

# Giacomo Enrico Sodini

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## RESEARCH INTERESTS

My main research interests lie at the intersection of Optimal Transport, Non-Smooth analysis, and Calculus of Variations. I work on Unbalanced Optimal Transport, on metric Sobolev and BV spaces on metric-measure spaces, and I study geometry and evolutions in spaces of (probability) measures.

## ACADEMIC POSITIONS

### University Assistant

Oct 2022 – Present

Fakultät für Mathematik - Universität Wien, Vienna

## EDUCATION

### Ph.D. in Mathematics

Nov 2019 – Sept 2022

TUM-IAS, Munich

Thesis: *Optimal transport: unbalanced positive measures, dissipative evolutions and Sobolev spaces*

Supervisors: Prof. M. Fornasier and Prof. G. Savaré

Grade: *summa cum laude*

### M.Sc. in Mathematical Engineering

Oct 2017 – Oct 2019

Politecnico di Milano

### B.Sc. in Mathematical Engineering

Oct 2014 – Jul 2017

Politecnico di Milano

## PUBLICATIONS

### Preprints

- [16] François Delarue, Mattia Martini, and Giacomo Enrico Sodini. “HJB equations driven by the Dirichlet-Ferguson Laplacian in Wasserstein-Sobolev spaces”. 2025. arXiv: 2511.03522.
- [15] Goro Akagi, Giacomo Enrico Sodini, and Ulisse Stefanelli. “Global well-posedness for a time-fractional doubly nonlinear equation”. 2025. arXiv: 2508.13694.
- [14] Giulia Cavagnari, Giuseppe Savaré, and Giacomo Enrico Sodini. “Stochastic Euler Schemes and Dissipative Evolutions in the Space of Probability Measures”. 2025. arXiv: 2505.20801.
- [13] Pierre-Cyril Aubin-Frankowski, Giacomo Enrico Sodini, and Ulisse Stefanelli. “Evolution variational inequalities with general costs”. 2025. arXiv: 2505.00559.
- [12] Enrico Pasqualetto and Giacomo Enrico Sodini. “Functions of bounded variation and Lipschitz algebras in metric measure spaces”. 2025. arXiv: 2503.21664.
- [11] Nicolò De Ponti, Giacomo Enrico Sodini, and Luca Tamanini. “The infimal convolution structure of the Hellinger-Kantorovich distance”. 2025. arXiv: 2503.12939.
- [10] Lorenzo Dello Schiavo and Giacomo Enrico Sodini. “The Hellinger-Kantorovich metric measure geometry on spaces of measures”. 2025. arXiv: 2503.07802.
- [9] Giulia Cavagnari, Giuseppe Savaré, and Giacomo Enrico Sodini. “A Lagrangian approach to totally dissipative evolutions in Wasserstein spaces”. 2023. arXiv: 2305.05211.

### Journal Articles

- [8] Massimo Fornasier, Pascal Heid, and Giacomo Enrico Sodini. “Approximation Theory, Computing, and Deep Learning on the Wasserstein Space”. *Mathematical Models and Methods in Applied Sciences* 35.04 (2025), pp. 825–903. DOI: 10.1142/S021820252500113.
- [7] Giulia Cavagnari, Giuseppe Savaré, and Giacomo Enrico Sodini. “Extension of monotone operators and Lipschitz maps invariant for a group of isometries”. *Canad. J. Math.* 77.1 (2025), pp. 149–186. DOI: 10.4153/S0008414X23000846.

- [6] Giuseppe Savaré and Giacomo Enrico Sodini. “A relaxation viewpoint to unbalanced optimal transport: duality, optimality and Monge formulation”. *J. Math. Pures Appl.* 188 (9 2024), pp. 114–178. DOI: 10.1016/j.matpur.2024.05.009.
- [5] Giacomo Enrico Sodini. “The general class of Wasserstein Sobolev spaces: density of cylinder functions, reflexivity, uniform convexity and Clarkson’s inequalities”. *Calc. Var. Partial Differential Equations* 62.7 (2023), Paper No. 212, 41. DOI: 10.1007/s00526-023-02543-1.
- [4] Massimo Fornasier, Giuseppe Savaré, and Giacomo Enrico Sodini. “Density of subalgebras of Lipschitz functions in metric Sobolev spaces and applications to Wasserstein Sobolev spaces”. *J. Funct. Anal.* 285.11 (2023), Paper No. 110153, 76. DOI: 10.1016/j.jfa.2023.110153.
- [3] Giulia Cavagnari, Giuseppe Savaré, and Giacomo Enrico Sodini. “Dissipative probability vector fields and generation of evolution semigroups in Wasserstein spaces”. *Probab. Theory Related Fields* 185.3-4 (2023), pp. 1087–1182. DOI: 10.1007/s00440-022-01148-7.
- [2] Giuseppe Savaré and Giacomo Enrico Sodini. “A simple relaxation approach to duality for optimal transport problems in completely regular spaces”. *J. Convex Anal.* 29.1 (2022), pp. 1–12.
- [1] Mattia Martini and Giacomo Enrico Sodini. “Numerical methods for a system of coupled Cahn-Hilliard equations”. *Commun. Appl. Ind. Math.* 12.1 (2021), pp. 1–12. DOI: 10.2478/caim-2021-0001.

