Giuseppe Savaré - CURRICULUM

PERSONAL INFORMATION

Savaré Giuseppe	ORCID: 0000-0002-0104-4158	MatSciNet: 336952
ResearcherID: H-3651-2014	Scopus: 6602154611	Google Scholar: w7qH1YYAAAAJ
Nationality: Italian	Born in Pavia, 25/08/1966	

EDUCATION

1984–1988: *Laurea (cum laude) in Mathematics*, University of Pavia, Italy

CURRENT POSITION

2020-: *Full Professor,* Mathematical Analysis. Department of Decision Sciences, Bocconi University

PREVIOUS POSITIONS

2000–2020: *Full Professor,* Mathematical Analysis Department of Mathematics, University of Pavia
1998–2000: *Associate professor,* University of Pavia
1990–1998: *Researcher,* IMATI-CNR, Pavia

FELLOWSHIPS AND AWARDS

2019-2023: *Hans Fischer senior fellow*, Institute for Advanced Study (IAS), Technical University of Munich
2019: *Plenary Speaker*, XXI Congresso Unione Matematica Italiana
2016: *Invited Speaker*, 7^{th} European Congress of Mathematics, Berlin: section "Analysis and PDEs"
2015: *John von Neumann Visiting Professor*, Technical University of Munich
2014: the results on Gradient Flows has been presented in the *Exposé Bourbaki 1065: Flots de gradient dans les espaces métriques et leurs applications d'aprè Ambrosio-Gigli-Savaré*, Asterisque 361.
2012: The paper *Chemical reactions as* Γ*-limit of diffusion* SIAM Rev. 54 (2012) (with M. Peletier, M. Veneroni) has been published as SIAM Review's SIGEST award.
2011: *Ennio De Giorgi Prize*, awarded by the *Italian Mathematical Union*
1994: *Gioachino Japichino* Prize, awarded by the *Accademia Nazionale dei Lincei*

SUPERVISION OF GRADUATE STUDENTS

Bocconi University:
current: Alessandro Pinzi
IAS-TUM, Munich:
2022: Giacomo Sodini (co-advised with M. Fornasier)
University of Pavia:
2019: Nicolò De Ponti
2017: Luca Minotti
2015: Giovanni Bonaschi (co-advised with M. Peletier, Eindhoven)
2014: Dario Mazzoleni (co-advised with A. Pratelli, Erlangen)
2011: Luca Natile
2007: Marco Veneroni
2006: Stefano Lisini
2005: Riccarda Rossi
1998: Simona Sanfelici (co-advised with P. Colli Franzone)
I also mention the supervision of the Master thesis (subsequently published in international mathematical journals) of Federico Bassetti, Laura Spinolo, Sara Daneri, Giulia Luise

POSTDOCTORAL FELLOWS

current: Luca Tamanini
2017-2019: Giulia Cavagnari
2016-2017: Dario Mazzoleni
2015-2016: Carlo Orrieri, Matteo Muratori
2009-2011: Edoardo Mainini
2007-2008: Daniel Matthes
2006-2008: Antonio Marigonda

TEACHING ACTIVITIES

University of Pavia:

1998-2020: courses of *Mathematical Methods* (Engineering Faculty) and *Mathematical Analysis* (degree in Mathematics), typically two main courses every year,~140 hours/year

2000-2020: several Ph.D. courses (PDEs, Semigroups, Calculus of Variations, Optimal transport)

Bocconi University:

2020-2022: Mathematical Analysis (Bachelor), Introduction to Real Analysis (Ph.D.)

Several invited courses to *international advanced schools* (as CIME, HIM, SNS, EVEQ)

ORGANISATION OF SCIENTIFIC MEETINGS

2023: Workshop on *Variational and geometric structures for evolution*, CIRM, Trento (Co-organizers: D. Knees, R. Rossi, M. Thomas)

2023: Workshop on *Optimal Transport, Mean-Field Models, and Machine Learning*, IAS-TUM, Munich (Co-organizers: D. Knees, R. Rossi, M. Thomas)

2022, 2018, 2016, 2014, 2012, 2010, 2008: *Workshops on Optimal Transportation and Applications*, Pisa (Co-organizers: L. Ambrosio, G. Buttazzo, N. Gigli)

2022: *Contemporary Trends in Kinetic Theory and PDEs*, Pavia (Co-organizers: J.A. Carrillo, A. Pulvirenti, M. Zanella)

2018: School on *Optimal transport: numerical methods and applications*, Lake Como School of Advanced Studies (Co-organizer: F. Santambrogio).

