

UNIVERSITY OF MILAN

Selection procedure for recruiting full professors under art.18, paragraph 1, of Law No.240/2010 for competition sector **01/A3 – Mathematical Analysis, Probability and Statistics**,
(scientific-disciplinary sector **MAT/05 – Mathematical Analysis**)
at the *Federigo Enriques* Department of **MATHEMATICS**,
(announcement published in Official Gazette No.46 of 11 June 2021) - Competition code 4655

Francesco ROSSI

CURRICULUM VITAE

PERSONAL DATA (DO NOT INCLUDE YOUR PERSONAL ADDRESS AND LANDLINE OR MOBILE PHONE NUMBER)

SURNAME	ROSSI
NAME	FRANCESCO
DATE OF BIRTH	30/06/1983

CV at a glance

Born in 1983, Ph.D. in 2009 (SISSA, IT and Univ. Bourgogne, FR).
Maître de Conférence 2010-17 (Aix-Marseille, FR). Associate Professor since 2017 (Univ. Padova, IT).
Habitations in Italy: Math. Analysis (1st class), Control Eng. (2nd class).
Qualifications in France: Applied Math. (Prof.), Control Eng. (Prof).

Teaching: 7 years at Polytech' Marseille (Dep. Industrial Engineering), 4y at Univ. Padova (Math.).
Courses: Analysis, Partial Differential Equations, Control Engineering, Statistics.
Founder of **UniPD-Paris Sciences&Lettres double-degree**. Supervision: 4 Post-Docs, 3 Ph.D.

Research: Analysis and Control of Large-scale systems, Control Theory, Modeling and Applications.
32 articles in international journals (SIAM J Control, SIAM J Math An, JMPA, ARMA, JDE)
34 conference proceedings (CDC, ACC, MTNS, UMI, SIMAI)
P.I. of a French ANR grant for Young Researchers and a STARS@UNIPD grant

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1 Qualifications

1.1 Degrees

09/2004: Laurea Triennale (B.Sc.) in Mathematics University of Milan, Italy
 Mark: 110 e Lode. Fellowship "Istituto Nazionale di Alta Matematica".

07/2006: Laurea Specialistica (M.Sc.) in Mathematics: SISSA and Univ. Trieste, Italy
 Mark: 110 e Lode. Fellowship SISSA.

1.2 Doctoral degree

Ph.D. in Applied Mathematics: obtained 26/10/2009

Title of the thesis: Sub-Riemannian geometry and hypoelliptic heat equations on 3D Lie groups - with applications to image reconstruction.

Supervisors: BOSCAIN Ugo Vittorio, AGRACHEV Andrei.

Institution: SISSA - Trieste, Italy and Université de Bourgogne - Dijon, France.

1.3 Further qualifications

Habilitation à Diriger des Recherches: French habilitation to supervise Ph.D., obtained 06/2016.

Title of the thesis: Analyse des équations de transport avec vitesses non-locales et applications à la commande des foules (Analysis of transport equations with non-local velocities and applications to crowd control)

Institution: Aix-Marseille Université, France.

Italian Scientific Habilitations: 01/A3 Analisi Matematica (I fascia)
 09/G1 Automatica (II fascia).

French Qualifications "Professeur": Sect. 26 Mathématiques appliquées
 Sect. 61 Automatique.

2 Employment

Since 15/09/2017: Associate Professor in Mathematical Analysis MAT/05

Institution: Università degli Studi di Padova.

Department: Dipartimento di Matematica "Tullio Levi-Civita".

01/09/2010- 15/09/2017: Maître de Conférences

Institution: Aix-Marseille Université, France.

Teaching: Polytech' Marseille - Dep. Computer Science, Industrial Eng.

Research: LSIS - equipe ESCODI: Estimation, control and diagnosis.

November 2009 - June 2010: Postdoctoral fellow

Institution: BCAM - Basque Center for Applied Mathematics, Bilbao, Spain.

Supervisor: E. Zuazua.

