

GABRIELE GRILLO – SHORT CV AND PUBLICATIONS

POSITION

- Full professor of Mathematical Analysis at the Dipartimento di Matematica, Politecnico di Milano, Piazza Leonardo da Vinci 32, 20133 Milano (tel. +39 02 23994620, fax +39 02 23994626, e-mail: gabriele.grillo@polimi.it). Deputy Dean of the Department (2017-2019, 2020-2022).

EDUCATION

- 1987 - Degree in Physics, University of Milano, Italy (110/110 cum laude).
- 1989 - “Magister Philosophiae” degree in Mathematical Physics, International School for Advances Studies (S.I.S.S.A.-I.S.A.S), Trieste, Italy (30/30 cum laude).
- 1992 - “Doctor Philosophiae” in Functional Analysis and Applications, International School for Advances Studies (S.I.S.S.A.-I.S.A.S), Trieste, Italy.

EMPLOYMENTS

- 1987-1990: Ph.D. student with grant, International School for Advances Studies (S.I.S.S.A.-I.S.A.S), Trieste, Italy.
- 1990-1997: researcher (assistant professor) at the Department of Mathematics of the University of Udine (Italy).
- 1997-1998: researcher at the Department of Mathematics of the University of Torino (Italy).
- 1998-2009: associate professor (till 2004) and then full professor at Department of Mathematics of the Politecnico of Torino (Italy).
- 2009-present: full professor at the Department of Mathematics of the Politecnico of Milano (Italy).

PAPERS ON REFEREED JOURNALS

- (1) Fast diffusion on noncompact manifolds: well-posedness theory and connections with semilinear elliptic equations, with M. Muratori and F. Punzo, to appear in *Trans. Amer. Math. Soc.* ([arXiv link](#)).
- (2) Smoothing effects and infinite time blowup for reaction-diffusion equations: an approach via Sobolev and Poincaré inequalities, with G. Meglioli, F. Punzo, to appear in *J. Math. Pures Appl.* ([arXiv link](#)).
- (3) The fractional porous medium equation on the hyperbolic space, with E. Berchio, M. Bonforte, D. Ganguly, *Calc. Var. Partial Diff. Equ.* **59** (2020), article 169 (36 pages), ([journal link](#)) ([arXiv link](#)).
- (4) Nonlinear characterizations of stochastic completeness, with K. Ishige, M. Muratori, *J. Math. Pures Appl.* **139** (2020), 63-82, ([arXiv link](#)), ([journal link](#)).
- (5) Uniqueness of very weak solutions for a fractional filtration equation, with M. Muratori, F. Punzo, *Adv. Math.* **365** (2020), article 107041 (35 pages), ([arXiv link](#)), ([journal link](#)).
- (6) Improved multipolar Poincaré-Hardy inequalities on Cartan-Hadamard manifolds, with E. Berchio, D. Ganguly, *Annali Mat. Pura Appl.* **199** (2020), 65-80 ([arXiv link](#)), ([journal link](#)).
- (7) An optimal improvement for the Hardy inequality on the hyperbolic space and related manifolds, with E. Berchio, D. Ganguly, Y. Pinchover, *Proc. Roy. Soc. Edinburgh Sect. A* **150** (2020), 1699-1736 ([arXiv link](#)), ([journal link](#)).
- (8) The porous medium equation on Riemannian manifolds with negative curvature: the superquadratic case, with M. Muratori and J. L. Vázquez, *Math. Ann.* **373** (2019), 119-153 ([arXiv link](#)), ([journal link](#)).