2018: Workshop *Optimal Control and Mean Field Games*, Pavia (Co-organizers: G. Cavagnari, S. Lisini, C. Orrieri)

2016: Bimester on *Nonlinear Flows*, Research Centre ESI, Vienna (Co-organizers: E. Feireisl, A. Juengel, A. Mielke, U. Stefanelli)

2014 and 2011: MFO Workshop *Variational Methods for Evolution*, Oberwolfach (Co-organizers: L. Ambrosio, A. Mielke, M. Peletier, F. Otto, U. Stefanelli)

2011: Conference *Analysis and Numerics of PDEs. In memory of Enrico Magenes*, Pavia

2010: BIRS Workshop: *Rate-independent systems: Modeling, Analysis, and Computations*, Banff (Co-organizer: U. Stefanelli)

2008: CIME Course: *Nonlinear Partial Differential Equations and Applications*, Cetraro (Co-organizer: L. Ambrosio)

INSTITUTIONAL RESPONSIBILITIES

2019: Director of the *Advanced School of Ph.D. Higher Education* (SAFD), University of Pavia

2014–2016: *University Assessment Commission*, University of Pavia

2001-2008: Director of the *Ph.D. program in Mathematics and Statistics*, University of Pavia

1998–present: IMATI-CNR, research associate

REVIEWING ACTIVITIES

2023-: ESAIM: Control, Optimisation and Calculus of Variations, member of the *editorial board*

2018–: Unione Matematica Italiana, member of the *Scientific Advisory Board*

2014–: C.I.M.E. Foundation, member of the *Scientific Advisory Board*

2016–: Applied Mathematics and Optimization, member of the *editorial board*

2013–: Potential Analysis, member of the *editorial board*

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

2009–: Membro Corrispondente, *Istituto Lombardo, Accademia di Scienze e Lettere*, Milano

MAJOR COLLABORATIONS

I have collaborated with more than 50 different co-authors. Among the main collaborations (not counting former Ph.D. students and post-docs), I recall

Luigi Ambrosio (Scuola Normale Superiore, Pisa, I): Optimal Transport, Gradient flows, analysis in metric spaces. Together with N. Gigli, we wrote the monograph *Gradient flows in metric spaces and in spaces of probability measures,* Birkhäuser, 2005 (second edition in 2008)

Piero Colli Franzone (Pavia): mathematical models for electrocardiology

Jean Dolbeault (Université Paris Dauphine, Paris): Transport distances, functional inequalities

Massimo Fornasier (Technical University of Munich): mean-field optimal control

Alexander Mielke (WIAS, Berlin): Rate-independent processes, doubly-nonlinear evolution equations, Optimal Entropy-Transport problems
Nicola Gigli (SISSA, Trieste): analysis in metric-measure spaces
Ricardo H. Nochetto (University of Maryland, USA): optimal error estimates for evolution problems
Mark Peletier (TU Eindhoven, NL): Reaction-diffusion systems, Fokker-Planck equations
Giuseppe Toscani (Pavia, I): nonlinear diffusion equations, entropy methods.
I also collaborated with *Yann Brenier, José A. Carrillo, Robert McCann, Wilfrid Gangbo, Alessio Porretta, Dejan Slepcev, Lorenzo Zambotti* on various evolutionary models related to Optimal Transport.

Publications

The MSC database attributes to me 99 publications, 4790 citations by 2550 authors, H-index 33. Seven of the papers listed below belong to the group of Highly cited papers according to WOS.
The most relevant contributions of my research activity over the past ten years concern:

- **Foundation of the theory of metric-measure spaces with *Riemannian Ricci curvature bounded from below* (the so-called RCD(K,N) condition):**

  Calculus and heat flow in metric measure spaces and applications to spaces with Ricci bounds from below (with L. Ambrosio, N. Gigli). Invent. Math. 195 (2014), 289–391. (*)
  [Heat flow and Cheeger energy in metric–measure spaces: L^2 and Optimal Transport theory]

  Metric measure spaces with Riemannian Ricci curvature bounded from below (with L. Ambrosio, N. Gigli). Duke Math. J., 163 (2014):1405–1490. (*).
  [The first analysis and characterization of Riemannian RCD(K,∞) spaces with quadratic Cheeger energy]

