

# Francesco Caravenna

## Curriculum Vitæ

[Last updated: October 6, 2022]

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### PERSONAL DETAILS

- Born on March 15, 1979, in Treviglio (BG), Italy.
- *Office*: via Cozzi 55, 20125 Milano, Italy  
office 3016, U5 building  
phone +39 02 6448 5752
- *E-mail*: [francesco.caravenna@unimib.it](mailto:francesco.caravenna@unimib.it)
- *Home page*: <http://www.matapp.unimib.it/~fcaraven/>
- *Language skills*: Italian (mother tongue), English, French
- *Computer skills*: C, R, HTML/CSS,  $\LaTeX$

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### EDUCATION

- (2002 – 2005) *Ph.D. in Mathematics*, University of Milano-Bicocca (I) and University of Paris 7 (F). Advisors: Giambattista Giacomin, Alberto Gandolfi.
- (1998 – 2002) '*Diploma di Licenza*' in *Physics* cum laude, Scuola Normale Superiore of Pisa (I). Advisor: Sergio Caracciolo.
- (1998 – 2002) *Master's Degree in Physics* cum laude, University of Pisa (I). Advisor: Sergio Caracciolo.

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### ACADEMIC POSITIONS

- (Oct 2016 – present) *Full Professor of Mathematics*, University of Milano-Bicocca (I).
- (Nov 2010 – Sep 2016) *Associate Professor of Mathematics*, University of Milano-Bicocca (I).
- (Oct 2006 – Oct 2010) *Assistant Professor of Mathematics* ("Ricercatore", tenured position), University of Padova (I).
- (Oct 2005 – Sep 2006) *Postdoc* in the group of Erwin Bolthausen, University of Zürich (CH).

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### PH.D. STUDENTS

- (2019 – . . .) Francesca Cottini, University of Milano-Bicocca and University of Pavia (joint PhD with Indam)
- (2016 – 2019) Giulia Comi, University of Pavia and University of Milano-Bicocca (joint PhD with Indam). Thesis "*Two fractional stochastic problems: semi-linear heat equation and singular Volterra equation*" defended on 13 December 2019.
- (2012 – 2015) Niccolò Torri, University Claude Bernarde Lyon 1 (F) and University of Milano-Bicocca (I); joint supervision with Fabio Lucio Toninelli. Thesis "*Localization and universality phenomena for random polymers*" defended on 18 September 2015.
- (2011 – 2014) Jacopo Corbetta, University of Milano-Bicocca (I). Thesis "*General smile asymptotics and a multiscaling stochastic volatility model*" defended on 4 March 2015.

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## HONORS

- Winner of the “Guido Fubini Prize 2011”, awarded by the Istituto Superiore Mario Boella to a young mathematician working in Italy in the field of random processes.

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## GRANTS

- Associated Investigator of the National Research Project ‘*Large Scale Random Structure*’ (PRIN 2015) [PI: Fabio Martinelli]
- Principal Investigator of the grant ‘*Probabilistic models for the statistical mechanics of polymers, interacting particle systems and applications*’ of the University of Padova (2008)
- Member of National Research Projects (PRIN 2004, 2006, 2009)

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## EDITORIAL ACTIVITY

- Associate Editor of the *Annals of Applied Probability* (2019 – )
- Associate Editor of the *Annales de l’Institut Henri Poincaré* (2018 – )

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## ORGANIZATION ACTIVITY

- Workshop “*Self-interacting random walks, Polymers and Folding*” (CIRM, Marseille (F), 9-13 September 2019) [in collaboration with Quentin Berger and Julien Poisat]
- “*Third Workshop on Large Scale Random Structures*” (Milano-Bicocca, 10-11 July 2019)
- Winter School “*Recent Breakthroughs in Singular Stochastic PDEs*” (Milano-Bicocca, 2-6 February 2015) [in collaboration with Federica Masiero and Gianmario Tessitore].
- “*XVIII Workshop on Quantitative Finance*” (Milano-Bicocca, January 25-26-27, 2017) and “*XII Workshop on Quantitative Finance*” (Padova, January 27-28, 2011).