- (9) Blow-up and global existence for the porous medium equation with reaction on a class of Cartan-Hadamard manifolds, with M. Muratori, F. Punzo, *J. Differential Equations* **266** (2019), 4305-4336, ([arXiv link](#)), ([journal link](#)).
- (10) The porous medium equation with measure data on negatively curved Riemannian manifolds, with M. Muratori, F. Punzo, *J. European Math. Soc.* **20** (2018), 2769-2812 ([arXiv link](#)), ([journal link](#)).
- (11) The porous medium equation with large initial data on negatively curved Riemannian manifolds, with M. Muratori, F. Punzo, *J. Math. Pures Appl.* **113** (2018), 195-226. ([arXiv link](#)), ([journal link](#)).
- (12) The porous medium equation on Riemannian manifolds with negative curvature. The large-time behaviour, with M. Muratori, J.L. Vázquez, *Adv. Math.* **314** (2017), 328-377 ([arXiv link](#)), ([journal link](#)).
- (13) Improved L^p -Poincaré inequalities on the hyperbolic space, with E. Berchio, L. D'Ambrosio, D. Ganguly, *Nonlin. Anal.* **157** (2017), 146-166 ([arXiv link](#)), ([journal link](#)).
- (14) Sharp Poincaré-Hardy and Poincaré-Rellich inequalities on the hyperbolic space, with E. Berchio and D. Ganguly, *J. Funct. Anal.* **272** (2017), 1661-1703 ([arXiv link](#)), ([journal link](#)).
- (15) Smoothing effects for the porous medium equation on Cartan-Hadamard manifolds, with M. Muratori, *Nonlin. Anal. TMA* **131** (2016), 346-362 ([arXiv link](#)), ([journal link](#)).
- (16) Improved time-decay for a class of scaling critical electromagnetic Schrödinger flows, with L. Fanelli and H. Kovařík, *J. Funct. Anal.* **269** (2015), 3336-3346, ([arXiv link](#)), ([journal link](#)).
- (17) Fractional porous media equations: existence and uniqueness of weak solutions with measure data, with M. Muratori and F. Punzo, *Calc. Var. Partial Diff. Equ.* **54** (2015), 3303-3335, ([arXiv link](#)), ([journal link](#)).
- (18) On the asymptotic behaviour of solutions to the fractional porous medium equation with variable density, with M. Muratori and F. Punzo, *Discr. Contin. Dynam. Systems* **35** (2015), 5927-5962, ([arXiv link](#)), ([journal link](#)).
- (19) Weighted dispersive estimates for two-dimensional Schrödinger operators with Aharonov-Bohm magnetic field, with H. Kovařík, *J. Differential Equations* **256** (2014), 3889-3911, ([arXiv link](#)), ([journal link](#)).
- (20) Sharp two-sided heat kernel estimates of twisted tubes and applications, with H. Kovařík and Y. Pinchover, *Arch. Rat. Mech. Anal.* **213** (2014), 215-243 ([arXiv link](#)), ([journal link](#)).
- (21) Radial fast diffusion on the hyperbolic space, with M. Muratori, *Proc. London Math. Soc.* **109** (2014), 283-317 ([arXiv link](#)), ([journal link](#)).
- (22) Stability and qualitative properties of radial solutions of the Lane-Emden-Fowler equation on Riemannian models, with E. Berchio and A. Ferrero, *J. Math. Pures Appl.* **102** (2014), 1-35 ([arXiv link](#)), ([journal link](#)).
- (23) Conditions at infinity for the inhomogeneous filtration equation, with M. Muratori and F. Punzo, *Ann. Inst. H. Poincaré Anal. Non Linéaire* **31** (2014), 413-428 ([arXiv link](#)), ([journal link](#)).
- (24) Sharp asymptotics for the porous media equation in low dimensions via Gagliardo-Nirenberg inequalities, with M. Muratori, *Riv. Mat. Univ. Parma* **5** (2014), 15-38 ([journal link](#)).
- (25) Quantitative bounds for subcritical semilinear elliptic equations, with M. Bonforte and J.L. Vázquez, *Contemp. Math.* **595** (2013), 63-89 ([journal link](#)).
- (26) Porous media equations with two weights: smoothing and decay properties of energy solutions via Poincaré inequalities, with M. Muratori and M. Porzio, *Discr. Contin. Dynam. Systems* **33** (2013), 3599-3640 ([arXiv link](#)), ([journal link](#)).
- (27) Sharp short and long-time asymptotics for solutions to the Neumann problem for the porous media equation, with M. Muratori, *J. Differential Equations* **254** (2013), 2261-2288 ([arXiv link](#)), ([journal link](#)).
- (28) Classification of radial solutions to the Emden-Fowler equation on the hyperbolic space, with M. Bonforte, F. Gazzola and J.L. Vázquez, *Calc. Var. Partial Diff. Equ.* **46** (2013), 375-401 ([arXiv link](#)), ([journal link](#)).

