Curriculum vitæ et studiorum of Alessandra Lunardi

1. General data

Present position: Full Professor in Mathematical Analysis (Dipartimento di Scienze Matematiche, Fisiche e Informatiche, Università di Parma, Parco Area delle Scienze 53/A, 43124 Parma, Italy).
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2. Studies

Corso di Laurea in Matematica, University of Pisa (Italy), 1976–1980. Perfezionamento in Matematica, Scuola Normale Superiore, Pisa (Italy), 1980–1983.

3. Positions and awards

1984-1987 Researcher - Dipartimento di Matematica, Università di Pisa.
1987 Bartolozzi Prize, Unione Matematica Italiana.
1987-1994 Full professor - Dipartimento di Matematica, Università di Cagliari.
1994-present Full professor - Dipartimento di Scienze Matematiche, Fisiche e Informatiche, Università di Parma.
2017 Luigi and Wanda Amerio Prize, Accademia Lombarda di Scienze e Lettere
2017-present Mercator Fellow, University of Bielefeld.

4. Scientific activities since 2000

Research interests

(a) Kolmogorov equations and related problems: invariant measures, elliptic and parabolic (possibly degenerate) differential operators with unbounded coefficients.

(b) Parabolic free boundary problems, mathematical models in combustion theory.

(c) Evolution problems with time in the whole $\mathbb{R}$.

(d) Infinite dimensional analysis: elliptic and parabolic equations in infinitely many variables, and tools for their study such as surface measures in infinite dimension, spaces of Sobolev and BV functions.

Coordination of research projects

"Analisi e controllo di equazioni di evoluzione deterministiche e stocastiche", PRIN 2000 (local coordinator);
"Kolmogorov equations", PRIN 2002 (local coordinator);
"Proprietà analitiche di semigruppi di Markov", GNAMPA-INDAM 2003 and 2004 (both as PI);
"Kolmogorov equations", PRIN 2004 (local coordinator);
"Kolmogorov equations", PRIN 2006 (local coordinator);
"Metodi deterministici e stocastici nello studio di problemi di evoluzione", PRIN 2008 (PI);
"Problemi differenziali di evoluzione: approcci deterministici e stocastici e loro interazioni", PRIN 2010/11 (local coordinator);
"Deterministic and stochastic evolution equations, PRIN 2015 (PI).

Training experience

I was the PDH thesis advisor of Luca Lorenzi (2001), Marcello Bertoldi (2002), Davide Di Giorgio (2004), Alessandro Zamboni (2006), Gianluca Cappa (2016). I am presently PDH thesis advisor of Davide Augusto Bignamini (thesis defense expected Feb. 2022).

I hosted and advised young foreign researchers in Parma for research training periods of 4 to 6 months: Olivier Baconneau (2001), Vincent Guyonne (2003), Balint Farkas (2005), Nicolas Saintier (2006), Matthias Geissert (2006), and young italian researchers for longer periods, through "assegni di ricerca" grants: Alessandro Zamboni (1 year, 2007/08), Luciana Angiuli (Sept. 2012-Sept. 2014), Simone Ferrari (May 2014-May 2016; Dec. 2018-Dec. 2019).

I regularly collaborate to the organization of the Internet Seminar, a series of courses via web that started in 1997/98, addressed to doctoral students and postdocs. I was the main organizer of the 2004/05 edition, on the subject "Analytic Semigroups and Reaction-Diffusion Problems", and co-organized the 2015/16 edition, on the subject "Infinite Dimensional Analysis".

Participation to conferences

I participated around eighty international conferences as invited speaker. In the last years, the most relevant were the following:

"The first Joint Meeting Brazil - Italy in Mathematics", Rio de Janeiro, 29.8-2.9.2016;
"Stochastic Partial Differential Equations and Related Fields", Bielefeld, 10–14.10.2016;
"Operator Semigroups in Analysis: Modern Developments, Będlewo, 24–28.4.2017;
"Developments in Stochastic Differential Equations", RIMS Varese 2327.7.2018;
"Parabolic Evolution Equations, Harmonic Analysis and Spectral Theory", Bad Herrenalb, 6-10.5.2019;
"Nonlinear Analysis: In Honor of Herbert Amann's 80th birthday", Cortona 11-14.6.2019;
"Evolution Equations: Applied and Abstract Perspectives", Luminy 28.10-1.11 2019.

Talks

I gave a number of invited talks in several universities and research centers, including: Universities of Roma 1, Roma 2, Bologna, Torino, L'Aquila, Pisa, Bari, Firenze, Trento, Parma, Politecnico di Milano, Milano Bicocca, Pavia, SNS Pisa, Lecce, Padova, TU Delft, Michigan State University at East Lansing, Zürich, Augsburg, UCLA, Paris IX-Dauphine, ENS Lyon, Bordeaux I, Bratislava, Praga, Indiana University at Bloomington, Institute Henri Poincaré (Paris), Louisiana State University at Baton Rouge, University of Maryland at College Park, Ulm, Tübingen, Vrije Universiteit Amsterdam, Clausthal, Hannover, TU Darmstadt, TU Karlsruhe, Bielefeld.

