Simona Fornaro, curriculum vitae

Personal data

PLACE OF BIRTH: San Pietro Vernotico (Br)

DATE OF BIRTH: 1976, 20 September

RESIDENCE: Pavia, Piazza San Pietro in Ciel d'Oro, 20.

Current Position

Assistant Professor in Mathematical Analysis
Dipartimento di Matematica "F. Casorati"
Università di Pavia
via Ferrata, 1 - 27100 - PAVIA (Italy)

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Academic degrees

2000: Laurea degree in Mathematics at the University of Lecce; "*Semigruppo del calore e congruenza di domini*". Advisor Prof. Giorgio Metafune.

2004: Ph.D in Mathematics at the University of Lecce; "*Regularity properties for second order partial differential operators with unbounded coefficients*".

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: "Assegno di ricerca" by the University of Lecce.

Leaves

- Maternity leave (art. 16 of D.LGS 151/2001) from November 29th, 2011 to April 29th, 2012.

- Parental leave (art. 32 of D.LGS.151/2001, art. 31 comma 4 CCNL 16.10.08 with salary) from April 30th, 2012 to June 13th, 2012.

Research Interests

- Second order partial differential equations of parabolic and elliptic type with unbounded coefficients ([1, 2, 3, 4, 6, 7, 9, 17, 18]).

- Semigroups theory ([1, 2, 3, 4, 6, 7, 8, 9, 11, 17]).

- Degenerate second order differential operators in L^p spaces ([5, 13, 14, 23]).

- Regularity of weak solutions of quasilinear degenerate and singular parabolic equations ([10, 12, 16, 19]).

Research projects

- Member of PRIN *"Equazioni di Kolmogorov"*; 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 singolari*", 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"*; 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.

Periods abroad

- October - November 2000: Ulm (Germany) visiting Prof. Wolfgang Arendt.

- September - December 2004: Ulm (Germany) visiting Prof. Wolfgang Arendt.

- October 1-15, 2010: Helsinki (Finland) visiting Prof. J. Kinnunen.

- October - December 2012: Jena (Germany) visiting Prof. V. Matveev.

Pubblications

Papers on international journals

[1] M. BERTOLDI, S. FORNARO, Gradient estimates in parabolic problems with unbounded coefficients, *Studia Mathematica,* **165** (2004), 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 and Integral equations,* **17** (2004), 259-296.

[3] S. FORNARO, V. MANCO, On the domain of some ordinary differential operators in spaces of continuous functions, *Archiv der Mathematik,* **82** (2004), 335-343.

[4] S. FORNARO, G. METAFUNE, E. PRIOLA, Gradient estimates for Dirichlet parabolic problems in unbounded domains, *Journal of Differential Equations,* **205** (2004), 329-353.

[5] S. FORNARO, G. METAFUNE, D. PALLARA, J. PRÜSS, L^p-theory for some elliptic and parabolic problems with first order degeneracy at the boundary, *Journal de Mathématiques Purés et Appliquées,* **87** (2007), 367–393.

[6] M. BERTOLDI, S. FORNARO, L. LORENZI, Gradient estimates for parabolic problems with unbounded coefficients in non-convex unbounded domains, *Forum Mathematicum,* **19,** (2007) 603-632.

[7] M. BERTOLDI, S. FORNARO, L. LORENZI, Pointwise gradient estimates in exterior domains, *Archiv der Mathematik,* **88** (2007), 77-89.

[8] W. ARENDT, R. CHILL, S. FORNARO, C. POUPAUD, L^p-maximal regularity for non-autonomous evolution equations, *Journal of Differential Equations,* **237** (2007), 1-26.

[9] 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, Ser. A* **18** (2007), 747-772.

[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, *Proceedings of the Royal Society of Edinburgh, Section A Mathematics,* **139** (2009), 1145-1161.

[12] S. Fornaro, U. Gianazza, Local properties of non-negative solutions to some doubly non-linear degenerate parabolic equations, *Discrete and Continuous Dynamical Systems, Ser. A,* **26** (2010), 481-492.

[13] S. Fornaro, G. Metafune, D. Pallara, Analytic semigroups generated in Lp by elliptic operators with high order degeneracy at the boundary, *Note di Matematica,* **31** (2011), 101-113.

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

[15] S. Fornaro, S. Lisini, G. Savaré, G. Toscani, Measure valued solutions of sub-linear diffusion equations with a drift term, *Discrete and Continuous Dynamical Systems, Ser. A,* **32** (2012), 1675-1707.

[16] S. Fornaro, V. Vespri, Harnack estimates for non-negative weak solutions of a class of singular parabolic equations, *Manuscripta Mathematica,* published online DOI: 10.1007/s00229-012-0562-1; in press.

[17] S. Fornaro, A. Rhandi, On the Ornstein Uhlenbeck operator perturbed by singular potentials in L^p- spaces, *Discrete and Continuous Dynamical Systems, Ser. S,* to appear.

Proceedings of conferences

[18] 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** Semin. Interdiscip. Mat. (S.I.M.), Potenza, (2007), 119-131.

[19] S. Fornaro, M. Sosio, V. Vespri, Energy Estimates and Integral Harnack inequality for some doubly nonlinear singular parabolic equations, *Contemporary Mathematics,* to appear

Lecture notes

[20] S. Fornaro, S. Maniglia, G. Metafune, Equazioni ellittiche del secondo ordine, parte prima: teoria L^2 e C^α, *Quaderno del Dipartimento di Matematica "E. De Giorgi", Università di Lecce,* **4** (2004) Edizioni del Grifo;

[21] S. Fornaro, M. Miranda, A. Rhandi, Semigruppi di Markov, operatori differenziali e disuguaglianze di tipo log-Sobolev, *Quaderno del Dipartimento di Matematica "E. De Giorgi", Università del Salento, Coordinamento SIBA,* **1** (2008).

