

Curriculum Vitae

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Filippo Santambrogio

Born in Milan (Italy) on June 13, 1980, holding Italian nationality (by birth) and French nationality (naturalized in 2014), married, 2 children (born in 2018 and 2021).

1 Education and career

1999-2003 Studies at the SNS in Pisa (student of the Scuola Normale, ranked first in the national entrance examination for the ordinary course in Sciences at the SNS) and at the Università di Pisa.

2003 Laurea (4 years, equivalent to a Master's degree) in Mathematics at the Università di Pisa and Diploma from the SNS : dissertation under the supervision of G. Buttazzo.

2003-2006 PhD student at the SNS in Pisa (ranked first in the SNS doctoral entrance examination) ; thesis advisor : Giuseppe Buttazzo.

2006 PhD in Mathematics (Perfezionamento in Matematica at the SNS in Pisa). Title: *Variational problems in transport theory avec mass concentration*, defended on 12/12, advisor G. Buttazzo.

2007 Postdoctoral researcher at the CMLA of ENS Cachan under the supervision of Jean-Michel Morel (January-August).

2007-2010 *Maître de Conférences* at Université Paris-Dauphine.

2009 *HDR*, defended at Université Paris-Dauphine (11/25). Title : *Classical and less classical problems in optimal transport: regularity, approximation, PDEs and applications*, presented by I. Ekeland.

2010-2018 Professor at Université Paris-Sud.

2014 Promoted to *First Class* of university professors.

since 2018 Professor at Université Claude Bernard - Lyon 1.

2020 Promoted to the *Exceptional Class* of university professors.

2024 Promoted to the *second level of the Exceptional Class* of university professors.

2 Awards and distinctions

- Bronze Medal, International Mathematical Olympiads, Bucharest, 1999.
- “Benedetto Sciarra” Prize in mathematics, awarded by the SNS in Pisa, 2004.
- “Gioacchino Iapichino” Prize (mathematical analysis), Accademia Nazionale dei Lincei, 2007.
- Junior Member of the *Institut Universitaire de France*, 2017-2022.
- “Calogero Vinti” Prize of the *Unione Matematica Italiana*, 2019.
- “Jean-Jacques Moreau” Prize of the *SMAI, SMF and Académie des Sciences*, 2021.
- ERC Advanced Grant project EYAWKAJKOS “Everything You Always Wanted to Know About the JKO Scheme”, ERC AdG 2021, this project started in September 2023.

3 Invited conferences

A selection of national and international conferences where I was invited to give a talk :

- Nov 2005, *MSRI Berkeley*, Optimal Mass Transport and its Applications;
- April 2008, *IPAM UCLA*, Numerics and Dynamics for Optimal Transport;
- Dec 2011, *Kyoto*, SNP 2011 “Singularities in nonlinear problems”;
- March 2012 : *MODE Days* plenary speaker, Dijon ;
- April 2012 : international conference *PICOF* plenary speaker, Palaiseau ;
- Aug 2013, *MSRI*, Introductory Workshop on Optimal Transport: Geometry and Dynamics ;
- Sept 2014, *Fields Institute, Toronto*, Optimization, Transport and Equilibrium in Economics ;
- Sept 2015, conference *M3ST 2015* in Kalamata (Greece), plenary speaker ;
- Dec 2015, *IMS Workshop on Congestion Games*, Singapore ;
- June 2016, *KIAS*, Seoul, “Analysis, Geometry, and Optimal Transport” ;
- June 2017, *SMAI Days*, plenary speaker, Ronce-les-bains;
- Aug 2017, *ICERM*, Pedestrian Dynamics: Modeling, Validation and Calibration, Brown University, Providence, USA;
- Sept 2018, *Pavia (Italy)* Optimal Control and Mean Field Games;
- Sept 2019, *HSE*, Moscow, Miniworkshop on mass transportation;
- Feb 2020, *U. Chicago*, MFG: recent progress;

- Dec 2021, *U. Chicago (online)*, Mathematical Advances in Mean Field Games;
- Aug 2022, *Toulouse*, 15th Franco-Romanian Colloquium on Applied Mathematics, plenary speaker.
- May 2023, *BIRS Granada*, Nonlinear diffusion and nonlocal interaction models - entropies, complexity, and multi-scale structures.
- April 2024, *CIRM*, Aggregation-Diffusion Equations & Collective Behavior: Analysis, Numerics and Applications.
- Sept 2025, Diffusion in *Warsaw*.

Since 2002 I have participated every year in the Italian meeting on the Calculus of Variations, first in Levico Terme and later in Riccione in February, where I have presented my work several times.

