# 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

- **Courses attended (topics):** Theoretical Computer Science (A-), Programming in Julia, Measure Theory (A+), Optimal Transport, Statistical Mechanics, Optimization.
- *Beyond the curriculum:* Probability Theory I, Probability Theory II.
- **Courses to follow:** Graph Theory, Statistical Theory I, Statistical Theory II, Stochastic Processes II, Modern Applied Machine Learning, Bayesian Statistics I.

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

- **Core courses:** Functional Analysis; Advanced Probability; Foundations of Geometry; Finite Elements Method.
- **Electives:**
  - Stochastic Processes; Mathematical Finance;
  - Econometrics; Statistical Methods in Physics;
  - Dynamical Systems: theory and numerics; Biomathematics;
  - Machine Learning
  - *Attended beyond the curriculum:* Advanced Functional Analysis; Evolutions 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

- Selected through a competitive process and awarded accommodation and enrollment in a merit-based academic track;
- **Additional 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:** Haussdorf Measure and Fractals; Laplacian Eigenvalues, under supervision of Prof. Dario Mazzoleni.

2019
2022

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

- **Main courses:**
  - Linear Algebra; Geometry 1 – 2; Algebra 1 – 2;
  - Mathematical Analysis 1 – 4; Equations of Mathematical Physics;
  - Probability; Mathematical Statistics;
  - Numerical Analysis; Numerical Modeling;
  - Programming 1 – 2; Optimization Algorithms and Models for Data Science; Foundations of Data Analysis.
- **Bachelor's thesis:** *Ewens Sampling Formula and its Applications to the Study of Population Biodiversity*, under the supervision of Prof. Emanuele Dolera.

## Research experience and positions

06/2024 - Present **Researcher in Statistical Optimal Transport**, *University College London*, Remote
Informal research collaboration on *Bayes Rule via Entropic Approximation of the Knothe–Rosenblatt Rearrangement*.
Supervisor: Prof. Carlo Ciliberto.
Research report in preparation.

10/2024 - 12/2024 **Researcher in Optimization Under Uncertainty**, *University of Cyprus & Vrije Universiteit Amsterdam*, Remote
Informal research collaboration on *Submodular functions for distributionally robust optimization*.
Supervisors: Prof. Angelos Georghiou, Prof. Rosario Paradiso.
Outcome: research 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.
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.

## 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.

## Honors and awards

2025 **Full 4-years PhD scholarship** from *Bocconi University*.

2025 **Full scholarship** to attend *Festum Pi*.

2025 **Full scholarship** to attend *StatML–Bocconi Spring School*.

2024 **€400 scholarship** and full accomodation from *Almo Collegio Borromeo and Corpus Christi College* to conduct summer research at Statistical Laboratory of University of Cambridge.

2024 **€600 scholarship** from *Almo Collegio Borromeo* to attend the PhD School in Stochastic Programming of Copenhagen University.

2024 **€2000 scholarship** from *Associazione Alunni Almo Collegio Borromeo* for being among the best students within the merit-based program.

2024 **5-months stay** at Maison de l'Italie at *Cité International Universitaire de Paris*.

2024 **€800 scholarship** from *Almo Collegio Borromeo* for master's thesis period in Paris.

2024 **€2250 Erasmus+ Traineeship grant** for research internship at *LIP6 Sorbonne Université/CNRS* (Paris).

2024 **€600 scholarship** from *Almo Collegio Borromeo* to attend the School of Brain Cells & Circuits "Camillo Golgi" in Erice, Italy.

2024 **Full scholarship** from *KAUST* to attend the Applied Mathematics School in Thuwal, Saudi Arabia.

## Certifications

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

Oct 2024 **GRE Quantitative 168, Verbal 162**, *ETS*.

Mar 2023 **Getting Started with Deep Learning**, *NVIDIA*.

Jan 2022 **Introduction to startups**, *Pack*.

Mar 2021 **IBM Data Science**, *Coursera*.

Dec 2020 **Startups 101: Come portare un'idea sul mercato**, *Entrepreneurship Club Pavia*.

Aug 2016 **DELF B1**, *Ministère de l'Éducation Nationale*.

## Languages

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

## Computer skills

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| Programming | Python, Matlab, R, Julia | Optimization | Pyomo, Gurobi, CPLEX |
| Data & ML | NumPy, Pandas, Matplotlib, OpenCV, PyTorch | Tools | Git, AWS, Excel |

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|---|---|---|---|
| Other | LaTeX, Linux (basic), WordPress | Workflow | Multiprocessing, basic HPC usage |

## Research interests

I am interested in the study of mathematical objects in infinite-dimensional settings, in particular **Optimal Transport**, and applications to *statistics*, *machine learning*, and *operations research*. I am also maturing an interest in the history of mathematics, in particular in relation with social and political history.

## Professional and organizational experience

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.

2022 – 2023

**Auditor & Data Analyst**, *JE Italy*

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

## 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.