

# Curriculum vitae – Marco Veneroni

Dipartimento di Matematica F. Casorati, Università degli studi di Pavia  
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## EDUCATION

2013 **Italian National Scientific Habilitation**

Qualification to associate professor

Sector A1/03 (Mathematical analysis, probability and statistics)

2007 **Ph.D. in Mathematics and Statistics**

Department of Mathematics “F. Casorati”, University of Pavia, Italy

Thesis: “Mathematical models for the cardiac electric field”

Supervisor: Prof. G. Savaré

2003 **Degree in Mathematics**

Department of Mathematics “F. Casorati”, University of Pavia, Italy

(Grade: 110/110 cum laude)

Thesis: “The Hodgkin-Huxley model for the propagation of the cardiac electric field”.

Supervisor: Prof. G. Savaré

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## EMPLOYMENT

09/2016 – present **Associate professor**

Department of Mathematics “F. Casorati”, University of Pavia, Italy

09/2011 – 08/2016 **Assistant professor**

Department of Mathematics “F. Casorati”, University of Pavia, Italy

01/2011 – 08/2011 **Post-doctoral fellow**

Department of Mathematics and Statistics, McGill University, Montreal, Canada

Supervisor: Prof. Rustum Choksi

01/2009 – 12/2010 **Post-doctoral fellow**

Department of Mathematics, Dortmund Technical University, Dortmund, Germany

Supervisor: Prof. dr. Ben Schweizer

11/2006 – 12/2008 **Post-doctoral fellow**

Department of Mathematics and Computer Science, Eindhoven University of Technology,  
Eindhoven, the Netherlands

Supervisor: Prof. dr. Mark A. Peletier

11/2003 – 10/2006 **Ph.D. candidate in Mathematics and Statistics**

Department of Mathematics “F. Casorati”, University of Pavia, Italy

Supervisor: Prof. Giuseppe Savaré

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## PUBLICATIONS

### PREPRINTS

1. G. Auricchio and M. Veneroni. On the structure of optimal transportation plans between discrete measures. *ArXiv preprint* 2104.13106 (2021).

### PUBLISHED PAPERS and PROCEEDINGS

2. G. Auricchio, A. Codegani, S. Gualandi, G. Toscani and M. Veneroni. The equivalence of Fourier-based and Wasserstein metrics on imaging problems. *Rendiconti Lincei - Matematica e applicazioni*, 31 (2020), 627–649.
3. F. Bassetti, S. Gualandi and M. Veneroni. On the computation of Kantorovich-Wasserstein distances between 2D-histograms by uncapacitated minimum cost flows. *SIAM Journal on Optimization*, 30 (2020), 2441–2469.
4. G. Auricchio, F. Bassetti, S. Gualandi and M. Veneroni. Computing Wasserstein barycenters via Linear Programming. *Lecture Notes in Artificial Intelligence*, 11494 (2019), 355–363.
5. G. Auricchio, S. Gualandi and M. Veneroni. The Maximum Nearby Flow Problem. *Advances in Optimization and Decision Science for Society, Services and Enterprises*. AIRO Springer Series, vol 3 (2019), 22–33.
6. G. Auricchio, S. Gualandi, M. Veneroni and F. Bassetti. Computing Kantorovich-Wasserstein distances on  $d$ -dimensional histograms using  $(d+1)$ -partite graphs. *Advances in Neural Information Processing Systems* (2018), 5793–5803.
7. L. Lussardi, S. Marini and M. Veneroni. Stochastic homogenization of maximal monotone relations and applications. *Networks and Heterogeneous Media*, 13 (2018), no. 1, 27–45.
8. S. Pelletier, O. Jabali, G. Laporte, M. Veneroni. Battery Degradation and Behaviour Modeling for Electric Vehicles. *Transportation Research Part B: Methodological*, 103 (2017), 158–187.
9. A. Segatti, M. Snarski, M. Veneroni. Analysis of a variational model for nematic shells. *Mathematical Models and Methods in Applied Sciences*, 26 (2016), no. 10, 1865–1918.
10. G. Canevari, A. Segatti, M. Veneroni. Morse’s index formula in VMO for compact manifolds with boundary. *Journal of Functional Analysis*, 269 (2015), no. 10, 3043–3082.
11. B. Schweizer, M. Veneroni. Homogenization of plasticity equations with two-scale convergence methods. *Applicable Analysis*, 94 (2015), no. 2, 376–399.
12. A. Segatti, M. Snarski, M. Veneroni. Equilibrium configurations of nematic liquid crystals on a torus. *Physical Review E*, 90 (2014), no. 1, 012501.
13. B. Schweizer, M. Veneroni. On non-periodic homogenization of time-dependent equations. *Nonlinear Analysis Real World Applications*, 15 (2014), 381–391.
14. R. Choksi, M. Morandotti, M. Veneroni. Global minimizers for axisymmetric multi-phase membranes. *ESAIM Control, Optimisation and Calculus of Variations*, 19 (2013), no. 4, 1014–1029.
15. M. A. Peletier, M. Renger, M. Veneroni. Variational formulation of the Fokker-Planck equation with decay: a particle approach. *Communications in Contemporary Mathematics*, 15 (2013), no. 5, 1350017, 43 pp.

