

# 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

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

## 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 Trento*; 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  $\Gamma$ -convergence to the rate functional arising in the large deviation principle for a system of independent Brownian particles.

## Ongoing Research Projects

**Measuring Dependence in Partial Exchangeable Setting with Reproducing Kernel Hilbert Spaces**  
*with M. Catalano and H. Lavenant*

## Exchange and Visiting Programs

<b>Erasmus+ Traineeship</b> <i>École Polytechnique, Palaiseau, France</i>	Oct 2020 – Feb 2021
<b>Erasmus+ Study</b> <i>Cardiff University, Cardiff, Wales, UK</i>	Jan – Jun 2018

## Conferences, Workshops and Summer Schools

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

## Teaching

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### Teaching Assistantships

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

### Other teaching activities

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<b>Summer School Teacher</b> <i>Bocconi Summer School for High School Students - Data Science Lab, Bocconi University</i>	Summer 2023
<b>Math Help Desk for Applicant Refugee Students and Asylum Seekers</b> <i>University of Trento</i>	Spring 2020

## Other activities

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### Volunteering

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<b>PhD Representative in the PhD Board</b> <i>Department of Decision Sciences, Bocconi University, Milan, Italy</i>	2022 – ongoing
<b>Student Representative in the Department Council</b> <i>Department of Mathematics, University of Bologna, Bologna, Italy</i>	2016 – 2018
<b>Student Representative in the BSc Board</b> <i>Bsc Mathematics, University of Bologna, Bologna, Italy</i>	2016 – 2018
<b>Student Representative in the School Board</b> <i>Liceo Scientifico Copernico, Bologna, Italy</i>	2013 – 2014