  Bakry-Émery curvature-dimension condition and Riemannian Ricci curvature bounds (with L. Ambrosio, N. Gigli). Annals of Probability, 43 (2015): 339–404. (*)
  [The full identification between the Bakry-Émery condition and RCD(K,∞) spaces]

  Self-improvement of the Bakry-Émery condition and Wasserstein contraction of the heat flow in RCD(K,∞) metric measure spaces Discrete Contin. Dyn. Syst. 34 (2014): 1641–1661. (*)
  [Second order calculus, measure-valued Γ_2-tensor, and improved Bakry-Émery condition]

  Convergence of pointed non-compact metric measure spaces and stability of Ricci curvature bounds and heat flows (with N. Gigli, A. Mondino) Proc. Lond. Math. Soc. 111 (2015): 1071–1129. (*)

  Nonlinear diffusion equations and curvature conditions in metric measure spaces (with L. Ambrosio, A. Mondino) Mem. Amer. Math. Soc. 262 (2019), no. 1270, v+121 pp.
  [The full identification between the Bakry-Émery condition and the RCD(K,N) spaces]

- **Metric-Sobolev spaces: identification of the construction by Lipschitz functions and Cheeger energy with the Newtonian approach**

  Density of Lipschitz functions and equivalence of weak gradients in metric measure spaces (with L. Ambrosio, N. Gigli) Rev. Mat. Iberoam. 29 (2013): 969–996. (*)

- **Entropy-Transport formulation for unbalanced optimal transport and the characterization of the new Hellinger-Kantorovich distance**

  Optimal entropy-transport problems and a new Hellinger-Kantorovich distance between positive measures (with M. Liero, A. Mielke). Invent. Math. 211 (2018): 969–1117. (*)

- **Foundation of Balanced Viscosity and Visco-Energetic solutions to rate-independent processes in infinite-dimensional spaces**

  Balanced viscosity (BV) solutions to infinite-dimensional rate-independent systems (with A. Mielke, R. Rossi). J. Eur. Math. Soc. (JEMS) 18 (2016): 2107–)2165. [The first contribution to existence, characterization, and properties of Balanced Viscosity solutions in infinite dimension.]

  Viscous corrections of the time incremental minimization scheme and visco-energetic solutions to rate-independent evolution problems. (with L. Minotti) Arch. Ration. Mech. Anal. 227 (2018), no. 2, 477-543.

- **The mean-field formulation of spatially inhomogeneous Evolutionary Games**

  Spatially Inhomogeneous Evolutionary Games (with L. Ambrosio, M. Fornasier, M. Morandotti) Comm. Pure Appl. Math. 74 (2021): 1353-–1402

In addition to the above papers and topics, in the last ten years I have also been working on *sub-linear diffusion, chemical reactions as* Γ*-limit of diffusion, Cahn-Hilliard and thin-film equations with nonlinear mobility, viscoplasticity at finite strain, sticky particle dynamics with interactions, mean-field optimal control and mean-field planning, the concavity of Rényi entropy power, variational convergence of gradient flows and rate-independent evolutions, the Weighted Energy-Dissipation principle for gradient flows, reverse approximation of gradient flows, jump processes as generalized gradient flows, the Opial property in Wasserstein spaces, duality properties of metric Sobolev spaces and capacity.*

Monographs and contributions to volumes

Sobolev Spaces in Extended Metric-Measure Spaces in *New Trends on Analysis and Geometry in Metric Spaces.* Lecture Notes in Mathematics, Springer 2022, 117–276.
[The refined theory of metric Sobolev space generated by sub-algebra of Lipschitz functions in extended metric-measure spaces.]

Gradient flows in metric spaces and in the space of probability measures (with L. Ambrosio, N. Gigli) Lectures in Mathematics ETH Zürich. Birkhäuser Verlag, Basel, 2005 (second edition 2008).
The two editions have received more than 1500 citations, according to MSC.

Computational electrocardiology: mathematical and numerical modeling (with P. Colli Franzone, L. F. Pavarino; contribution). In Complex systems in biomedicine, pages 187–241. Springer Italia, Milan, 2006.

