Gianluca Covini

PhD Student in Statistics and Computer Science - Bocconi University

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gianlucacovini

Interested in foundations of optimal transport and applications to statistics, machine learning and operations research.

Education

2025 – 2029 **PhD in Statistics and Computer Science (Computer Science track)**, *Bocconi University*, Milan, Italy

- **Coursework**:
  - *Math/Probability:* Measure Theory; Probability Theory I–II (extra); Statistical Mechanics.
  - *OT/Optimization:* Optimal Transport; Optimization.
  - *CS/Implementation:* Theoretical Computer Science; Programming in Julia.
  - *Planned (2026):* Graph Theory; Statistical Theory I–II; Stochastic Processes II; Bayesian Statistics I; Modern Applied ML.

2022 – 2025 **Master's Degree in Mathematics**, *University of Pavia*, Pavia, Italy, *110/110* cum laude*; GPA: 29.5/30*

- **Core areas:**
  - *Analysis & Probability:* Functional Analysis; Advanced Probability.
  - *Geometry & PDEs:* Foundations of Geometry; Finite Elements Method.
- **Electives by topic:**
  - *Stochastics:* Stochastic Processes; Mathematical Finance.
  - *Statistics & data analysis:* Econometrics; Statistical Methods in Physics; Machine Learning.
  - *Modeling:* Dynamical Systems (theory and numerics); Biomathematics.
- *Attended beyond the curriculum:* Advanced Functional Analysis; Evolution Equations; Calculus of Variations.
- **Master's thesis:** *Dynamic Parameter Policies for LeadingOnes on Enhanced State Spaces*, under the supervision of Prof. Carola Doerr (Sorbonne Université/CNRS), Prof. Stefano Gualandi (University of Pavia).

2022 – 2024 **Alumnus of Merit-Based Program**, *Almo Collegio Borromeo*, Pavia, Italy

- **Main courses attended:** Optimal Transport for Optimization; Fuzzy Logic; Introduction to SDEs; Quantitative Methods for Art.
- **Co-organized courses:** Machine Learning for Healthcare Management; Seminar Series in Mathematics.
- **Reading groups:** Hausdorff Measure and Fractals; Laplacian Eigenvalues (supervision: Prof. Dario Mazzoleni).

2019
2022

Bachelor's Degree in Mathematics, *University of Pavia*, Pavia, Italy, *110/110* cum laude*; GPA: 29.8/30*

- **Coursework by area:**
  - *Analysis & PDEs:* Mathematical Analysis I–IV; Equations of Mathematical Physics.
  - *Algebra & Geometry:* Linear Algebra; Algebra I–II; Geometry I–II.
  - *Probability & Statistics:* Probability; Mathematical Statistics.
  - *Numerical analysis & scientific computing:* Numerical Analysis; Numerical Modeling.
  - *Optimization & data science:* Optimization Algorithms and Models for Data Science; Foundations of Data Analysis.
  - *Programming:* Programming I–II.
- **Bachelor's thesis:** *Ewens Sampling Formula and its Applications to the Study of Population Biodiversity*, under the supervision of Prof. Emanuele Dolera.

Research Projects and Positions

06/2024 - Present **Research project in Statistical Optimal Transport**, Remote

- Informal research collaboration on *Bayes Rule via Entropic Approximation of the Knothe–Rosenblatt Rearrangement*.
- **Supervisor:** Prof. Carlo Ciliberto (UCL).
- Research report in preparation.

10/2024 - 12/2024 **Survey-Based Study in Optimization Under Uncertainty**, Remote

- Informal collaboration on *Submodular functions for distributionally robust optimization*.
- **Supervisors:** Prof. Angelos Georghiou (University of Cyprus), Prof. Rosario Paradiso (VU Amsterdam).
- **Outcome:** survey report.

07/2024 - 08/2024 **Statistics Summer Research Intern**, *Statistical Laboratory, University of Cambridge*, Cambridge, UK

- Project on *Simulation Study on the Statistical Properties of Stochastic Optimization Problems*.
- **Supervisors:** Prof. Qingyuan Zhao, Tobias Freidling.
- **Outcome:** research report.

03/2024 - 09/2024 **Researcher in Operations Research**, *LIP6 – Sorbonne Université/CNRS*, Paris, France

- Research on dynamic algorithm configuration, developing optimal parameter policies for genetic algorithms in Python.
- **Supervisor:** Prof. Carola Doerr.
- **Outcome:** Master's Thesis, published article.

08/2023 - 03/2024 **Machine Learning Researcher**, *Sphaera*, Hybrid

- Development of a tracking algorithm for 5-a-side soccer in Python (NumPy, PyTorch, OpenCV, Matplotlib).
- **Supervisors:** Dr. Mirko Messori, Dr. Giuseppe Roberto Marseglia.
- **Outcome:** research report (the algorithm developed remained confidential)

Publications

[1] Gianluca Covini, Denis Antipov, Carola Doerr. *Enhancing Parameter Control Policies with State Information*. Proceedings of the Foundations of Genetic Algorithms (FOGA 2025), Leiden, Netherlands, 2025. arXiv:2507.08368.

Talks and Presentations

Feb 2025 **Conference Presentation**, *ROADEF 2025 – Conference of the French Operations Research Society*, Champs-sur-Marne, France

Presented Master's thesis research on dynamic parameter policies for randomized local search on the LeadingOnes problem. Abstract published in the ROADEF 2025 Book of Abstracts.

