Alberto Bonicelli

Curriculum Vitae

LPSM
Sorbonne Université
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Personal webpage
in *LinkedIn*

Latest update: February 5, 2025

Birth Alzano Lombardo (BG), 27/05/97

Citizenship Italian

Language Italian (native language), English (B2 level, First certificate)

Scientific interests

Mathematical physics: Algebraic quantum field theory, renormalization

Mathematics: Stochastic partial differential equations, microlocal analysis, regularity structures

Professional experience & Education

From Oct. 2024: **Postdoc**, *LPSM Sorbonne*, FSMP Fellowship, Supervisor: Prof. Lorenzo Zambotti.

Oct. 2021 - Jan. 2025: **PhD student in mathematical physics**, *University of Pavia*, Department of Physics, Supervisor: Prof. Claudio Dappiaggi, Co-supervisor: Prof. Nicolò Drago.
Thesis: Algebraic methods for the perturbative analysis of stochastic differential equations.

Oct. 2019 - Sept. 2021: **Masters's Degree in Theoretical Physics**, *University of Pavia*, Summa cum Laude, Supervisors: Prof. Claudio Dappiaggi, Dr. Paolo Rinaldi.
Thesis: A microlocal approach to the stochastic nonlinear Schrödinger equation.

Oct. 2016 - Sept. 2019: **Bachelor's Degree in Physics**, *University of Pavia*, Summa cum Laude, Supervisor: Prof. Claudio Dappiaggi, Dr. Paolo Rinaldi.
Thesis: Geodesic Motion on Riemannian Manifolds from Heat Kernel Techniques

Publications

Link to my Google Scholar page.

2024 **A. B., C. Dappiaggi, P. Rinaldi**, *On the stochastic Sine-Gordon model: an interacting field theory approach*, Communications in Mathematical Physics.

2024 **A. B., B. Costeri, C. Dappiaggi, P. Rinaldi**, *A microlocal investigation of stochastic partial differential equations for spinors with an application to the Thirring model*, Mathematical Physics, Analysis and Geometry.

2023 **A. B., C. Dappiaggi, N. Drago**, *An algebraic correspondence between stochastic differential equations and the Martin-Siggia-Rose formalism*, ArXiv preprint.

2023 **A. B., C. Dappiaggi, P. Rinaldi**, *An algebraic and microlocal approach to the stochastic nonlinear Schrödinger equation*, Annales Henri Poincaré.

Talks

Contributed talks

2 July 2024 **A quantum field theory perspective on singular stochastic PDEs**, *52th Saint-Flour probability summer school*.

18 Dec. 2023 **Functional spaces and the regularity of space-time white noise**, *Oberwolfach Arbeitsgemeinschaft*, QFT and stochastic PDEs.

19 Sept. 2023 **What if Quantum Field Theory meets complex systems?**, *PhD end-of-year seminar*, II year.

June. 2023 **Deterministic and Probabilistic Dynamics of Nonlinear Dispersive PDEs**, *Maxwell Institute for Mathematical Sciences* , Edinburgh, (Poster).

Sept. 2022 **A microlocal and algebraic approach to SPDEs**, *XLVII Summer school on mathematical physics - GNFM*, Ravello.

30 Oct. 2022 **A complex world**, *PhD end-of-year seminar*, I year.

Invited talks

13 Oct. 2022 **Algebraic formulation of the SDE-Path integral correspondence**, *Department of mathematics*, University of Trento.

1 Dec. 2022 **Stochastic nonlinear Schrödinger equation, an algebraic point of view**, *Department of mathematics*, University of Trento.

5 Dec. 2022 **Stochastic nonlinear Schrödinger equation from an algebraic and microlocal viewpoint**, *Department of mathematics*, University of Genova.

16 Apr. 2024 **Convergence results in the stochastic sine-Gordon model: An algebraic viewpoint**, *Department of mathematics*, University of Potsdam.

22 May 2024 **An interactive field approach to the stochastic sine-Gordon model**, *Department of mathematics*, Université de Bretagne occidentale, Rencontre ANR Smooth 2024.

28 May 2024 **An interactive field approach to the stochastic sine-Gordon model**, *Institute Elie Cartan*, Université de Lorraine, Decorated Tree-like structures for singular dynamics.

27 Nov. 2024 **Renormalization, an extension problem**, *Analytical methods in interplay with physics* , A workshop to explore Asymptotics, Randomness and Noncommutativity, University of Potsdam.

Fellowships and awards

2024 **FSMP PostDoc fellowship**, 2-year fellowship founded by the Fondation Sciences Mathématiques de Paris.