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## RESEARCH INTERESTS

My research activity is focused on *probability theory and its applications*, including:

- Statistical Mechanics (disordered systems, random polymers)
- Stochastic Equations (singular PDEs, scaling limits)
- Random Walks (asymptotic properties, renewal theory)
- Mathematical Finance (stochastic volatility models, implied volatility)

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## PUBLICATIONS

### Journal papers

- (35) F. Caravenna, F. Cottini, *Gaussian Limits for Subcritical Chaos*, *Electron. J. Probab.* 27 (2022), article no. 81, 1-35
- (34) F. Caravenna, L. Zambotti, *Hairer’s Reconstruction Theorem without Regularity Structures*, *EMS Surv. Math. Sci.* 7 (2020), 207-251.
- (33) F. Caravenna, F. den Hollander, *Phase transitions for spatially extended pinning*, *Probab. Theory Related Fields* 181 (2021), 329-375.

- (32) F. Caravenna, R. Sun, N. Zygouras, *The two-dimensional KPZ equation in the entire subcritical regime*, Ann. Probab. 48 (2020), 1086-1127.
- (31) F. Caravenna, R. Sun, N. Zygouras, *On the moments of the (2+1)-dimensional directed polymer and stochastic heat equation in the critical window*, Commun. Math. Phys. 372 (2019), 385-440.
- (30) F. Caravenna, R. Sun, N. Zygouras, *The Dickman subordinator, renewal theorems, and disordered systems*, Electron. J. Probab. 24 (2019), paper no. 101, 40 pp.
- (29) F. Caravenna, *On the maximum of conditioned random walks and tightness for pinning models*, Electron. Commun. Probab. 23 (2018), paper n. 69, 13 pp.
- (28) F. Caravenna, R. Doney, *Local large deviations and the strong renewal theorem*, Electron. J. Probab. 24 (2019), paper no. 72, 1-48.
- (27) F. Caravenna, A. Garavaglia, R. van der Hofstad, *Diameter in ultra-small scale-free random graphs*, Random Structures Algorithms 54 (2019), 444-498.
- (26) F. Caravenna, J. Corbetta, *The asymptotic smile of a multiscaling stochastic volatility model*, Stochastic Process. Appl. 128 (2018), 1034-1071.
- (25) F. Caravenna, R. Sun, N. Zygouras, *Universality in marginally relevant disordered systems*, Ann. Appl. Probab. 27 (2017), 3050-3112.
- (24) F. Caravenna, J. Corbetta, *General smile asymptotics with bounded maturity*, SIAM J. Financial Math. 7 (2016), 720-759.
- (23) F. Caravenna, F. L. Toninelli, N. Torri, *Universality for the pinning model in the weak coupling regime*, Ann. Probab. 45 (2017), 2154-2209.
- (22) F. Caravenna, F. den Hollander, N. Pétrélis, J. Poisat, *Annealed scaling for a charged polymer*, Math. Phys. Anal. Geom. (2016), 19:2.
- (21) F. Caravenna, R. Sun, N. Zygouras, *The continuum disordered pinning model*, Probab. Theory Related Fields 164 (2016), 17-59.
- (20) F. Caravenna, R. Sun, N. Zygouras, *Polynomial chaos and scaling limits of disordered systems*, J. Eur. Math. Soc. 19 (2017), 1-65.
- (19) F. Caravenna, F. den Hollander, *A general smoothing inequality for disordered polymers*, Electron. Commun. Probab. 18 (2013), no. 76, 1-15.
- (18) F. Caravenna, L. Chaumont, *An invariance principle for random walk bridges conditioned to stay positive*, Electron. J. Probab. 18 (2013), no. 60, 1-32.
- (17) Q. Berger, F. Caravenna, J. Poisat, R. Sun, N. Zygouras, *The critical curve of the random pinning and copolymer models at weak coupling*, Commun. Math. Phys. 326 (2014), 507-530.
- (16) F. Caravenna, P. Carmona, N. Pétrélis, *The discrete-time parabolic Anderson model with heavy-tailed potential*, Ann. Inst. H. Poincaré 48 (2012), 1049-1080.
- (15) A. Andreoli, F. Caravenna, P. Dai Pra, G. Posta, *Scaling and multiscaling in financial series: a simple model*, Adv. in Appl. Probab. 44 (2012), 1018-1051.
- (14) M. Borecki, F. Caravenna, *Localization for (1+1)-dimensional pinning models with  $(\nabla + \Delta)$  interaction*, Electron. Commun. Probab. 15 (2010), 534-548.
- (13) F. Caravenna, G. Giacomin, *The weak coupling limit of disordered copolymer models*, Ann. Probab. 38 (2010), 2322-2378.
- (12) F. Caravenna, N. Pétrélis, *Depinning of a polymer in a multi-interface medium*, Electron. J. Probab. 14 (2009), 2038-2067.