Since 2008, I have consistently participated, by invitation, in the conference “Optimal Transportation and Applications”, held every two years at the SNS in Pisa, and I joined the organization for the 2024 edition and for the one planned in 2026, co-funding the event with my ERC funds.

I have also been invited to every edition of the conference “Mean field games et related topics” (which rotates between Rome, Padua and Paris every two years), and I participated in 2011 (Rome), 2015 (Paris) and 2017 (Rome), to every edition of the conference “Gradient Flows face-to-face” since 2021, participating in 2022 and 2024 and organizing the 2023 edition in Lyon, and to every edition of the conference “Optimal Transport and Applications” in Oberwolfach (2017, 2021 online, 2024, and I will co-organize it from 2027 onward).

I have given talks in seminars or working groups of several laboratories in France (UPMC, Paris-Dauphine, Paris-Sud, ENS Cachan, Lyon, Ulm and Rennes, École Polytechnique, Dijon, Chambéry, Marseille, Montpellier, Rennes, Brest, Lille, Grenoble, Limoges, Tours), and abroad (Italy, United Kingdom, Ireland, Greece, Cyprus, Russia, Canada, China, Korea, Australia, Tunisia, Cameroon).

I have given *colloquia* in Dijon, Limoges, Canberra, Münster, Paris 5, Dauphine, Avignon and at MIT in Boston.

4 Graduate courses abroad

- 24-hour course at TUM (Munich, Germany) on “Variational Mean Field Games”, May-June 2018.
- 48-hour course in Pavia (Italy), taught jointly (50%) with A. Segatti, on the Calculus of Variations (Master 2 level), March-June 2019.
- 12-hour course at Roma Tor Vergata (Italy) “Introduction to Optimal Transport and Applications”, online, May 2021.
- 24-hour course at TUM (Munich, Germany) on “Optimal Transport, Numerics and Sampling”, online, October 2021–February 2022.
- 24-hour doctoral course in Padua (Italy) on “Optimal Transport and Wasserstein Gradient Flows”, April-May 2022 (4h introduction by D. Vittone, 12h in person, 8h online).
- 12-hour course at the Gran Sasso Sciences Institute, L’Aquila (Italy), on “Convex Duality and Applications in PDEs and Game Theory”, February 2023.

5 PhD supervision

Completed PhD theses :

- Lorenzo Brasco, 2007/10, *joint supervision* U. Pisa – Paris-Dauphine (co-supervised at 33% with G. Buttazzo and G. Carrier). Funding : Italian doctoral fellowship. Title : “Geodesics and PDE methods in transport models”, defended in October 2010. Lorenzo Brasco is now full professor at the Università di Ferrara, Italy.
- Nicolas Bonnotte, 2010/13, *joint supervision* SNS Pisa – Paris-Sud (co-supervised at 50% with L. Ambrosio). Funding : doctoral contract for ENS students (ENS Paris) + Vinci grant from the Franco-Italian University for expenses related to the joint supervision. Title : “One-dimensional and evolution methods for optimal transport”, defended in December 2013. Nicolas currently works as a data scientist in a Parisian start-up.
- Jean Louet, 2010/14. PhD thesis at Université Paris-Sud. Funding : doctoral contract for ENS students (ENS Cachan). Title: “Optimal transport problems with gradient penalization”, defended in July 2014. Jean is now agrégé professor in CPGE at Lycée Hoche in Versailles.
- Alpár Richard Mészáros, 2012/15. PhD thesis at Université Paris-Sud. Funding : doctoral contract funded by Université Paris-Sud. Title: “Density constraints in Optimal Transport, PDEs and Mean Field Games”, defended in September 2015. Alpár is currently Full Professor at Durham University, United Kingdom.
- Antonin Monteil, 2012/15 (co-supervised at 50% with R. Ignat). PhD thesis at Université Paris-Saclay. Funding : doctoral contract for ENS students (ENS Cachan). Title: “Elliptic approximations of singular energies under divergence constraints”, defended in December 2015. Antonin is currently MCF in Créteil.
- Paul Pegon, 2014/17. PhD thesis at Université Paris-Saclay. Funding : doctoral contract for ENS students (ENS Cachan). Title: “Fractal structures in branched transport”, defended in November 2017. Paul is currently MCF at Paris-Dauphine.
- Samer Dweik, 2015/18. PhD thesis at Université Paris-Saclay. Funding : doctoral contract funded by the Île-de-France region (DIM). Title: “Transport and control problems with boundary costs: regularity and summability of optimal and equilibrium densities”, defended in July 2018. Samer is currently assistant professor in Qatar.
- Hugo Lavenant, 2016/19. PhD thesis at Université Paris-Saclay. Funding : doctoral contract for ENS students (ENS Paris). Title : “Optimal curves and mappings in the Wasserstein space”, defended in May 2019. Hugo is currently tenure-track assistant professor at Bocconi University in Milan, Italy.
- Aleksey Kroshnin, PhD thesis at Lyon 1 and at the IITP in Moscow, jointly supervised (50%) with A. Sobolevski, 2018/2021, defended in November 2021. Funding : Russian contract + funding from the French Embassy in Russia (Vernadsky grant) for the joint supervision. Title : “Inside and around Wasserstein Barycenters”. Alexey is currently employed in a financial company in London.

