS, Julia and deep learning.

MSc in Mathematics

University of Pavia

📅 Sep 2022 – Feb 2025

📍 Pavia, Italy

- Final grade: **110/110 cum laude**; GPA: **29.5/30**.
- Thesis: *Dynamic Parameter Policies for Leading Ones on Enhanced State Spaces*. Supervisors: Prof. Carola Doerr and Prof. Stefano Gualandi.

Alumnus of Merit-Based Program

Almo Collegio Borromeo

📅 Sep 2022 – Jul 2024

📍 Pavia, Italy

- Advanced courses and reading groups in optimal transport, stochastic differential equations, fractals and spectral theory.
- Co-organized courses in machine learning for healthcare management and a seminar series in mathematics.

BSc in Mathematics

University of Pavia

📅 Oct 2019 – Sep 2022

📍 Pavia, Italy

- Final grade: **110/110 cum laude**; GPA: **29.8/30**.
- Thesis: *Ewens Sampling Formula and its Applications to the Study of Population Biodiversity*. Supervisor: Prof. Emanuele Dolera.

Research and Publications

Current projects

- **Sinkhorn Propagation on Graphs**, with Hugo Lavenant. Variational formulation of propagation problems on graphs of probability measures via Sinkhorn geometry and gradient flows.
- **Bayes Rule via Entropic Approximation of the Knothe–Rosenblatt Rearrangement**, with Carlo Ciliberto and Giulia Luise. Entropic transport approximations for Bayes update in filtering.

Publication

- Gianluca Covini, Denis Antipov, Carola Doerr. *Enhancing Parameter Control Policies with State Information*. FOGA 2025. arXiv:2507.08368.

Research Focus

- Optimal transport and entropic OT
- Sinkhorn-type geometries
- Gradient-flow perspectives
- Statistics, optimization and ML

Optimal Transport Sinkhorn

Gradient Flows Stochastic Processes

Machine Learning

Skills

Programming Python, Julia, R, MATLAB
Scientific computing NumPy, Pandas, PyTorch, OpenCV, Matplotlib

Optimization Pyomo, Gurobi, CPLEX
Tools Git, LaTeX, Linux, basic HPC

Other Multiprocessing, Excel, WordPress, basic AWS

Languages

Italian Native

English C1 - TOEFL iBT 106/120

French B1 - DELF B1

Certifications

- TOEFL iBT 106/120 (C1), ETS, Oct 2024.
- GRE General Test, ETS, Oct 2024: Quantitative 168, Verbal 162.
- NVIDIA Deep Learning; IBM Data Science; DELF B1.

Selected Research Experience

Survey-Based Study in Optimization Under Uncertainty

Remote collaboration

Oct 2024 – Dec 2024

Remote

- Informal collaboration on submodular functions for distributionally robust optimization.
- Supervisors: Prof. Angelos Georghiou and Prof. Rosario Paradiso. Outcome: survey report.

Statistics Summer Research Intern

Statistical Laboratory, University of Cambridge

Jul 2024 – Aug 2024

Cambridge, UK

- Simulation study of statistical properties of stochastic optimization problems.
- Supervisors: Prof. Qingyuan Zhao and Tobias Freidling. Outcome: research report.

Research Intern in Operations Research

LIP6 – Sorbonne Universite/CNRS

Mar 2024 – Sep 2024

Paris, France

- Developed optimal parameter policies for genetic algorithms in Python, within a project on dynamic algorithm configuration.
- Supervisor: Prof. Carola Doerr. Outcomes: master's thesis and conference paper.

Machine Learning Researcher

Sphaera

Aug 2023 – Mar 2024

Hybrid

- Developed a tracking algorithm for 5-a-side soccer using Python, NumPy, PyTorch, OpenCV and Matplotlib.
- Supervisors: Dr. Mirko Messori and Dr. Giuseppe Roberto Marseglia. Outcome: research report.

Talks and Teaching

Conference Presentation

ROADEF 2025

Feb 2025

Champs-sur-Marne, France

- Presented MSc thesis research on dynamic parameter policies for randomized local search on LeadingOnes.

Seminar Talk

WIAS Berlin

Jan 2025

Online

- Presented Lambert et al., *Variational Inference via Wasserstein Gradient Flows*, in a public applied stochastics seminar.

Academic Tutor

University of Pavia

Oct 2021 – Sep 2025

Pavia, Italy

- Teaching assistant for Calculus and Probability in Engineering, Artificial Intelligence and Mathematics BSc programs.

Lecturer – Advanced Computational Statistics

Almo Collegio Borromeo

Oct 2023 – Dec 2023

Pavia, Italy

- Designed and taught an R-based course on theory and applications to real-world data.

Scholarships and Awards

- Full PhD Scholarship, Bocconi University, 2025.
- Selected funded participation in advanced schools and workshops, 2024–2025.
- Merit-Based Scholarship, Associazione Alunni Almo Collegio Borromeo, 2024.
- Fully funded research stay, Corpus Christi College, University of Cambridge, 2024.
- Erasmus+ Traineeship Grant for research internship at LIP6, 2024.
- Research residence, Maison de l'Italie, Cite Internationale Universitaire de Paris, 2024.

Selected Schools

Causality and Graphical Models Summer School

Bocconi-StatML

Jul 2025

Como, Italy

Mathematical Foundations of Machine Learning

CIRM

May 2026

Vason, Italy

Summer School in Analysis and Machine Learning

Festum Pi

Jul 2025

Chania, Greece

Theoretical Foundations of Machine Learning

MaLGA Center

Jun 2025

Genoa, Italy

Bocconi-StatML Spring School

University of Oxford

Apr 2025

Windsor, UK

Advanced Stochastic Optimization

NTNU

Dec 2024

Trondheim, Norway

PhD School of Stochastic Programming

University of Copenhagen

Jun 2024

Copenhagen, Denmark

Activities

- Auditor and Data Analyst, JE Italy, 2022–2023.
- IT Consultant and Head of IT, JECO Pavia, 2021–2023.
- Volunteer, Sant'Egidio – Youth for Peace, 2022.
- Activity Manager, Entrepreneurship Club Pavia, 2020–2021.
- Co-founder and Board Member, The Most Maiorum, 2018–2021.

I give consent to process my personal data for recruitment purposes in accordance with Regulation (EU) 2016/679.