2024 **MathInGreaterParis fellowship**, Postdoctoral fellowship cofunded by Marie Sklodowska-Curie Actions H2020-MSCA-COFUND-2020.
Declined

2023 **Bando Cassini**, founded by Institut Francais Italia and Laboratory Ypatia of Mathematical Sciences.

2023 **Progetto giovani GNFM**, *Feynman propagator for Dirac fields: a microlocal analytic approach*, founded by Gruppo Nazionale di Fisica Matematica.

17/02/22 **Premio Grazioli**, *Istituto Lombardo Accademia di Scienze e Lettere*.

Attended Workshops and Schools

29 Nov. - 03 Dec. 2021 **Winter school - Analytical methods in quantum and continuum mechanics**, *Department of Mathematics*, Politecnico of Torino.

24 - 25 Jun. 2022 **46-th LQP meeting**, FAU Erlangen-Nürnberg.

12 - 24 Sep. 2022 **Summer school - XLVII summer school in mathematical physics**, *Ravello*, INdAM, GNFN.

6 - 8 Feb. 2023 **Universality in Condensed Matter and Statistical Mechanics**, *Rome*, Università degli Studi Roma Tre (online).

14 - 16 Jun. 2023 **Deterministic and probabilistic dynamics of nonlinear dispersive PDEs**, *Edinburgh*, Maxwell institute for mathematical sciences, I presented a poster.

26 - 28 Jun. 2023 **Frontiers in mathematical physics**, *Cergy*, CY Cergy Paris Université.

30 Jun. 2023 **Higher structures in geometry and mathematical physics**, *thematic programme*, Institut Henri Poincaré, Paris.

4-6 Oct. 2023 **Panorama of mathematics II**, Hausdorff Center for Mathematics, Bonn.

18-22 Dec. 2023 **Oberwolfach Arbeitsgemeinschaft**, QFT and stochastic PDEs.

8-12 Apr. 2024 **Curved spacetimes, field theory and beyond**, *Paris*, Institute Henri Poincaré.

22-24 May 2024 **Rencontre ANR Smooth 2024**, *Université de Bretagne occidentale*.

27-29 May 2024 **Decorated Tree-like structures for singular dynamics**, *Université de Lorraine*.

01-13 Jul. 2024 **52th Probability summer school**, *Saint-Flour, France*.

27-29 Nov. 2024 **Analytical methods in interplay with physics**, *A workshop to explore Asymptotics, Randomness and Noncommutativity*, Potsdam.

4-6 Dec. 2024 **Singular SPDEs, invariant measures and discrete models**, *Institute Elie Cartan*, Nancy.

Orgaized conferences

11-12 Jan. 2024 **Common trends and challenges in QFT and stochastic PDEs**, *Pavia*, Principal investigator.
https://sites.google.com/view/spdesqft/home

Short visits

Oct. 2023 - Jul. 2024 **Research visit**, *Invited by Prof. Lorenzo Zambotti*, LPSM Sorbonne.

28 may - 17 June 2023 **Research visit**, *Invited by Prof. Matteo Capoferri*, Department of mathematics, Heriot-Watt University, Edinburgh.

2022-2023 **Research activity with Prof. Simone Murro**, *Department of mathematics*, University of Genova.

2021-2022 **Research activity with Prof. Nicolò Drago**, *Department of mathematics*, University of Trento.

Thesis supervision

2023 **Beatrice Costeri**, *University of Pavia, Master's degree in physics*, A microlocal approach to the stochastic nonlinear Dirac equation, Summa cum Laude.
Co-supervisor with Claudio Dappiaggi and Paolo Rinaldi

2023 **Raman Deep Sing**, *University of Pavia, Bachelor degree in physics*, Local Fundamental Solutions of the Wave Operator on Lorentzian Manifolds, Summa cum Laude.
Co-supervisor with Claudio Dappiaggi

Professional development activities

Teaching activities

2022-2023 **Seminars for the class of Mathematical Methods of Physics I**, *(Prof. Barbara Pasquini), 15 Hours, B.Sc. in Physics*, University of Pavia.

2022-2023 **Seminars for the class of Mathematical Methods of Physics II**, *(Prof. Claudio Dappiaggi), 10 Hours, B.Sc. in Physics*, University of Pavia.

2021-2022 **Seminars for the class of Mathematical Methods of Physics I**, *(Prof. Barbara Pasquini), 10 Hours, B.Sc. in Physics*, University of Pavia.

2021-2022 **Course on tensor calculus**, *10 hours, Almo collegio Borromeo*, Pavia.

2021-2022 **Seminars for the class of Mathematical Methods of Physics II**, *(Prof. Claudio Dappiaggi), 10 Hours, B.Sc. in Physics*, University of Pavia.

2020 - 2021 **Tutor of General Physics**, *15 Hours, CTF first year class*, University of Pavia.