Mattia Zanella

University of Pavia		Scopus ID:	56708255000
Department of Mathematics		Researcher ID:	E-4181-2015
Via A. Ferrata 5		Phone:	(+39) 3336818229
27100, Pavia		Email:	mattia.zanella@unipv.it
Italy		Homepage:	http://www.mattiazanella.eu

Education

- **PhD in Mathematics**, University of Ferrara.
  Thesis: "Boltzmann–type and mean–field modeling of social dynamics: numerics, control, uncertainty quantification", advisor Prof. Lorenzo Pareschi.
  Final Grade: Approved cum laude.
  PhD Defense: April 4th, 2017.
- **Doctor Europaeus**, University of Ferrara.
- **Laurea Magistrale** in Mathematics, University of Milano, 2012.
  Final grade: 110/110 cum laude.

Academic Positions

- April 2022 – present **Associate Professor** in Mathematical Physics (SSD MAT/07)
  University of Pavia, Department of Mathematics "F. Casorati"
  Via A. Ferrata 5, 27100, Pavia (Italy)

- November 2019 – March 2022 **Assistant Professor** (Tenure-Track) in Mathematical Physics (SSD MAT/07)
  Ricercatore a Tempo Determinato di Tipo B
  University of Pavia, Department of Mathematics "F. Casorati"
  Via A. Ferrata 5, 27100, Pavia (Italy)

- August 2018 – October 2019 **Assistant Professor** in Mathematical Physics (SSD MAT/07)
  Ricercatore a Tempo Determinato di Tipo A
  Politecnico di Torino, Department of Mathematical Sciences '' G. L. Lagrange"
  Corso Duca degli Abruzzi 24, 10129, Torino (Italy)

- January 2017 – July 2018 **Postdoctoral Fellow**
  Politecnico di Torino, Department of Mathematical Sciences '' G. L. Lagrange"
  Corso Duca degli Abruzzi 24, 10129, Torino (Italy)
  Funding Agency: Compagnia di San Paolo.

- January 2013 – September 2013 **Research Assistant**
  University of Milano, Department of Mathematics "F. Enriques"
  Via Saldini 50, 20133, Milano (Italy)

Qualifications

National Scientific Qualification (ASN - Abilitazione Scientifica Nazionale) as Full Professor in Mathematical Physics
Validity: October 3rd, 2022 – October 3rd, 2032

Awards

- "Anile Prize 2018", Associazione Angelo Marcello Anile.
- "Nicolò Copernico Award 2018" for young PhD fellows distinguished for innovative thesis in sciences and technologies.

Visiting periods

- Prof. José Antonio Carrillo, Imperial College, UK
- Prof. Bertram Düring, University of Warwick, UK
- Prof. Seung-Yeal Ha, HYKE Research Group, Seoul National University, Republic of Korea
- Hausdorff Research Institute for Mathematics, Germany, Research Program *Kinetic Theory*
- Prof. Michael Herty, RWTH Aachen University, Germany
- Prof. Shi Jin, University of Wisconsin-Madison, USA
- Prof. Axel Klar, TU Kaiserslautern, Germany
- Prof. Marie-Therese Wolfram, University of Warwick, UK
- Institut Mittag–Leffler, Research Program *Mathematical Biology*
- Institut Mittag–Leffler, Sweden, Research Program *Interactions between Partial Differential Equations & Functional Inequalities*,

Funding Acquisition

Research Grants

- PRIN 2022 PNRR (Research Projects of Relevant National Interest, National Recovery and Resilience Plan)
  Funding Institution: Italian Ministry of University and Research (MUR)
  Title: *A Unitary Mathematical Framework for Modelling Muscular Dystrophies*
  Role: Principal Investigator
  Grant: 225k€ (96k€ Pavia unit)
  Time frame: 2024 - 2026
- PRIN2020 (Research Projects of Relevant National Interest)
  Funding Institution: Italian Ministry of University and Research (MUR)
  Title: *Integrated Mathematical Approaches to Socio-Epidemiological Dynamics*
  Role: Coordinator of the Research Unit of the University of Pavia
  Grant: 465k€ (95k€ Pavia unit)
  Time frame: 2021 - 2024

- Institutional Horizon Europe Committee Unipv (INROAD+), 2020
  Funding Institution: University of Pavia
  Title: *High fidelity methods for model-based uncertainty quantification of emergent phenomena*, 2020.
  Role: Principal Investigator
  Grant: 10k€
  Time frame: 2021 - 2023
- INdAM GNCS Grant for Young Researchers, 2017
  Funding Institution: Istituto Nazionale di Alta Matematica (INdAM)
  Title: *Uncertainty quantification and control for nonlinear nonlocal PDEs for aggregation–diffusion problems*
  Role: Principal Investigator
  Grant: 1.2k€
  Time frame: 2017
- Research Grant for Young Researchers
  Funding Institution: University of Ferrara
  Title: *Uncertainty quantification and control for kinetic equations*
  Role: Principal Investigator
  Grant: 4.5k€
  Time frame: 2015

Bilateral Projects

- Cassini Senior (Ambassade de France en Italie, Institut Français, Laboratory Ypatia of Mathematical Sciences)
  Title: Collective models for networked particle systems
  Role: Principal Investigator - Co-Principal Investigator Dr. Nastassia Pouradier-Duteil (Paris Sorbonne University, France)
  Grant: 1.58k€
- CUIA (Italian University Consortium for Argentina)
  Title: Mathematical challenges in social systems and applications to public health
  Role: Principal Investigator - Co-Principal Investigator Dr. Nicolas Saintier (University of Buenos Aires, Argentina)
  Grant: 3k€
- Royal Society International Exchanges
  Title: *Kinetic Opinion Formation Models for Digital Societies*
  Role: Co-Principal Investigator - Principal Investigator Dr. Marie-Therese Wolfram (University of Warwick, UK)
  Grant: 12k£

Publications

Editor of Books & Special Issues

- S.-Y. Ha, Q. Li, A. Tosin, M. Zanella (Eds.) Special Issue "From integro-differential models to data-oriented approaches for emergent phenomena", *European Journal of Applied Mathematics*, 2024 (expected).
- G. Albi, W. Boscheri, M. Zanella (Eds.). *Advances in Numerical Methods for Hyperbolic Balance Laws and Related Problems*, SEMA-SIMAI Springer Series, vol. 32, Springer, 2023.
  DOI:10.1007/978-3-031-29875-2

- G. Albi, S. Merino-Aceituno, A. Nota, M. Zanella (Eds.). *Trails in Kinetic Theory: Foundational Aspects and Numerical Methods*, SEMA-SIMAI Springer Series, vol. 25, Springer, Cham, 2021. DOI:10.1007/978-3-030-67104-4

Submitted Manuscripts

S5. J. Franceschi, L. Pareschi, M. Zanella. Emerging properties of the degree distribution in large non-growing networks.
Preprint arXiv:2409.06099, 2024.

S4. A. Bondesan, A. Piralla, E. Ballante, A. M. G. Pitrolo, S. Figini, F. Baldanti, M. Zanella. Predictability of viral load kinetics in the early phases of SARS-CoV-2 through a model-based approach.
Preprint arXiv:2407.03158, 2024.