- (11) F. Caravenna, N. Pétrélis, *A polymer in a multi-interface medium*, Ann. Appl. Probab. 19 (2009), 1803-1839.
- (10) F. Caravenna, G. Giacomin, M. Gubinelli, *Large scale behavior of semiflexible heteropolymers*, Ann. Inst. H. Poincaré Probab. Statist. 46 (2010), 97-118.
- (9) F. Caravenna, J.-D. Deuschel, *Scaling limits of (1+1)-dimensional pinning models with Laplacian interaction*, Ann. Probab. 37 (2009), 903-945.
- (8) E. Bolthausen, F. Caravenna, B. de Tilière, *The quenched critical point of a diluted disordered polymer model*, Stochastic Process. Appl. 119 (2009), 1479-1504.
- (7) F. Caravenna, J.-D. Deuschel, *Pinning and wetting transition for (1+1)-dimensional fields with Laplacian interaction*, Ann. Probab. 36 (2008), 2388-2433.
- (6) F. Caravenna, L. Chaumont, *Invariance principles for random walks conditioned to stay positive*, Ann. Inst. H. Poincaré Probab. Statist. 44 (2008), 170-190.
- (5) F. Caravenna, G. Giacomin, L. Zambotti, *Sharp asymptotic behavior for wetting models in (1+1)-dimension*, Electron. J. Probab. 11 (2006), 345-362.
- (4) F. Caravenna, G. Giacomin, L. Zambotti, *A renewal theory approach to periodic copolymers with adsorption*, Ann. Appl. Probab. 17 (2007), 1362-1398.
- (3) F. Caravenna, G. Giacomin, M. Gubinelli, *A numerical approach to copolymers at selective interfaces*, J. Stat. Phys. 122 (2006), 799-832.
- (2) F. Caravenna, G. Giacomin, *On constrained annealed bounds for pinning and wetting models*, Electron. Commun. Probab. 10 (2005), 179-189.
- (1) F. Caravenna, *A local limit theorem for random walks conditioned to stay positive*, Probab. Theory Related Fields 133 (2005), 508-530.

## Proceedings

- F. Caravenna, F. den Hollander and N. Pétrélis, *Lectures on Random Polymers*, in: Probability and Statistical Physics in Two and more Dimensions. Proceedings of the Clay Mathematics Institute Summer School and XIV Brazilian School of Probability (Buzios, Brazil). Edited by David Ellwood, Charles Newman, Vladas Sidoravicius and Wendelin Werner. Clay Mathematics Proceedings 15 (2012), 319-393.
- F. Caravenna, G. Giacomin, F. L. Toninelli, *Copolymers at selective interfaces: settled issues and open problems*, in: Probability in complex physical systems. In honour of Erwin Bolthausen and Jürgen Gärtner. Edited by J.-D. Deuschel, B. Gentz, W. König, M. von Renesse, M. Scheutzow, U. Schmock. Springer Proceedings in Mathematics 11 (2012), 289-312.
- A. Andreoli, F. Caravenna, P. Dai Pra, G. Posta, *A model for multiscaling and clustering of volatility in financial indexes*, Proceedings of the 19th International Symposium on Mathematical Theory of Networks and Systems - MTNS, vol.5, no.9, 2010/7.
- F. Caravenna, *Modelli di polimeri e passeggiate aleatorie*, Boll. Unione Mat. Ital. Serie IX, vol. I (2008), 559-571.
- F. Caravenna, G. Giacomin, L. Zambotti, *Infinite volume limits of polymer chains with periodic charges*, Markov Process. Related Fields 13 (2007), 697-730.

## Textbook

- Q. Berger, F. Caravenna, P. Dai Pra. *Probabilità. Un'introduzione attraverso esempi, modelli e applicazioni*. Seconda Edizione. Springer-Verlag Italia, Milano (2021).

