Curriculum vitae
of
Simona Fornaro

Education

- MSc in Mathematics at the University of Lecce (now of Salento), April 2000, 110/110 *cum laude. Advisor Prof. Giorgio Metafune.*

- *Ph.D in Mathematics at the University of Lecce, May 2004.*

Grants

- September 2000–March 2001: "*E. De Giorgi*" fellowship by the Department of Mathematics of Lecce.

- April 2000 – March 2004: Ph.D. scholarship by the Department of Mathematics of Lecce.

- September 2004 – December 2004: DAAD-STIBET grant by the University of Ulm (Germany).

- January 2005 – August 2007: Research grant by the University of Lecce.

Positions

- October 2007 - July 2015: Assistant professor at the Faculty of Engineering of the University of Pavia.

- August 2015 - now: Associate professor at the University of Pavia.

Scientific interests

- Partial differential equations of parabolic and elliptic type with unbounded coefficients.

- Degenerate second order linear elliptic operators.

- Doubly non linear parabolic equations.

Publications

[1] M. Bertoldi, S. Fornaro, Gradient estimates in parabolic problems with unbounded coefficients, *Studia Math.* **165** 2004, no. 3, 221 – 254.

[2] G. Cupini, S. Fornaro, Maximal regularity in $L^p(\mathbb{R}^N)$ for a class of elliptic operators with unbounded coefficients, *Differential Integral Equations,* **17** 2004 (3-4),259–296.

[3] S. Fornaro, V. Manco, On the domain of some ordinary differential operators in spaces of continuous functions, *Arch. Math. (Basel),* **82** 2004 (4), 335–343.

[4] S. Fornaro, G. Metafune, E. Priola, Gradient estimates for Dirichlet parabolic problems in unbounded domains, *J. Differential Equations,* **205** 2004, (2), 329–353.

[5] W. Arendt, R. Chill, S. Fornaro, C. Poupaud, L^p-maximal regularity for non-autonomous evolution equations, *Journal of Differential Equations,* **237** (2007), no. 1, 1–26.

[6] M. Bertoldi, S. Fornaro, L. Lorenzi, Pointwise gradient estimates in exterior domains, *Archiv der Mathematik,* **88** (2007), no. 1, 77–89.

[7] G. Cupini, S. Fornaro, A generation result for a class of elliptic operators with unbounded coefficients in L^p spaces, Subelliptic PDE's and applications to geometry and finance, *Lect. Notes Semin. Interdiscip. Mat.* **6** 2007, 119–131 .

[8] S. Fornaro, L. Lorenzi, Generation results for elliptic operators with unbounded diffusion coefficients in L^p- and C_b-spaces, *Discrete and Continuous Dynamical Systems, Series A* **18** (2007), no. 4, 747-772.

[9] S. Fornaro, G. Metafune, D. Pallara, J. Prüss, L^p-theory for some elliptic and parabolic problems with first order degeneracy at the boundary, *J. Math. Pures Appl. (9)* **87** 2007, no. 4, 367–393.

[10] S. Fornaro, M. Sosio, Intrinsic Harnack estimates for some doubly nonlinear degenerate parabolic equations, *Advances in Differential Equations,* **13** (2008), 139–168.

[11] S. Fornaro, N. Fusco, G. Metafune, D. Pallara, Sharp upper bounds for the density of some invariant measures, *Proc. Roy. Soc. Edinburgh Sect. A,* **139** 2009 (6), 1145–1161.

[12] S. Fornaro, U. Gianazza, Local properties of non-negative solutions to some doubly non-linear degenerate parabolic equations, *Discrete Contin. Dyn. Syst.* **26** 2010 481–492.

[13] S. Fornaro, G. Metafune, D. Pallara, Analytic semigroups generated in L^p by elliptic operators with high order degeneracy at the boundary, *Note Mat.* **31** 2011, 103–116.