S3. A. Medaglia, G. Nastasi, V. Romano, M. Zanella. Uncertainty quantification for charge transport in GNRs through particle Galerkin methods for the semiclassical Boltzmann equation.
Preprint arXiv: 2404.19602, 2024.

S2. S.-Y. Ha, M. Kang, J. Yoon, M. Zanella. Measure-valued death state and local sensitivity analysis for Winfree models with uncertain high-order couplings.
Preprint arXiv:2404.14072, 2024.

S1. R. Bailo, J. A. Carrillo, A. Medaglia, M. Zanella. Uncertainty Quantification for the Homogeneous Landau-Fokker-Planck Equation via Deterministic Particle Galerkin methods.
Preprint arXiv: 2312.07218, 2023.

Journal Articles

56. E. Calzola, G. Dimarco, G. Toscani, M. Zanella. Emergence of condensation patterns in kinetic equations for opinion dynamics. *Physica D: Nonlinear Phenomena*, 470 Part A: 134356, 2024.
DOI:10.1016/j.physd.2024.134356

55. B. Düring, J. Franceschi, M.-T. Wolfram, M. Zanella. Breaking consensus in kinetic opinion formation models on graphons. *Journal of Nonlinear Science*, 34:79, 2024.
DOI:10.1007/s00332-024-10060-4

54. R. F. Cabini, A. Pichiecchio, A. Lascialfari, S. Figini, M. Zanella. A kinetic approach to consensus-based segmentation of biomedical images. *Kinetic and Related Models*, in press.
DOI:10.3934/krm.2024017

53. L. Pareschi, M. Zanella. Reduced variance random batch methods for nonlocal PDEs. *Acta Applicandae Mathematicae*, 191, 4, 2024.
DOI:10.1007/s10440-024-00656-z

52. S. Bonandin, M. Zanella. Effects of heterogeneous opinion interactions in many-agent systems for epidemic dynamics. *Networks and Heterogeneous Media*, 19(1): 235-261, 2024.
DOI:10.3934/nhm.20240011

51. A. Medaglia, L. Pareschi, M. Zanella. Particle simulation methods for the Landau-Fokker-Planck equation with uncertain data. *Journal of Computational Physics*, 503:112845, 2024.
DOI:10.1016/j.jcp.2024.112845

50. A. Bondesan, G. Toscani, M. Zanella. Kinetic compartmental models driven by opinion dynamics: vaccine hesitancy and social influence. *Mathematical Models and Methods in Applied Sciences*, 34(06): 1043–1076, 2024.
DOI:10.1142/S0218202524400062

49. G. Dimarco, L. Pareschi, M. Zanella. Micro-macro stochastic Galerkin methods for nonlinear Fokker-Plank equations with random inputs. *Multiscale Modeling & Simulation*, 22(1): 527–560, 2024. DOI:10.1137/22M1509205

48. F. Auricchio, M. Carraturo, G. Toscani, M. Zanella. Impact of interaction forces in first order many-agent systems for swarm manufacturing. *Discrete and Continuous Dynamical Systems - S*, 17(1):78-97, 2024. DOI:10.3934/dcdss.2023173

47. G. Toscani, M. Zanella. On a kinetic description of Lotka-Volterra dynamics. *Rivista di Matematica della Università di Parma*, in press. Preprint arXiv:2302.14573

46. F. Auricchio, G. Toscani, M. Zanella. Trends to equilibrium for a nonlocal Fokker-Planck equation. *Applied Mathematics Letters*, 145:108746, 2023. DOI:10.1016/j.aml.2023.108746

45. J. Franceschi, A. Medaglia, M. Zanella. On the optimal control of kinetic epidemic models with uncertain social features. *Optimal Control, Applications and Methods*, 45(2): 494-522, 2024. DOI:10.1002/oca.3029

44. M. Zanella. Kinetic models for epidemic dynamics in the presence of opinion polarization. *Bulletin of Mathematical Biology*, 85:36, 2023. DOI:10.1007/s11538-023-01147-2

43. A. Medaglia, L. Pareschi, M. Zanella. Stochastic Galerkin particle methods for kinetic equations of plasmas with uncertainties. *Journal of Computational Physics*, 479:112011, 2023. DOI:10.1016/j.jcp.2023.112011

42. F. Auricchio, G. Toscani, M. Zanella. Fokker-Planck modeling of many-agent systems in swarm manufacturing: asymptotic analysis and numerical results. *Communications in Mathematical Sciences*, 21(6):1655-1677, 2023. DOI:10.4310/CMS.2023.v21.n6.a10

41. J. Franceschi, L. Pareschi, M. Zanella. From agent-based models to the macroscopic description of fake-news spread: the role of competence in data-driven applications. *Partial Differential Equations and Applications*, 3, 68, 2022. DOI:10.1007/s42985-022-00194-z

40. A. Medaglia, A. Tosin, M. Zanella. Monte Carlo stochastic Galerkin methods for non-Maxwellian kinetic models of multiagent systems with uncertainties. *Partial Differential Equations and Applications*, 3, 51, 2022. DOI:10.1007/s42985-022-00189-w

39. G. Dimarco, G. Toscani, M. Zanella. A multi-agent description of the influence of higher education on social stratification. *Journal of Economic Interaction and Coordination*, in press. DOI:10.1007/s11403-022-00358-5

38. E. Bernardi, L. Pareschi, G. Toscani, M. Zanella. Effects of vaccination efficacy on wealth distribution in kinetic epidemic models. *Entropy*, 22:216, 2022. DOI:10.3390/e24020216

37. A. Medaglia, G. Colelli, L. Farina, A. Bacila, P. Bini, E. Marchioni, S. Figini, A. Pichiecchio, M. Zanella. Uncertainty quantification and control of kinetic models of tumour growth under clinical uncertainties. *International Journal of Non-Linear Mechanics*, 141:103933, 2022. DOI:10.1016/j.ijnonlinmec.2022.103933

36. G. Dimarco, A. Tosin, M. Zanella, Kinetic derivation of Aw-Rascle-Zhang-type traffic models with driver-assist vehicles. *Journal of Statistical Physics*, 186:17, 2022.
DOI:10.1007/s10955-021-02862-7

35. G. Dimarco, G. Toscani, M. Zanella. Optimal control of epidemic spreading in the presence of social heterogeneity. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 380:20210160, 2022.
DOI:10.1098/rsta.2021.0160

34. R. Borsche, A. Klar, M. Zanella. Kinetic-controlled hydrodynamics for multilane traffic models. *Physica A: Statistical Mechanics and its Applications*, 587: 126486, 2022.
DOI:10.1016/j.physa.2021.126486

33 L. Pareschi, T. Trimborn, M. Zanella. Mean-field control variate methods for kinetic equations with uncertainties and applications to socio-economic sciences. *International Journal for Uncertainty Quantification*, 12(1):61–84, 2022.
DOI:10.1615/Int.J.UncertaintyQuantification.2021037960

32. G. Albi, L. Pareschi, M. Zanella. Modelling lockdown measures in epidemic outbreaks using selective socio-economic containment with uncertainty. *Mathematical Biosciences and Engineering*, 18(6): 7161–7190, 2021.
DOI:10.3934/mbe.2021355

31. G. Toscani, M. Zanella. On a class of Fokker-Planck equations with subcritical confinement. *Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl.*,, 32:471-497, 2021.
DOI:10.4171/RLM/944

30. M. Zanella, C. Bardelli, G. Dimarco, S. Deandrea, P. Perotti, M. Azzi, S. Figini, G. Toscani. A data-driven epidemic model with social structure for understanding the COVID-19 infection on a heavily affected Italian Province. *Mathematical Models and Methods in Applied Sciences*, 31(12):2533-2570, 2021.
DOI:10.1142/S021820252150055X.