16. R. Choksi, M. Veneroni. Global minimizers for the doubly-constrained Helfrich energy: the axisymmetric case. *Calculus of Variations and Partial Differential Equations*, 48, (2013), no. 3-4, 337–366.
17. S. Arnrich, A. Mielke, M. A. Peletier, G. Savaré, M. Veneroni. Passage to the limit in a Wasserstein gradient flow: from diffusion to reaction. *Calculus of Variations and Partial Differential Equations*, 44 (2012), no. 3, 419–454.
18. M. A. Peletier, G. Savaré, M. Veneroni. Chemical reactions as Gamma-limit of diffusion. *SIAM Review*, 54 (2012), no. 2, 327–352.
19. M. A. Peletier, M. Veneroni. Stripe patterns and a projection-valued formulation of the Eikonal Equation. *Philosophical Transactions of the Royal Society A: Mathematical, Physical & Engineering Sciences*, 370 (2012), 1730–1739.
20. M. A. Peletier, M. Veneroni. Stripe patterns and the Eikonal equation. *Discrete and Continuous Dynamical Systems – Series S*, 5 (2012), no. 1, 183–189.
21. B. Schweizer, M. Veneroni. The needle problem approach to non-periodic homogenization. *Networks and Heterogeneous Media*, 6 (2011), no. 4, 755–781.
22. M. Veneroni. Stochastic homogenization of subdifferential inclusions via scale integration. *International Journal of Structural Changes in Solids*, 3 (2011), no. 1, 83–98.
23. B. Schweizer, M. Veneroni. Periodic homogenization of the Prandtl-Reuss model with hardening. *Journal of Multiscale Modelling*, 2 (2010), no. 1 & 2, 69–106.
24. M. A. Peletier, M. Veneroni. Non-oriented solutions of the Eikonal equation. *Comptes Rendus Mathématique*, 348 (2010), no. 19–20, 1099–1101.
25. M. A. Peletier, G. Savaré, M. Veneroni. From diffusion to reaction via Gamma-convergence. *SIAM Journal on Mathematical Analysis*, 42 (2010), no. 4, 1805–1825.
26. M. A. Peletier, M. Veneroni. Stripe patterns in a model for block-copolymers. *Mathematical Models and Methods in Applied Sciences*, 20 (2010), no. 6, 843–907.
27. M. Veneroni. Reaction-Diffusion systems for the macroscopic bidomain model of the cardiac electric field. *Nonlinear Analysis Real World Applications*, 10 (2009), no. 2, 849–868.
28. M. Veneroni. Reaction-Diffusion systems for the microscopic cellular model of the cardiac electric field. *Mathematical Methods in the Applied Sciences*, 29 (2006), no. 14, 1631–1661.