3 Teaching activities

3.1 Classes and Modules

Since 2017: Associate Professor of Math. Analysis at University of Padova (120h per year).
 2020/21: Analisi Matematica 1 - Ingegneria Meccatronica - 72h
 Analisi Matematica 2 - Ingegneria Meccatronica - 48h
 2019/20: Analisi Matematica 1 - Ingegneria Meccatronica - 72h
 Introduction to Partial Differential Equations - L. Magistrale Math. (English) - 48h
 Calculus - Scuola Galileiana (Excellence school at University of Padova) - 24h
 2018/19: Analisi Matematica 1 - Ingegneria Meccatronica - 72h
 Introduction to Partial Differential Equations - L. Magistrale Math. (English) - 16h
 Calculus - Scuola Galileiana (Excellence school at University of Padova) - 24h
 2017/18: Analisi Matematica 1 - Ingegneria Meccatronica - 96h
 Introduction to Partial Differential Equations - L. Magistrale Math. (English) - 16h

2010/2017: Maître de Conférences (Assistant Professor) at Polytech Marseille.
 Students in 3rd-5th years in Industrial Engineering and Computer Science.
 Courses: Applied Mathematics (60h per year), Statistics (50h), Control Systems (80h).

Other classes:
2016/17: Course "Control theory" - M2 (M.Sc.) in Mathematics - Aix-Marseille Université - 24h
June 2015: Course "Control in finite and infinite dimension" - Ph.D. school in Mathematics, Universities of Modena-Reggio Emilia-Ferrara-Parma - 9h.
2013/14: Course "Control systems, optimal control and planification of trajectory" - Master "Research in Systems Theory" - Aix-Marseille Université - 10h

4 Complementary teaching activities and service activities to students

4.1 Mentoring Master's degree theses, Ph.D. theses and Post-Docs

Mentoring of Master's degree theses

2020-2021: A. Valente, Master student in Mathematics at Univ. Padova.

Thesis: Analysis and Control of Compartmental Models in Epidemiology.

March-June 2015: A. Ben Braim, M2 Research student at Master SIS, Marseille,

Thesis: Modeling and control of interconnected robots.

March-June 2014: W. Nouainia, M2 Research student at Master SIS, Marseille,

Thesis: Collective behavior of flocks.

Mentoring Ph.D. students

Since 10/2020: M. Bentaibi, Ph.D. student, funded by Excellence Department grant at UniPD.

Co-supervised with F. Ancona.

Topic: Dynamics and control of networked structures with Partial Differential Equations.

2016-2019: B. Bonnet, Ph.D. student, funded by Archimède - French Excellence grant.

Ph.D. thesis: Optimal control in Wasserstein Spaces. See [23], [27], [31].

2014-2017: J. Marino, Industrial Ph.D. at ST Microelectronics - LSIS, France.
Ph.D. thesis: Diagnosis of semiconductor production equipments by stochastic analysis.
See [C1], [C2], [C3].

Mentoring Post-Doc fellows

Since 04/2021: L. Lombardini, post-doc funded by STARS@UNIPD
Topic: Axiomatic characterization of Wasserstein distances. See [C5].

Since 11/2020: A. Delyon, post-doc funded by STARS@UNIPD
Topic: Biological shape optimization in Wasserstein spaces.

10/2020-06/2021: G. Ciampa, post-doc funded by STARS@UNIPD
Topic: Vanishing viscosity for mean-field control. See [Pr4], [C8].

2016-2018: M. Duprez, Post-Doc, funded by Archimède - French Excellence grant.
Topic: Control of the transport equation. See [24], [29].

4.2 Tutoring Master's degree students

June-July 2021: C. Allasi and C. Balkasse, Engineering students at Polytech' Marseille
Internship for Research - Università di Padova.

June-July 2018: M. Adjel and D. Di Russo, Engineering students at Polytech' Marseille
Internship for Research - Università di Padova.

June-July 2014: S. Ohanian and Q. Watel, Engineering students at Polytech' Marseille
Internship for Research - RUTGERS Camden, NJ, USA - co-supervised with B. Piccoli.

June-July 2013: M. Agostini and N. Ait Kaddour, Engineering students at Polytech' Marseille
Internship for Research - RUTGERS Camden, NJ, USA - co-supervised with B. Piccoli.

June-July 2012: M. El Kasri, Engineering student at Polytech' Marseille
Internship for Research - LSIS, Marseille.

4.3 Organization activities

Since 2020 in Univ. Padova:
Founder of the **MAPPA double-degree M.Sc. in Mathematics** with University Paris Sciences & Lettres, France. Funded by French-Italian University. See <http://mappa.math.unipd.it>

2010-2017 in Aix-Marseille Univ.: Coordinator for International students (40 students per year).