29. G. Dimarco, B. Perthame, G. Toscani, M. Zanella. Kinetic models for epidemic dynamics with social heterogeneity. *Journal of Mathematical Biology*, 83, 4, 2021.
DOI:10.1007/s00285-021-01630-1

28. G. Albi, L. Pareschi, M. Zanella. Control with uncertain data of socially structured compartmental epidemic models. *Journal of Mathematical Biology*, 82, 63, 2021.
DOI:10.1007/s00285-021-01617-y

27. N. Loy, M. Zanella. Structure preserving schemes for Fokker-Planck equations with nonconstant diffusion matrices. *Mathematics and Computers in Simulation*, 188: 342-362, 2021.
DOI:10.1016/j.matcom.2021.04.018

26. M. Zanella, C. Bardelli, M. Azzi, S. Deandrea, P. Perotti, S. Silva, E. Cadum, S. Figini, G. Toscani. Social contacts, epidemic spreading and health system. Mathematical modeling and applications to COVID-19 infection. *Mathematical Biosciences and Engineering*, 18(4): 3384–3403, 2021.
DOI:10.3934/mbe.2021169

25. L. Preziosi, G. Toscani, M. Zanella. Control of tumour growth distributions through kinetic methods. *Journal of Theoretical Biology*, 514: 110579, 2021.
DOI:10.1016/j.jtbi.2021.110579.

24. L. Pareschi, M. Zanella. Monte Carlo stochastic Galerkin methods for the Boltzmann equation with uncertainties: space-homogeneous case. *Journal of Computational Physics*, 423: 109822, 2020.
DOI:10.1016/j.jcp.2020.109822

23. B. Piccoli, A. Tosin, M. Zanella. Model-based assessment of the impact of driver-assist vehicles using kinetic theory. *Zeitschrift für Angewandte Mathematik und Physik*, 71:152, 2020. DOI:10.1007/s00033-020-01383-9

22. E. Ballante, C. Bardelli, M. Zanella, S. Figini, G. Toscani. Economic segregation under the action of trading uncertainties. *Symmetry*, 12(9): 1390, 2020. DOI:10.3390/sym12091390

21. G. Dimarco, L. Pareschi, G. Toscani, M. Zanella. Wealth distribution under the spread of infectious diseases. *Physical Review E*, 102: 022303, 2020 DOI:10.1103/PhysRevE.102.022303

20. G. Toscani, A. Tosin, M. Zanella. Kinetic modelling of multiple interactions in socio-economic systems. *Networks & Heterogeneous Media*, 15(3): 519-542, 2020. DOI:10.3934/nhm.2020029

19. A. Tosin, M. Zanella. Uncertainty damping in kinetic traffic models by driver-assist controls. *Mathematical Control & Related Fields*, 11(3): 681-713, 2021. DOI:10.3934/mcrf.2021018

18. J. A. Carrillo, M. Zanella. Monte Carlo gPC methods for diffusive kinetic flocking models with uncertainties. *Vietnam Journal of Mathematics*, 47(4): 931-954, 2019. DOI:10.1007/s10013-019-00374-2

17. M. Zanella. Structure preserving stochastic Galerkin methods for Fokker-Planck equations with background interactions. *Mathematics and Computers in Simulation*, 168:28-47, 2020. DOI:10.1016/j.matcom.2019.07.012.

16. G. Toscani, A. Tosin, M. Zanella. Multiple-interaction kinetic modelling of a virtual-item gambling economy. *Physical Review E*, 100(1):012308, 2019. DOI:10.1103/PhysRevE.100.012308.

15. L. Pareschi, G. Toscani, A. Tosin, M. Zanella. Hydrodynamic models of preference formation in multiagent societies. *Journal of Nonlinear Science*, 29(6):2761-2796, 2019. DOI:10.1007/s00332-019-09558-z

14. A. Tosin, M. Zanella. Kinetic-controlled hydrodynamics for traffic models with driver-assist vehicles. *Multiscale Modeling & Simulation*, 17(2):716-749, 2019. DOI:10.1137/18M1203766

13. G. Albi, L. Pareschi, M. Zanella. Boltzmann games in heterogeneous consensus dynamics. *Journal of Statistical Physics*, 175(1):97-125, 2019. DOI:10.1007/s10955-019-02246-y

12. J. A. Carrillo, L. Pareschi, M. Zanella. Particle based gPC methods for mean-field models of swarming with uncertainty. *Communications in Computational Physics*, 25(2):508-531, 2019. DOI:10.4208/cicp.OA-2017-0244

11. M. Herty, A. Tosin, G. Visconti, M. Zanella. Hybrid stochastic kinetic description of two-dimensional traffic dynamics. *SIAM Journal on Applied Mathematics*, 78(5):2737-2762, 2018. DOI:10.1137/17M1155909

10. G. Toscani, A. Tosin, M. Zanella. Opinion modeling on social media and marketing aspects. *Physical Review E*, 98(2):022315, 2018. DOI:10.1103/PhysRevE.98.022315

9. A. Tosin, M. Zanella. Boltzmann–type models with uncertain binary interactions. *Communications in Mathematical Sciences*, 16(4):962-984, 2018.
DOI:10.4310/CMS.2018.v16.n4.a3

8. L. Pareschi, M. Zanella. Structure preserving schemes for nonlinear Fokker–Planck equations and applications. *Journal of Scientific Computing*, 74(3):1575-1600, 2018.
DOI:10.1007/s10915-017-0510-z

7. P Vellucci, M. Zanella. Microscopic modeling and analysis of collective decision–making: equality bias leads suboptimal solutions. *Annali dell'Università di Ferrara – Sezione VII Scienze Matematiche*, 64(1):185-207, 2018.
DOI:10.1007/s11565-017-0280-4

6. M. Herty, M. Zanella. Performance bounds for the mean-field limit of constrained dynamics. *Discrete and Continuous Dynamical Systems – Series A*, 37(4):2023-2043, 2017.
DOI:10.3934/dcds.2017086

5. L. Pareschi, P. Vellucci, M. Zanella. Kinetic models of collective decision–making in the presence of equality bias. *Physica A: Statistical Mechanics and its Applications*, 467:201-217, 2017.
DOI:10.1016/j.physa.2016.10.003

4. G. Albi, L. Pareschi, M. Zanella. Opinion dynamics over complex networks: kinetic modelling and numerical methods. *Kinetic and Related Models*, 10(1):1-32, 2017.
DOI:10.3934/krm.2017001

3. D. Morale, M. Zanella, V. Capasso, W. Jaeger. Stochastic modelling and simulation of ion transport through channels. *Multiscale Modeling & Simulation*, vol. 14(1):113-137, 2016.
DOI:10.1137/15M1010907

