Francesco Carlo DE VECCHI | Curriculum Vitae

Contact information

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Current Position

01.09.18–Pres. || **Assistant professor (RTD-b)**, Università degli Studi di Pavia — Pavia, Italy
Dipartimento di Matematica "F. Casorati".

Past Positions

02.05.18–31.08.22 || **Postdoc. Researcher**, Universität Bonn. — Bonn, Germany
Institut für Angewandte Mathematik, Supervisor: Prof. Massimiliano Gubinelli.

Education

01.11.14–26.03.18 || **Ph.D. in Mathematics**, Univeristà degli Studi di Milano. — Milano, Italy
Thesis: "Lie symmetry analysis and geometrical methods for finite and infinite dimensional stochastic differential equations",
Advisor: Dr. Stefania Ugolini, *Coadvisor:* Prof. Paola Morando.

08.03.11–24.07.14 || **M.Sc. in Mathematics**, Univeristà degli Studi di Milano. — Milano, Italy
Grade: 110/110 with honors.
Thesis: "Symmetries of diffusion processes and applications",
Advisor: Prof. Giuseppe Gaeta, *Coadvisor:* Dr. Stefania Ugolini.

23.08.07–24.02.11 || **B.Sc. in Mathematics**, Università degli Studi di Milano. — Milano, Italy
Grade: 110/110 with honors.
Thesis: "Aspetti geometrici e applicazioni della teoria dei sistemi integrabili",
Advisor: Prof. Livio Pizzocchero.

Teaching Activities

09.16 || Tutor for "Precorso di Matematica" (2016), B.Sc. in Physics, Università degli Studi di Milano, supervisor: Prof. Clemente Zanco.

10.16–02.17 || Tutor for the course "Analisi 1" (2016/17), B.Sc. in Physics, Università degli Studi di Milano, supervisor: Prof. Clemente Zanco.

04.20–07.20 || Teaching assistant for the course "Advanced Topics in Applied Probability - Functional Integration and Quantum Mechanics", M.Sc. in Mathematics, Rheinische Friedrich-Wilhelms-Universität Bonn, main lecturer: Prof. Massimiliano Gubinelli.

04.20–07.20 || "Graduate Seminar on Stochastic Analysis- The mathematics of Feynman path integrals" for M.Sc. in Mathematics, Rheinische Friedrich-Wilhelms-Universität Bonn.

10.20–01.21 || "Selected Topics in Stochastic Analysis- Gaussian Measures in Infinite Dimension" for M.Sc. in Mathematics, Rheinische Friedrich-Wilhelms-Universität Bonn.

10.20–01.21 || Teaching assistant for the course "Markov processes", M.Sc. in Mathematics, Rheinische Friedrich-Wilhelms-Universität Bonn, main lecturer: Prof. Andreas Eberle.

04.21–07.21 || "Selected Topics in Probability Theory - Gaussian Measures II: Applications to (S)PDEs" for M.Sc. in Mathematics, Rheinische Friedrich-Wilhelms-Universität Bonn.

10.21–02.22 || "Grundzüge der Stochastischen Analysis/Foundations in Stochastic Analysis" for B.Sc. and M.Sc. in Mathematics, Rheinische Friedrich-Wilhelms-Universität Bonn.

03.22–03.22 || "Gaussian measures and applications to analysis and mathematical physics" for Ph.D. programme in Mathematical Sciences, Università degli Studi di Milano

Talks and Posters

Invited talks

- Title of the talk: Symmetries of stochastic differential equations, workshop "Stochastic and Symmetry: theory and applications from Mechanics to Finance", October 5th 2015, Milano (Italy)
- Title of the talk: Symmetries of stochastic differential equations: theory and applications, "Assemblea scientifica GNFM 2017", May 4th-6th 2017, Montecatini Terme (Italy)
- Title of the talk: Gauge symmetries of semimartingales, "Symmetry and invariance in stochastic dynamics", September 18th 2017, San Giorgio di Valpolicella (Italy)
- Title of the talk: Gauge symmetries of semimartingales, "Stochastic systems: their analysis, geometry and perturbation", July 10th-15th 2018, Beijing (China)
- Title of the talk: Elliptic stochastic quantization and supersymmetry, "Random transformation and invariance in stochastic dynamics", March 25th-28th 2019, Verona (Italy)
- Title of the talk: Elliptic stochastic quantization and supersymmetry, April 25th 2019, University of Wuppertal, Wuppertal (Germany)
- Title of the talk: Elliptic stochastic quantization and supersymmetry, June 12th 2019, University of Warwick, Coventry (United Kingdom)
- Title of the talk: Elliptic stochastic quantization, during the trimester program "Randomness, PDEs and Nonlinear Fluctuations", September 19th 2019, Hausdorff Research Institute for Mathematics, Bonn (Germany)
- Title of the talk: Stochastic quantization of exponential quantum field theory, "Harmonic Analysis and Rough Paths", November 18th-19th 2019, Bonn (Germany)
- Title of the talk: Grassmannian stochastic analysis and the stochastic quantization of Euclidean Fermions, DMV Jahrestagung 2020: Minisymposium: Nonlinear PDEs & Probability, September 14th-17th 2020, Germany