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## RESEARCH VISITS

- Five months at the *Mathematical Institute* of the *University of Leiden* (NL) as a visiting professor in the framework of the ERC Advanced Grant VARIS, at the invitation of Frank den Hollander (17 March - 11 May 2012; 1 May - 30 June 2013; 1-30 March 2014)
- Two months at the *Laboratoire de Probabilités et Modèles Aléatoires*, *Universities of Paris 6 and Paris 7* (F), at the invitation of Giambattista Giacomin and Lorenzo Zambotti (5 October - 13 December 2009) .
- One month at the *Institute of Mathematics* of the *Technical University of Berlin* (D) at the invitation of Jean-Dominique Deuschel (8 January - 2 February 2007) .
- Shorter periods (one/two weeks) at the *National University of Singapore* (18-29 Mar 2019, 27 Mar - 7 Apr 2017, 4-15 Apr 2016, 4-15 May 2015, 27 Jan - 8 Feb 2014, 14-25 May 2012), *University of Warwick* (16-21 Jun 2014), *Univeristé Lyon 1* (13-16 May 2019), *Unioersity of Luxembourg* (13-17 Jun 2016), *Unioersity of Nantes* (18-22 Oct 2010), *Technical University of Berlin* (3-14 Nov 2008), *ENS Lyon* (16-20 Jun 2008), *University of Paris 7* (17-21 Jul 2006, 19-23 May 2008), *University of Zürich* (28 Apr - 2 May 2008), *Technical University of Eindhoven / Eurandom* (10-14 Jul 2006, 22-26 Oct 2007).

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## SEMINARS

I gave several invited talks at national and international conferences, as well as many other talks in universities and research centers, plus a few didactic talks.

### Invited Talks

- (26 Jul 2022) *Renewal Theory, Disordered Systems, and Stochastic PDEs*, Workshop “A journey through complex systems” in honor of Paolo Dai Pra 60th birthday, L’Aquila (I).
- (12 Sep 2022) *The critical 2d Stochastic Heat Flow*, Workshop “Large Scale Stochastic Dynamics”, Mathematisches Forschungsinstitut Oberwolfach (D).
- (26 Jul 2022) *Renewal Theory, Disordered Systems, and Stochastic PDEs*, Workshop “Lévy Processes and Random Walks” in celebration of Ron Doney’s 80th birthday, Manchester (UK) [online talk].
- (28 Jun 2022) *The critical 2d Stochastic Heat Flow*, SPA 2022 Conference, Invited session “Stochastic Partial Differential Equations”, Wuhan (CN) [online talk].
- (2 May 2022) *The critical 2d Stochastic Heat Flow is not a Gaussian Multiplicative Chaos*, Workshop “Random Walk, Reinforcement and Localization”, CIRM, Marseille (F).
- (8 Sep 2021) *Gaussian Limits for Subcritical Chaos*, workshop “Directed Polymers and Folding”, CIRM, Marseille (F).
- (7 Jun 2021) *Central Limit Theorems in Disordered Systems and Stochastic PDEs*, UMI-PRISMA Seminar [online talk].
- (21 Jan 2021) *Hairer’s Reconstruction Theorem without Regularity Structures*, One World Probability Seminar [online talk].
- (11 Sep 2020) *The two-dimensional directed polymer and the Dickman subordinator*, workshop “Random Polymers and Networks”, IGESA center, Porquerolles island (F).
- (12 Nov 2019) *On the two-dimensional KPZ equation*, Conference of the Euro-Maghreb International Research Network in Mathematics and Applications, Madrid (E).