2. G. Albi, L. Pareschi, M. Zanella. Uncertainty Quantification in control problems for flocking models. *Mathematical Problems in Engineering*, vol. 2015, 14 pp., 2015.
DOI:10.1155/2015/850124

1. G. Albi, L. Pareschi, M. Zanella. Boltzmann–type control of opinion consensus through leaders, *Philosophical Transactions of the Royal Society A: Mathematical Physical and Engineering Sciences*, 372(2028), 2014.
DOI:10.1098/rsta.2014.0138

Book Chapters

5. G. Albi, G. Bertaglia, W. Boscheri, G. Dimarco, L. Pareschi, G. Toscani, M. Zanella. Kinetic modelling of epidemic dynamics: social contacts, control with uncertain data, and multiscale spatial dynamics. In *Predicting Pandemics in a Globally Connected World, Vol. 1*, Editors N. Bellomo and M. Chaplain, Springer-Nature, pp. 43–108.
DOI:10.1007/978-3-030-96562-4_3

4. M. Herty, A. Tosin, G. Visconti, M. Zanella. Reconstruction of traffic speed distributions from kinetic models with uncertainties. In *Mathematical descriptions of traffic flow: micro, macro and kinetic models*, Eds. G. Puppo, A. Tosin, SEMA-SIMAI Springer Series, vol 12, 2021.
DOI:10.1007/978-3-030-66560-9_1

3. A. Tosin, M. Zanella. Boltzmann-type description with cutoff of Follow-the-Leader traffic models. In *Trails in Kinetic Theory: Foundational Aspects and Numerical Methods*, Eds. G. Albi, S. Merino-Aceituno, A. Nota, M. Zanella, SEMA-SIMAI Springer Series, vol. 25, pp. 227-251, 2021.
DOI:10.1007/978-3-030-67104-4_8

2. G. Dimarco, L. Pareschi, M. Zanella. Uncertainty quantification for kinetic models in socio–economic and life sciences. In *Uncertainty Quantification for Hyperbolic and Kinetic Equations*, S. Jin, L. Pareschi Eds., SEMA SIMAI Springer Series, vol. 14, pp. 151-191, 2017.
DOI:10.1007/978-3-319-67110-9_5

1. G. Albi, L. Pareschi, G. Toscani, M. Zanella. Recent advances in opinion modeling: control and social influence. In *Active Particles Volume 1. Advances in Theory, Models and Applications*, N. Bellomo, P. Degond, and E. Tadmor Eds., Birkhäuser–Springer, pp. 49-98, 2017.
DOI:10.1007/978-3-319-49996-3_2

Proceedings

4. A. Medaglia, M. Zanella. Kinetic and macroscopic epidemic models in presence of multiple heterogeneous populations. In P. Barbante et al. (eds.) *From Kinetic Theory to Turbulence Modeling: The Legacy of Carlo Cercignani*, Springer INdAM Series, vol. 51, pp. 191–201 .
DOI:10.1007/978-981-19-6462-6_15.

3. A. Tosin, M. Zanella. Control strategies for road risk mitigation in kinetic traffic modelling. *IFAC-PapersOnLine*, 51(9):67-72, 2018.
DOI:10.1016/j.ifacol.2018.07.012

2. L. Pareschi, M. Zanella. Structure preserving schemes for mean–field equations of collective behavior. In: Klingenberg C., Westdickenberg M. (eds) *Theory, Numerics and Applications of Hyperbolic Problems II. HYP 2016.* Springer Proceedings in Mathematics & Statistics, vol 237, pp. 405–421, Springer, Cham.
DOI:10.1007/978-3-319-91548-7_31

1. G. Albi, L. Pareschi, M. Zanella. On the optimal control of opinion dynamics on evolving networks. In *System Modeling and Optimization. CSMO 2015. IFIP Advances in Information and Communication Technology*, L. Bociu, J. A. Désidéri, A. Habbal Eds., vol. 494, Springer, Cham.
DOI:10.1007/978-3-319-55795-3_4

Interdisciplinary Collaborations

3. J. Dibble, A. Prelorendjos, O. Romice, M. Zanella, E. Strano, M. Pagel, S. Porta. On the origin of spaces: Morphometric foundations of urban form evolution. *Environment and Planning B: Urban Analytics and City Science*, 46(4): 707–730, 2019.
DOI:10.1177/2399808317725075

2. J. Dibble, A. Prelorendjos, O. Romice, M. Zanella, E. Strano, M. Pagel, S. Porta. Urban morphometrics: Towards a science of urban evolution. *City as Organism: New Visions for Urban Life*, 2, pp. 1143–1154. Proceedings of the 22nd International Seminar on Urban Form, Rome.

1. A. Venerandi, M. Zanella, O. Romice, J. Dibble, S. Porta. Form and urban change – An urban morphometric study of five gentrified neighbourhoods in London. *Environment and Planning B: Urban Analytics and City Science*, 44(6): 1056–1076, 2017.
DOI:10.1177/0265813516658031.

Popularization

- Instructor at the ECMI Modelling Week 2024 with the project "Many-agent systems in swarm additive manufacturing: how can we uniformly cover a portion of a domain?", University of Catania.

- Invited talk - "Il ruolo delle scienze dure: risolvere problemi tipici delle scienze sociali", Winter School L'Innovazione Cambia il Futuro, Motore Sanità, Villa Erba, Cernobbio (CO), Italy, February 2024 (in Italian).
- Invited talk - "Approcci data-driven e modelli epidemiologici per analizzare la diffusione di un'epidemia: applicazione ai dati COVID-19 della provincia di Pavia", 11th Italian Day of Statistics, November 2021.
- Invited talk - "Modelli matematici come strumento decisionale: epidemie e comportamento collettivo", $\pi-$day Giornata Internazionale della Matematica, March 14th, 2021.
- M. Zanella, G. Toscani. Modelli matematici per controllare l'impatto sociale dell'epidemia. *Università di Pavia - Idee per Ripartire*, November 2020 (in Italian).
- A. Tosin, M. Zanella. La popolarità delle opinioni. *MaddMath - MaddSpot*, June 2018 (in Italian).
- G. Albi, M. Zanella. Manuale per un leader: strategie di controllo dell'opinione pubblica. *Gli Stati Generali*, May 2015 (in Italian).