- Title of the talk: Stochastic quantization of exponential quantum field theory, Webinar: Recent developments in Stochastics with Applications in Mathematical Physics and Finance, November 23rd-24th 2020
- Title of the talk: An introduction to Grassmannian stochastic analysis, New Directions in Rough Path Theory, December 7th-12th 2020, Mathematisches Forschungsinstitut Oberwolfach, Germany
- Title of the talk: Stochastic quantization of exponential-type quantum field theorie, Minisymposium "Stochastic Evolution Equations (MS - ID 68)" at 8th European Congress of Mathematics, June 20th - 26th 2021, Portorož (Slovenia)
- Title of the talk: Stochastic methods in quantum fields: introduction and applications to scalar fields, "13th Colloquium on Mathematics and Foundations of Quantum Theory", July 2nd 2021, Adam Mickiewicz University in Poznań, Poznań (Poland)
- Title of the talk: Stochastic quantization of exponential-type quantum field theories, "The 7th KTGU Mathematics Workshop for Young Researchers", February 14th 2022, University of Kyoto (Japan)
- Title of the talk: Bose-Einstein condensation and McKean-Vlasov optimal control problems, Session: "Stochastic methods in quantum theory" at "Third Italian Meeting on Probability and Mathematical Statistics", June 13th-16th, 2022, Bologna (Italy)
- Title of the talk: Stochastic quantization of exponential-type quantum field theories, Session: "Rough analysis and applications" at "Third Italian Meeting on Probability and Mathematical Statistics", June 13th-16th, 2022, Bologna (Italy)
- Title of the talk: Grassmannian Stochastic Analysis and the Stochastic Quantization of Euclidean Fermions, Invited session: "Quantum field theory and stochastic analysis" at "IMS Annual Meeting in Probability and Statistics", June 27th-30th 2022, London (U.K.)

Contributed talks and posters

- Title of the talk: Entropy Chaos and Bose-Einstein Condensation, conference "Mathematical Challenges in Quantum Mechanics", February 8th-13th 2016, Bressanone (Italy)
- Title of the talk: Symmetries of SDEs and applications, conference "Stochastic Partial Differential Equations and Applications", May 30th- June 3rd 2016 Levico Terme (Italy)
- Title of the poster: Invariance properties of SDEs with application to stochastic calculus, June 19th-22nd 2017, Torino (Italy)
- Title of the poster: Gauge symmetries of semimartingales with applications, "Opening conference of Verona Paris Stochastic Modelling Semester", December 2017 18th-21st, Verona (Italy)
- Title of the talk: Elliptic stochastic quantization, "Second Italian Meeting on Probability and Mathematical Statistics", June 17th - 20th 2019, Vietri sul Mare (Italy)
- Title of the talks: Symmetries of SDEs driven by semimartingales with jumps I and II, Supersymmetry and dimensional reduction of SDEs and SPDEs, "Geometry and Algebra in Stochastic Dynamics", January 27th-30th 2020, Milano (Italy)
- Title of the prerecorded talk: Grassmannian stochastic analysis and the stochastic quantization of Euclidean Fermions, Bernoulli-IMS One World Symposium 2020, August 24th-28th 2020

- Title of the talk: Stochastic quantization of exponential-type quantum field theories, "Analytical Methods in Quantum and Continuum Mechanics: Winter School In Turin", November 29th-December 3rd, 2021, Torino (Italy)
- Title of the talk: Stochastic quantization of exponential-type quantum field theories, "SPDEvent", September 7th- 9th, 2022, Bielefeld (Germany)

Organization of Scientific Events

- Local organizer of the workshop "Geometry and algebra in stochastic Dynamics" Dipartimento di Matematica, Universitá degli studi di Milano, $27-29$ January, Milano (other organizers: Sergio Albeverio, Frederic Patras, Stefania Ugolini, Elisa Mastrogiacomo, Paola Morando, see http://users.mat.unimi.it/users/ugolini/workshop2020/)
- Coorganizer of Oberseminar Stochastics at Institute for Applied Mathematics, University of Bonn, Winter Semester 2019/20, Sommer Semester 2020, Winter Semester 2020/21, Sommer Semester 2021 (other organizers: Patrik Ferrari, Ronan Herry) (see https://wt.iam.uni-bonn.de/event-calendar/events).