Invited presentations to conferences (selection)

- MFO workshop: *Heat Kernels, Stochastic Processes and Functional Inequalities*, Oberwolfach, 2022
- HCM Conference: *From Dirichlet Forms to Wasserstein Geometry*, Bonn, 2022
- Workshop on *Frontiers in Nonlocal Nonlinear PDEs*, Anacapri, 2022
- Workshop Geometric Measure Theory and applications, Cortona, 2021
- MFO workshop: *Applications of Optimal Transportation in the Natural Sciences* (online), Oberwolfach, 2021
- Workshop: *Calculus of Variations and Applications*, SISSA, Trieste, 2020.
- *XXI Congresso Unione Matematica Italiana*, 2019. Plenary Speaker
- Workshop: *Optimal transport and Geometric Analysis*, Venice, 2019.
- ICMS Workshop: *Gradient flows: challenges and new directions*, Edinburgh, 2018.
- BIRS workshop: *Topics in the Calculus of Variations: Recent Advances and New Trends*, Banff, 2018.
- BIRS workshop: *Entropies, the Geometry of Nonlinear Flows, and their Applications*, Banff, 2018.
- MFO workshop: *Variational Methods for Evolution* Oberwolfach, 2017
- MFO workshop: *Applications of Optimal Transportation in the Natural Sciences* Oberwolfach, 2017
- 7^{th} European Congress of Mathematics, Berlin: section "Analysis and PDEs". Invited speaker.
- MFO workshop: *Heat Kernels, Stochastic Processes, and Functional Inequalities*, Oberwolfach, 2016.
- Conference on *New trends in Optimal Transport*, HIM, Bonn, 2015.
- BIRS workshop: *Entropy Methods, PDEs, Functional Inequalities, and Applications*, Banff, 2014.
- International Conference on *Fractal Geometry and Stochastics V*, Tabarz (DE), 2014. Plenary speaker.
- Workshop on *Infinite-Dimensional Geometry*, MSRI, Berkeley, 2013.
- EQUADIFF 2013, Prague. Plenary speaker.
- Conference on *Probability and Geometry*, Poitiers, 2012.
- BIRS Workshop: *Optimal Transportation and Differential Geometry* Banff, 2012.
- MFO workshop: *Interplay of Analysis and Probability in Physics*, Oberwolfach, 2012.
- MFO mini-workshop: *Manifolds with Lower Curvature Bounds*, Oberwolfach, 2012.
- RISM meeting: *Multiphase and Multiphysics problems*, Verbania (IT), 2011.
- BIRS workshop: *Nonlinear Diffusions and Entropy Dissipation: From Geometry to Biology*, Banff, 2010.
- CIRM-HCM Meeting: *Stochastic Analysis, SPDEs, Particle Systems, Optimal Transport* Levico (IT), 2010.

**An Highly cited paper according to WOS*

– Wokshop on *Particle systems, nonlinear diffusions, and equilibration*, HCM, Bonn, 2007.
– Workshop on *Optimal Transportation, and Applications to Geophysics and Geometry*, Edinburgh, 2007.
– Workshop on *Optimal transport: theory and application*, Centro De Giorgi, Pisa, 2006.
– *Nonlinear Diffusion Equations and related PDEs*, UAM, Madrid, 2006
– Workshop on *Modelling and analysis of phase transitions* Centro De Giorgi, Pisa, 2006.
– ICMS Workshop: *Optimal Transportation, Transport Equations and Hydrodynamics*, Edinburgh, 2005.
– *10th Conference on Free Boundary Problems*, Coimbra, June 7-12, 2005. Plenary speaker.

Invited courses to international advanced schools

– CIME course on *New Trends on Analysis and Geometry in Metric Spaces*, Levico Terme, Italy 2017: Sobolev Spaces in Extended Metric-Measure Spaces
– *Gradient flows and entropy methods*, HIM, Bonn, 2015: The Weighted Energy-Dissipation (WED) principle for gradient flows.
– *Analysis and Geometry on Singular Spaces*, Scuola Normale Superiore, Pisa, 2014: Metric measure spaces with Riemannian Ricci curvature bounded from below.
– *Seventh Summer School in Analysis and Applied Mathematics*, Roma, 2013: Gradient flows and rate-independent evolutions: a variational approach.
– CNA Summer School on *"New Vistas in Image Processing and PDEs"* Carnegie Mellon University, Pittsburgh, 2010: Applications of optimal transport to evolutionary PDEs.
– *School on "Optimal transport: Theory and applications"* Institut Fourier, Grenoble, 2009: Gradient flows and optimal transport.
– *EVEQ2008*, Prague, 2008: A variational approach to gradient flows and rate-independent problems.
– *School in Nonlinear Analysis and Calculus of Variations* Scuola Normale Superiore, Pisa, 2006: Gradient flows: a variational approach.