- Clément Sarrazin, 2018/2021, PhD thesis at Paris-Saclay, co-supervision (50%) with Q. Mérigot, defended in January 2022. Funding : MESRI (Hadamard doctoral school of Paris-Saclay). Title : “Lagrangian discretization of variational problems in Wasserstein spaces”. Clément is currently assistant professor at Institut Mines Télécom (IMT) Nord-Europe in Villeneuve-d’Ascq.
- Annette Dumas, 2021/24, PhD thesis at Lyon 1, defended in September 2024. Funding : MESRI (Infomaths doctoral school of Lyon). Title : “Deterministic Mean Field Games with Jumps”. Annette is currently MCF in Limoges.
- Thibault Caillet, 2022/25, PhD thesis at Lyon 1, defended in July 2025. Funding : Lyon 1 doctoral contract, obtained through a competitive call for projects (AAP Etoiles 2022). Title : “The JKO scheme in linear and nonlinear diffusion : new estimates and convergence”. Thibault is currently PRAG at Sorbonne Paris Nord, Villetaneuse.

Ongoing PhD theses :

- Nicolas Masson, Paris-Saclay PhD thesis started in 2022 and co-supervised (30%) with B. Maury, on crowd motion models with “civilized” variants. Funding : doctoral contract for ENS students (ENS Paris)
- Fanch Coudreuse, Lyon 1 PhD thesis started in 2023 and co-supervised (50%) with I. Gentil on functional inequalities in the JKO scheme. Funding : Lyon 1 doctoral contract funded by my ERC funds. Defense scheduled for July 2026.
- Kexin Lin, Lyon 1 PhD thesis started in 2024 on fourth-order PDEs arising from the total variation flow. Funding : Lyon 1 doctoral contract funded by my ERC funds.
- Sofiane Cherf, Lyon 1 PhD thesis started in 2024 and co-supervised (20%) with A. Baradat on the entropic approximation of gradient flows and the Muskat problem. Funding : doctoral contract for ENS students (ENS Lyon).

6 Responsibilities

6.1 Editorial responsibilities

- Referee for more than thirty different journals and conferences in mathematics, applied mathematics, economics and computer science, including *JMPA*, *CPAM*, *ARMA*, *Comm. PDEs*, *Calc. Var. PDE*, *Ann. Sci. SNS*, *SICON*, *SIMA*, *Discr. Appl. Math.*
- Associate editor of *ESAIM M2AN* (2017/2023) and of *Appl. Math. Optim.* (since 2017), of *J. Dyn. games* (since 2018), of *J. Conv. An.* (since 2020), of *ESAIM COCV* (since 2025), of *Acta Appl. Math.* (since 2025).

6.2 Teaching responsibilities

- Director of the PDE track of the Paris-Sud Master 2 program, 2011/15 ;
- Founder and director of the optimization track of the Paris-Saclay Master 2 program, 2015/18 ;

- Director of the PDE track of the Advanced Mathematics Master 2 program, ENS Lyon and Lyon 1, 2020/25.

6.3 Management and coordination of research networks

- elected member of the *comité de liaison* (2017/23) and head of the SMAI-MODE group (2019/22) ;
- French coordinator of the LIA FuMa in collaboration with Australia (2018/23);
- head of the CNRS “Optimization” network since 2024.
- member of the scientific committee of the GDR CALVA (2019/23).

6.4 Local mandates

- elected member of the laboratory council since 2020;
- head of the MMCS team of the laboratory since 2023 (80 persons) ;
- member of the research committee of the Labex MILyon, 2020/24 ;
- member of the strategic committee of the Institut de Mathématiques de Marseille (2020/2024) ;
- member of the expert committee of the ITI (Interdisciplinary Thematic Institute) IRMIA++ at the University of Strasbourg (2022/27) ;