## Books

- [B1] Mauro D’Amico et al. “Mathematical Analysis - Module 1 Exercises”. Vol. 1. BAI Series. Università Bocconi, EGEA, 2021.

## Theses

- [T1] Giacomo Enrico Sodini. “Optimal Transport: unbalanced positive measures, dissipative evolutions and Sobolev spaces”. PhD thesis. Technische Universität München, 2022, p. 296.

## TALKS

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- **11.2025** Institut für Statistik seminar, TU Graz, Graz
- **10.2025** AKOR seminar, TU Vienna, Vienna
- **10.2025** Analysis and Applied Mathematics Seminar, Bocconi University, Milano
- **10.2025** Austrian Calculus of Variations day, University of Graz, Graz
- **09.2025** The Annual 2025 ÖMG-DMV Meeting, JKU, Linz
- **04.2025** Seminar on Calculus of Variations, University of Vienna, Vienna
- **01.2025** Dolomites Winter School, Folgarida
- **11.2024** Math department seminar, University of Jyväskylä, Jyväskylä
- **11.2024** Austrian Calculus of Variations day, University of Innsbruck, Innsbruck
- **10.2024** Analysis group seminar, University of Durham, Durham
- **09.2024** MeRiOT, Varenna
- **05.2024** Lions-Magenes days 2024, University of Pavia, Pavia
- **04.2024** Variational Analysis, Models and Methods in Measure Spaces, CIRM, Marseille
- **11.2023** Austrian Calculus of Variations day, TU Wien, Vienna
- **11.2023** Probability group seminar, Université Côte d’Azur, Nice
- **11.2023** Probability group internal seminar, University of Vienna, Vienna
- **09.2023** The Mathematics of Subjective Probability, Bicocca University, Milano
- **05.2023** PDE Afternoon, University of Vienna, Vienna
- **04.2023** OTMFML, IAS/TUM, Munich
- **01.2023** Maas group weekly seminar, ISTA, Klosterneuburg
- **11.2022** Geometric Analysis and PDEs at PoliMi, Politecnico di Milano, Milano
- **11.2022** Austrian Calculus of Variations day, University of Salzburg, Salzburg
- **11.2022** Smooth Functions on Rough Spaces and Fractals with Connections to Curvature Functional Inequalities, BIRS, Banff

- **10.2022 Seminar on Calculus of Variations**, University of Vienna, Vienna
- **10.2022 Optimal Transportation and Application**, SNS, Pisa
- **07.2022 KU-LMU-TUM Joint Seminar**, TUM, Munich
- **06.2022 PIMS-IFDS-NSF Summer School on Optimal Transport**, University of Washington, Seattle
- **05.2022 Oberseminar**, TUM, Munich
- **11.2021 Mathematics Department Seminars**, Politecnico di Milano, Milano
- **04.2020 SeMiNarri di Matematica**, University of Pavia, Pavia

## TEACHING

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### Lecturer

- **University of Vienna**
  - Topics in the Calculus of Variations (SoSe 2025)

### Teaching Assistant

- **University of Vienna**
  - Introduction to Analysis (WiSe 2025-2026)
  - Analysis 3 (SoSe 2025)
  - Topologie und Funktionalanalysis (WiSe 2024-2025, WiSe 2023-2024)
  - Analysis 2 (SoSe 2024)
- **Bocconi University**
  - Mathematical Analysis - Module 1 (2024-2025, 2023-2024, 2022-2023, 2021-2022, 2020-2021)
- **TU Munich**
  - Foundations in Data Analysis (SoSe 2022, SoSe 2021, SoSe 2020)
- **Politecnico di Milano**
  - Mathematical Analysis II (2021-2022, 2020-2021)

Last updated: November 6, 2025