Milano, December 1, 2022

Giuseppe Savaré

List of publications

[1] Giuseppe Savaré. "Sobolev spaces in extended metric-measure spaces". In: *New trends on analysis and geometry in metric spaces*. Vol. 2296. Lecture Notes in Math. Springer, Cham, [2022] ©2022, pp. 117–276. URL: https://doi.org/10.1007/978-3-030-84141-6_4.

[2] Giulia Cavagnari et al. "Lagrangian, Eulerian and Kantorovich formulations of multi-agent optimal control problems: equivalence and gamma-convergence". In: *J. Differential Equations* 322 (2022), pp. 268–364. ISSN: 0022-0396. URL: https://doi.org/10.1016/j.jde.2022.03.019.

[3] Mark A. Peletier et al. "Jump processes as generalized gradient flows". In: *Calc. Var. Partial Differential Equations* 61.1 (2022), Paper No. 33, 85. ISSN: 0944-2669. URL: https://doi.org/10.1007/s00526-021-02130-2.

[4] Giuseppe Savaré and Giacomo E. Sodini. "A simple relaxation approach to duality for optimal transport problems in completely regular spaces". In: *J. Convex Anal.* 29.1 (2022), pp. 1–12. ISSN: 0944-6532.

[5] Luigi Ambrosio and Giuseppe Savaré. "Duality properties of metric Sobolev spaces and capacity". In: *Math. Eng.* 3.1 (2021), Paper No. 1, 31. URL: https://doi.org/10.3934/mine.2021001.

[6] Luigi Ambrosio et al. "Spatially inhomogeneous evolutionary games". In: *Comm. Pure Appl. Math.* 74.7 (2021), pp. 1353–1402. ISSN: 0010-3640. URL: https://doi.org/10.1002/cpa.21995.

[7] Giulia Luise and Giuseppe Savaré. "Contraction and regularizing properties of heat flows in metric measure spaces". In: *Discrete Contin. Dyn. Syst. Ser. S* 14.1 (2021), pp. 273–297. ISSN: 1937-1632. URL: https://doi.org/10.3934/dcdss.2020327.

[8] Emanuele Naldi and Giuseppe Savaré. "Weak topology and Opial property in Wasserstein spaces, with applications to gradient flows and proximal point algorithms of geodesically convex functionals". In: *Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl.* 32.4 (2021), pp. 725–750. ISSN: 1120-6330. URL: https://doi.org/10.4171/rlm/955.

[9] Florentine Fleissner and Giuseppe Savaré. "Reverse approximation of gradient flows as minimizing movements: a conjecture by De Giorgi". In: *Ann. Sc. Norm. Super. Pisa Cl. Sci. (5)* 20.2 (2020), pp. 677–720. ISSN: 0391-173X. URL: https://doi.org/10.2422/2036-2145.201711_008.

[10] Matteo Muratori and Giuseppe Savaré. "Gradient flows and evolution variational inequalities in metric spaces. I: Structural properties". In: *J. Funct. Anal.* 278.4 (2020), pp. 108347, 67. ISSN: 0022-1236. URL: https://doi.org/10.1016/j.jfa.2019.108347.

[11] Luigi Ambrosio, Andrea Mondino, and Giuseppe Savaré. "Nonlinear diffusion equations and curvature conditions in metric measure spaces". In: *Mem. Amer. Math. Soc.* 262.1270 (2019), pp. v+121. ISSN: 0065-9266. URL: https://doi.org/10.1090/memo/1270.

[12] M. Fornasier et al. "Mean-field optimal control as gamma-limit of finite agent controls". In: *European J. Appl. Math.* 30.6 (2019), pp. 1153–1186. ISSN: 0956-7925. URL: https://doi.org/10.1017/s0956792519000044.

[13] Carlo Orrieri, Alessio Porretta, and Giuseppe Savaré. "A variational approach to the mean field planning problem". In: *J. Funct. Anal.* 277.6 (2019), pp. 1868–1957. ISSN: 0022-1236. URL: https://doi.org/10.1016/j.jfa.2019.04.011.