Jan 2025 **Seminar of the series "Modern Methods in Applied Stochastics and Nonparametric Statistics"**, *WIAS Berlin*, Online talk

Presented the paper from Lambert et al. *Variational Inference via Wasserstein Gradient Flows* in a public seminar of the research group Stochastic Algorithms and Nonparametric Statistics of WIAS Berlin as part of PhD interview process.

Teaching Experience

10/2021 - 09/2025 **Academic Tutor**, *University of Pavia*, Pavia, Italy

Teaching assistant for Calculus (Engineering Bachelor's program) and Probability (Artificial Intelligence and Mathematics Bachelor's programs).
Supervisors: Prof. Elisabetta Rocca, Prof. Abramo Agosti, Prof. Emanuele Dolera, Prof. Carlo Orrieri.

10/2023 - 12/2023 **Lecturer – Advanced Computational Statistics**, *Almo Collegio Borromeo*, Pavia, Italy

Designed and taught the course *Advanced Computational Statistics*, with theory and applications to real-world data in R.
Supervisor: Prof. Emanuele Dolera.

Summer Schools and Short Courses

Jul 2025 **Summer School in Analysis and Machine Learning**, *Festum Pi*, Chania, Greece

Kinetic theory, stability of optimal transport and diffusion models.

Jun 2025 **Theoretical Foundations of Machine Learning**, *MaLGa Center – University of Genoa*, Genoa, Italy

Statistical learning theory, kernel methods, neural networks, optimization; RKHS, convex analysis, generalization.

Apr 2025 **Bocconi–StatML Spring School**, *Oxford University*, Windsor, UK

Computational optimal transport and statistical learning with missing values (Julie Josse, Gabriel Peyré).

Dec 2024 **PhD Winter School on Advanced Stochastic Optimization**, *NTNU*, Trondheim, Norway

Mixed-integer stochastic programming, decision making under uncertainty, distributionally robust optimization, SDDP.

Jun 2024 **2nd Copenhagen PhD School of Stochastic Programming**, *University of Copenhagen*, Copenhagen, Denmark
Stochastic programming, multi-stage models, bounding techniques, scenario generation, decision-dependent uncertainty.

Sep 2020 **Intensive School in Data Science**, *ISAGS – University of Pavia*, Pavia, Italy
Machine learning and applications in chemistry, genomics and neurosciences.

Scholarships

2025 **Full PhD Scholarship**, Bocconi University.

2024–2025 **Fully or partially funded participation** in selective schools, including:
- StatML – Bocconi Spring School
- Festum Pi
- Applied Mathematics School, KAUST
- PhD School in Stochastic Programming, University of Copenhagen
- School of Brain Cells & Circuits "Camillo Golgi" (Erice)

2024 **Merit-based Scholarship**, Associazione Alunni Almo Collegio Borromeo.

2024 **Research stay**, Corpus Christi College, University of Cambridge (fully funded).

2024 **Erasmus+ Traineeship Grant** for research internship at LIP6, Sorbonne Université/CNRS (Paris).

2024 **Research residence**, Maison de l'Italie, Cité Internationale Universitaire de Paris (5 months).

Certifications

Oct 2024 **TOEFL iBT 106/120 (C1)**, *ETS*.

Oct 2024 **GRE General Test**: Quantitative 168, Verbal 162, *ETS*.

Additional certifications: Getting Started with Deep Learning (NVIDIA, 2023); Introduction to Startups (Pack, 2022); IBM Data Science (Coursera, 2021); Startups 101: Come portare un'idea sul mercato (Entrepreneurship Club Pavia, 2020); DELF B1 (Ministère de l'Éducation Nationale, 2016).

Languages

Italian	Native	
English	C1	*TOEFL iBT 106/120.*
French	B1	*DELF B1.*

Computer Skills

Programming	Python, Matlab, R, Julia	Optimization	Pyomo, Gurobi, CPLEX
Data & ML	NumPy, Pandas, Matplotlib, OpenCV, PyTorch	Tools	Git, AWS, Excel
Other	LaTeX, Linux (basic), WordPress	Workflow	Multiprocessing, basic HPC usage

Research Interests

I am broadly interested in **optimal transport** and its connections with *statistics*, *optimization*, and *machine learning*, including **variational methods** and **gradient-flow perspectives**.

Professional and Organizational Experience

2022 – 2023

Auditor & Data Analyst, *JE Italy*

Monitoring and analysis of confederation data; audit consulting services for junior enterprises.

2021 – 2023

IT Consultant, *JECO Pavia*, Pavia, Italy

Data management and digitalization projects for SMEs.

- *Head of IT* (Sep 2021 – Oct 2022): managed area members and annual strategy planning using OKR.

Extracurricular Activities

2022 – 2022

Volunteer, *Sant'Egidio – Youth for Peace*, Pavia, Italy

Recreational activities for children in difficult situations and activities to counter school dropout.

2020 – 2021

Activity Manager, *Entrepreneurship Club Pavia*, Pavia, Italy

Organization of public events with entrepreneurs and startuppers; management of internal activities.

2018 – 2021

Co-Founder and Board Member, *The Most Maiorum*, Pavia, Italy

Organized cultural and charity events with hundreds of spectators.

References

Available upon request.

I give consent to process my data with the purpose of the recruitment process, in accordance to the Regulation of the European Parliament 679/2016, regarding the protection of natural persons and free movement of such data.