[14] S. Fornaro, S. Lisini, G. Savaré, G. Toscani, Measure valued solutions of sub-linear diffusion equations with a drift term, *Discrete Contin. Dyn. Syst.* **32** 2012, 1675–1707.

[15] Fornaro, S. and Metafune, G. and Pallara, D. and Schnaubelt, R., Degenerate operators of Tricomi type in L^p-spaces and in spaces of continuous functions, *J. Differential Equations,* **252** 2012, 1182–1212.

[16] Fornaro, S. and Metafune, G. and Pallara, D. and Schnaubelt, R., One-dimensional degenerate operators in L^p-spaces, *J. Math. Anal. Appl.* **402** 2013, 308 – 318.

[17] S. Fornaro, A. Rhandi, On the Ornstein Uhlenbeck operator perturbed by singular potentials in L^p-spaces, *Discrete Contin. Dyn. Syst.* **33** 2013, 5049–5058.

[18] S. Fornaro, M. Sosio, V. Vespri, Energy estimates and integral Harnack inequality for some doubly nonlinear singular parabolic equations, *Recent trends in nonlinear partial differential equations. I. Evolution problems,* **Contemp. Math.** 5942013, 179–199.

[19] S. Fornaro, V. Vespri, Harnack estimates for non-negative weak solutions of a class of singular parabolic equations, *Manuscripta Math.* **141** 2013, 85–103.

[20] S. Fornaro, M. Sosio, V. Vespri, $L^r_{\rm loc}$-$L^\infty_{\rm loc}$ estimates and expansion of positivity for a class of doubly non linear singular parabolic equations, *Discrete Contin. Dyn. Syst. Ser. S* **7** 2014 (4), 737–760.

[21] Fornaro, S. and Metafune, G. and Pallara, D. and Schnaubelt, R., Second order elliptic operators in L^2 with first order degeneration at the boundary and outward pointing drift, *Commun. Pure Appl. Anal.* **14** 2015 (2), 407–419.

[22] S. Fornaro, M. Sosio, V. Vespri, Harnack type inequalities for some doubly nonlinear singular parabolic equations, *Discrete Contin. Dyn. Syst.* **35** 2015 (12), 5909–5926.

[23] F. G. Düzgün, S. Fornaro, V. Vespri, Interior Harnack estimates: the state-of-the-art for quasilinear singular parabolic equations, *Milan J. Math.* **83** 2015 (2) 371–395.

[24] S. Fornaro, F. Gregorio, A. Rhandi, Elliptic operators with unbounded diffusion coefficients perturbed by inverse square potentials in L^p-spaces, *Commun. Pure Appl. Anal.* **15** 2016, (6), 2357–2372.

[25] Fornaro, S. and Metafune, G., Analyticity of the Cox-Ingersoll-Ross semigroup, *Positivity,* **24** (2020) 915–931.

[26] Fornaro, S. and Henriques, E. and Vespri, V., Harnack type inequalities for the parabolic logarithmic p-Laplacian equation, *Le Matematiche,* **75** (2020), no. 1, 277–311.

[27] Fornaro, S. and Metafune, G. and Pallara, D. and Schnaubelt, R., L^p-spectrum of degenerate hypoelliptic Ornstein-Uhlenbeck operators, *J. Funct. Anal.,* **280** (2021) 2, Paper No. 108807, 22.

[28] Fornaro, S. and Henriques, E. and Vespri, V., Regularity results for a class of doubly nonlinear very singular parabolic equations, *Nonlinear Anal.,* **205** (2021),Paper No. 112213, 30.

[29] Fornaro, S. and Henriques, E. and Vespri, V., Stability to a class of doubly nonlinear very singular parabolic equations, *Manuscripta Math.,* **168** 1-2, (2022) 165–179.

[30] Fornaro, S. and Metafune, G. and Pallara, D. and Schnaubelt, R. Multi-dimensional degenerate operators in L^p-spaces, *Commun. Pure Appl. Anal.,* **21** 6, (2022), 2115–2145.