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## THESES

29. M. Veneroni. Mathematical models for the cardiac electric field. 2007. Ph.D. thesis, Università degli Studi di Pavia, Italy.
  30. M. Veneroni. The Hodgkin-Huxley model for the propagation of the cardiac electric field. 2003. Degree thesis in Mathematics, Università degli Studi di Pavia, Italy.
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## REPORTS & PROFESSIONAL ARTICLES

31. F. Bassetti, S. Gualandi, M. Veneroni. On the computation of distances between 2-D histograms by minimum cost flows. *XXII Workshop on Combinatorial Optimization*. 2018.
  32. B. Schweizer, M. Veneroni. Homogenization of plasticity equations with hardening using Finite-Element approaches. *Oberwolfach report*. 2013.
  33. M. A. Peletier, M. Veneroni. Stripe patterns and the Eikonal equation. *Oberwolfach report*. 2009.
  34. M. Veneroni. Modelli matematici per il campo elettrico cardiaco. *La Matematica nella Società e nella Cultura: Rivista dell'Unione Matematica Italiana*, 1 (2008), no. 2, 367–370.
  35. J.B. van den Berg, N. van den Berg, B. van den Bergen, A. Boer, F. van de Bult, S. Dahmen, K. Frederix, Y. van Gennip, J. Hulshof, H. Meijer, P.H.M.W. in 't Panhuis, C. Stolk, R. Swierstra, M. Veneroni, E. Vondenhoff. *Understanding the electromagnetic field in an MRI scanner*. In R.H. Bisseling, K. Dajani, T.J. Dijkema, J. van de Leur, P.A. Zegeling (Eds.), *Proceedings 58th European Study Group Mathematics with Industry (ESGI58/SWI2007, Utrecht, The Netherlands, January 29-February 2, 2007)*. (pp. 69-90).
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## AWARDS

- 2011 SIAM Review's SIGEST award for the research article:  
M. A. Peletier, G. Savaré, M. Veneroni. From diffusion to reaction via Gamma-convergence. *SIAM Journal on Mathematical Analysis*, 42 (2010), no. 4, 1805–1825.
  - 2004 “Prof. Vittorio Emanuele Galafassi” prize for the best degree thesis in Mathematics at the University of Pavia, Italy.
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## GRANTS

### Individual grants

- 2014 Renewal of the “Rita Levi Montalcini” program for young researchers - see below  
Funding institution: the Italian Ministry for University and Research  
Duration: three years
- 2010 “Rita Levi Montalcini” program for young researchers  
Funding institution: the Italian Ministry for University and Research  
Duration: three years, renewable
- 2007 Applied research grant “Ingenio”  
Funding institution: Regione Lombardia, Italy  
Duration: one year
- 2003 Scholarship for the Ph.D. in Mathematics and Statistics at the University of Pavia, Italy  
Funding institution: the Italian Ministry for University and Research  
Duration: three years.

## Group grants

- 2017 Scientific project coordinator  
Title: “Dynamics of defects on curved surfaces”  
Funding institution: INDAM (National Institute of High Mathematics - Italy)  
Duration: one year  
Size of research team: four researchers
- 2016 Member of scientific project  
Title: “Well-posedness and asymptotic analysis for models of liquid crystals and polymers”  
Funding institution: INDAM (National Institute of High Mathematics - Italy)  
Duration: one year  
Size of research team: six researchers (Scientific coordinator: Cecilia Cavaterra (University of Milano))
- 2014 Scientific project coordinator  
Title: “Surface energies: Analysis and applications to liquid crystals”  
Funding institution: INDAM (National Institute of High Mathematics - Italy)  
Duration: one year  
Size of research team: three researchers
- 2012 Member of scientific project  
Title: “Mathematical analysis of fluxes of liquid crystals”  
Funding institution: INDAM (National Institute of High Mathematics - Italy)  
Duration: one year  
Size of research team: five researchers (Scientific coordinator: Antonio Segatti (University of Pavia))
- 2011 Member of scientific project  
Title: “Calculus of Variations”  
Funding institution: the Italian Ministry for University and Research  
Program: Scientific Research Programs of Relevant National Interest (PRIN)  
Duration: three years  
Size of the local cluster: 20 researchers  
Scientific coordinators: Gianni Dal Maso (SISSA Trieste) and Giuseppe Savaré (University of Pavia)
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## RESEARCH VISITS