- (30 Oct 2019) *On the 2d KPZ Equation*, Half day in Stochastic Analysis and applications, University of Padova (I).
- (24 Oct 2019) *On the 2d KPZ and Stochastic Heat Equation*, Workshop on “Singular SPDEs and Related Topics”, Hausdorff Research Institute for Mathematics, Bonn (D).
- (27 Sep 2019) *On the 2d KPZ and Stochastic Heat Equation*, Meeting of the AAP Editorial Board, University of Nice (F).
- (20 Jun 2019) *On the 2d KPZ and Stochastic Heat Equation*, Second Italian Meeting on Probability and Mathematical Statistics, Vietri sul Mare (I).
- (3 July 2018) *Moment asymptotics for 2d directed polymer and stochastic heat equation in the critical window*, Two days workshop on “Large scale random structures”, University of Padova (I).
- (3 Apr 2018) *Moment asymptotics for 2d directed polymer and stochastic heat equation in the critical window*, Workshop “Polymer, Folding and Phase Transition”, CIRM, Marseille (F).
- (23 Jan 2018) *Pinning model, universality and rough paths*, Conference “Universality and scaling limits of interacting random systems”, Inhomogeneous Random Systems 2018, Institut H. Poincaré, Paris (F).
- (27 Jul 2017) *Local large deviations and the strong renewal theorem*, SPA 2017 Conference, “Random Walks” Invited Session, Moscow (RU).
- (5 Jun 2017) *Marginally relevant polymer models in the critical window*, Conference “Statistical Mechanics, random planar geometry and interacting random walks”, University of Lyon 1 (F).
- (8 May 2017) *Marginally relevant polymer models in the critical window*, Workshop on “Large scale random structures”, University of Roma Tre (I).
- (12 Dec 2016) *Universality in marginally relevant disordered systems*, Workshop “Guided Tour: Random Media” for the 60th birthday of Frank den Hollander, Eurandom, Eindhoven (NL).
- (14 Jun 2016) *Scaling and universality in Probability*, Mathematics Colloquium of the University of Luxembourg (L).
- (10 Sep 2015) *A multilinear extension of the central limit theorem and the universality phenomenon for disordered systems*, XX Congress of the Italian Mathematical Union, Siena (I).
- (31 Aug 2015) *Universality in marginally relevant disordered systems*, Meeting on “Scaling Limits in Models of Statistical Mechanics”, Oberwolfach Center of Mathematical Research (D).
- (5 May 2015) *Polynomial chaos and scaling limits of disordered systems*, Workshop on Stochastic Processes in Random Media, Institute for Mathematical Sciences, National University of Singapore.
- (28 Jul 2014) *The continuum disordered pinning model*, SPA 2014 Conference, “Random Polymers” Invited Session, Buenos Aires (AR).
- (6 Jun 2014) *Polynomial chaos and scaling limits of disordered systems*, Statistical Mechanics Conference, University of Nantes (F).
- (27 Apr 2014) *Polynomial chaos and scaling limits of disordered systems*, Mini-Workshop at NYU Abu Dhabi (UAE).
- (13 Mar 2014) *Scaling and universality in Probability*, General Colloquium, Institute of Mathematics, University of Leiden (NL).

- (12 Sep 2013) *Scaling limits and universality for random pinning models*, 15th Italian Meeting on Hyperbolic Equations, University of Milano-Bicocca (I).
- (9 Aug 2013) *Scaling limits and universality for random pinning models*, Workshop “Universality and Scaling Limits in Probability and Statistical Mechanics”, Hokkaido University, Sapporo (JP).
- (21 Mar 2013) *Scaling limits and universality for random pinning models*, Workshop “Analysis and Stochastics in Complex Physical Systems”, University of Leipzig (D).
- (15 Feb 2011) *The weak coupling limit of disordered copolymer models*, Workshop on Interacting Processes in Random Environments, Fields Institute, Toronto (CDN).
- (16 Oct 2010) *The weak coupling limit of disordered copolymer models*, Workshop “Probabilistic Methods in Statistical Physics” on the occasion of Erwin Bolthausen’s 65th birthday, Technische Universität Berlin (D).
- (7 Jun 2010) *Scaling and multiscaling in financial indexes: a simple model*, Workshop “Statistical Mechanics and Random Media”, University of Nantes (F).
- (11 Jun 2008) *Pinning and wetting transition for (1+1)–dimensional fields with Laplacian interaction*, Workshop on Gradient Models and Elasticity, University of Warwick (UK).
- (6 Mar 2008) *The quenched critical point of a diluted disordered polymer model*, GREFI-MEFI 2008 Workshop, CIRM, Marseille (F).
- (26 Sep 2007) *Polymer models and random walks*, XVIII Congress of the Italian Mathematical Union, Bari (I).
- (22 Jun 2007) *On the phase diagram of random copolymers at selective interfaces*, Workshop “Random Polymer Models”, Eurandom, Eindhoven (NL).
- (21 Feb 2007) *Pinning and wetting models with Laplacian interaction in (1+1)–dimension*, Workshop “Polymer Models and Related Topics”, Laboratoire J.A. Dieudonné, University of Nice ‘Sophia Antipolis’ (F).
- (4 Sep 2006) *Pinning models with Laplacian interactions in (1+1)–dimension*, Meeting on “Spatial Random Processes and Statistical Mechanics”, Oberwolfach Center of Mathematical Research (D).
- (6 Jun 2006) *A renewal theory approach to weakly inhomogeneous polymer models*, Workshop “Hydrodynamic Limits and Particle Systems”, Ennio De Giorgi Center of Mathematical Research in Pisa (I).