- (29) Quantitative local bounds for subcritical semilinear elliptic equations, with M. Bonforte, J.L. Vázquez, *Milan J. Math.* **80** (2012), 65-118 ([arXiv link](#), [journal link](#)).
- (30) Behaviour near extinction for the fast diffusion equation on bounded domains, with M. Bonforte and J.L. Vázquez, *J. Math. Pures Appl.* **97** (2012), 1-38 ([arXiv link](#), [journal link](#)).
- (31) Sharp rates of decay of solutions to the nonlinear fast diffusion equation via functional inequalities, with M. Bonforte, J. Dolbeault and J.L. Vázquez, *Proc. Natl. Acad. Sci. USA.* **107** (2010) 16459-16464 ([arXiv link](#), [journal link](#)).
- (32) On the equivalence between p -Poincaré inequalities and L^r - L^q regularization and decay estimates of certain nonlinear evolutions, *J. Differential Equations* **249** (2010), 2561–2576 ([journal link](#)).
- (33) Special fast diffusion with slow asymptotics, entropy method and flow on a Riemannian manifold, with M. Bonforte and J.L. Vázquez, *Arch. Rat. Mech. Anal.* **196** (2010), 631-680, ([arXiv link](#), [journal link](#)).
- (34) Hypercontractivity, Nash inequalities and subordination for classes of nonlinear semigroups, with F. Cipriani, *Semigroup Forum* **78** (2009), 77-98 ([arXiv link](#), [journal link](#)).
- (35) A parabolic regularization property of p -logarithmic Sobolev generators, *Diff. Equations Appl.* **1** (2009), 123–138 ([journal link](#)).
- (36) Asymptotics of the fast diffusion equations via entropy estimates, with A. Blanchet, M. Bonforte, J. Dolbeault, J. L. Vázquez, *Arch. Rat. Mech. Anal.* **191** (2009), 347–385 ([arXiv link](#), [journal link](#)).
- (37) Fast diffusion flow on manifolds of nonpositive curvature, with M. Bonforte and J.L. Vázquez, *J. Evol. Equ.* **8** (2008), 99–128. ([journal link](#)).
- (38) Singular evolution on manifolds, their smoothing properties, and Sobolev inequalities, with M. Bonforte, *Discr. Cont. Dynam. Systems*, Added Volume (2007), 130–137.
- (39) Hardy-Poincaré inequalities and applications to nonlinear diffusions, with A. Blanchet, M. Bonforte, J. Dolbeault, J.L. Vázquez, *C. R. Math. Acad. Sci. Paris* **344** (2007), 431–436 ([journal link](#)).
- (40) Super and ultracontractive bounds for doubly nonlinear evolution equations, with M. Bonforte, *Rev. Mat. Iberoamericana* **22** (2006), 111-129 ([journal link](#)).
- (41) Direct and reverse Gagliardo–Nirenberg inequalities from logarithmic Sobolev inequalities, with M. Bonforte, *Bull. Polish Acad. Sci. Math.* **53** (2005), 323-336 ([journal link](#)).
- (42) Asymptotics of the porous media equations via Sobolev inequalities, with M. Bonforte, *J. Funct. Anal.* **225** (2005), 33-62 ([journal link](#)).
- (43) On the Schrödinger heat kernel in horn-shaped domains, *Colloq. Math.* **99** (2004), 145-155 ([journal link](#)).
- (44) Ultracontractivity and approach to equilibrium for supercritical parabolic equations on Riemannian manifolds, with M. Bonforte and F. Cipriani, *Adv. Differential Equations* **8** (2003), 843–872 ([journal link](#)).
- (45) Nonlinear Dirichlet forms, nonlinear Markov semigroups and applications to minimal surfaces, with F. Cipriani, *J. Reine Angew. Math.* **562** (2003), 201–235, ([journal link](#)).
- (46) Hardy and Rellich type inequalities for metrics defined by vector fields, *Potential Anal.*, **18** (2003), 187–217 ([journal link](#)).
- (47) L^q - L^∞ Hölder continuity for quasilinear parabolic equations associated to Sobolev derivations, with F. Cipriani, *J. Math. Anal. Appl.* **270** (2002), 267-290 ([journal link](#)).
- (48) Uniform bounds for solutions to quasilinear parabolic equations, with F. Cipriani, *J. Differential Equations* **177** (2001), 209–234 ([journal link](#)).
- (49) The Markov property for classes of nonlinear evolutions, with F. Cipriani, *Nonlinear Anal.* **47** (2001), 3549–3554 ([journal link](#)).
- (50) Off-diagonal bounds of non-gaussian type for the Dirichlet heat kernel, *J. London Math. Soc.* **62** (2000), 599–612 ([journal link](#)).
- (51) On the L^p -Agmon's theory, with F. Cipriani, *Discr. Contin. Dynam. Systems*, Added Volume (1998), 167–176.