4. Editorial work

Member of the Editorial Boards of

- *Journal of Evolution Equations*,
- *Journal of Mathematical Analysis and Applications*,
- *Rivista di Matematica della Università di Parma*,
- *Evolution Equations and Control Theory*,
- *Analysis, Geometry and Number Theory.*

Member of the Editorial Committee of

- *Nonlinear Differential Equations and Applications* (NoDEA),

of which I was Managing Editor from Aug. 2010 to Aug. 2013.

5. Service

Coordinator of the joint PhD program in Mathematics of the Universities of Parma, Modena-Reggio Emilia, Ferrara, since Nov. 2020. Previously, local coordinator of the Parma branch, from Nov. 2013 to Oct. 2020; Coordinator of the PhD program in Pure Mathematics and Applied Mathematics Mathematics of the University of Parma from Nov. 2011 to Oct. 2013.

Member of the Scientific Committee of GNAMPA-INdAM, from 2013 to 2021.

Member of Panel PE1, ERC Starting and Consolidator Grants (call 2011).

Member of Panel PE1, ERC Consolidator Grants (call 2013).

Member of Panel PE1, ERC Consolidator Grants (call 2015).

Member of Panel PE1, ERC Consolidator Grants (call 2017).

Member of committees for competitions to several positions in Italy. Ricercatore A: Bologna (2012), Trento (2013), Pavia (2015), Bari (2015). Ricercatore B: Roma La Sapienza (2016). Seconda Fascia (Associate Professor): Lecce (2013), Milano Statale (2018). Prima fascia (Full Professor): Parma (2015).

Local service, in the University of Parma: Member of "Giunta" of Dipartimento di Scienze Matematiche, Fisiche e Informatiche from Jan. 2018 to Dec. 2020; member of "Comitato di Area 01" from 2018 to 2020. Previously, head of "Comitato di Area 01" from April 2004 to May 2011; dean of the Studies in Mathematics (Presidente del Consiglio Unificato dei Corsi di studio in Matematica) from Nov. 1999 to Nov. 2003 and from April 2004 to Oct. 2008.

6. Publications, since 2000

Papers on Journals

1. Lunardi, Alessandra: *Free boundary parabolic problems*. Boll. Unione Mat. Ital. Sez. B Artic. Ric. Mat. (8) 3 (2000), 11-29.

2. Brauner, Claude-Michel; Hulshof, Josephus; Lunardi, Alessandra: *A general approach to stability in free boundary problems*, J. Differential Equations **164** (2000), no. 1, 16-48.

3. Baconneau, Olivier; Brauner, Claude-Michel; Lunardi, Alessandra: *Computation of bifurcated branches in a free boundary problem arising in combustion theory*, M2AN Math. Model. Numer. Anal. **34** (2000), no. 2, 223-239.

4. Brauner, Claude-Michel; Lunardi, Alessandra: *Instabilities in a two-dimensional combustion model with free boundary*, Arch. Ration. Mech. Anal. **154** (2000), no. 2, 157-182.

5. Brauner, Claude-Michel; Lunardi, Alessandra: *Bifurcation of nonplanar travelling waves in a free boundary problem*, Nonlinear Anal. **44** (2001), no. 2, Ser. A: Theory Methods, 247-261.

6. Brauner, Claude-Michel; Lunardi, Alessandra; Schmidt-Lainé, Claudine: *Stability of travelling waves in a multidimensional free boundary problem*, Nonlinear Anal. **44** (2001), no. 2, Ser. A: Theory Methods, 263-280.

7. Brauner, Claude-Michel; Hulshof, Josephus; Lunardi, Alessandra: *A critical case of stability in a free boundary problem*, J. Evol. Equ. **1** (2001), no. 1, 85-113.

8. Lorenzi, Luca; Lunardi, Alessandra: *Stability in a two-dimensional free boundary combustion model*, Nonlinear Analysis T.M.A. **53** (2003), 227-276. Erratum "Stability in a two-dimensional free boundary combustion model" [Nonlinear Anal. 53 (2003) 227-276], Nonlinear Analysis **53** (2003), 859–860.

9. Baconneau, Olivier; Lunardi, Alessandra: *Smooth solutions to a class of free boundary parabolic problems*, Trans. Amer. Math. Soc. **356** (2004), no. 3, 987–1005.