5 Scientific research activities and publications

5.1 Short research statement

Analysis and control of large-scale systems: Since 2011, I study models for large systems of interacting agents (such as pedestrian crowds, road traffic, opinion dynamics). The corresponding dynamics are often described by transport PDEs with non-local velocities, which study is quite recent. I am deeply interested in applying geometric methods (flows, geometric estimates) to such problems, in connection with my skills in geometric control (see below). My results are of two natures:

- a) On the more analytical side, I developed new methods to study such PDEs: I introduced the generalized Wasserstein distance for mass-varying models [11], [17] as well as its further generalization to less regular probability vector fields [26] and signed measures [Pr1]. I studied the mean-field limit with non-regular interaction kernels [18] and multiple populations [25]. I also proved convergence of suitable numerical schemes [8];
- b) The most recent focus of my researches is about control of such systems. I am developing a new, complete theory for localized control, i.e. for the control of such PDE when the external action is constrained to a fixed set. Here, geometric conditions naturally appear, see [24]. I developed general models for sparse stabilization [16], [20], [21], [Pr2]. I provided the first complete characterization of controllability and minimal time control for the standard transport PDE [24], [29]. I proved general first-order conditions and regularity results for optimal control in [14], [19], [22], [23], [31], [Pr4].

Grants: P.I. of a ANR (French) Young Researcher grant. Topic: “Control of Crowds: from control theory to applications to road traffic”.

P.I. of a STARS@UNIPD 2019 Consolidator grant. Topic: “Control of Nonlocal Equations for Crowds and Traffic models”.

Collaborators: J. Carrillo (Oxford, UK), E. Trélat (Paris Sorbonne, France), B. Piccoli (Rutgers, USA), M. Fornasier (TU-Munich, Germany), P. Goatin (INRIA, France).

Geometric control theory and hypoelliptic operators: Since my Ph.D., I study control systems with geometric methods, with a particular focus on sub-Riemannian geometry. I am also interested in applications of control techniques to image processing (the Petitot model), to quantum control, and to numerical simulation of systems.

Since 2007, I study hypoelliptic PDEs, that are PDEs strictly related to sub-Riemannian geometry. My researches deal with explicit and approximate computations of solutions, with an emphasis on equations on Lie groups.

Relevant publications: [1-6], [9], [10], [15], [27], [28], [30], [32], [Pr3].

Collaborators: U. Boscain (Poly Paris, France), J.-P. Gauthier (Univ. Toulon, France), S. Polidoro (Univ. Modena-Reggio Emilia, Italy).

Modeling and applications: Beside my main research topics, I am often interested in interdisciplinary research projects, dealing with mathematical modeling and control, such as:

An artificial visual cortex: I worked in developing a new software-hardware system mimicking the human visual cortex, based on the Hubel-Wiesel model. This system is based on a formulation of visual cortex capabilities (such as image reconstruction) in terms of sub-Riemannian geometry and hypoelliptic operators. See [7], [12], [13].

PCA for fault detection: I supervised an Industrial Ph.D. thesis at ST Microelectronics (site Le Rousset, France) on the adaptation of Principal Component Analysis to the problem of detecting equipment with altered production capacity. The method is currently applied in production lines for semiconductors. See [C1], [C2], [C3].

Modeling and control for circular economy: I recently started a collaboration with B. Albrecht (Professor of Architecture at Iuav Venice, Italy) for modeling and enforcing circularity in the urban and regional planning.

5.2 Scientific publications

Bibliometric data (IRIS): 33 articles, 632 citations, h-index 14, 10-years h-index 13.

In the list below, I point out journals with Impact Factor 2019 larger than 1 and articles with more than 10 citations. **I choose 15 publications with asterisk * as part of my application.**

