

Personal Informations

Born in [REDACTED]

Italian citizenship.

Personal E-mail: [REDACTED]

Employment

Current Employment: Post-Doc at the **Université de Lorraine**

Supervisor: Yvain Bruned

Professional Address: Office 303, Faculté des Sciences et technologie,
Boulevard des Aiguillettes, BP 70239, 54506 Vandoeuvre-lès-Nancy

Professional E-mail: carlo.bellingeri@univ-lorraine.fr

Education

2015-2019 **PhD in Mathematics** LPSM Sorbonne Université

Thesis title: “Itô formulae for the stochastic heat equation
via the theories of rough paths and regularity structures”

Advisor: **Lorenzo Zambotti**.

2013-2015 **MS in Mathematics** *cum laude* University of Pavia

Master’s thesis: “An Introduction to the Theory of Regularity Structures”

Master supervisors: **Lorenzo Zambotti** and **Federico Bassetti**.

2014-2015 **Erasmus Program** Université Pierre et Marie Curie, Paris

2010-2013 **BS in Mathematics** *cum laude* University of Pavia

Bachelor thesis: “Harmonic Functions, Capacity and Wiener’s Criterion”

Bachelor supervisor: **Enrico Vitali**.

2009 **High school diploma** (specialisation in classical studies)

Graduation 100/100.

Previous work experiences

2019-2023 **Post-Doc**, Technical University of Berlin

Postdoctoral researcher with teaching duties
and funded by the FOR2402 research group

Supervisor : Peter Friz.

2018-2019 **Demi-ATER**, Sorbonne University, Paris.

2015-2018 **Doctoral contract with teaching**, Sorbonne University, Paris.

2013-2014 **Academic Tutor**, University of Pavia.

Research Interests

Stochastic analysis

Rough analysis (Regularity structures and Rough paths)

Stochastic and deterministic partial differential equations

Algebraic structures in probability

Awards

July 2016 **“UBI Banca” Award** University of Pavia, Italy
Best mathematics master student during academic years 2013-2015.

Publications

- C. Bellingeri, *An Itô type formula for the additive stochastic heat equation*, Electron. J. Probab. 25 (2020), Paper No. 2, 52 pp.
- C. Bellingeri, A. Djurdjevac, Peter K. Friz, N. Tapia, *Transport and continuity equations with (very) rough noise*, Partial Differ. Equ. Appl. 2 (2021), no. 4, Paper No. 49, 26 pp.
- C. Bellingeri, P. K. Friz, M. Gerencsér, *Singular paths spaces and applications*, Stoch. Anal. Appl. 40 (2022), no. 6, 1126–1149.
- C. Bellingeri, P. K. Friz, S. Paycha, R. Preiß, *Smooth rough paths, their geometry and algebraic renormalization* Vietnam J. Math. 50 (2022), no. 3, 719–761.
- C. Bellingeri, N. Gilliers, *On the Signature of a Path in an Operator Algebra Symmetry Integrability Geom. Methods* (2022) Appl.18, Paper no. 096, 43 pp.
- C. Bellingeri, *Quasi-geometric rough paths and rough change of variable formula*, Ann. Inst. Henri Poincaré Probab. Stat.59 (2023), no.3, 1398–1433.

Preprints

- C. Bellingeri, R. Penaguiao, *Discrete signature varieties*, arXiv preprint 2303.13377
- C. Bellingeri, E. Ferrucci, N. Tapia, *Branched Itô Formula and natural Itô-Stratonovich isomorphism*, arXiv preprint 2312.04523
- C. Bellingeri, P. K. Friz, S. Paycha, *Generalized Euler-Maclaurin formula and Signatures*, arXiv preprint 2403.09335
- C. Bellingeri, H. Kern, *A Stochastic Reconstruction Theorem on Rectangular Increments with an Application to a Mixed Hyperbolic SPDE*, arXiv preprint arXiv:2404.18634

Proceedings/Academic contributions

- C. Bellingeri, *Algebraic structures in the rough change of variable formula*, Oberwolfach Reports 2348a (2024).
- I. Bailleul, C. Bellingeri, Y. Bruned, A. Fermanian, N. Marie *Rough paths and SPDE* ESAIM: Proceedings and Surveys 74, 169-184 (2023).
- C. Bellingeri, *Statistiques des traductions françaises des Rerum Vulgarium Fragmenta*, Methodological note in *Le Phenix Poète et les Alouêtes* by R. Raimondo, Peter Lang edition (2021).

