Curriculum Vitæ

Luca Rossi

Personal data

- Born: August 29, 1979, in Rome, Italy

- Citizenship: Italian

- Address: Università degli Studi di Padova
  Dipartimento di Matematica
  Via Trieste, 63 - 35121 Padova

- Phone: +39 049 8271380

- Email: lucar@math.unipd.it

Actual position

- December 2008: Researcher in Analysis
  Department of Mathematics
  University of Padova.

Education

- April - October 2008: Post-doc at CAMS - EHESS, Paris, for the ANR project "UR-TICLIM"

- December 2006: PhD in Mathematics,
  at the Sapienza University of Rome (advisor: prof. I. Capuzzo Dolcetta) in cooperation agreement with the University of Paris 6 "Pierre et Marie Curie" (advisor: prof. H. Berestycki). Title of the PhD thesis: *Generalized principal eigenvalue in unbounded domains and applications to nonlinear elliptic and parabolic problems*

- June 2003: Diplôme d'Études Approfondies (DEA): Analyse Numérique,
  at the Jacques Louis Lions Laboratory of the University of Paris 6 "Pierre et Marie Curie", *mention très bien*

- July 2002: Degree in Mathematics *cum laude*,
  at the Sapienza University of Rome (first inscription: October 1998). Title of the degree thesis: *Viscosity solutions for fully nonlinear obstacle problems*, advisor: prof. G. M. Troianiello.

Areas of interest

- Analysis

- Elliptic and parabolic partial differential equations

- Population dynamics.

Publications

My papers can be downloaded here:
`http://www.math.unipd.it/~lucar/publications.html`

Preprints

1. (with A. Tellini and E. Valdinoci) The effect on Fisher-KPP propagation in a cylinder with fast diffusion on the boundary. Preprint.
   arXiv: `http://arxiv.org/abs/1504.04698`

2. (with H. Berestycki and N. Rodriguez) Periodic cycles of rioting activity. Preprint.

3. The Freidlin-Gärtner formula for reaction term of any type. Preprint.
   arXiv: `http://arxiv.org/abs/1503.09010`

Published or accepted for publication

4. (with D. Castorina and A. Cesaroni) On a parabolic Hamilton-Jacobi-Bellman equation degenerating at the boundary. To appear on *Commun. Pure Appl. Anal.*
   arXiv: `http://arxiv.org/abs/1509.00177`

5. (with H. Berestycki and J.-M. Roquejoffre) Travelling waves, spreading and extinction for Fisher-KPP propagation driven by a line with fast diffusion. To appear on *Nonlinear Anal.*

6. (with M. Bardi and A. Cesaroni) Nonexistence of nonconstant solutions of some degenerate Bellman equations and applications to stochastic control. To appear on *ESAIM Control Optim. Calc. Var.*
   arXiv: `http://arxiv.org/abs/1501.00423`

7. (with H. Berestycki and J.-M. Roquejoffre) The shape of expansion induced by a line with fast diffusion in Fisher-KPP equations. To appear on *Comm. Math. Phys.*
   arXiv: `http://arxiv.org/abs/1402.1441`

8. (with F. Hamel) Transition fronts for the Fisher-KPP equation. To appear on *Trans. Amer. Math. Soc.*
   arXiv: `http://arxiv.org/abs/1404.2821`

9. (with A.-C. Coulon, H. Berestycki and J.-M. Roquejoffre) The effect of a line with non-local diffusion on Fisher-KPP propagation. *Math. Models Methods Appl. Sci.* **25** (2015), 2519–2562

10. (with G. Nadin) Transition waves for Fisher-KPP equations with general time-heterogeneous and space-periodic coefficients. *Anal. PDE* **8** (2015), 1351–1377

11. (with F. Hamel) Admissible speeds of transition fronts for non-autonomous monostable equations. *SIAM J. Math. Anal.* **47** (2015), 3342–3392

12. (with H. Berestycki, I. Capuzzo Dolcetta and A. Porretta) Maximum Principle and generalized principal eigenvalue for degenerate elliptic operators. *J. Math. Pures Appl.* **103** (2015), 1276–1293

13. (with H. Berestycki) Generalizations and properties of the principal eigenvalue of elliptic operators in unbounded domains. *Comm. Pure Appl. Math.* **68** (2015), 1014–1065

14. (with L. Ryzhik) Transition waves for a class of space-time dependent monostable equations. *Commun. Math. Sci.* **12** (2014), no. 5, 879–900.