Journal Articles

- [1] * U. BOSCAIN, F. ROSSI, *Invariant Carnot-Caratheodory metrics on S^3 , $SO(3)$, $SL(2)$ and Lens Spaces*, SIAM J. Contr. Opt. 47 (4), pp. 1851–1878, 2008. **IF: 1.71. Citations: 65.**
- [2] * A. AGRACHEV, U. BOSCAIN, J.-P. GAUTHIER, F. ROSSI, *The intrinsic hypoelliptic Laplacian and its heat kernel on unimodular Lie groups*, J. Funct. Analysis 256, pp. 2621–2655, 2009. **IF: 1.49. Citations: 77.**
- [3] U. BOSCAIN, F. ROSSI, *Projective Reeds-Shepp car on S^2 with quadratic cost*, ESAIM: Control, Optimisation and Calculus of Variations, 16, no. 2, pp. 275–297, 2010. **IF: 1.18.**
- [4] U. BOSCAIN, G. CHARLOT, F. ROSSI, *Existence of planar curves minimizing length and curvature*, Proc. Steklov Inst. Mathematics, vol. 270, n. 1, pp. 43–56, 2010. **Citations: 13.**
- [5] F. ROSSI, P. COLANERI, R. SHORTEN, *Padé discretization for systems with piecewise linear Lyapunov functions*, IEEE Trans. Automatic Control, vol. 56, issue 11, pp. 2717–2722, 2011. **IF: 5.62. Citations: 13.**
- [6] U. BOSCAIN, J.-P. GAUTHIER, F. ROSSI, *Hypoelliptic heat kernel on 3-step nilpotent Lie groups*, Contemporary Mathematics. Fundamental Directions, Vol. 42, pp. 48–61, 2011.
- [7] * U. BOSCAIN, J. DUPLAIX, J.-P. GAUTHIER, F. ROSSI, *Anthropomorphic Image Reconstruction via Hypoelliptic Diffusion*, SIAM J. on Control and Optimization 50, pp. 1309–1336, 2012. **IF: 1.71. Citations: 29.**
- [8] B. PICCOLI, F. ROSSI, *Transport equation with nonlocal velocity in Wasserstein spaces: convergence of numerical schemes*, Acta Applicanda Mathematicae 124, pp. 73–105, 2013. **Citations: 43.**
- [9] * F. ROSSI, *Large time behavior for the heat equation on Carnot groups*, Nonlinear Differential Equations and applications, Volume 20, Issue 3, pp. 1393–1407, 2013. **IF: 1.13.**
- [10] S. SAJJA, F. ROSSI, P. COLANERI, R. SHORTEN, *Extensions of “Padé Discretization for Linear Systems With Polyhedral Lyapunov Functions” for generalised Jordan structures*, IEEE Transactions on Automatic Control, Volume 58, Issue 8, pp. 2071–2076, 2013. **IF: 5.62.**
- [11] * B. PICCOLI, F. ROSSI, *Generalized Wasserstein distance and its application to transport equations with source*, Archive for Rational Mechanics and Analysis, Volume 211, Issue 1, pp. 335–358, 2014. **IF: 2.42. Citations: 58.**
- [12] R. DUTS, U. BOSCAIN, F. ROSSI, Y. SACHKOV, *Association fields via cusplless sub-Riemannian geodesics in $SE(2)$* , J. Math. Im. Vis., V. 49 (2), pp. 384–417, 2014. **IF: 1.35. Citations: 25.**
- [13] U. BOSCAIN, R. DUTS, F. ROSSI, Y. SACHKOV, *Curve cusplless reconstruction via sub-Riemannian geometry*, ESAIM:COCV, Volume 20, Issue 03, pp. 748–770, 2014. **IF: 1.18. Citations: 18.**
- [14] * M. FORNASIER, B. PICCOLI, F. ROSSI, *Mean-Field Sparse Optimal Control*, Phil. Trans. R. Soc. A, 372: 20130400, 2014. **IF: 3.27. Citations: 46.**
- [15] * U. BOSCAIN, J.-P. GAUTHIER, F. ROSSI, M. SIGALOTTI, *Approximate controllability, exact controllability, and conical eigenvalue intersections for quantum mechanical systems*, Comm. Mathematical Physics, V. 333 (3), pp. 1225–1239, 2015. **IF: 2.10. Citations: 29.**