## Other Talks

- (19 Mag 2022) *The critical 2d Stochastic Heat Flow*, GSSI, L’Aquila (I).
- (25 Ott 2021) *Hairer’s Reconstruction Theorem without Regularity Structures*, organized by TU Delft (NL) [online talk]
- (15 Dec 2020) *On the two-dimensional KPZ and Stochastic Heat Equation*, Vienna Probability Seminar (A) [online talk]
- (11 Nov 2020) *On the two-dimensional KPZ and Stochastic Heat Equation*, organized by University College Dublin (IE) [online talk]
- (11 Jun 2020) *Hairer’s Reconstruction Theorem without Regularity Structures*, organized by TU Berlin (D) [online talk]
- (27 Jan 2020) *On the two-dimensional KPZ and Stochastic Heat Equation*, Sapienza Università di Roma (I).

- (27 Sep 2018) *Local large deviations and the strong renewal theorem*, DEC-Statistics Seminar, Bocconi University, Milan (I).
- (6 Mar 2018) *Moment asymptotics for 2d directed polymer and stochastic heat equation in the critical window*, Stochastic Analysis Seminar, Imperial College, London (UK).
- (9 Feb 2018) *Pinning model, universality and rough paths*, Rhein-Main Kolloquium Stochastik, Technische Universität Darmstadt (D).
- (23 May 2017) *Marginally relevant polymer models in the critical window*, University of Grenoble (F).
- (15 Jun 2016) *Universality in marginally relevant disordered systems*, University of Luxembourg (L).
- (2 Jun 2016) *Universality in marginally relevant disordered systems*, University of Paris Diderot (F).
- (19 Nov 2015) *Multi-linear central limit theorems and scaling limits of disordered systems*, Vienna Seminar in Mathematical Finance and Probability (A).
- (19 Mar 2015) *Polynomial chaos and scaling limits of disordered systems*, Probability Seminar, ENS Lyon (F).
- (11 Oct 2013) *Polynomial chaos and scaling limits of disordered systems*, University of Padova (I).
- (12 Jul 2013) *Scaling limits and universality for random pinning models*, Rhein-Main Kolloquium Stochastik, University of Mainz (D).
- (13 Jun 2013) *Scaling limits and universality for random pinning models*, Most Informal Probability Seminar, University of Leiden (NL).
- (10 Jun 2013) *Scaling limits and universality for random pinning models*, University of Angers (F).
- (27 Jul 2012) *Scaling and multiscaling in financial series: a simple model*, Department of Statistics and Quantitative Methods, University of Milano-Bicocca (I).
- (10 Jul 2012) *A random copolymer near a selective interface*, University of Roma Sapienza (I).
- (3 Apr 2012) *Bootstrap percolation on Galton Watson trees*, Most Informal Probability Seminar, University of Leiden (NL).
- (12 Mar 2012) *Scaling and multiscaling in financial series: a simple model*, University of Modena and Reggio Emilia (I).
- (23 Sep 2011) *Scaling and multiscaling in financial indexes: a simple model*, University of Rome Tor Vergata (I).
- (16 Dec 2010) *A polymer in a multi-interface medium*, Oberseminar Stochastics, University of Bonn (D).
- (2 Nov 2010) *Scaling and multiscaling in financial indexes: a simple model*, University of Milano-Bicocca (I).
- (10 Jun 2010) *The weak coupling limit of disordered copolymer models*, University of Warwick (UK).
- (20 May 2010) *Scaling and multiscaling in financial indexes: a simple model*, University of Padova (I).
- (1 Feb 2010) *Scaling and multiscaling in financial indexes: a simple model*, University of Pavia (I).
- (8 Dec 2009) *A polymer in a multi-interface medium*, Séminaire de Probabilités, Laboratoire de Probabilités et Modèles Aléatoires, Universities of Paris 6 and Paris 7 (F).
- (5 Nov 2009) *Large scale behavior of semiflexible heteropolymers*, University of Nantes (F).