15. (with H. Berestycki and J. M. Roquejoffre) Fisher-kpp propagation in the presence of a line: Further effects. *Nonlinearity* **26** (2013), no. 9, 2623–2640.

16. (with G. Nadin, L. Ryzhik and B. Perthame) Wave-like solutions for nonlocal reaction-diffusion equations: a toy model. *Math. Model. Nat. Phenom.* **8** (2013), 33–41.

17. (with H. Berestycki and J. M. Roquejoffre) The influence of a line with fast diffusion on Fisher-KPP propagation. *J. Math. Biol.* **66** (2013), no. 4-5, 743–766.

18. (with G. Nadin) Propagation phenomena for time heterogeneous KPP reaction-diffusion equations. *J. Math. Pures Appl. (9)* **98** (2012), no. 6, 633–653.

19. (with H. Berestycki and J. M. Roquejoffre) The periodic patch model for population dynamics with fractional diffusion. *Discrete Contin. Dyn. Syst. Ser. S* **4** (2011), no. 1, 1–13.

20. Liouville type results for periodic and almost periodic linear operators. *Ann. Inst. H. Poincaré Anal. Non Linéaire* **26** (2009), no. 6, 2481–2502.

21. (with H. Berestycki) Reaction-diffusion equations for population dynamics with forced speed. II. Cylindrical-type domains. *Discrete Contin. Dyn. Syst.* **25** (2009), no. 1, 19–61.

22. (with M. E. Amendola and A. Vitolo) Phragmèn-Lindelöf principles for nonlinear elliptic equations. *J. Math. Sci. Adv. Appl.* **2** (2009), no. 1, 43–63.

23. (with H. Berestycki) Reaction-diffusion equations for population dynamics with forced speed. I. The case of the whole space. *Discrete Contin. Dyn. Syst.* **21** (2008), no. 1, 41–67.

24. (with M. E. Amendola and A. Vitolo) Harnack inequalities and ABP estimates for nonlinear second-order elliptic equations in unbounded domains. *Abstr. Appl. Anal.* (2008), Art. ID 178 534, 19.

25. Non-existence of positive solutions of fully nonlinear elliptic equations in unbounded domains. *Commun. Pure Appl. Anal.* **7** (2008), no. 1, 125–141.

26. (with H. Berestycki and F. Hamel) Liouville-type results for semilinear elliptic equations in unbounded domains. *Ann. Mat. Pura Appl. (4)* **186** (2007), no. 3, 469–507.

27. (with H. Berestycki) On the principal eigenvalue of elliptic operators in $\mathbb{R}^N$ and applications. *J. Eur. Math. Soc. (JEMS)* **8** (2006), no. 2, 195–215.

Selected plenary talks

- *Asymptotic Problems for Partial Differential Equations and Viscosity Solutions*
  Kyoto University, Japan, December 2015

- *Mostly Maximum Principle*
  Agropoli, Italy, September 2015

- *Espalia*
  Sapienza University of Rome, Italy, June 2015

- *Nonlinear elliptic PDEs at the End of the World*
  Punta Arenas, Chile, March 2015

- *Mathematical Models for Social Sciences*
  Laboratoire JLL Paris 6 and CAMS - EHESS, France, December 2014

- *Front Propagation and Particle Systems*
  Banff, Canada, August 2014

- *Impact of climate change on biological invasions and population distributions*
  Banff, Canada, May 2013

- *Mostly Maximum Principle*
  Sapienza University of Rome, Italy, September 2012

- *ERC Workshop on Geometric Partial Differential Equations*
  Scuola Normale Superiore, Pisa, Italy, September 2012

- *Positivity: a key to fully-nonlinear equations*
  Vietri, Italy, June 2010

- *2nd Meeting of Women of the Laplacian*
  Monopoli, Italy, June 2010

- *8th Seminar of differential equations and Dynamical Systems*
  Isfahan University of Technology, Iran, July 2008

- *Mathematical Modeling and Analysis in Biological and Chemical Systems*
  University Paris-Sud XI and IHÉS, France, September 2007

- *Workshop on Reaction-Diffusion and Free Boundary Problems*
  Banff, Canada, March 2006

- *Journées du CERMICS*
  École nationale des ponts et chaussées, Paris, France, March 2006.