- [16] * B. PICCOLI, F. ROSSI, E. TRÉLAT, *Control to flocking of the kinetic Cucker-Smale model*, SIAM J. Mathematical Analysis 47, no. 6, pp. 4685–4719, 2015. **IF: 1.39. Citations: 40.**
- [17] B. PICCOLI, F. ROSSI, *On properties of the Generalized Wasserstein distance*, Archive for Rational Mechanics and Analysis, vol. 222, pp. 1339–1365, 2016. **IF: 2.42. Citations: 23.**
- [18] P. GOATIN, F. ROSSI, *A traffic flow model with non-smooth metric interaction: well-posedness and micro-macro limit*, Comm. Math. Sciences, 15 (1), pp. 261–287, 2017. **Citations: 21.**
- [19] M.L. DELLE MONACHE, B. PICCOLI, F. ROSSI, *Traffic regulation via controlled speed limit*, SIAM J Control Optimization, 55(5), pp. 2936–2958, 2017. **IF: 1.71. Citations: 10.**
- [20] M. CAPONIGRO, B. PICCOLI, F. ROSSI, E. TRÉLAT, *Sparse Jurdjevic-Quinn stabilization of dissipative systems*, Automatica, 86, pp. 110–120, 2017. **IF: 5.54.**
- [21] M. CAPONIGRO, B. PICCOLI, F. ROSSI, E. TRÉLAT, *Mean-Field Sparse Jurdjevic-Quinn control*, Math. Mod. Meth. Appl. Sciences, Vol. 27 (7), pp. 1223–1253, 2017. **IF: 3.04. Citations: 17.**
- [22] * M. BONGINI, M. FORNASIER, F. ROSSI, F. SOLOMBRINO, *Mean-Field Pontryagin Maximum Principle*, J. Opt. Th. Appl., Vol. 175, pp. 1–38, 2017. **IF: 1.38. Citations: 19.**
- [23] * B. BONNET, F. ROSSI, *The Pontryagin Maximum Principle in the Wasserstein Space*, Calc. Var. PDE, 58:11, 2019. **IF: 1.52. Citations: 11.**
- [24] * M. DUPREZ, M. MORANCEY, F. ROSSI, *Approximate and exact controllability of the continuity equation with a localized vector field*, SIAM J. Contr Opt, 57-2, pp. 1284–1311, 2019. **IF: 1.71.**
- [25] * G. ALBI, M. BONGINI, F. ROSSI, F. SOLOMBRINO, *Leader formation with mean-field birth and death models*, Math. Mod. Meth. Applied Sciences, Vol. 29, No. 04, pp. 633–679, 2019. **IF: 3.04.**
- [26] B. PICCOLI, F. ROSSI, *Measure dynamics with Probability Vector Fields and sources*, Discrete & Continuous Dynamical Systems - A, Vol. 39(11), pp. 6207–6230, 2019. **IF: 1.33.**
- [27] B. BONNET, J.-P. GAUTHIER, F. ROSSI, *Generic Singularities of the 3D-Contact sub-Riemannian Conjugate Locus*, Comptes Rendus Acad. Sci. Math, Vol. 357 (6), pp. 520–527, 2019.
- [28] * G. CIBELLI, S. POLIDORO, F. ROSSI, *Sharp Estimates for Geman-Yor Processes and applications to Arithmetic Average Asian options*, J. Math. Pures Appl., V. 129, pp. 87–130, 2019. **IF: 1.88.**
- [29] * M. DUPREZ, M. MORANCEY, F. ROSSI, *Minimal time for the continuity equation controlled by a localized perturbation of the velocity vector field*, Journal of Differential Equations, Volume 269, Issue 1, pp. 82–124, 2020. **IF: 2.19.**
- [30] J.-P. GAUTHIER, F. ROSSI, *A universal gap for non-spin quantum systems*, Proc. AMS 149 (3), pp. 1203–1214, 2021.
- [31] * B. BONNET, F. ROSSI, *Intrinsic Lipschitz Regularity of Mean-Field Optimal Controls*, SIAM J Control, 59-3, pp. 2011–2046, 2021. **IF: 1.71.**
- [32] B. PICCOLI, F. ROSSI, *Generalized solutions to bounded-confidence models*, Math. Mod. Meth. Applied Sciences, accepted, arXiv:2012.00755.

Preprints

- [Pr1] B. PICCOLI, F. ROSSI, M. TOURNUS, *A norm for signed measures, with application to non local transport equation with source term*, submitted, hal-01665244v2.
- [Pr2] J. A. CARRILLO, D. KALISE, F. ROSSI, E. TRÉLAT, *Controlling swarms towards flocks and mills*, submitted, arXiv:2103.07304.
- [Pr3] F. CERAGIOLI, P. FRASCA, B. PICCOLI, F. ROSSI, *Generalized solutions to opinion dynamics models with discontinuities*, submitted, arXiv:2105.13159.
- [Pr4] G. CIAMPA, F. ROSSI, *Vanishing viscosity for mean-field optimal control of continuity equations*, in preparation.