- (21 Jul 2009) *A polymer in a multi-interface medium*, University of Roma 3 (I).
- (12 Nov 2008) *A polymer in a multi-interface medium*, Berliner Kolloquium Wahrscheinlichkeitstheorie (IRTG Seminar), Humboldt University in Berlin (D).
- (19 Jun 2008) *Pinning and wetting transition for (1+1)-dimensional fields with Laplacian interaction*, Séminaire de Probabilités, ENS Lyon (F).
- (30 Apr 2008) *Pinning and wetting transition for (1+1)-dimensional fields with Laplacian interaction*, Seminar on Stochastic Processes, University of Zürich (CH).
- (23 Oct 2007) *The quenched critical point of a diluted disordered polymer model*, Random Spatial Structures Seminar, Eurandom, Eindhoven (NL).
- (17 Jul 2007) *The quenched critical point of a diluted disordered polymer model*, St. Flour Summer School of Probability (F).
- (24 Jan 2007) *Free energy lower bounds for random copolymers at selective interfaces*, Technical University of Berlin (D).
- (13 Jul 2006) *Pinning models with Laplacian interactions in (1+1)-dimension*, Random Spatial Structures Seminar, Eurandom, Eindhoven (NL).
- (17 Mar 2006) *A renewal theory approach to periodically inhomogeneous polymer models*, Séminaire de Probabilités et Statistique, Centre de Mathématiques et Informatique, University of Provence, Marseille (F).
- (21 Dec 2005) *A local limit theorem and an invariance principle for random walks conditioned to stay positive*, Seminar on Stochastic Processes, ETH Zürich (CH).
- (16 Dec 2005) *A renewal theory approach to periodically inhomogeneous polymer models*, Berlin-Leipzig Seminar, Technical University of Berlin (D).
- (19 Jul 2005) *A renewal theory approach to periodically inhomogeneous polymer models*, St. Flour Summer School of Probability (F).
- (27 May 2005) *Random copolymers at selective interfaces*, University of Milano-Bicocca (I).
- (2 Jun 2004) *A local limit theorem for random walks conditioned to stay positive*, Rencontres de Probabilités, University of Rouen (F).

### Didactic Talks

- (4 Sep 2019) *Mathematics and chance*, talk for an audience of high school students, Summer School “La Matematica Oggi”, San Pellegrino Terme, BG (I).
- (12 Mar 2015) *Mathematics in the university*, talk for an audience of high school students, Open Day “Privavera in Bicocca 2015”.
- (14 Mar 2013) *Research in mathematics*, talk for an audience of high school students, Open Day “Privavera in Bicocca 2013”.
- (5 Nov 2008) *The Banach-Tarski Paradox*, Technische Universität Berlin (D).
- (29 June 2006) *What is. . . the Banach-Tarski Paradox?*, Zürich Graduate Colloquium (CH).

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### TEACHING EXPERIENCE

I have given undergraduate courses and recitations in several universities (Milano-Bicocca, Padova, Zurich, Politecnico di Milano). I have also given more advanced courses for Ph.D. programs, schools and workshops.