Communications

Talks

69. August 2024 - Invited talk *Condensation Effects in Kinetic Models for Consensus Dynamics*, Workshop "Recent Advances in Kinetic Theory: Modeling, Computation", Westlake University, Hangzhou, Popular Republic of China.
68. July 2024 - Invited talk *Reduced variance random batch methods for nonlocal meanfield equations*, SciCADE2024, MS25-1 "Analysis and Numerical Computations for Kinetic Models", National University of Singapore, Singapore.
67. July 2024 - Invited talk *Condensation effects in kinetic consensus dynamics*, Workshop on Scientific Computing and Data Science, Chinese University of Hong Kong, Hong Kong.
66. June 2024 - Invited talk *Micro-macro stochastic Galerkin methods for nonlinear Fokker-Planck equations with random data*, ECCOMAS Congress 2024, MS159 "Novel Kinetic Approaches in Optimization and Uncertainty Quantification", Lisbon, Portugal.
65. April 2024 - Invited seminar *Trends to equilibrium for many-agent systems in swarm manufacturing*, Department of Mathematical, Physical and Computer Sciences, University of Parma, Italy.
64. March 2024 - Invited talk *Trends to equilibrium for many-agent systems in swarm manufacturing*, Cassini Workshop "Evolution equations and functional inequalities", University of Bergamo, Italy.
63. February 2024 - Invited talk *Stochastic Galerkin Particle Methods for Kinetic Equations of Plasmas with Uncertain Data*, minisymposium "Recent Advances on Quantifying Uncertainties in Kinetic Equations", SIAM Conference on Uncertainty Quantification 2024, Trieste, Italy.
62. February 2024 - Invited talk *Beyond epidemic spread: management and forecast through mathematical modelling*, Winter School "Social Sciences for Global Challenges", University of Pavia.
61. January 2024 - Invited talk *Kinetic modelling and control of epidemic dynamics with social heterogeneity*, Workshop "Modeling, analysis, and control of multi-agent systems across scales", Centro di Ricerca Matematica Ennio De Giorgi, Scuola Normale Superiore, Italy.

60. January 2024 - Invited seminar *Impact of interaction forces on first-order models for swarm manufacturing* - Research Training Group Energy, Entropy, and Dissipative Dynamics (EDDy), RWTH Aachen University, Germany.

59. November 2023 - Invited seminar *Kinetic modelling and control of multiagent systems with heterogeneous social features*, Department of Mathematics, University of Warwick, UK.

58. November 2023 - Invited talk *Kinetic modelling and control of multiagent systems with missing information*, Workshop *Control Methods in Hyperbolic Partial Differential Equations*, MFO Oberwolfach, Germany.

57. October 2023 - Invited online talk *Stochastic Galerkin particle methods for kinetic equations of plasmas with uncertain data* - French-Korean International Research Laboratory in Mathematics.

56. September 2023 - Invited talk *Trends to equilibrium for Fokker-Planck equations in swarm manufacturing* - Congress of the Italian Mathematical Union (UMI), Section 9 "Mathematics and Applications", University of Pisa, Italy.

55. August 2023 - Invited talk *Trends to equilibrium for nonlocal Fokker-Planck equations in swarm manufacturing* - Workshop "HYKE-Hwarang Day", Seoul National University, Republic of Korea.

54. August 2023 - Invited talk *Trends to equilibrium for nonlocal Fokker-Planck equations with discontinuous drift*, minisymposium "Many-agent systems and mean-field models for socio-economic and life sciences dynamics", ICIAM2023 Conference, Tokyo, Japan.

53. July 2023 - Invited lecture *Kinetic modelling and control of epidemic dynamics with social heterogeneity* - Blended Intensive Program *Modelling and Simulation of Socio-Behavioural Phenomena*, University of L'Aquila, Italy.

52. July 2023 - Invited talk *Trends to equilibrium for nonlocal Fokker-Planck equations with discontinuous drift* - Workshop "Multiscale phenomena in continuum mechanics: singular limits, out of equilibrium and transitions" - Palermo, Italy.

51. June 2023 - Invited talk *Kinetic modelling and control of multiagent systems with missing information* - Workshop "Collective and Self-Organised Dynamics: Kinetic and Network Approaches" - University of Parma, Italy.

50. June 2023 - Invited talk *Stochastic Galerkin particle methods for kinetic equations of plasmas with uncertain data* - Workshop "Numerical Aspects of Hyperbolic Balance Laws and Related Problems" - Palazzone di Cortona, Italy.

49. April 2023 - Invited online seminar *Kinetic modelling and control of epidemic dynamics with social heterogeneity* - University of Graz, Austria.

48. January 2023 - Invited seminar *Interfaces between Kinetic Models of Collective Phenomena and Data Science* - Seoul National University, HYKE Research Group, Republic of Korea.

47. November 2022 - Invited talk *Uncertainty quantification for kinetic equations of emerging phenomena* - BIRS-CMO Workshop, "Kinetic Equations: Recent Developments and Novel Applications", Oaxaca, Mexico.

46. June 2022 - Invited talk *Uncertainty quantification for many-agent systems* - Thematic Program "Computational Uncertainty Quantification: Mathematical Foundations, Methodology, and Data", Workshop 5 on "UQ in Kinetic and Transport Equations in High-Frequency Wave Propagation", Erwin Schrödinger Institute (ESI), Vienna.

45. June 2022 - Contributed talk *Kinetic modelling and control of epidemic dynamics with social heterogeneity* - XXI International Conference on Waves and Stability in Continuous Media, Catania, Italy.

44. May 2022 - Invited seminar *Uncertainty quantification for kinetic equations of emergent phenomena* - Research Training Group Energy, Entropy, and Dissipative Dynamics (EDDy), RWTH Aachen University, Germany.

43. April 2022 - Invited seminar *Uncertainty quantification for kinetic equations of emergent phenomena* - Program Frontiers in kinetic theory: connecting microscopic to macroscopic scales, Isaac Newton Institute for Mathematical Sciences, UK.

42. February 2022 - Invited seminar *Kinetic modelling and control of epidemic dynamics with social heterogeneity* - Infectious Disease Outbreaks (IDO) Seminars, Department of Mathematics, University of Bordeaux, France.

41. June 2021 - Invited talk *Kinetic and macroscopic models for epidemic dynamics*, MS "PDE models in the Life and Social Sciences", 8th European Congress of Mathematics.

40. May 2021 - Contributed talk *Kinetic models for epidemic dynamics* - Conference "The Legacy of Carlo Cercignani: from Kinetic Theory to Turbulence Modeling", Politecnico di Milano, Italy.

39. May 2020 - Invited talk *Uncertainty quantification and control for emerging phenomena*, Electronic Spring Workshop "PhD in Computational Mathematics and Decision Sciences", University of Pavia, Italy.

38. December 2019 - Invited talk *Uncertainty quantification and control for collective phenomena*, Workshop "Emergent phenomena - from Kinetic Models to Social Hydrodynamics", Thematic Program on "Quantum and Kinetic Problems: Modeling, Analysis, Numerics and Applications", Institute for Mathematical Sciences, National University of Singapore, Singapore.

37. November 2019 - Seminar *Uncertainty damping in the macroscopic forecast of vehicular traffic flow*, Laboratory SmartData@Polito, Politecnico di Torino, Italy.

36. September 2019 - Invited talk *Kinetic-controlled hydrodynamics*, Section 8: "Fisica Matematica", XXI Congresso UMI (Unione Matematica Italiana), University of Pavia, Italy.

35. September 2019 - Invited talk *Uncertainty damping in kinetic traffic models*, Section 9: "Modelli e Applicazioni", XXI Congresso UMI (Unione Matematica Italiana), University of Pavia, Italy.

34. July 2019 - Invited talk *Uncertainty damping in kinetic traffic modelling by driver-assit controls*, MS "Mathematical descriptions of traffic flow: micro, macro and kinetic models for a complex phenomenon", International Congress on Industrial and Applied Mathematics (ICIAM2019), Valencia, Spain.

33. July 2019 - Invited talk *Kinetic-controlled hydrodynamics*, MS "Novel concepts in model-driven optimization and control of agent-based systems", International Congress on Industrial and Applied Mathematics (ICIAM2019), Valencia, Spain.