Selected communications

21/05/2014 Stanford University - *Applied Math Seminar*

09/12/2013 Sapienza University of Rome - *Seminario di Analisi Matematica*

13/03/2012 LATP Marseille - *Séminaire Analyse Appliquée*

10/03/2011 University of Chicago - *Nonlinear PDEs Seminar*

11/05/2010 University of Chicago - *Nonlinear PDEs Seminar*

23/06/2009 Tor Vergata University of Rome 2 - *Seminario di Equazioni Differenziali*

14/01/2008 INRIA, Paris - *Équipe SISYPHE*

24/05/2007 FDP, University of Tours - *Séminaire d'Analyse*

Funds and research projects

- 2013 - present: **Member** of the ERC Advanced Grant 2012 project "ReaDi : Reaction-Diffusion Equations, Propagation and Modelling", PI: H. BERESTYCKI

- 2014: **Principal Investigator** of the GNAMPA-INdAM (Italy) project "Propagation phenomena on lines and networks". Grant: € 2.400; duration: 1 year

- 2011 - 2012: **Principal Investigator** of the project "Asymptotic stability of fronts for parabolic equations" of the University of Padova. Grant: € 20.000; duration: 2 years

- 2010: **Principal Investigator** of the GNAMPA-INdAM (Italy) project "Front propagation phenomena and homogenization problems". Grant: € 5.500; duration: 1 year

- 2009 - 2010: **Member** of the PRIN (Italian national grant) "Viscosity and control methods for nonlinear diffusion degenerate models", P.I.: I. CAPUZZO DOLCETTA

- 2008: **Member** of the ANR (France) project "URTICLIM", P.I.: H. BERESTYCKI

- 2007 - 2008: **Member** of the PRIN (Italian national grant) "Viscosity, metric and control theory methods in nonlinear PDE's", P.I.: I. CAPUZZO DOLCETTA.

Workshop organization

- April 2012: *Geometric PDEs and applications*, University of Padova, http://events.math.unipd.it/gepde/?q=node/1

- June 2011: *Fronts and Nonlinear PDEs, A tribute to Henri Berestycki*, École Normale Supérieure Paris, France.

Student supervision

- March 2014 - February 2016: Daniele Castorina, Post-doc at University of Padova http://www.math.unipd.it/ castorin/

- January 2015 - July 2015: Romain Ducasse, ENS Cachan, Master stage

- 2011: Andrea Bertazzo, Master thesis "Traveling fronts for monostable reaction-diffusion equations in cylinders", University of Padova.

Teaching experience

- 2014/2015: Analysis 2. Department of Mathematics, University of Padova

- March 2014: "Population dynamics in the presence of a line with fast diffusion". Spring school on Nonlinear PDEs, Sapienza University of Rome

- 2013/2014: Analysis 2. Department of Mathematics, University of Padova

- 2012/2013: Analysis 1. Department of Mathematics, University of Padova

- 2011/2012: Calculus 1. Department of Engineering, University of Padova

- 2011/2012: "Équations de réaction-diffusion et dynamiques de populations biologiques". Master 2, Laboratoire Jacques Louis Lions, Paris 6 (in collaboration with H. Berestycki)

- April 2012: "Topics in Nonlinear Partial Differential Equations". PhD course, University of Padova (in collaboration with L. C. Evans and P. Soravia)

- 2010/2011: Analyse 1. École Nationale Supérieure des Travaux Publics (ENSTP), Yaoundé, Camerun

- 2009/2010: Calculus 1. Department of Engineering, University of Padova

- 2008/2009: Differential equations 2. Department of Mathematics, University of Padova (in collaboration with A. Marson)

- 2008/2009: Analysis 1. Department of Physics, Sapienza University of Rome (titulars: C. Mascia, C. Pinzari, A. Pisante, A. Terracina)

- June 2008: mini-course "Reaction-diffusion equations and propagation phenomena". CIMPA Summer School "Nonlinear analysis and Geometric PDE", Tsaghkadzor, Armenia (titular: H. Berestycki)

- 2006/2007: Analysis 1. Department of Engineering, Sapienza University of Rome (titular: L. Moschini)

- 2004/2005: Geometry 1. Department of Engineering, Sapienza University of Rome (titular: A. Bichara)

- 2004/2005: Analysis 2. Department of Statistics, Sapienza University of Rome (titular: A. Serrecchia)

- 2003/2004: Mathematics 1 Department of Statistics, Sapienza University of Rome (titular: P. Papi)

- 2003/2004: Mathematics. Department of Biology, Sapienza University of Rome (titular: C. Maffei).

Reviewer

Ann. Inst. H. Poincaré, Anal. Non Linéaire, Calc. Var. Partial Differential Equations, Comm. Partial Differential Equations, J. Differential Equations, J. London Math. Soc., Nonlinear Anal., Nonlinearity, Trans. Amer. Math. Soc.