10. Da Prato, Giuseppe; Lunardi, Alessandra: *Elliptic operators with unbounded drift coefficients and Neumann boundary condition*, J. Diff. Eqns. **198** (2004), 35–52.

11. Metafune, Giorgio; Lunardi, Alessandra: *On the domains of elliptic operators in L^1*, Differential Integral Equations **17** (2004), no. 1-2, 73–97.

12. Guatteri, Giuseppina; Lunardi, Alessandra: *Smoothing of quasilinear parabolic operators and applications to forward-backward stochastic systems*, Adv. Differential Equations **10** (2005), no. 1, 65–88.

13. Di Giorgio, Davide; Lunardi, Alessandra: *On Fredholm properties of $Lu = u' - A(t)u(t)$ for paths of sectorial operators*, Proc. Royal Soc. Edinb. **135 A** (2005), 39–59.

14. Metafune, Giorgio; Lunardi, Alessandra, Pallara, Diego: *Dirichlet boundary conditions for elliptic operators with unbounded drift*, Proc. A.M.S. **133** (2005), no. 9, 2625–2635.

15. Di Giorgio, Davide; Lunardi, Alessandra: Schnaubelt, Roland: *Optimal regularity and Fredholm properties of abstract parabolic operators in L^p spaces on the real line*, Proc. London Math. Soc. **91** (2005), no. 3, 703–737.

16. van den Berg, Jan B., Brauner, Claude-Michel, Hulshof, Josephus, Lunardi, Alessandra: *The speed law for highly radiative flames in a gaseous mixture with large activation energy*, SIAM J. Appl. Math. **66** (2005), no. 2, 408–432.

17. Da Prato, Giuseppe; Lunardi, Alessandra: *Maximal dissipativity of class of elliptic degenerate operators in weighted L^2 spaces*, Discrete Contin. Dyn. Syst. Ser. B **6** (2006), no. 4, 751–760.

18. Farkas, Balint; Lunardi, Alessandra: *Maximal regularity for Kolmogorov operators in L^2 spaces with respect to invariant measures*, J. Math. Pures Appl. **86** (2006), 310–321.

19. Lorenzi, Luca; Lunardi, Alessandra: *Elliptic operators with unbounded diffusion coefficients in L^2 spaces with respect to invariant measures*, J. Evol. Equ. **6** (2006), 691–709.

20. Da Prato, Giuseppe; Lunardi, Alessandra: *On a class of self-adjoint elliptic operators in L^2 spaces with respect to invariant measures*, J. Diff. Eqns. **234** (2007), 54–79.

21. Da Prato, Giuseppe; Lunardi, Alessandra: *On a class of degenerate elliptic operators in L^1 spaces with respect to invariant measures*, Math. Z. **256** (2007), 509–520.

22. Da Prato, Giuseppe; Lunardi, Alessandra: *Ornstein-Uhlenbeck operators with time periodic coefficients*, J. Evol. Equ. **7** (2007), 587–614.

23. Brauner, Claude-Michel, Frankel, Michael, Hulshof, Josephus, Lunardi, Alessandra, Sivashinsky, Gregory: *On the kappa-theta model of cellular flames: existence in the large and asymptotics*, Discr. Cont. Dyn. Syst. Series S, 1 (2008), 27–39.

24. Geissert, Matthias; Lunardi, Alessandra: *Invariant Measures and Maximal L^2 Regularity for Nonautonomous Ornstein-Uhlenbeck Equations*, J. Lond. Math. Soc. (2) **77** (2008), no. 3, 719–740.

25. Lorenzi, Luca; Lunardi, Alessandra; Zamboni, Alessandro: *Asymptotic behavior in time periodic parabolic problems with unbounded coefficients*, J. Differential Equations **249** (2010), 3377–3418.

26. Da Prato, Giuseppe; Lunardi, Alessandra: *On the Dirichlet semigroup for Ornstein – Uhlenbeck operators in subsets of Hilbert spaces*, J. Funct. Anal. **259** (2010), 2642–2672.

27. Da Prato, Giuseppe; Lunardi, Alessandra: *Ultraboundedness for parabolic equations in convex domains without boundary conditions*, Physica D **239** (2010), 1453–1457.

28. Kunze, Markus; Lorenzi, Luca; Lunardi, Alessandra: *Nonautonomous Kolmogorov parabolic equations with unbounded coefficients*, Trans. Amer. Math. Soc. **362** (2010), no. 1, 169–198.

29. Geissert, Matthias; Lunardi, Alessandra: Asymptotic behavior and hypercontractivity in non-autonomous Ornstein-Uhlenbeck equations. J. Lond. Math. Soc. (2) **79** (2009), no. 1, 85–106.

30. Da Prato, Giuseppe; Lunardi, Alessandra: *On a class of elliptic and parabolic equations in convex domains without boundary conditions*, Discrete Contin. Dyn. Syst. **22** (2008), no. 4, 933–953.