List of publications

Journal Articles

1. Albeverio Sergio, Luigi Borasi, Francesco C. De Vecchi and Massimiliano Gubinelli. "Grassmannian stochastic analysis and the stochastic quantization of Euclidean Fermions." *Probability Theory and Related Fields* (2022): 1-87.
2. Albeverio, Sergio, Francesco C. De Vecchi, Andrea Romano and Stefania Ugolini. "Mean-field limit for a class of stochastic ergodic control problems." *SIAM Journal on Control and Optimization* Vol. 60, Iss. 1 (2022): 479-504
3. De Vecchi, Francesco C., Mastrogiacomo, Elisa, Turra, Mattia, and Ugolini, Stefania. "Noether theorem in stochastic optimal control problems via contact symmetries." *Mathematics (MDPI)* 9.9 (2021): 953.
4. De Vecchi, Francesco C., Paola Morando, and Stefania Ugolini. "Reduction and reconstruction of SDEs via Girsanov and quasi Doob symmetries." *Journal of Physics A: Mathematical and Theoretical* 54 (2021): 185203.
5. Albeverio, Sergio, De Vecchi, Francesco C., Morando, Paola, and Ugolini, Stefania (2021). "Random transformations and invariance of semimartingales on Lie groups." *Random Operators and Stochastic Equations* 29.1 (2021): 41-65.
6. Albeverio, Sergio, Francesco C. De Vecchi, and Massimiliano Gubinelli. "The elliptic stochastic quantization of some two dimensional Euclidean QFTs". *Annales de l'Institut Henri Poincaré, Probabilités et Statistiques.* Vol. 57. No. 4. (2021): 2372-2414.
7. De Vecchi, Francesco C., Luca M. Giordano, Daniela Morale and Stefania Ugolini "A note on the continuity in the Hurst index of the solution of rough differential equations driven by a fractional Brownian motion." *Stochastic Analysis and Applications* (2020): 1-15.
8. De Vecchi, Francesco C., and Paola Morando. "The geometry of differential constraints for a class of evolution PDEs." *Journal of Geometry and Physics* (2020): 103771.

9. Albeverio, Sergio, Francesco C. De Vecchi, and Massimiliano Gubinelli. "Elliptic stochastic quantization." *Annals of Probability* 48.4 (2020): 1693-1741.

10. De Vecchi, Francesco C., Paola Morando, and Stefania Ugolini. "Symmetries of stochastic differential equations using Girsanov transformations." *Journal of Physics A: Mathematical and Theoretical* 53.13 (2020): 135204.

11. Albeverio, Sergio, Francesco C. De Vecchi, Paola Morando and Stefania Ugolini "Weak symmetries of stochastic differential equations driven by semimartingales with jumps." *Electronic Journal of Probability* 25 (2020).

12. Albeverio, Sergio, Francesco C. De Vecchi, Andrea Romano and Stefania Ugolini "Strong Kac's chaos in the mean-field Bose-Einstein Condensation." *Stochastics and Dynamics* (2019): 2050031

13. De Vecchi, Francesco C., Andrea Romano and Stefania Ugolini. "A symmetry-adapted numerical scheme for SDEs." *Journal of Geometric Mechanics* 11.3 (2019).

14. De Vecchi, Francesco C., Paola Morando, and Stefania Ugolini. "A note on symmetries of diffusions within a martingale problem approach." *Stochastics and Dynamics* (2018): 1950011

15. De Vecchi, Francesco C., and Paola Morando. "Solvable structures for evolution PDEs admitting differential constraints." *Journal of Geometry and Physics* 124 (2018): 170-179.

16. Albeverio, Sergio, Francesco C. De Vecchi, and Stefania Ugolini. "Entropy Chaos and Bose-Einstein Condensation." *Journal of Statistical Physics* 168.3 (2017): 483-507.

17. De Vecchi, Francesco C., Paola Morando, and Stefania Ugolini. "Reduction and reconstruction of stochastic differential equations via symmetries." *Journal of Mathematical Physics* 57.12 (2016): 123508.

18. De Vecchi, Francesco C., Paola Morando, and Stefania Ugolini. "Symmetries of stochastic differential equations: A geometric approach." *Journal of Mathematical Physics* 57.6 (2016): 063504.

19. De Vecchi, Francesco C., and Stefania Ugolini. "An entropy approach to Bose-Einstein condensation." *Comm. on Stoch. Anal* 8.4 (2014): 517-529.

Conference proceedings

1. Albeverio, Sergio, and Francesco C. De Vecchi. "Some Recent Developments on Lie Symmetry Analysis of Stochastic Differential Equations." *International Conference on Random Transformations and Invariance in Stochastic Dynamics.* Springer, Cham, 2019.

2. De Vecchi, Francesco C. and Massimiliano Gubinelli. "A note on supersymmetry and stochastic differential equations." *International Conference on Random Transformations and Invariance in Stochastic Dynamics.* Springer, Cham, 2019.

Preprints

1. Barashkov Nikolay and Francesco C. De Vecchi "Elliptic stochastic quantization of Sinh-Gordon QFT." *arXiv preprint* arXiv:2108.12664 (2021).

2. De Vecchi Francesco C. "A de Finetti-type theorem for random-rotation-invariant continuous semimartingales", *arXiv preprint* arXiv:1712.08374 (2017).

3. De Vecchi, Francesco C. "Finite dimensional solutions to SPDEs and the geometry of infinite jet bundles." *arXiv preprint* arXiv:1712.08490 (2017).