Talks in conferences

- Mar. 2024 **Euler-Maclaurin formula and generalised iterated integrals**
Alg., anal. and geom. structures emerging from QFT, University of Sichuan
- Aug. 2023 **Varieties of Discrete Signatures**
Structural Aspects of Signatures and Rough Paths, CAS Oslo.
- Jun. 2022 **Between singular SPDEs and stochastic calculus: the KPZ equation**
Short talk at 3rd Italian Meeting on Probability and Statistics, Bologna
- Mai. 2022 **A Young-type Euler Mclaurin formula**
Short talk at the 15th Young Researchers Berlin-Oxford meeting, Berlin.
- Dec. 2021 **“Smooth” rough paths**
Talk at GDR TRAG Young research meeting, IHP
- Nov. 2021 **A geometric approach to renormalisation on “smooth” rough paths**
Short-talk at Higher Structures Emerging from Renormalisation, ESI
- Aug. 2021 **Beyond geometric rough paths**
Web-talk at Journées MAS 2020-2021
- Jun. 2021 **Ito formulae for singular SPDEs**
Web-talk at 8th ECM, session on Stochastic Evolution Equations.
- Mar. 2021 **The non-commutative signature of a path**
Web-talk at “Pathwise Stochastic Analysis and Applications”, CIRM.
- Feb. 2021 **Higher order non-commutative rough paths**
Web-talk at 14th Young Researchers Berlin-Oxford meeting.
- Aug. 2020 **Singular path spaces and applications**
Web-talk at the Bernoulli-IMS One World Symposium.
- Jun. 2020 **Singular Hölder spaces and applications**
Web-Talk at the Conference Stochastic Analysis Brats, Pisa.
- Singular rough paths**
Short web-talk at the 13th Young Researchers Berlin-Oxford meeting, Berlin.
- Feb. 2020 **Transport equations with low-regularity geometric rough noise**
Short talk at 3rd Haifa Probability School, Technion Haifa.
- Oct. 2019 **Quasi-geometric rough paths and rough change of variable formula**
Talk at the conference GDR Renormalisation, Calais.
- Jun. 2019 **Quasi-tensor algebra and rough paths theory**
Short talk at 2nd Italian Meeting on Probability and Statistics, Vietri sul mare
- May 2019 **Change of variable formulae on the SHE**
Talk at 11th Young Researchers Berlin-Oxford meeting, Berlin.
- Apr. 2019 **Rough change of variable formulae on the SHE**
Talk at the conference Random Partial Differential Equations, CIRM Marseille.
- Jul. 2018 **Rough Stochastic Heat Equation**
Short talk at the 9th Young Researchers Berlin-Oxford meeting, Berlin.
- Jun. 2018 **Stochastic Heat Equation and Rough Paths**
Talk at the conference “Rencontres Mathématiques de Rouen”, Rouen.
- Mai. 2017 **Ito formula on branched rough paths and some interesting consequences**
Short talk at the 7th Young Researchers Berlin-Oxford meeting, Berlin.
- Dec. 2017 **Stochastic Heat Equation and Regularity Structures**
Short talk at the 2nd Haifa Probability School, Technion, Haifa.

Invited talks at mathematics departments

- Jan. 2024 **Seminar of the Probability-Statistics team**
IECL, University of Lorraine
- Nov. 2022 **PhD Seminar in Advanced Stochastic Modelling**
University of Vienna
- Jun. 2022 **Arbeitsgemeinschaft Applied Analysis**
Max Planck Institute for Mathematics in the Sciences
- Oct. 2021 **Pavia-Milan Seminar in Probability and Statistics**
University of Pavia, online talk
- Jul. 2021 **Research Seminar in Mathematical Analysis**
University of Potsdam, online talk
- Mai. 2021 **PhD Seminar of LPSM**
Sorbonne Université, online talk
- Oct. 2019 **Research Seminar in Mathematical Analysis**
University of Potsdam
- Jun. 2019 **PhD Seminar of LPSM**
Sorbonne Université.
- Apr. 2019 **Seminar of the research group FOR2402**
Technical University of Berlin.
- Feb. 2018 **Probability Seminar of ENSTA Paris**
Polytechnic Institute of Paris.
- Jan. 2018 **Seminar of the research group FOR2402**
Technical University of Berlin.