- 01/2016 –04/2016 Department of Mathematics and Statistics, McGill University, Montreal, Canada  
(Invited by Prof. Rustum Choksi)
- 04/2014 SISSA – International School for Advanced Studies, Trieste, Italy  
(Invited by Dr. Luca Heltai)
- 03/2013 –09/2013 Department of Mathematics and Statistics, McGill University, Montreal, Canada  
(Invited by Prof. Rustum Choksi)
- 01/2013 Institute for Applied Mathematics, Bonn, Germany  
(Invited by Prof. dr. Juan Velázquez)
- 09/2011 –02/2012 Department of Mathematics and Statistics, McGill University, Montreal, Canada  
(Invited by Prof. Rustum Choksi)
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## TEACHING EXPERIENCE

### University of Pavia, Italy

- Mathematics, 1st year Bachelor of Biological Sciences - since 2017.
- Mathematical analysis 2, 1st year Bachelor of Biomedical, Electronic, and Computing systems Engineering - since 2012.
- Evolution equations, 1st and 2nd year Masters of Mathematics - 2016 and 2018.
- Mathematical analysis, 1st year Bachelor of Civil Engineering - 2016.
- Mathematical analysis 1, 1st year Bachelor of Biomedical, Electronic, and Computing systems Engineering - 2015.
- Mathematical analysis 2, 1st year Bachelor in Building Engineering and Architecture - 2013 and 2015.
- Mathematical analysis 3, 1st year Masters of Civil Engineering - 2013.
- Mathematical methods for Engineering, 2nd year Bachelor of Biomedical and Computing systems Engineering - 2012.
- Advanced mathematical methods for Engineering, 1st year Masters of Electrical Engineering - 2012.

### McGill University – Montreal, Canada

- 2011 – Co-lecturer: Seminar on Operator theory  
Masters, PhD, Postdoctoral students
- Lecturer: Applied linear algebra (MATH-270)  
2nd year Bachelor of Computer, Electrical, Software Engineering

## Technical University Dortmund, Germany

- 2010–11 – Lecturer: An introduction to homogenization theory  
1st and 2nd year Masters of Mathematics
- Co-lecturer: Seminar on Introduction to stochastic homogenization  
Masters, PhD, Postdoctoral students
- Co-lecturer: Seminar on Stochastic partial differential equations  
Masters, PhD, Postdoctoral students
- 2009–10 – Lecturer: Advanced Engineering Mathematics  
1st year Masters of Automation and Robotics
- Lecturer: Weak convergence methods in calculus of variations and PDEs  
Masters and PhD students

## Eindhoven University of Technology, The Netherlands

- 2007–08 – Co-Lecturer: Seminar on Partial Differential Equations  
PhD, Postdoctoral students
- Co-Lecturer: Seminar on An introduction to Gamma-convergence  
Masters, PhD, Postdoctoral students

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## STUDENT SUPERVISION

- 2021 · **Gennaro Auricchio**, PhD in Mathematics, Università degli Studi di Pavia.  
Title of the thesis: “Efficient methods for Discrete Optimal Transport”  
Co-supervisor with prof. S. Gualandi, Università degli Studi di Pavia.
- 2020 · **Francesca Bagnalasta**, Bachelor’s in Mathematics, Università degli Studi di Pavia.  
Title of the thesis: “Teoria dei sistemi dinamici singolarmente perturbati ed applicazioni in elettrofisiologia”.
- **Emanuele Carnevale Baraglia**, Bachelor’s in Bioengineering, Università degli Studi di Pavia.  
Title of the thesis: “Un modello matematico per la precessione di fase dell’attività delle cellule di posizione ippocampali”. Co-supervisor: prof. G. R. Biella, Università degli Studi di Pavia.
- **Sofia M. Cecchini**, Bachelor’s in Bioengineering, Università degli Studi di Pavia.  
Title of the thesis: “Un algoritmo di trasporto ottimo per la registrazione di immagini”.
- **Rachele Mascolo**, Bachelor’s in Mathematics, Università degli Studi di Pavia.  
Title of the thesis: “Reti neurali feed-forward: analisi e applicazione per il riconoscimento di cifre manoscritte”.
- **Erick Turricelli**, Bachelor’s at IUSS, Dept. of Science, Technology, and Society.  
Title of the thesis: “Design of an autonomous system for a driverless car”.
- 2017 · **Elisa C. Pavarino**, Bachelor’s in Bioengineering, Università degli Studi di Pavia.  
Title of the thesis: “La rappresentazione dello Spazio nel Cervello: modelli computazionali per le grid cells”. Co-supervisor with prof. G. R. Biella, Università degli Studi di Pavia.
- 2016 · **Stefano Marini**, Master’s in Mathematics, Università Cattolica del Sacro Cuore, Brescia.  
Title of the thesis: “Stochastic homogenization of maximal monotone relations and applications”  
Co-supervisor with prof. L. Lussardi, Università Cattolica del Sacro Cuore, Brescia.

