Curriculum vitæ

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Giacomo Enrico Sodini
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Research Interests

Mathematical Analysis. In particular

- Optimal Transport,
- Calculus of Variations,
- Non-smooth analysis.

Current Position

1 | **University assistant** — Since October 2022
Universität Wien | Österreich

Education

1 | **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*

2 | **M.Sc. in Mathematical Engineering** — Oct 2017 | Oct 2019
Politecnico di Milano
Thesis: *Fine estimates on the matching problem via PDE techniques*
Advisors: *Prof. L. Ambrosio and Prof. S.Salsa*
Grade: *110/110 cum laude*

3 | **B.Sc. in Mathematical Engineering** — Oct 2014 | Jul 2017
Politecnico di Milano
Thesis: *Probability Measures on Trajectories Spaces and the Kolmogorov Existence Theorem*
Advisor: *Prof. M. Gregoratti*
Grade: *110/110 cum laude*

4 | **High School Degree** — Sept 2009 | Jun 2014
Liceo Scientifico Statale Lorenzo Respighi | Piacenza
Grade: *100/100*

Publications

1 | **Approximation Theory, Computing, and Deep Learning on the Wasserstein Space** w/M. Fornasier and P. Heid |
Accepted for publication in M3AS Preprint | January 2025

2 | **A relaxation viewpoint to Unbalanced Optimal Transport: duality, optimality and Monge formulation** w/G. Savaré |
Journal de Mathématiques Pures et Appliquées | 188 (2024)

3 | **Extension of monotone operators and Lipschitz maps invariant for a group of isometries** w/G. Cavagnari and G. Savaré |
Canadian Journal of Mathematics | Published online (2023) pp. 1-38

4 | **Density of subalgebras of Lipschitz functions in metric Sobolev spaces and applications to Wasserstein Sobolev spaces** w/M. Fornasier and G. Savaré |
Journal of Functional Analysis | 285.11 (2023)

5 | **The general class of Wasserstein Sobolev spaces: density of cylinder functions, reflexivity, uniform convexity and Clarkson's inequalities** |
Calculus of Variations and Partial Differential Equations | 62.7 (2023)

6 | **Dissipative PVFs and generation of evolution semigroups in Wasserstein spaces** w/G. Cavagnari and G. Savaré |
Probability Theory and Related Fields | 185.3-4 (2023), pp. 1087-1182

7 | **A simple relaxation approach to duality for OT problems in completely regular spaces** w/G. Savaré |
Journal of Convex Analysis 29.1 (2022), pp.1-12

8 | **Mathematical Analysis - Module 1 Exercises** w/M. D'Amico, J. De Tullio and G. Osimo |
Egea - Le dispense del Pellicano (2021)

9 | **Numerical methods for a system of coupled Cahn-Hilliard equations** w/M.Martini |
Communications in Applied and Industrial Mathematics, 12, (2021), Issue 1, pp. 1-12

Preprints

1 | **The infimal convolution structure of the Hellinger-Kantorovich distance** w/N. De Ponti and Luca Tamanini |
Preprint | March 2025

2 | **The Hellinger-Kantorovich metric measure geometry on spaces of measures** w/L. Dello Schiavo |
Preprint | March 2025

3 | **A Lagrangian approach to dissipative evolutions in Wasserstein spaces** w/G. Cavagnari and G. Savaré |
Preprint | May 2023

Talks

1 | **A relaxation viewpoint to Unbalanced Optimal Transport** January 2025
Invited speaker | Folgarida

2 | **The Hellinger–Kantorovich metric measure geometry on spaces of measures** November 2024
Speaker | Mathematics Department University of Jyväskylä

3 | **The canonical measure on spaces of measures** Noveber 2024
Speaker | Mathematics Department University of Innsbruck

4 | **Dissipative evolutions in the space of probability measures** October 2024
Speaker | Mathematics Department University of Durham

5 | **The Hellinger–Kantorovich metric measure geometry on spaces of measures** September 2024
Speaker | Varenna

6 | **Wasserstein Sobolev spaces and applications to the computation of the Wasserstein distance** May 2024
Invited speaker | Mathematics Department University of Pavia

7 | **Dissipative evolutions in Wasserstein spaces: the explicit Euler scheme** April 2024
Invited speaker | CIRM Marseille