Schools and Workshops

- Jul. 2024 **52nd Summer School on Probability** LMBP, Saint-Flour.
- Mar. 2024 **Alg., an. and geom. structures emerging from QFT** Sichuan University.
- Sep. 2023 **IRTG Summerschool Döllmensee**, Berlin.
Statistical Mechanics and Stochastic PDEs CIME, Cetraro
- Mai 2023 **Summer School on PDEs and Randomness** MPI Leipzig.
- Sep. 2022 **Interacting particle systems and applications** University of Trento.
- Jul. 2022 **Rough analysis and data science** Imperial college, London.
- Nov. 2021 **Higher Structures Emerging from Renormalisation** ESI Vienna.
- Sep. 2021 **PDE and Randomness** Bath University.
- May 2021 **SPDEs & friends** TU Berlin.
- Feb. 2021 **Cumulants in Stochastic Analysis** TU Berlin.
- Jan. 2021 **Scaling Limits from Microscopic to Macroscopic Physics** CIRM.
- Jul. 2020 **PDE and Randomness** One World Probability Summer School.
- Feb. 2020 **3rd Haifa Probability School** Technion, Haifa.
- Oct. 2019 **Singular SPDEs and Related Topics** HIM, Bonn.
- Sep. 2019 **New Frontiers in Singular SPDEs and Scaling Limits** HIM, Bonn.
- Mar. 2019 **Spring School on Random Interfaces** University of Augsburg.
- Dec. 2018 **Scaling limits & SPDEs** Newton Institute, Cambridge.
- Sep. 2018 **Renormalisation in QFT and in SPDEs** Newton Institute, Cambridge.

Jul. 2018 **Developments in SPDEs (in honor of G. Da Prato)** RISM, Varese.
 Dec. 2017 **2nd Haifa Probability School** Technion, Haifa.
 Jul. 2017 **18th Luis Santaló Summer School** UIMP, Santander.
 Jun. 2017 **PIMS-CRM Summer School in Probability** UBC, Vancouver.
 Feb. 2017 **Recent Development in Singular Stochastic PDEs** HIM, Bonn.
 Aug. 2016 **Singular Random Dynamics** CIME, Cetraro.
 Jul. 2016 **46th Summer School on Probability** LMBP, Saint-Flour.
 Feb. 2016 **Path in, to and from renormalisation** University of Potsdam.
 Jul. 2015 **45th Summer School on Probability** LMBP, Saint-Flour.

Academic Responsibilities

Nov. 2023 Organiser of a **MFO mini-Workshop** at Oberwolfach:
Combinatorial and algebraic structures in rough analysis
 with Yvain Bruned, Ilya Chevyrev and Rosa Preiß.
 2021-2022 Organiser of the **DFG FOR2402** seminar at TU Berlin,
 with Tom Klose.
 2019-2020 Organiser of the **12th Oxford-Berlin Research Meeting** Dec 4th-6th 2019.
 with Terry Lyons, Peter Friz and Patric Bonnier.
 2016-2017 Organiser of the **Phd weekly seminar** at LPMA,
 with Henri Elad-Altman, Michel Pain and Yann Chiffaudel.

Teaching Activity

2023-2024 **Stochastic Models** Teaching assistant
 Faculty of Mathematics, TU Berlin.
Calculus 1 for Engineering Teaching assistant
 Faculty of Engineering, TU Berlin.
Hopf algebras and randomness Academic mini-course
 University of Sichuan, Chengdu.
 2022-2023 **Calculus 1 for Economists** Lecturer
 Faculty of Economics, TU Berlin.
Calculus 2 for Economists Lecturer
 Faculty of Economics, TU Berlin.
 2021-2022 **Calculus 1 for Engineering** Teaching Assistant
 Faculty of Engineering, TU Berlin.
Probability for Engineering Teaching Assistant
 Faculty of Engineering, TU Berlin.
Stochastic calculus for Engineering Teaching Assistant
 Faculty of Engineering, TU Berlin.
 2020-2021 **Calculus 2 for Engineering** Teaching Assistant
 Faculty of Engineering, TU Berlin.
Probability for Engineering Teaching Assistant
 Faculty of Engineering, TU Berlin.

- 2018-2019 **Measure theory and Probability** Teaching Assistant
Third year students of Mathematics, Sorbonne Université.
Stochastic Calculus and applications to finance Teaching Assistant
Master 1, ISUP.
- 2016-2017 **Measure theory and Probability** Teaching Assistant
First year students of Statistics, ISUP.
Advanced Calculus Teaching Assistant
First year students of Mathematics, UPMC.
Matrix and linear Algebra Teaching Assistant
First year students of Chemistry, UPMC.
- 2015-2016 **Sequences and Integrals** Teaching Assistant
First year students of Mathematics, UPMC.
- 2013-2014 **“General Mathematics”** Tutoring
First year students of Biological sciences, University of Pavia.
“Numerical Methods” Tutoring
First year students of Chemical sciences, University of Pavia.

Languages and Computer Skills

- Languages:* Italian (mother tongue),
English, French (professional knowledge)
German (good knowledge), Spanish (beginner).
- Computer:* C, MATLAB, \LaTeX , HTML.

Editorial Activity

- Peer Review: Annals of Probability, Electronic Communications in Probability, Bernoulli,
Annales de l'IHP: Probabilités et Statistiques, Electronic Journal of Probability
Mediterranean Journal of Mathematics, Journal of Algebraic Combinatorics

15/07/2024