32. June 2019 - Invited talk *Structure preserving gPC methods for kinetic equations with uncertainties*, MS "Computational methods for model driven optimization and control under uncertainty", 28th Biennial Numerical Analysis Conference, University of Strathclyde, Glasgow, UK.

31. May 2019 - Invited talk *Monte Carlo gPC methods for kinetic equations with uncertainties*, Workshop "Asymptotic methods and numerical approximations of multi-scale evolutions problems, and uncertainty quantification", ENS Rennes, France.

30. March 2019 - Invited talk *Uncertainty damping in kinetic models of collective phenomena*, Workshop "Control Theory and Applications", Gran Sasso Science Institute (GSSI), L'Aquila, Italy.

29. February 2019 - Invited talk *Kinetic-controlled hydrodynamics*, Workshop "Numerical methods for multiscale control problems and applications" University of Verona, Italy.

28. December 2018 - Invited talk *Uncertainty quantification for kinetic equations of collective behavior*, Workshop "Innovative Trends in the Numerical Analysis and Simulation of Kinetic Equations", Mathematisches Forschungsinstitut Oberwolfach, Germany.

27. November 2018 - Invited lecture *Uncertainty Quantification for kinetic equations of collective behavior*, Autumn School "From Interacting Particle Systems to Kinetic Equations: Modelling, Control & Numerical Methods", University of Verona, Italy.

26. October 2018 - Contributed talk *Control strategies for road risk mitigation in kinetic and hydrodynamic traffic modelling*, Conference Kinetic and Transport Equations: Mathematical Advances and Applications, University of Parma, Parma, Italy.

25. October 2018 - Invited talk *Control strategies for road risk mitigation in kinetic and hydrodynamic traffic modelling*, Workshop Problems in discrete dynamics: from biochemical systems to rare events, networks, clustering and related topics - IV Edition, Arcidosso, Italy.

24. September 2018 - Invited talk *Stochastic Galerkin methods for kinetic equations of collective behavior*, Session "Advances in Kinetic Theory", Joint Meeting UMI–SIMAI–PTM, Wrocław, Poland.

23. July 2018 - Invited talk *Boltzmann games in heterogeneous consensus dynamics*, MS "Inverse problems and optimal control approaches in socio-economic applications", 28th IFIP TC7 Conference 2018, University of Duisburg-Essen, Germany.

22. July 2018 - Invited talk *Control strategies for road risk mitigation in kinetic and hydrodynamic traffic modelling*, MS "Modeling and optimization of networked systems", 28th IFIP TC7 Conference 2018, University of Duisburg-Essen, Germany.

21. May 2018 - Invited talk *Stochastic Galerkin methods for kinetic equations of collective behavior* - Workshop Kinetic Theory for Control, Games and Uncertainty, RWTH Aachen University, Aachen, Germany.

20. February 2018 - Invited talk *Uncertainty quantification for kinetic and mean-field equations* - Convegno Nazionale GNCS 2018, Montecatini Terme, Italy.

19. December 2017 - Seminar *Uncertainty quantification and optimal control problems for multiagent systems* - Department of Mathematical Sciences G. L. Lagrange, Politecnico di Torino, Italy.

18. December 2017 - Invited talk *Opinion dynamics over kinetic networks*, MS "Kinetic and mean-field models in socio-economics and life sciences", SIAM Conference on Analysis of Partial Differential Equations, Baltimore, USA.

17. November 2017 - Invited talk *Hybrid stochastic kinetic description of 2D traffic dynamic* - The Finite Volume Schemes and Traffic Modeling in Besançon, Université Franche–Comte, Besançon, France.

16. November 2017 - Department seminar *Hybrid stochastic kinetic description of 2D traffic dynamics* - Department of Mathematics IGPM, RWTH Aachen University, Germany.

15. October 2017 - Seminar *Uncertainty quantification for kinetic and mean–field equations* - Department of Mathematics, University of Sussex, Brighton, UK.

14. October 2017 - Invited talk *Opinion dynamics over kinetic networks* - Workshop Problems in discrete dynamics: from biochemical systems to rare events, networks, clustering and related topics - III Edition, Arcidosso, Italy.

13. September 2017 - Contributed talk *Uncertainty quantification for mean-field equations in social sciences* - XVII Italian Meeting on Hyperbolic Equations, University of Pavia, Pavia, Italy.

12. June 2017 - Invited talk *Opinion dynamics over kinetic networks*, MS "Numerical Approximation and Optimization of Agent-based Models", 27th Biennial Numerical Analysis Conference, University of Strathclyde, UK.

11. May 2017 - Contributed talk *Structure preserving methods for mean-field equations with random inputs* - Warwick EPSRC Symposium: Emerging PDE models in Socio-Economic Sciences, University of Warwick, UK.

10. May 2017 - Department seminar *Structure preserving methods for mean-field equations with random inputs* - Department of Mathematics, RWTH Aachen University, Aachen, Germany.

9. April 2017 - Invited lecture *Structure preserving methods for mean-field equations with random inputs* - School on Uncertainty Quantification for Hyperbolic Equations and Related Topics, GSSI, L'Aquila, Italy.

8. March 2017 - Invited talk *Uncertainty quantification for kinetic equations in socio-economic sciences*, MS "Modeling and Applications with Kinetic and Transport Models", SIAM CS&E 2017 Conference, Atlanta, USA.

7. July 2016 - Contributed talk *Uncertainty quantification for kinetic models of collective behavior* - Summer School UQ for Applied Problems, Basque Center for Applied Mathematics (BCAM), Bilbao, Spain.

6. January 2016 - Invited talk *Modeling and control of opinion dynamics on networks* - International Workshop Kinetic Theory and Multiscale Phenomena: Modelling, Analysis and New Applications , Stellenbosch, South Africa.

5. December 2015 - Department Seminar *Stochastic multiscale modelling of ion transport across membranes* - Department of Mathematics, Politecnico di Milano, Milano, Italy.

4. June 2015 - Invited talk *Mean-field and Boltzmann control of socio-economic systems*, MS "Modeling and Control of Multi-agent Systems", 27th IFIP TC7 Conference 2015, Sophia-Antipolis, France.

3. June 2015 - Department seminar *Uncertainty quantification in control problems for flocking models* - Department of Mathematics, RWTH Aachen University, Aachen, Germany.

2. March 2015 - Department seminar *Uncertainty quantification in control problems for flocking models* - Department of Mathematics, University of Wisconsin-Madison, Madison, USA.

1. March 2015 - Invited talk *Uncertainty quantification in control problems for flocking models* - SIAM CS&E 2015 Conference, Salt Lake City, USA.