31. Caselles, Vicent; Lunardi, Alessandra; Miranda, Michele Jr; Novaga, Matteo: *Perimeter of sublevel sets in infinite dimensional spaces*, Adv. Calc. Var. **5** (2012), no. 1, 59–76.

32. Da Prato, Giuseppe; Lunardi, Alessandra: *Maximal L^2 regularity for Dirichlet problems in Hilbert spaces*, J. Math. Pures Appl. **99** (2013), 741–765.

33. Angiuli, Luciana; Lorenzi, Luca; Lunardi, Alessandra: *Hypercontractivity and asymptotic behaviour in nonautonomous Kolmogorov equations*, Comm. Part. Diff. Eqns **28** (2013), 2049–2080.

34. Da Prato, Giuseppe; Lunardi, Alessandra: *Sobolev regularity for a class of second order elliptic PDE's in infinite dimension*, Annals of Probability **42** (2014), 2113–2160.

35. Celada, Pietro; Lunardi, Alessandra: *Traces of Sobolev functions on regular surfaces in infinite dimensions*, Journal of Functional Analysis **266** (2014), 1948–1987.

36. Da Prato, Giuseppe; Lunardi, Alessandra; Tubaro, Luciano: *Surface mesures in infinite dimension*, Rend. Lincei Mat. Appl. **25** (2014), 1–22.

37. Da Prato, Giuseppe; Lunardi, Alessandra: *Maximal Sobolev regularity in Neumann problems for gradient systems in infinite dimensional domains*, Ann. Inst. H. Poincaré, Prob. Stat. **51** (2015), 1102–1123.

38. Lunardi, Alessandra; Miranda, Michele Jr; Pallara, Diego: *BV functions on convex domains in Wiener spaces*, Potential Analysis **43** (2015), 23–48.

39. Luciana Angiuli, Alessandra Lunardi: *Semilinear nonautonomous parabolic equations with unbounded coefficients in the linear part*, Nonlinear Analysis **125** (2015), 468–497.

40. Luca Lorenzi, Alessandra Lunardi, Roland Schnaubelt: *Strong convergence of solutions to nonautonomous Kolmogorov equations*, Proc. Amer. Math. Soc. **144** (2016), 3903–3917.

41. Sandra Cerrai, Alessandra Lunardi: *Averaging principle for non autonomous slow-fast systems of stochastic RDEs: the almost periodic case*, SIAM J. Math. Analysis **49** (2017), 2843–2884.

42. Da Prato, Giuseppe; Lunardi, Alessandra, Tubaro, Luciano: *Malliavin Calculus for non gaussian differentiable measures and surface measures in Hilbert spaces*, Trans. Amer. Math. Soc. **370** (2018), 5795-5842.

43. Cerrai, Sandra; Lunardi, Alessandra: *Schauder theorems for Ornstein-Uhlenbeck equations in infinite dimension*, J. Differential Equations **267** (2019), 7462-7482.

44. Da Prato, Giuseppe; Lunardi, Alessandra; Tubaro, Luciano: *On the law of the minimum in a class of unidimensional SDEs*, Milan J. Math. **87** (2019), 93-104.

45. Da Prato, Giuseppe; Lunardi, Alessandra: *BV functions in Hilbert spaces*, Math. Ann. (2020 online) https://doi.org/10.1007/s00208-020-02037-x.

46. Lunardi, Alessandra; Metafune, Giorgio; Pallara, Diego: *The Ornstein-Uhlenbeck semigroup in finite dimension*, Philos. Trans. Roy. Soc. A **378** (2020), no. 2185, 20200217, 15 pp.

47. Lunardi, Alessandra; Pallara, Diego: *Ornstein-Uhlenbeck semigroups in infinite dimension*, Philos. Trans. Roy. Soc. A **378** (2020), no. 2185, 20190620, 19 pp.

48. Lunardi, Alessandra; Röckner, Michael: *Schauder theorems for a class of (pseudo-) differential operators on finite and infinite dimensional state spaces*, J. London Math. Soc. **104** (2021), 492-540.

Monographs

1. *Analytic semigroups and optimal regularity in parabolic problems*, Birkhäuser Verlag, Basel, 2013 [2013 reprint of the 1995 original], Modern Birkhäuser Classics. Birkhäuser/ Springer Basel AG, Basel, 1995.

2. *Interpolation theory*, Appunti. Scuola Normale Superiore di Pisa. Edizioni della Normale, Pisa. Second Edition, 2009. Third Edition, 2018.

From the beginning of my career I produced more than 120 publications, including articles in journals, conference proceedings and contributions to multi-authored books. The complete list may be found in MathSciNet.