8 | **Monotone evolutions in the space of probability measures and the extension problem** November 2023
Speaker | TU Wien

9 | **Dissipative evolutions in the space of probability measures** November 2023
Speaker | Department of Mathematics University Nice

10 | **Unbalanced Optimal Transport: a relaxation viewpoint** November 2023
Speaker | Mathematics Department University of Vienna

11 | **A relaxation approach to Optimal Transport with applications to the unbalanced case** September 2023
Invited speaker | Mathematics Department Bicocca University

12 | **Density of subalgebras of Lipschitz functions in metric Sobolev spaces and applications to Sobolev-Wasserstein spaces** May 2023
Speaker | Mathematics Department UniVie

13 | **Density of subalgebras of Lipschitz functions in metric Sobolev spaces and applications to Sobolev-Wasserstein spaces** April 2023
Invited speaker | IAS-TUM Munich

14 | **Density of subalgebras of Lipschitz functions in metric Sobolev spaces and applications to Sobolev-Wasserstein spaces** January 2023
Speaker | ISTA Vienna

15 | **Density of subalgebras of Lipschitz functions in metric Sobolev spaces and applications to Sobolev-Wasserstein spaces** November 2022
Invited speaker | Mathematics Department PoliMi

16 | **Dissipative evolutions in Wasserstein spaces** November 2022
Contributed speaker | Mathematics Department of University of Salzburg

17 | **Density of subalgebras of Lipschitz functions in metric Sobolev spaces and applications to Sobolev-Wasserstein spaces** November 2022
Contributed speaker | BIRS Banff

18 | **A relaxation approach to Optimal Transport with applications to the unbalanced case** October 2022
Speaker | Mathematics Department UniVie

19 | **A relaxation approach to Optimal Transport with applications to the unbalanced case** October 2022
Invited Speaker | SNS Pisa

20 | **Density of subalgebras of Lipschitz functions in metric Sobolev spaces and applications to Sobolev-Wasserstein spaces** July 2022
Speaker | KU-LMU-TUM Joint Seminar

21 | **A relaxation approach to optimal transport with applications to the unbalanced case** June 2022
Contributed speaker | University of Washington, Seattle

22 | **Unbalanced optimal transport** May 2022
Speaker | TUM Department of Mathematics

23 | **A relaxation approach to optimal transport** November 2021
Invited speaker | Mathematics Department of Politecnico di Milano

24 | **A brief introduction to optimal transport** April 2020
Speaker | Mathematics Department of University of Pavia

Teaching

1 | **Lecturer for Topics in the Calculus of Variations** Second semester 2024/2025

2 | **Exercise classes for Analysis 3. Lecturer: Michael Eichmair** Second semester 2024/2025

3 | **Exercise classes for Topologie und Funktionalanalysis. Lecturer: Hermann Schichl** First semester 2024/2025

4 | **Exercise classes for Analysis 2. Lecturer: Nathanael Berestycki** Second semester 2023/2024

5 | **Exercise classes for Topologie und Funktionalanalysis. Lecturer: Gerald Teschl** First semester 2023/2024

6 | **Exercise classes for Mathematical Analysis - Module 1. Lecturer: Giuseppe Savaré** First semester 2023/2024

7 | **Exercise classes for Mathematical Analysis - Module 1. Lecturer: Giuseppe Savaré** First semester 2022/2023

8 | **Exercise classes for Foundations in Data Analysis. Lecturer: Felix Kramer** Summer semester 2022

9 | **Exercise classes for Mathematical Analysis II. Lecturer: Giulia Cavagnari** Second semester 2021/2022

10 | **Exercise classes for Mathematical Analysis - Module 1. Lecturer: Giuseppe Savaré** First semester 2021/2022

11 | **Exercise classes for Foundations in Data Analysis. Lecturer: Massimo Fornasier** Summer semester 2021

12 | **Exercise classes for Mathematical Analysis II. Lecturer: Giulia Cavagnari** Second semester 2020/2021

13 | **Exercise classes for Mathematical Analysis - Module 1. Lecturer: Giuseppe Savaré** First semester 2020/2021

14 | **Exercise classes for Foundations in Data Analysis. Lecturer: Massimo Fornasier** Summer semester 2020