Organization activity

- Italo-Korean Symposium on "Advances in Kinetic Equations for Collective Phenomena and Related Models", February 2024, University of Pavia, Italy.
  (co-organiser Prof. Seung-Yeal Ha)

- Workshop "Integrated Mathematical Approaches to Socio-Epidemiological Dynamics", January 2024, University of Trento, Italy.
  (co-organisers Prof. Andrea Pugliese, Prof. Andrea Tosin, Prof. Giacomo Dimarco, Prof. Rossana Vermiglio)

- Special Session "Mathematics in Life Sciences", Congress of the Italian Mathematical Union (UMI), September 2023, University of Pisa, Italy.
  (co-organizers Prof. Chiara Giverso, Dr. Cinzia Soresina)

- Workshop "Mathematical challenges in social systems and applications to public health", May 2023, University of Buenos Aires, Argentina.
  (co-organizers Prof. Nicolas Saintier, Prof. Juan-Pablo Pinasco)
- Focused Research Group *Novel perspectives in kinetic equations for emerging phenomena*, July 2022, Banff International Research Station for Mathematical Innovation and Discovery (BIRS), Canada.
  (co-organizers Prof. Jingwei Hu, Prof. Lorenzo Pareschi, Prof. Weiran Sun)
- Workshop *Contemporary Trends in Kinetic Theory and PDEs*, July 2022, University of Pavia, Italy.
  (co-organizers Prof. J. A. Carrillo, Dr. Ada Pulvirenti, Prof. Giuseppe Savaré)
- Young Researcher Conference *Numerical Aspects of Hyperbolic Balance Laws and Related Problems*, December 2021, University of Verona, Italy.
  (co-organizer Dr. Giacomo Albi)
- Minisymposium *Novel Approaches in the Mathematical Understanding of COVID-19 Epidemic*, SIMAI 2020+2021 Conference, September 2021, University of Parma, Italy.
  (co-organizer Dr. Cinzia Soresina)
- Minisymposium *Recent Results in Kinetic Theory and Applications*, SIMAI 2020+2021 Conference, September 2021, University of Parma, Italy.
  (co-organizer Dr. Giorgio Martalò)
- Electronic Workshop *Collective Models, Control and Uncertainty Quantification for Infectious Diseases and Related Problems*, April 2020.
  (co-organizers Dr. Giacomo Albi, Prof. Giacomo Dimarco, Prof. Lorenzo Pareschi)
- Minisymposium *Computational Methods for Model-driven Optimization and Control under Uncertainty*, 28th Numerical Analysis Conference, June 2019, University of Strathclyde, Glasgow, UK.
  (co-organizer Dr. Dante Kalise Balza)
- Summer School *Trails in Kinetic Theory: Foundational Aspects and Numerical Methods*, May 2019, Hausdorff Research Institute for Mathematics, Bonn, Germany.
  (co-organizers Dr. Giacomo Albi, Dr. Sara Merino Aceituno, Dr. Alessia Nota)
- Workshop *Recent Trends in Kinetic Modelling and Related Fields*, Politecnico di Torino, October 2018, Politecnico di Torino, Italy.
  (co-organizer Prof. Andrea Tosin)
- Special Session *Models and Numerical Methods in Kinetic Theory*, 12th AIMS Conference on Dynamical Systems, Differential Equations and Applications, July 2018, Taipei, Taiwan.
  (co-organizers Prof. Giacomo Dimarco, Prof. Andrea Tosin)
- Conference *Numerical Aspects of Hyperbolic Balance Laws and Related Problems*, April 2018, University of Ferrara, Ferrara, Italy.
  (co-organizers Dr. Giacomo Albi, Prof. Giacomo Dimarco)
- Conference *Numerical Aspects of Hyperbolic Balance Laws and Related Problems*, December 2015, University of Ferrara, Ferrara, Italy.
  (co-organizers Prof. Giacomo Dimarco, Prof. Lorenzo Pareschi)

Referee Activity

I served as referee for the following journals:
Acta Applicandae Mathematicae • Aerospace Science & Technology • Analysis and Applications • Applied Mathematical Modelling • Applied Mathematics and Computation • Applied Mathematics Letters • Applied Mathematics and Optimization • Applied Physics Reviews • Communications in Computational Physics • Communications in Mathematical Sciences • Communications in Nonlinear Science and Numerical Simulation • Computer & Mathematics with Applications • Discrete and Continuous Dynamical Systems • Entropy • Frontiers in Artificial Intelligence • IEEE Journal of Biomedical and Health Informatics • International Journal of Automation and Computing • Journal of Applied Analysis • Journal of Computational Physics • Journal of Computational Science • Journal of Differential Equations • Journal of Statistical Physics • Journal of Theoretical Biology • Kinetic and Related Models • Mathematical Biosciences and Engineering • Mathematical Medicine and Biology • Mathematics and Computers in Simulation • Mathematical Methods in the Applied Sciences • Mathematical Models and Methods in the Applied Sciences • Nonlinearity • Numerische Mathematik • Optimization and Engineering • Physica A • Physics Letters A • Philosophical Transactions of the Royal Society A • PLoS ONE • Proceedings of the Royal Society A • SIAM Journal on Applied Mathematics • SIAM Journal on Multiscale Modeling & Simulation • SIAM Journal on Numerical Analysis • SIAM Journal on Scientific Computing • SEMA–SIMAI Springer Series.

Certified referee activity `https://publons.com/a/1271086/`.

Research Partnerships

- 2020 – 2021: Research project "Mathematical modeling and statistics for the forecast of the Covid-19 epidemic in the territory of the Province of Pavia", University of Pavia and Health Protection Agency (ATS) of Pavia.

Research Contracts

- March 2022 – December 2022: Centre for Advanced Imaging and Radiomics, IRCCS Mondino Foundation, National Neurological Institute. Support to the project "Development of radiomics and refinement of advanced MR imaging biomarkers in neuromuscular diseases", Prof. Anna Pichiecchio.
  Research: Development of automated systems for image segmentation from encephalic and muscle MRIs and machine learning algorithms for neuroradiological purposes.
- March 2021 – December 2021: Centre for Advanced Imaging and Radiomics, IRCCS Mondino Foundation, National Neurological Institute. Support to the project "Development of radiomics and refinement of advanced MR imaging biomarkers in neuromuscular diseases", Prof. Anna Pichiecchio.
  Research: collaboration with the Institute's neuroradiologists for the evaluation of imaging data.

Boards

- 2024
  - Member of the PhD Evaluation Committee of Mr. Davide Carbone, Politecnico of Torino, Italy. Thesis: "Generative Models as Out-of-equilibrium particle systems: the case of Energy-Based Models", supervisors: Prof. L. Rondoni, Prof. E. Vanden-Ejiden.

- Member of the PhD Evaluation Committee of Mr. Oliver Lewis Jack Wright, University of Warwick, UK. Thesis: "Leader-Follower Opinion Dynamics: Demographically Stratified Kinetic Models, Fokker-Planck Equations and Optimal Control", supervisor: Prof. B. Düring.

- 2023 – present: Member of the Scientific Committee of the *Centre for Health Technologies*, University of Pavia.
- 2023 – 2026: Coordinator of the National Group *Socio-Epidemiological Mathematical Modelling*, Italian Mathematical Union (UMI).
- 2020 – 2023: Member of the Scientific Committee of the National Group *Socio-Epidemiological Mathematical Modelling*, Italian Mathematical Union (UMI).
- 2023 – present: Member of the Teaching Board of PhD program in "Computational Mathematics, Learning, and Data Science" (from XXXIX cycle), University of Pavia and Università della Svizzera Italiana (USI).
- 2020 – 2023: Member of the Teaching Board of PhD program in "Computational Mathematics and Decision Sciences" (from XXXVI cycle), University of Pavia and Università della Svizzera Italiana (USI).
- 2020 – 2021: Member of the Scientific Committee of *Mathematics for Artificial Intelligence - MAIn 2021*, Politecnico di Torino, Italy.
- 2019: Member of the PhD Committee of Dr. Giovanni Dematteis, Politecnico of Torino, Italy. Thesis: “Large deviations for rare realizations of dynamical systems”, supervisor: Prof. Lamberto Rondoni, co-supervisor: Prof. E. Vanden-Ejiden.