Chapters in books and proceedings

- [B1] U. BOSCAIN, J. DUPLAIX, J.-P. GAUTHIER, F. ROSSI, *Image Reconstruction via Hypoelliptic Diffusion on the Bundle of Directions of the Plane*, in Mathematical Image Processing, Springer Proceedings in Mathematics, Vol. 5, Ed. M. Bergounioux, 2011.
- [B2] A. AYDOGDU, M. CAPONIGRO, S. MCQUADE, B. PICCOLI, N. POURADIER DUTEIL, F. ROSSI, E. TRÉLAT, *Interaction Network, State Space and Control in Social Dynamics*, in Active Particles, Volume 1, pp. 99–140, Mod. Simul. Science, Eng. Technology, Birkhäuser Math., 2017.
- [B3] B. PICCOLI, F. ROSSI, *Measure-theoretic models for crowd dynamics*, in Crowd Dynamics Vol. 1 - Theory, Models, and Safety Problems, N. Bellomo and L. Gibelli Eds, Birkhäuser, 2018.

5.3 Speaking at conferences and conventions of international interest

Participation as invited speakers

- [Inv1] F. ROSSI, *Image reconstruction via hypoelliptic diffusion on the bundle of directions of the plane*, Math. Image proc. - Orléans, France, 30/03/2010.
- [Inv2] F. ROSSI, *Controllability and optimal control of the transport equation with localized vector fields*, Optimal Control and Mean Field Games, 19-21 September 2018, Pavia, Italy.
- [Inv3] F. ROSSI, *Controllability and minimal time for control of the transport equation*, Analysis, Control and Inverse Problems for PDEs, Workshop of LIA COPDESC, 26-30/11/2018, Napoli, Italy.

34 peer-reviewed presentations at international conferences.

A selection of presentations with my students:

- [C1] J. MARINO, F. ROSSI, M. OULADSINE, J. PINATON, *Gaussian Time Error: a fault detection index for semiconductor processes*, 2016 Europ. Contr. Conf., Aalborg, Denmark, 2016.
- [C2] J. MARINO, F. ROSSI, M. OULADSINE, J. PINATON, *Gaussian Time Error: a new index for fault detection in semiconductor processes*, 2016 Amer. Contr. Conf., Boston, USA, 2016.
- [C3] J. MARINO, F. ROSSI, M. OULADSINE, J. PINATON, *Unsupervised Semiconductor Chamber Matching Based on Shape Comparison*, IFAC World 2017, Toulouse, France, 2017.

- [C4] B. BONNET, F. ROSSI, *Sparse Control of Kinetic Cooperative Systems to Approximate Alignment*, IFAC 2017 World Congress, Toulouse, France, 2017.
- [C5] L. LOMBARDINI, F. ROSSI, *Obstruction to extension of Wasserstein distances for variable masses*, SIMAI 2020+2021, Parma, 2021.
- [C6] B. BONNET, F. ROSSI, *Variance Optimization and Control Regularity for Mean-Field Dynamics*, submitted to LHMNC 2021.
- [C7] F. BOAROTTO, F. ROSSI, *When does the evolved set have negligible boundary?*, submitted to 60th IEEE Conf. Dec. Control, 2021.
- [C8] G. CIAMPA, F. ROSSI, *Vanishing viscosity for linear-quadratic mean-field control problems*, submitted to 60th IEEE Conf. Dec. Control, 2021.

Seminars: I gave 25 other talks in France, Germany, Ireland, Italy, Spain, USA, Australia.

Recent online seminar: Control and regularity for non-local transport equations, Seminar at Univ. Erlangen Chair in Applied Analysis, <https://www.video.uni-erlangen.de/clip/id/24910>

5.4 Grants - Organisation and coordination of national and international research groups

STARS@UNIPD 2019-2021: P.I. of a local grant to support applications to Consolidator ERC.

Topic: "Control of Nonlocal Equations for Crowds and Traffic models". Grant: 140.000 €.

ANR JCJC 2016-2019: P.I. of the French Grant for Young Researchers.

Topic: "Control of Crowds: from control theory to applications to road traffic".

Grant: 208.000 €. Collaborators: A. Giua and M. Morancey.

Stopped in 2017 after moving to University of Padova.

Fond. Cariparo Visiting Scientist 2019: Padova-France grant, with E. Trélat (Paris Sorbonne).