- (52) On Persson’s theorem in local Dirichlet spaces, *Z. Anal. Anwendungen* **17** (1998), 329–338 ([journal link](#)).
- (53) L^p exponential decay for solutions to functional equations in local Dirichlet spaces, with F. Cipriani, *J. Reine Angew. Math.* **496** (1998), 163–179 ([journal link](#)).
- (54) Pointwise properties of eigenfunctions and heat kernels of Dirichlet–Schrödinger operators, with F. Cipriani, *Potential Anal.* **8** (1998), 101–126 ([journal link](#)).
- (55) Lower bounds for the Dirichlet heat kernel, *Quart. J. Math. Oxford Ser. II* **48** (1997), 203–211 ([journal link](#)).
- (56) Pointwise lower bounds for positive solutions of elliptic equations and applications to intrinsic ultracontractivity of Schrödinger semigroups, with F. Cipriani, *Boll. U.M.I.* **10B** (1996), 927–941.
- (57) Heat Kernels and Theta Functions, *Expo. Math.* **14**, 181–186 (1996).
- (58) On Dirichlet–Schrödinger operators with strong potentials, *Studia Math.* **116**, 239–254 (1995) ([journal link](#)).
- (59) Contractivity properties of Schrödinger Semigroups on Bounded Domains, with F. Cipriani, *J. London Math. Soc.* **52**, 583–593 (1995) ([journal link](#)).
- (60) Long–Time Behaviour of Langevin Algorithms with Time–Dependent Energy Function, *Math. Nachr.* **172**, 127–143 (1995) ([journal link](#)).
- (61) Logarithmic Sobolev Inequalities and Langevin Algorithms, *Stoch. Anal. Applic.* **12**, 309–328 (1994) ([journal link](#)).
- (62) Simulated Annealing with Time–Dependent Energy Function, with A. Frigerio, *Math. Z.* **213** (1993), 97–116 ([journal link](#)).
- (63) Asymptotic Behaviour of Time–Inhomogeneous Evolutions on von Neumann Algebras, with A. Frigerio, *Pubbl. R.I.M.S. Kyoto Univ.* **29** (1993), 841–856 ([journal link](#)).
- (64) Some Existence and Regularity Results for Linear Partial Differential Equations with Constant Coefficients, with M. Giudici, *Riv. Mat. Pura Applicata* **12** (1993), 89–110.
- (65) On a Class of Naked Strong Curvature Singularities, *Class. Quantum Grav.* **8** (1991), 739–749 ([journal link](#)).
- (66) Black Holes in Tolman-Bondi Spacetimes, with V.Gorini, M.Pelizza, *Mod. Phys. Lett.* **A5** (1990), 719–723 ([journal link](#)).
- (67) Cosmic Censorship and Tolman-Bondi Spacetimes, with V.Gorini, M.Pelizza, *Phys. Lett.* **A135** (1989), 154–158 ([journal link](#)).

PAPERS ON CONFERENCE PROCEEDINGS

- (68) Ultracontractive bounds for nonlinear evolution equations governed by the subcritical p -Laplacian, with M. Bonforte, in *Progr. Nonlin. Differential Equations* **61** (2005), 15–28 ([chapter link](#)).
- (69) A quadratic form inequality for classes of degenerate elliptic operators, in: “Progress in partial differential equations”, eds. J. Amann, M. Chipot, Pitman Res. Notes Math. Ser. **383** Vol. 1, pp. 138–147 (Longman, Harlow, 1998).
- (70) Time-Dependent Schrödinger Operators and Simulated Annealing, with A. Frigerio, in: “Semigroup Theory and Evolution Equations”, eds. P. Clément, E. Mitidieri, B. de Pagter, Lecture Notes in Pure and Applied Mathematics **135**, 165–181 (Marcel Dekker, New York, 1991).
- (71) On the Causal Structure of Tolman-Bondi Spacetimes, Proceedings of the Italian Conference on Relativity (1991), 450–455, World Scientific.

PREPRINTS

- (72) Global existence of solutions and smoothing effects for classes of reaction-diffusion equations on manifolds, with G. Meglioli, F. Punzo ([arXiv link](#)).

