

Francesco Mascari

he/him | PhD Student

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📄 francesco-mascari

I am currently working as a PhD student in Statistics and Computer Science at Bocconi University in Milan. My main research interests are Bayesian Nonparametrics, Reproducing Kernel Hilbert Spaces, Wasserstein Distance, and Random Measures.

Education

PhD in Statistics and Computer Science <i>Bocconi University, Milan, Italy</i>	2021 – ongoing
MSc in Mathematics for Life and Data Sciences, cum laude <i>University of Trento, Trento, Italy</i>	2018 – 2021
BSc in Mathematics, cum laude <i>University of Bologna, Bologna, Italy</i>	2015 – 2018
High School Diploma in Scientific Studies, cum laude <i>Liceo Scientifico Copernico, Bologna, Italy</i>	2010 – 2015

PhD Research Project

Title: *Measuring Dependence in Partial Exchangeable Setting with Reproducing Kernel Hilbert Spaces*

Advisor: Prof. Hugo Lavenant, Bocconi University

Co-advisor: Prof. Marta Catalano, Luiss University

Abstract: We aim to apply the theory of Reproducing Kernel Hilbert Spaces to measure the level of borrowing of information in a partially exchangeable model with two groups. Moreover, we seek applicability both a priori and a posteriori, while preserving numerical tractability.

MSc Thesis

Title: *A Micro-macro Connection: The Valuable Relation between Large Deviations for Diffusion Processes and Wasserstein Gradient Flows*

Supervisors: Prof. Carlo Orrieri, University of Pavia; Dr. Giovanni Conforti, École Polytechnique

Abstract: This work aims to present the passage from the microscopic stochastic description of a system of particles to its macroscopic description as a Fokker-Planck equation. After a brief introduction to some basics in Convex Analysis and Measure Theory, a complete review of optimal transport and Wasserstein metric, on the one hand, and of large deviations for path measures of diffusion processes, on the other, is displayed. A thorough description of the gradient flow formulation for the Fokker-Planck equation is then analyzed with a particular interest in the JKO functional, which is shown to be equivalent in Γ -convergence to the rate functional arising in the large deviation principle for a system of independent Brownian particles.

Ongoing Research Projects

Measuring Dependence under Partial Exchangeability with Reproducing Kernel Hilbert Spaces
with M. Catalano and H. Lavenant

Exchange and Visiting Programs

Visiting Programme <i>LUISS University, Rome, Italy</i>	Oct 2024 – ongoing
Erasmus+ Traineeship <i>École Polytechnique, Palaiseau, France</i>	Oct 2020 – Feb 2021
Erasmus+ Study <i>Cardiff University, Cardiff, Wales, UK</i>	Jan – Jun 2018

Invited Talks

4th Italian Meeting on Probability and Mathematical Statistics <i>Sapienza University of Rome, Rome, Italy</i> <i>Measuring Dependence under Partial Exchangeability with Reproducing Kernel Hilbert Spaces</i>	Jun 2024
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Posters

2024 ISBA World Meeting <i>Ca' Foscari University of Venice, Venice, Italy</i> <i>Measuring Dependence under Partial Exchangeability with Reproducing Kernel Hilbert Spaces</i>	Jul 2024 <i>Best Poster Award</i>
BAYSM2024 <i>Ca' Foscari University of Venice, Venice, Italy</i> <i>Measuring Dependence under Partial Exchangeability with Reproducing Kernel Hilbert Spaces</i>	Jun 2024

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Other Conferences, Workshops and Schools

Summer School on Optimal Transport, Stochastic Analysis and Applications to Machine Learning <i>KAIST, Daejeon, South Korea</i>	Jun 2024
2023 LMS Invited Lecture Series <i>Durham University, Durham, England, UK</i>	Jul 2023
Turin-Bath PhD Workshop in Applied Probability and Statistics <i>Collegio Carlo Alberto, Turin, Italy</i>	Jun 2023
Workshop Mathematical Statistics <i>Bocconi University, Milan, Italy</i>	Apr 2023
Optimal Transport and Applications <i>University of Pisa, Pisa, Italy</i>	Oct 2022
Summer School in Mathematics of Machine Learning <i>Scuola Matematica Interuniversitaria, Cortona, Italy</i>	Jul 2022
Summer School in Advanced Statistics and Probability: Random Structures and Combinatorial Statistics <i>Lake Como School of Advanced Studies, Como, Italy</i>	Jul 2022
Stochastic Games and Martingale Optimal Transport <i>University of Milan, Milan, Italy</i>	May 2022
Summer School in Geometric Statistics <i>University of Toulouse III, Toulouse, France</i>	Sep 2019

Teaching

Teaching Assistantships.....

Applied Stochastic Processes - (30515) <i>BSc Economics, Management and Computer Science, Bocconi University</i>	Spring 2024
Foundations of Data Science - (30607) <i>BSc Economics, Management and Computer Science, Bocconi University</i>	Spring 2024
Optimization - (20603) <i>MSc Data Science and Business Analytics, Bocconi University</i>	Spring 2024
Mathematics - module 2 (applied) - (30063) <i>BSc Economia Aziendale e Management, Bocconi University</i>	Spring 2024
Statistics - (30001) <i>BSc International Economics and Finance, Bocconi University</i>	Fall 2023
Bayesian Statistical Methods - (20231) <i>MSc Data Science and Business Analytics, Bocconi University</i>	Fall 2023
Mastering Data for Insurance <i>SDA Bocconi</i>	Spring 2023
Optimization - (20603) <i>MSc Data Science and Business Analytics, Bocconi University</i>	Spring 2023
Mathematics - module 2 (applied) - (30063) <i>BSc International Economics and Finance, Bocconi University</i>	Spring 2023
Advanced Analysis and Optimization - module 1 (30551) <i>BSc Mathematical and Computing Sciences for Artificial Intelligence, Bocconi University</i>	Fall 2022
Mathematics and Statistics II - (145105) <i>BSc Biomolecular Sciences and Technologies, University of Trento</i>	Spring 2020
Calculus A - (145503) <i>BSc Mathematics, University of Trento</i>	Fall 2019
Calculus I - (145432) <i>BSc Physics, University of Trento</i>	Fall 2019

Other teaching activities.....

Workshop Instructor <i>Data Science Lab, Bocconi University</i>	Summer 2023
Workshop Instructor <i>Data Science Lab, Bocconi University</i>	Summer 2023
Math Help Desk for Applicant Refugee Students and Asylum Seekers <i>University of Trento</i>	Spring 2020

Other activities

Volunteering

PhD Representative in the PhD Board

Department of Decision Sciences, Bocconi University, Milan, Italy

2022 – ongoing

Student Representative in the Department Council

Department of Mathematics, University of Bologna, Bologna, Italy

2016 – 2018

Student Representative in the BSc Board

BSc Mathematics, University of Bologna, Bologna, Italy

2016 – 2018

Student Representative in the School Board

Liceo Scientifico Copernico, Bologna, Italy

2013 – 2014