Schools and Workshops attended

- *Giornate SISSA di Analisi Nonlineare*, Trieste, 1-4 giugno 1999.
- 2^{nd} TULKA Internet Seminar *Spectral theory and asymptotic behaviour of semigroups*, Blaubeuren (Germany), June 13-19, 1999, with presentation of the seminar **"Stability of semigroup"**.
- 3^{rd} TULKA Internet Seminar *Semigroups generated by elliptic operators*, Blaubeuren (Germany) June 18-23, 2000, with presentation of the talk **"L^∞-contractivity of semigroups generated by sectorial form"**.
- 2^{nd} *European-Maghreb Workshop on Semigroup Theory, Evolution Equations and Applications*, L'Aquila, June 25-30, 2000.
- SMI Summer School *Equazioni differenziali della fisica matematica* and *Analisi complessa*, Perugia July 23–August 26.
- SMI Summer School *Semigroups of operators*, Cortona, July 8-28, 2001.
- 3^{rd} *European-Maghreb Workshop on Semigroup Theory, Evolution Equations and Applications*, Marrakesh, March 17-24, 2002.

- International Summer School *Operators Methods for Evolution Equations and Approximation Problems*, Monopoli (Bari), September 15-22, 2002, and presentation of the poster **"Global and pointwise gradient estimates for a second order elliptic operators"**.

- 6^{th} TULKA Internet Seminar *Operator Matrices and Delay Semigroups*, Blaubeuren (Germany), June 16-21, 2003, and presentation of the seminar **"Semigroups for a population cell model"**.

- International Minicourse-Workshop *Interplay between C_0-semigroups and PDEs: theory and applications*, Bari, September 22-27, 2003.

- Workshop *Kolmogorov's equations*, Pisa, October 17-18, 2003, and presentation of the seminar **"Maximal regularity in $\mathbf{L^p}(\mathbb{R}^\mathbf{N})$ for a class of elliptic operators with unbounded coefficient"**.

- Workshop *PDEs in rough enviroments*, Schmitten (Germania), December 1-6, 2003, and presentation of the seminar **"Maximal regularity in $\mathbf{L^p}(\mathbb{R}^\mathbf{N})$ for a class of elliptic operators with unbounded coefficients"**.

- 4^{th} *European-Maghreb Workshop on Semigroup Theory, Evolution Equations and Applications*, Freudenstadt, March 27- April 3, 2004.

- 8^{th} International Internet Seminar 2004-2005 *Analytic Semigroups and Reaction-Diffusion Problems*, Casalmaggiore, (Cremona) June 6-12, 2005.

- Workshop *Harnack Inequalities and Positivity for solutions of Partial Differential Equations*, Cortona, June 12-18, 2005.

- *Meeting on Subelliptic PDEs and Applications to Geometry and Finance*, Cortona, June 11-17, 2006.

- Miniscuola *Four mini courses on fine properties of solutions of Partial Differential Equations (in memory of Filippo Chiarenza and Gene Fabes)*, Centro "E. De Giorgi" Pisa, September 11-15, 2006.

- *Workshop on Kolmogorov equations*, Parma, November 1-3, 2006, and presentation of the seminar **"Analytic semigroups generated by elliptic operators with a first order degeneracy at the boundary"**.

- XVIII Convegno UMI, Bari, September 24-29, 2007, and presentation of the seminar **"Disuguaglianza di Harnack intrinseca per equazioni paraboliche doppiamente degeneri"**.

- *Giornata di lavoro Mi-Pv 2007*, Pavia, October 2007, and presentation of the seminar **"Disuguaglianza di Harnack intrinseca per equazioni paraboliche doppiamente degeneri"**.

- GNAMPA School *Harmonic Analysis and Evolution Equations*, Parma, February 4-8, 2008.

- *WCNA 2008, minisimposium "Harnack Inequalities in Analysis and Partial Differential Equations"*, Orlando, FL, USA, July 2-9, 2008, and presentation of the seminar **"Upper and lower bounds for non-negative solutions of some doubly nonlinear degenerate parabolic equations"**.