- 2012 · **Michael Snarski**, (report for a Scholarship funded by the Natural Sciences and Engineering Research Council of Canada), McGill University, Montreal.  
 Title of the report: “A survey of genus 1 minimizers to the constrained Willmore and Helfrich functionals for biological membranes”. Informal supervision with prof. R. Choksi and prof. D. Jakobson, McGill University, Montreal.
- 2011 · **Zhe Chen**, Bachelor’s in Mathematics (report for an Undergraduate Summer Scholarship funded by Institut des Sciences Mathématiques - Montréal), McGill University, Montreal.  
 Title of the Honours independent study: “Convex analysis and nonlinear optimization”.  
 Co-supervisor with prof. G. Tsogtgerel, McGill University, Montreal.
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## SCIENTIFIC PRESENTATIONS

- “*Stochastic homogenization of maximal monotone relations and applications*”, invited seminar, University of Trento, April 5, 2017
- “*Stochastic homogenization of maximal monotone relations*”, 16th GAMM-Seminar on Microstructures, Dortmund, January 21, 2017
- “*Analysis of a Variational Model for Nematic Shells*”, CIME course on Mathematical Thermodynamics of complex fluids, Cetraro, July 2, 2015
- “*On minimizers of the bending energy for two-phase biomembranes*”, SIAM Conference on Life Sciences, Charlotte (NC), August 6, 2014
- “*Some results on a variational model for nematic shells-Part B*”, 10<sup>th</sup> AIMS Conference on Dynamical Systems, Differential Equations and Applications, Madrid, July 8, 2014
- “*On minimizers of the bending energy for two-phase biomembranes*”, 9<sup>th</sup> European Conference on Mathematical and Theoretical Biology, Göteborg, June 15, 2014
- “*Analysis of a variational model for liquid crystal shells*”, 18<sup>th</sup> European Conference on Mathematics for Industry, Taormina, June 11, 2014
- “*Equilibrium configurations of nematic liquid crystals on surfaces*”, invited seminar, SISSA – Trieste, April 1, 2014
- “*Equilibrium configurations of nematic liquid crystals on surfaces*”, two days Workshop on LC-flows, Pavia, March 24-25, 2014
- “*On minimizers of Helfrich energy for two-phase biomembranes*”, invited seminar, Technical University Dortmund, March 05, 2013
- “*On minimizers of Helfrich energy for two-phase biomembranes*”, workshop on Variational Models and Methods for Evolution, Levico Terme, September 10-12, 2012
- “*On minimizers of the bending energy of two-phase biomembranes*”, invited seminar, McGill University, Montreal, August 31, 2012
- “*On minimizers of Helfrich energy for two-phase biomembranes*”, workshop on Geometry of Interfaces and Capillarity, Granada, June 25-27, 2012
- “*On minimizers of Helfrich energy for two-phase biomembranes*”, 12th International Conference on Free Boundary Problems, Frauenchiemsee, June 11-15, 2012