[14] Riccarda Rossi et al. "Weighted energy-dissipation principle for gradient flows in metric spaces". In: *J. Math. Pures Appl. (9)* 127 (2019), pp. 1–66. ISSN: 0021-7824. URL: https://doi.org/10.1016/j.matpur.2018.06.022.

[15] Matthias Liero, Alexander Mielke, and Giuseppe Savaré. "Optimal entropy-transport problems and a new Hellinger-Kantorovich distance between positive measures". In: *Invent. Math.* 211.3 (2018), pp. 969–1117. ISSN: 0020-9910. URL: https://doi.org/10.1007/s00222-017-0759-8.

[16] Alexander Mielke, Riccarda Rossi, and Giuseppe Savaré. "Global existence results for viscoplasticity at finite strain". In: *Arch. Ration. Mech. Anal.* 227.1 (2018), pp. 423–475. ISSN: 0003-9527. URL: https://doi.org/10.1007/s00205-017-1164-6.

[17] Luca Minotti and Giuseppe Savaré. "Viscous corrections of the time incremental minimization scheme and visco-energetic solutions to rate-independent evolution problems". In: *Arch. Ration. Mech. Anal.* 227.2 (2018), pp. 477–543. ISSN: 0003-9527. URL: https://doi.org/10.1007/s00205-017-1165-5.

[18] Giuseppe Savaré. "Diffusion, optimal transport and Ricci curvature". In: *European Congress of Mathematics*. Eur. Math. Soc., Zürich, 2018, pp. 311–331.

[19] Luigi Ambrosio, Nicola Gigli, and Giuseppe Savaré. "Diffusion, optimal transport and Ricci curvature for metric measure spaces". In: *Eur. Math. Soc. Newsl.* 103 (2017), pp. 19–28. ISSN: 1027-488X. URL: https://doi.org/10.4171/news/103/4.

[20] Riccarda Rossi and Giuseppe Savaré. "From visco-energetic to energetic and balanced viscosity solutions of rate-independent systems". In: *Solvability, regularity, and optimal control of boundary value problems for PDEs*. Vol. 22. Springer INdAM Ser. Springer, Cham, 2017, pp. 489–531.

[21] Luigi Ambrosio, Matthias Erbar, and Giuseppe Savaré. "Optimal transport, Cheeger energies and contractivity of dynamic transport distances in extended spaces". In: *Nonlinear Anal.* 137 (2016), pp. 77–134. ISSN: 0362-546X. URL: https://doi.org/10.1016/j.na.2015.12.006.

[22] Luigi Ambrosio, Andrea Mondino, and Giuseppe Savaré. "On the Bakry-Émery condition, the gradient estimates and the local-to-global property of $RCD^*(K, N)$ metric measure spaces". In: *J. Geom. Anal.* 26.1 (2016), pp. 24–56. ISSN: 1050-6926. URL: https://doi.org/10.1007/s12220-014-9537-7.

[23] Matthias Liero, Alexander Mielke, and Giuseppe Savaré. "Optimal transport in competition with reaction: the Hellinger-Kantorovich distance and geodesic curves". In: *SIAM J. Math. Anal.* 48.4 (2016), pp. 2869–2911. ISSN: 0036-1410. URL: https://doi.org/10.1137/15M1041420.

[24] Alexander Mielke, Riccarda Rossi, and Giuseppe Savaré. "Balanced viscosity (BV) solutions to infinite-dimensional rate-independent systems". In: *J. Eur. Math. Soc. (JEMS)* 18.9 (2016), pp. 2107–2165. ISSN: 1435-9855. URL: https://doi.org/10.4171/JEMS/639.

[25] Alexander Mielke, Riccarda Rossi, and Giuseppe Savaré. "Balanced-viscosity solutions for multi-rate systems". In: *J. Phys. Conf. Ser.* 727 (2016), pp. 012010, 26. ISSN: 1742-6588. URL: https://doi.org/10.1088/1742-6596/727/1/012010.

[26] Virginia Agostiniani, Riccarda Rossi, and Giuseppe Savaré. "On the transversality conditions and their genericity". In: *Rend. Circ. Mat. Palermo (2)* 64.1 (2015), pp. 101–116. ISSN: 0009-725X. URL: https://doi.org/10.1007/s12215-014-0184-4.