[22] S. Fornaro, F. Paronetto, V. Vespri, Disuguaglianza di Harnack per equazioni paraboliche, *Quaderno del Dipartimento di Matematica "E. De Giorgi", Università del Salento, Coordinamento SIBA,* **2** (2008).

Preprints

[23] S. Fornaro, G. Metafune, D. Pallara, R. Schnaubelt, One-dimensional degenerate operators in L^p–spaces, submitted

Teaching activity

- Practical class of *"Analisi Matematica 1"* (basic calculus for functions in one variables), Faculty of Sciences of the University of Lecce, 2003/2004;

- 18 hours lectures of *"Metodi Matematici per l'Ingegneria"* (Mathematical Models for Engineering) at the Faculty of Engineering of the University of Lecce, 2005/2006 and 2006/2007.

- *Analisi Matematica B (ca)* (calculus for functions in several variables), at the Faculty of Engineering of the University of Pavia, 2007/2008.

- *Analisi Matematica B (ca)* (calculus for functions in several variables), at the Faculty of Engineering of the University of Pavia, 2008/2009.

- *Modelli e Metodi Matematici 2* (Mathematical Models and Methods for Engineering) at the Faculty of Engineering of the University of Pavia, 2008/2009.

- *Analisi Matematica 2* (calculus for functions in several variables), at the Faculty of Engineering of the University of Pavia, 2009/2010.

- *Analisi Matematica 2* (calculus for functions in several variables), at the Faculty of Engineering of the University of Pavia, 2010/2011.

Invitations and seminars

Italy: University of Parma, University of Firenze, University of Salerno, University of Lecce, Centro De Giorgi in Pisa;

Germany: University of Ulm, University of Tübingen, University of Karlsruhe, University of Jena;

Finlandia: AALTO University of Helsinki;

Portogallo: University of Coimbra;

U.S.A.: Vanderbilt University;

Schools and Workshops attended

- ▼ *Giornate SISSA di Analisi Nonlineare*, Trieste, June 1-4, 1999.

- ▼ 2nd TULKA Internet Seminar *Spectral theory and asymptotic behaviour of semigroups*, Blaubeuren (Germany) June 13-19, 1999; seminar "Stability of semigroups".

- ▼ 3rd TULKA Internet Seminar *Semigroups generated by elliptic operators*, Blaubeuren (Germany) June 18-23, 2000; seminar "L^{∞}-contractivity of semigroups generated by sectorial forms".

- ▼ 2nd *European-Maghreb Workshop on Semigroup Theory, Evolution Equations and Applications*, L'Aquila, June 25-30, 2000.

- ▼ S.M.I. Summer schools *Equazioni differenziali della fisica matematica* and *Analisi complessa*, Perugia July 23 - August 26, 2000 with score "A".

- ▼ S.M.I. Summer course *Semigroups of operators*, Cortona July 8-28, 2001.

- ▼ 3rd *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; poster "Global and pointwise gradient estimates for a second order elliptic operators".

- ▼ 6th TULKA Internet Seminar *Operator Matrices and Delay Semigroups*, Blaubeuren (Germany), June 16-21, 2003; 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.

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

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

▼ *4th European-Maghreb Workshop on Semigroup Theory, Evolution Equations and Applications*, Freudenstadt (Germany), March 27- April 3, 2004.

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

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

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

▼ *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, <u>seminar</u> "Analytic semigroups generated by elliptic operators with a first order degeneracy at the boundary".

▼ XVIII Convegno UMI, Bari, September 24-29, 2007, <u>talk</u> "Disuguaglianza di Harnack intrinseca per equazioni paraboliche doppiamente degeneri".

▼ *Sesta Giornata di Studio Università di Pavia - Politecnico di Milano su Equazioni Differenziali e Calcolo delle Variazioni*, Milano, October 18, 2007, <u>seminar</u>: "Disuguaglianza di Harnack intrinseca per equazioni paraboliche doppiamente degeneri".

▼ GNAMPA school *"Harmonic Analysis and Evolution Equations"*, Parma, February 4-8, 2008.

▼ *WCNA 2008, minisymposium "Harnack Inequalities in Analysis and Partial Differential Equations"*, Orlando, FL, USA, July 2–9, 2008, <u>seminar</u>: "Upper and lower bounds for non-negative solutions of some doubly nonlinear degenerate parabolic equations".

▼ *6th Euro-Maghreb workshop on Semigroups, Evolution Equations and Applications*, CIRM, Luminy, France, November 10–14, 2008, <u>seminar</u>: "Local properties of nonnegative solutions to some doubly nonlinear degenerate parabolic equations".

▼ *Settima Giornata di Studio Politecnico di Milano - Università di Pavia su Equazioni differenziali e Calcolo delle variazioni*, Pavia, November 28, 2008.

▼ Miniworkshop *Equazioni di Kolmogorov*, Pisa, January 8–10, 2009, <u>seminar</u>: "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, <u>seminar</u>: "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, <u>seminar</u>: "Degenerate operators of Tricomi type in L^p–spaces and in spaces of continuous functions".

Pavia, November 3, 2012