- “*On minimizers of the doubly constrained Helfrich functional*”, workshop on Scale Transitions in Chemistry and Biology, Edinburgh, June 4-8, 2012
- “*Global minimizers for axisymmetric multiphase membranes*”, invited seminar, Università Cattolica di Brescia, May 9, 2012
- “*On minimizers of the doubly-constrained Helfrich functional*,” SIAM Conference on Analysis of Partial Differential Equations, San Diego, November 14-17, 2011
- “*From diffusion to reaction via Gamma-convergence*,” SIAM Conference on Analysis of Partial Differential Equations, San Diego, November 14-17 2011
- “*Existence of minimizers for a constrained functional on curvatures*,” invited seminar, CRM/McGill, Montreal, October 31, 2011
- “*Periodic homogenization for a model of plasticity*,” workshop on “*Macroscopic Modeling of Materials with Fine Structure*,” Carnegie Mellon University, Pittsburgh, May 26-28, 2011
- “*Periodic homogenization for a model of plasticity*,” BIRS workshop “*Rate-independent systems: Modeling, Analysis, and Computations*,” Banff, August 29 – September 3, 2010
- “*Homogenization of Prandtl-Reuss plasticity equations*,” 81<sup>st</sup> Annual meeting of the International Association of Applied Mathematics and Mechanics (GAMM), Karlsruhe, March 22-26, 2010
- “*Homogenization of Prandtl-Reuss plasticity equations*,” Eindhoven-Dortmund meeting, March 15-16, 2010
- “*Homogenization for a problem of elasto-plasticity*,” invited seminar, University of Trento, March 2, 2010
- “*Homogenization of plasticity equations in arbitrary dimension*,” invited seminar, Technische Universität Darmstadt, December 16, 2009
- “*Variational methods for pattern formation in diblock copolymers*,” “*CASA day*,” Eindhoven, November 13, 2008
- “*Variational methods for pattern formation in diblock copolymers*,” workshop “*PDE approximations in fast reaction - slow diffusion scenarios*” Leiden, November 10-14, 2008
- “*Variational methods for pattern formation in diblock copolymers*,” invited seminar, Technische Universität Dortmund, November 6, 2008
- “*Variational methods for pattern formation in diblock copolymers*,” Jahrestagung der Deutsche Mathematiker Vereinigung, Erlangen, September 2008
- “*Variational methods for pattern formation in diblock copolymers*,” invited seminar, Centre for Wiskunde & Informatica, Amsterdam, September 9, 2008
- “*Variational methods for pattern formation in polymers*,” NDNS+ workshop “*Partial Differential Equations in Applied Analysis*,” Apeldoorn, May 22-23, 2008
- “*A Variational model for diblock copolymers*,” CIM/UC Summer School “*Topics in Nonlinear PDES*,” Coimbra, July 22-27, 2007
- “*Patterns formation in diblock copolymers*,” “*CASA day*,” Eindhoven, May 9, 2007
- “*Inverse eigenvalue problems*,” “*CASA Seminar*,” Eindhoven, April 4, 2007
- “*Mathematical models for the cardiac electric field*,” European Mathematical Society summer school “*Mathematics in Molecular Cell Biology*,” Linz, September 11-23, 2006

- “*Reaction diffusion systems modeling the cardiac electric field,*” workshop “Modellizzazione matematica ed analisi dei problemi a frontiera libera”, Montecatini Terme, September 29–30, 2005
- “*Equazioni di Reazione-Diffusione per l’elettrocardiologia,*” workshop INDAM “Integrazione di sistemi complessi in biomedicina: modelli, simulazioni, rappresentazioni”, Bergamo, November 22–24, 2004

## OTHER SCIENTIFIC ACTIVITIES

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|------------------|--|
| 2017             | Member of the selection committee for a postdoctoral fellowship on “Problemi variazionali di evoluzione e di trasporto ottimo”, at the Department of Mathematics, University of Pavia  |
| 2016             | Member of the selection committee for a postdoctoral fellowship on “Problemi variazionali di evoluzione e di trasporto ottimo”, at the Department of Mathematics, University of Pavia  |
| 2013             | Reviewer for the French National Research Agency (ANR)   |
| 2012             | Scientific consultant for the “ <i>Cecil Graham Doctoral Dissertation Award</i> ” of the Canadian Applied and Industrial Mathematics Society.  |
| 2006 –present    | Reviewer for : <i>Discrete and Continuous Dynamical Systems, Interfaces and Free Boundaries, Journal of Fixed Point Theory and Applications, Journal of Mathematical Analysis and Applications, Multiscale Modeling and Simulation, Networks and Heterogeneous Media, Nonlinear Analysis Real World Applications, Proceedings of the Royal Society A, SIAM Journal on Mathematical Analysis.</i> |
| 12–18 June, 2005 | Member of the organizing committee for the INDAM workshop “ <i>Harnack inequalities and positivity,</i> ” Cortona, Italy.  |

Pavia, April 28, 2021