Evaluation of Research Projects

- 2023 Referee of a Marie Skłodowska-Curie grant for the University of Cyprus.
- 2022 Referee of Research Projects for the University of Florence and for the University of Parma, Italy.
- 2021 Referee of Research Projects for the National Science Centre (Narodowe Centrum Nauki, NCN), Poland.
- 2019 Referee of Research Projects for the University of Verona, Italy.
- 2018 Referee of Research Projects of High National Interest (PRIN) for the Italian Ministry of Education, University and Research.

Postdoctoral Students and Research Fellows

- November 2023 - September 2024: Andrea Medaglia
  PostDoc, University of Pavia, Italy
  Research topic: Uncertainty quantification for kinetic equations
- May 2023 - December 2023: Andrea Bondesan
  PostDoc, University of Pavia, Italy
  Research topic: Kinetic equations for multiagent systems

Advisor of PhD Students

- October 2024 - present: Horacio Tettamanti, PhD in Computational Mathematics, Learning, and Data Science, University of Pavia.
- October 2021 - September 2024: Jonathan Franceschi, PhD in Computational Mathematics and Decision Sciences, University of Pavia.
  (co-supervised with Prof. Lorenzo Pareschi)
- October 2020 - September 2023: Andrea Medaglia, PhD in Computational Mathematics and Decision Sciences, University of Pavia. PhD Dissertation Defense: February 22, 2024.

Advisor of BSc and MSc Students

- Under way: Giulia Guicciardi, MSc in Mathematics, University of Pavia.
  Co-supervised with Prof. M.-T. Wolfram (University of Warwick)
- April 2024: Sara Rosina, MSc in Mathematics, University of Pavia.
  Thesis: "On a Lotka-Volterra Kinetic-Type Model:Analysis and Numerical Results".
  Co-supervised with Prof. G. Toscani (University of Pavia).
- November 2023: Sabrina Bonandin, MSc in Mathematics, University of Pavia.
  Thesis: "Many-agent modeling of opinion dynamics in the presence of epidemics".
  Fondazione Grazioli Award 2023, Istituto Lombardo di Scienze e Lettere.
- November 2022: Giacomo Salvati, BSc in Mathematics, University of Pavia.
  Thesis "Compartmental epidemic modelling in the presence of uncertain data".
  Co-supervised with Dr. A Medaglia (University of Pavia)
- September 2022: Giovanni Savarè, BSc in Mathematics, University of Pavia.
  Thesis "Metodi particle swarm e consensus based in ottimizzazione matematica".
  Co-supervised with Dr. Jonathan Franceschi (University of Pavia)
- December 2021: Edoardo Maria Del Mul, MSc in Mathematical Engineering, Politecnico di Milano, Italy.
  Thesis "Kinetic description of a market economy".
  Co-supervised with Prof. S. Lorenzani (Politecnico di Milano), and Prof. C. Sgarra (Politecnico di Milano)
- November 2021: Giulia Guicciardi, BSc in Mathematics, University of Pavia, Italy.
  Thesis: "Dinamiche di opinione su network evolutivi".
- September 2021: Francesca Demarchi, MSc in Mathematics, University of Pavia, Italy. Thesis: "Teoria dell'informazione e disuguaglianze di entropia".
  Co-supervised with Prof. Giuseppe Toscani (University of Pavia)
- July 2021: Emanuele Bernardi, MSc in Mathematics, University of Pavia, Italy.
  Thesis: "Kinetic models for wealth distribution in presence of epidemic dynamics with asymptomatic cases".
  Co-supervised with Prof. J. A. Carrillo (University of Oxford)
- May 2021: Luca Alberti Archetti, IUSS Pavia, Italy.
  Thesis: "On a kinetic model for epidemic spreading with reinfection based on social contacts: applications to the SARS-CoV-2 epidemic".

- April 2021: Michele Mascherpa, MSc in Mathematics, University of Pavia, Italy.
  Thesis: "Kinetic models for wealth distribution with taxation".
  Co-supervised with Prof. Bertram Düring (University of Warwick), and Prof. Giuseppe Toscani (University of Pavia)
- October 2020: Adele Ravagnani, MSc in Complex Systems, Politecnico di Torino, Italy.
  Thesis: "Phase transition in vehicular traffic: a Boltzmann-type kinetic approach".
  Co-supervised with Prof. Andrea Tosin (Politecnico di Torino)
- April 2020: Andrea Medaglia, MSc in Physics, University of Milan, Italy.
  Thesis: "Kinetic-controlled non-Maxwellian traffic models with driver-assist vehicles" .
  Co-supervised with Prof. Davide Galli (University of Milan), and Prof. Andrea Tosin (Politecnico di Torino).
- March 2020: Matteo Defilippi, MSc in Mathematical Engineering, Politecnico di Torino, Italy.
  Thesis: "Virtual shaker testing of a large-size satellite with uncertainty quantification of the mechanical stiffness"
  Co-supervised with Prof. Andrea Tosin (Politecnico di Torino)
  External Company: Thales Alenia Space (representative: Dr. Eng. Pietro Nali)

Teaching

Holder of Undergraduate Courses

- 2022 – present: Kinetic Models and Applications, MSc in Mathematics, University of Pavia, Italy.
- 2021 – present: Mathematical Models in Applied Sciences, MSc in Geology, University of Pavia, Italy.
- 2019 – present: Mathematics, BSc in Geology, University of Pavia, Italy.
- 2019: Probability & Statistics, MSc in Architecture, Politecnico di Torino, Italy.

Self–contained Mini Courses

- 2019: *Numerical Methods for Kinetic Equations*, MSc in Mathematical Engineering, Politecnico di Torino, Italy.
- 2017: *An Introduction to Numerical Methods for Stochastic Computations*, MSc in Mathematics, University of Ferrara, Italy
- 2016: *Stochastic Calculus and Financial Markets: Laboratory of Numerical Methods*, MSc in Mathematics, University of Ferrara, Italy.
- 2015 *Stochastic Calculus and Financial Markets: Laboratory of Numerical Methods*, MSc in Mathematics, University of Ferrara, Italy.

Teaching Assistant in Undergraduate Courses

- 2019: Rational Mechanics, BSc in Civil Engineering, Politecnico di Torino.
- 2018– 2019: Calculus, MSc in Architecture, Politecnico di Torino.
- 2016: Calculus I, MSc in Architecture, University of Ferrara, and Continuous Mechanics, MSc in Mathematics, University of Ferrara.

- 2015: Calculus I, MSc in Architecture, University of Ferrara.
- 2015: Continuous Mechanics, MSc in Mathematics, University of Ferrara.
- 2014: Calculus II, BSc in Civil Engineering, University of Ferrara.
- 2013: Stochastic Calculus and Applications, MSc in Mathematics, University of Milan.

Pavia, 04/09/2024 M.Z.