ORGANIZATION OF SCIENTIFIC CONFERENCES AND COURSES

- “Partial Differential Equations and Related Analytic-Geometric Inequalities”, Politecnico di Milano, February 2017, with F. Gazzola.
- CIME course on “Nonlocal and nonlinear diffusions and interactions: new methods and directions”, Cetraro, July 2016, with M. Bonforte. Course lecturers: J.A. Carrillo, M. del Pino, A. Figalli, G. Mingione, J.L. Vázquez ([CIME homepage](#)).
- “Nonlinear elliptic and parabolic partial differential equations” Politecnico di Milano, June 2013, with F. Gazzola.
- “Trends in mathematical analysis and applications”, Politecnico di Milano, March 2012, with F. Gazzola, M. Grasselli, V. Pata, S. Salsa, F. Tomarelli.
- “Spectral Theory and Schrödinger operators”, Politecnico di Milano, March 2011, with F. Cipriani.
- “Nonlinear evolution equations”, Palermo, June 2010, with G. Bonanno, G. Ciraolo, V. Vespri.
- “Functional Analysis”, Aosta, May 1999, with F. Astengo, M. Peloso, A. Tabacco.
- “Classical and Quantum Probability”, Università di Udine, September 1994, with C. Cecchini, A. Giovagnoli.

EDITORIAL ACTIVITY

- Member of the Editorial Board of “*Nonlinear Analysis*” ([journal’s homepage](#)) (2014–2020).
- Member of the Managing Board of “*Milan Journal of Mathematics*” ([journal’s homepage](#)) (2015–).
- Guest editor of an issue of “*Discrete and Continuous Dynamical Systems - Series S*” (2014) (with F. Gazzola). ([journal issue’s page](#)).
- Guest editor of issues of **137-138** (2016) of “*Nonlinear Analysis*” (2016), in honor of J.L. Vázquez for his 70th birthday (with M. Bonforte and L. Caffarelli) ([link to volume 137](#), [link to volume 138](#)).
- Editor (with M. Bonforte) of the volume “Nonlocal and Nonlinear Diffusions and Interactions: New Methods and Directions”, *Lecture Notes in Mathematics* **2186** ([link to Springer page](#)).
- Member of the Editorial Board of “*Analysis, Geometry and Number Theory*” ([journal’s homepage](#)) (2016–2017).

RECENT INVITED TALKS (SELECTION)

- Geometric aspects of harmonic analysis and spectral theory, Haifa (Israel), June 2019.
- Partial Differential Equations in Analysis and Mathematical Physics, Santa Margherita di Pula (Italy), May 2019.
- VI Italian-Japanese Workshop on Geometric Properties for Parabolic and Elliptic PDEs, Cortona (Italy), May 2019.
- Università di Roma “Tor Vergata”, Dipartimento di Matematica, May 2018.
- A geometry day, Como (Italy), January 2018.
- Hardy-type Inequalities and Elliptic PDEs, in honor of Professor Moshe Marcus’s 80th birthday, Sde Boker (Israel), January 2018.
- Non-local equations and fractional diffusion, Warwick (UK), May 2017.
- Nonlinear diffusion and free boundary problems, in honor of the 70th anniversary of Juan Luis Vázquez, Madrid (Spain), May 2017.
- 3rd Conference on Recent Trends in Nonlinear Phenomena, Perugia (Italy), September 2016.
- 7th Euro-Japanese Workshop on Blow-up, Będlewo (Poland), September 2016.
- A day on nonlocal PDEs, Madrid (Spain), December 2015.
- Nonlocal Nonlinear Partial Differential Equations and Applications, Anacapri (Italy), September 2015.
- Frontiers of Mathematics and Applications-IV, Summer Course UIMP 2015, Santander (Spain), July 2015.
- Singular and degenerate evolution problems (INDAM workshop), Cortona (Italy), June 2014

- Third Italian-Japanese Workshop on Geometric Properties for Parabolic and Elliptic PDEs, Tokyo (Japan), September 2013.
- Technion, Haifa (Israel), Department of Mathematics, April 2013.
- UAM, Madrid (Spain), Department of Mathematics, February 2013.
- New Trends in Nonlinear Parabolic Equations, Parma (Italy), November 2012.
- Recent Trends in Nonlinear Diffusion, Pisa (Italy), July 2012.
- Nonlinear PDEs and Functional Inequalities, Madrid, September 2011.
- Asymptotic dynamics driven by solitons and traveling fronts in nonlinear PDE, Santiago de Chile, July 2011.