[27] Luigi Ambrosio, Simone Di Marino, and Giuseppe Savaré. "On the duality between p-modulus and probability measures". In: *J. Eur. Math. Soc. (JEMS)* 17.8 (2015), pp. 1817–1853. ISSN: 1435-9855. URL: https://doi.org/10.4171/JEMS/546.

[28] Luigi Ambrosio, Nicola Gigli, and Giuseppe Savaré. "Bakry-Émery curvature-dimension condition and Riemannian Ricci curvature bounds". In: *Ann. Probab.* 43.1 (2015), pp. 339–404. ISSN: 0091-1798. URL: https://doi.org/10.1214/14-AOP907.

[29] Nicola Gigli, Andrea Mondino, and Giuseppe Savaré. "Convergence of pointed non-compact metric measure spaces and stability of Ricci curvature bounds and heat flows". In: *Proc. Lond. Math. Soc. (3)* 111.5 (2015), pp. 1071–1129. ISSN: 0024-6115. URL: https://doi.org/10.1112/plms/pdv047.

[30] Luigi Ambrosio, Nicola Gigli, and Giuseppe Savaré. "Calculus and heat flow in metric measure spaces and applications to spaces with Ricci bounds from below". In: *Invent. Math.* 195.2 (2014), pp. 289–391. ISSN: 0020-9910. URL: https://doi.org/10.1007/s00222-013-0456-1.

[31] Luigi Ambrosio, Nicola Gigli, and Giuseppe Savaré. "Metric measure spaces with Riemannian Ricci curvature bounded from below". In: *Duke Math. J.* 163.7 (2014), pp. 1405–1490. ISSN: 0012-7094. URL: https://doi.org/10.1215/00127094-2681605.

[32] Sara Daneri and Giuseppe Savaré. "Lecture notes on gradient flows and optimal transport". In: *Optimal transportation*. Vol. 413. London Math. Soc. Lecture Note Ser. Cambridge Univ. Press, Cambridge, 2014, pp. 100–144.

[33] Giuseppe Savaré. "Self-improvement of the Bakry-Émery condition and Wasserstein contraction of the heat flow in RCD(K, ∞) metric measure spaces". In: *Discrete Contin. Dyn. Syst.* 34.4 (2014), pp. 1641–1661. ISSN: 1078-0947. URL: https://doi.org/10.3934/dcds.2014.34.1641.

[34] Giuseppe Savaré and Giuseppe Toscani. "The concavity of Rényi entropy power". In: *IEEE Trans. Inform. Theory* 60.5 (2014), pp. 2687–2693. ISSN: 0018-9448. URL: https://doi.org/10.1109/TIT.2014.2309341.

[35] Luigi Ambrosio, Nicola Gigli, and Giuseppe Savaré. "Density of Lipschitz functions and equivalence of weak gradients in metric measure spaces". In: *Rev. Mat. Iberoam.* 29.3 (2013), pp. 969–996. ISSN: 0213-2230. URL: https://doi.org/10.4171/RMI/746.

[36] Luigi Ambrosio, Nicola Gigli, and Giuseppe Savaré. "Heat flow and calculus on metric measure spaces with Ricci curvature bounded below—the compact case". In: *Analysis and numerics of partial differential equations*. Vol. 4. Springer INdAM Ser. Springer, Milan, 2013, pp. 63–115. URL: https://doi.org/10.1007/978-88-470-2592-9_8.

[37] Y. Brenier et al. "Sticky particle dynamics with interactions". In: *J. Math. Pures Appl. (9)* 99.5 (2013), pp. 577–617. ISSN: 0021-7824. URL: https://doi.org/10.1016/j.matpur.2012.09.013.

[38] Alexander Mielke, Riccarda Rossi, and Giuseppe Savaré. "Nonsmooth analysis of doubly nonlinear evolution equations". In: *Calc. Var. Partial Differential Equations* 46.1-2 (2013), pp. 253–310. ISSN: 0944-2669. URL: https://doi.org/10.1007/s00526-011-0482-z.

[39] Riccarda Rossi and Giuseppe Savaré. "A characterization of energetic and BV solutions to one-dimensional rate-independent systems". In: *Discrete Contin. Dyn. Syst. Ser. S* 6.1 (2013), pp. 167–191. ISSN: 1937-1632. URL: https://doi.org/10.3934/dcdss.2013.6.167.

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