PICS CNRS 2016-2018: France-USA grant, with B. Piccoli (Rutgers, NJ).

PHC PROCOPE 2014-15: France-Germany grant, with M. Fornasier (TU-Munich).

5.5 Participation to grants

France - ANR PRC 2015-2018: Project SR-Gi "Géométrie sous-Riemannienne". P.I.: E. Trélat (U. Paris 6). I was part of the team of 20 researchers, working in sub-Riemannian geometry.

USA - NSF Research Network 2012-2020: Project Ki-Net "Kinetic description of emerging challenges in multiscale problems of natural sciences". P.I: E. Tadmor (U. Maryland, USA). I was an external collaborator, collaborating with the team lead by B. Piccoli.

6 Managing, organisational and service activities

6.1 Conference organization

23–27/5/2022: 100 years UMI - 800 years UniPD Padova, Italy.

The conference will celebrate both the foundation of Unione Matematica Italiana in 1922 and of the University of Padova in 1222. Invited speakers will be both Fields Medals and distinguished Italian and international mathematicians. The conference will also feature the 1st UMI meeting for Ph.D. students.

I am part of the Organizing committee with F. Ancona, M. Bardi, A. Bernardi, M. Ferrante...

11–13/12/2019: 58th IEEE Conference on Decision and Control Nice, France.

CDC is recognized as the premier scientific and engineering conference dedicated to the theory and practice of systems and control, with more than 1.900 participants.

I was the Publicity Chair. General Chair: C. Canudas-de-Wit (CNRS GIPSA-Lab, France).

3–7/06/2019: Crowds: models and control CIRM Marseille, France.

Co-organized with P. Caines, P. Goatin, S. Hoogendoorn, N. Leonard, E. Trélat, A. Giua, M. Morancey, B. Piccoli, M.-T. Wolfram.

Presentations of 23 senior and 10 junior speakers.

12–14/12/2016: 55th IEEE Conference on Decision and Control Las Vegas, Nevada, USA.

I was the Publicity Chair. General Chair: A. Giua (Univ. Cagliari, Italy).

2–6/12/2013: MCT: Mathematical Control in Trieste SISSA, Trieste, Italy.

Co-organized with A. Agrachev, J.-M. Coron, J.-P. Gauthier, E. Trélat, E. Zuazua,...

Supported by ERC, European Science Foundation, GNAMPA-Indam, GDR CON-EDP.

I also organized 5 other smaller conferences in Italy, France, U.S.A.

6.2 Managing tasks for Ph.D. students

Since 2018: part of the Academic Board of the Ph.D. in Mathematical Sciences of University of Padova. I was in the Ph.D. selection committee in 2020.

Since 2012: participation to 4 Ph.D. Committees in Nancy, Paris Dauphine (France), Poli. Torino, Roma Tor Vergata (Italy)

6.3 Editorial activity

Associate editor for:

IEEE Control Systems Society Conference Editorial Board (for both Conference on Decision and Control and American Control Conference);

European Control Association Conference Editorial Board (for European Control Conf.).

Coordinator of the covid.ieeecss.org joint IFAC-IEEE CSS website for COVID researches.

6.4 Academic and industrial review

Academic reviewer for AMS Reviews (MathSciNet), ZBMath, SIAM J. Math. Analysis, SIAM J. Control Optimization, J. Math Pures Appl., IEEE Trans. Autom. Control, Automatica, IEEE Trans. Cont. Net. Sys., J. Franklin Institute, J. Dynamical Control Systems, ESAIM : COCV, J. Differential Equations, Systems & Control letters, Networks and Heterogeneous Media, J. Mathematical Sciences, J. Mathematical Imaging and Vision, and others.

Industrial reviewer of Industrial R&D projects for the French Ministry of University and Research, to access to tax reduction for research (Crédit d'Impôt Recherche).

7 University Third Mission: school, society, dissemination

2020: Organizer of 3 online lessons for high school students during COVID lockdown: more than 5.000 live students and 55.000 views. See <https://www.math.unipd.it/video-scuole>

2018-: member of the “Third mission and formation of teachers” Commission of the Department of Mathematics, Univ. Padova.

2017-: Activities with “Math.en.Jeans” (high school) and KidsUniversity (junior high school)

DATE: 06/07/2021

PLACE: Rezzato (BS), Italy