- *6^{th} Euro-Maghreb workshop on Semigroups, Evolution Equations and Applications*, CIRM, Luminy, France, November 10-14, 2008, and presentation of the talk **"Local properties of nonnegative solutions to some doubly nonlinear degenerate parabolic equations"**.

- Workshop *Equazioni di Kolmogorov*, Pisa, January 8-10, 2009, and presentation of the seminar **"Proprietà di regolarità locale per soluzioni positive di equazioni doppiamente degeneri"**.

- INdAM Intensive Bimester "Geometric properties of nonlinear local and nonlocal problems", Dipartimento di Matematica "F. Casorati", Università di Pavia and Dipartimento di Matematica "F. Brioschi" Politecnico di Milano, May 1-June 20, 2009.

- C.I.M.E. Summer Course "Regularity estimates for nonlinear elliptic and parabolic problems", Cetraro (Cosenza), June 21-27, 2009.

- Intensive period "Hyperbolic Conservation Laws and Fluid Dynamics" Parma, February 1-28, 2010.

- Workshop "Nonlinear evolution equations", Mondello (Palermo), June 8-11, 2010, seminar: **"Harnack estimates for non negative weak solutions of singular parabolic equations satisfying the comparison principle"**.

- Workshop "Deterministic and stochastic methods in evolution problems", Parma, September 7-9, 2011, seminar: **"Degenerate operators of Tricomi type in L^p-spaces and in spaces of continuous functions"**.

- Workshop "Singular and Degenerate Evolution Problems", Cortona 2014, seminar: **"Degenerate elliptic operators in L^p-spaces'**.

- Workshop " Nonlinear PDEs in Braga", Braga (Portugal) 7-9 June 2019.

- Workshop "Evolution Equations: Applied and Abstract Perspectives", 28 October - 1 November 2019, Cirm Luminy (France).

- Workshop "Kolmogorov Operators and their applications", Cortona, 13 - 17 June 2022.

- Conference *New Challenges in Operator Semigroups*, Oxford, 18 - 22 July 2022, seminar **"New perspectives on degenerate elliptic operators in L^p-spaces'**.

Teaching activity

Since the academic year 2007/08 I taught the following courses at the Faculty of Engineering of the University of Pavia (at most two each year) "Analisi Matematica 1", "Analisi Matematica 2", "Modelli e Metodi Matematici", "Complementi di Analisi Matematica", "Complementi di Analisi Matematica e Statistica".

Research projects

- Member of PRIN "Equazioni di Kolmogorov"; national coordinator Prof. Giuseppe Da Prato, 2005-2006 and 2007-2008.

- Coordinator of the project "GNAMPA 2009: Regolarità per equazioni alle derivate parziali paraboliche degeneri e/o singolar", duration 12 months.

- Member of the bilateral project CNR-FCT between Italy and Portugal "Risultati di Regolarità per le soluzioni di equazioni alle derivate parziali paraboliche singolari e degeneri", 2009-2010.

- Member of PRIN 2009 "Proprietà geometriche di problemi di diffusione non lineari"; national coordinator Prof. Italo Capuzzo Dolcetta, duration 24 months.

- Coordinator of the project "GNAMPA 2011: Regolarità in problemi di tipo Stefan e in problemi di elasticità", duration 12 months.

- Coordinator of the project "GNAMPA 2011: Regolarità in problemi di tipo Stefan e in problemi di elasticità", duration 12 months.

- Coordinator of the project "GNAMPA 2017: Regolarità massimale per alcuni operatori lineari ellittici degeneri", duration 12 months.

- Member of GNAMPA-INdAM Project 2023 "Regolarità per problemi ellittici e parabolici con crescite non standard", duration 12 months.

- Member of PRIN "Noise in fluid dynamics and related models"; PI Prof. Flavio Flandoli, 2023-2025.

Other

- Member of the *Joint Commission for tutoral activity* of the University of Pavia.

- Referee for several international journals.