#### Courses and mini-courses in schools and workshops

- (19-22 Mar 2021), *Gaussian Limits for 2d Directed Polymers, KPZ and SHE* [2 x 1.5h], in collaboration with Rongfeng Sun and Nikos Zygouras, Berlin-Oxford IRTG [course given online, due to the Covid-19 emergency]
- (10-11 Dec 2018) *On the two-dimensional KPZ and Stochastic Heat Equation via directed polymers* [3 x 1.5h], Conference “State of research: statistical mechanics” of the French Mathematical Society, Institut Henri Poincaré, Paris (F).
- (2 Jun 2016) *Polynomial chaos and scaling limits of disordered systems* [3h], Working group on “Statistical mechanics and particle systems”, University of Paris Diderot (F).
- (7 - 11 Mar 2016) *Polynomial chaos and scaling limits of disordered systems* [3 x 1.5h], Workshop YEP XIII, Eurandom, TU Eindhoven (NL).
- (28 Sep - 2 Oct 2015) *Polynomial chaos and scaling limits of disordered systems* [5 x 1.5h], Berlin-Potsdam Summer School 2015, Levico Terme (I).
- (10-12 Jan 2013) *Random Polymers and Localization Strategies* [3 x 2h], School of “Random Polymers”, Eurandom, Eindhoven (NL).
- (14-18 May 2012) *Random Polymers and Localization Strategies* [3 x 2h + 1h], Workshop “Random Polymers and Related Topics”, Institute for Mathematical Sciences, National University of Singapore.
- (6-10 Sep 2011) *The strange behavior of a random walk* [1.5h + 2h], Mathematics Summer School “Alfa Class” for top undergraduate students by “Progetto Diderot” – Fondazione CRT, Solonghella (AL), Italy.
- (2-7 Aug 2010) *Random Polymers* [5x1h tutorials, in collaboration with Nicolas Pétrélis, for the course given by Frank den Hollander], XIV Brazilian School of Probability and Clay Mathematics Institute 2010 Summer School “Probability and Statistical Physics in Two and more Dimensions”, Búzios – Rio de Janeiro (BR).

### Ph.D. Courses

- (Spring 2020) *Topics from the Gaussian World*, Ph.D. in Mathematics, Universities of Pavia and Milano-Bicocca [30h, with Maurizia Rossi].
- (Spring 2019) *An Introduction to Regularity Structures*, Ph.D. in Mathematics, Universities of Pavia and Milano-Bicocca [30h].
- (Spring 2017) *Rough Paths and Stochastic Differential Equations*, Ph.D. in Mathematics, Universities of Pavia and Milano-Bicocca [30h, with Gianmario Tessitore].
- (Spring 2014) *Random Graphs and Complex Networks*, Ph.D. in Mathematics, joint course (“interdottorato”) for the Universities of Milano, Milano-Bicocca, Pavia and Politecnico of Milano [30h, with Federico Bassetti].
- (Spring 2010) *Random Graphs and Complex Networks*, Ph.D. in Mathematics, University of Padova [20h, with Paolo Dai Pra].
- (Spring 2009) *Poisson Point Processes and Applications*, Ph.D. in Mathematics, University of Padova [10h]
- (Fall 2006) *Polymer Models and Random Walks*, Ph.D. in Mathematics, University of Padova [10h].

### Undergraduate Courses and Recitations

*At the University of Milano-Bicocca*

- (Fall 2021) *Probability Theory* (course), Bachelor’s Degree in Mathematics.

- (Spring 2022) *Probability and Statistics for Informatics* (course), Bachelor's Degree in Informatics [in collaboration with Federica Masiero and Maurizia Rossi]
- (Fall 2021) *Probability Theory* (course + recitations), Bachelor's Degree in Mathematics.
- (Spring 2021) *Probability and Statistics for Informatics* (course), Bachelor's Degree in Informatics [in collaboration with Federica Masiero and Maurizia Rossi]
- (Spring 2021) *Stochastic Methods and Models* (course), Master's Degree in Mathematics [in collaboration with Maurizia Rossi]
- (Fall 2020) *Probability Theory* (course), Bachelor's Degree in Mathematics.
- (Fall 2019) *Stochastic Methods for Finance* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2019) *Probability Theory* (course), Bachelor's Degree in Mathematics.
- (Spring 2019) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2018) *Stochastic Methods for Finance* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2018) *Probability Theory* (course), Bachelor's Degree in Mathematics.
- (Spring 2018) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2017) *Probability Theory* (course), Bachelor's Degree in Mathematics.
- (Spring 2017) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2016) *Probability Theory* (course), Bachelor's Degree in Mathematics.
- (Spring 2016) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2015) *Probability Theory* (course), Bachelor's Degree in Mathematics.
- (Spring 2015) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2014) *Probability Theory* (course + recitations), Bachelor's Degree in Mathematics.
- (Spring 2014) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2013) *Probability Theory* (course + recitations), Bachelor's Degree in Mathematics.
- (Spring 2013) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2012) *Probability Theory* (course + recitations), Bachelor's Degree in Mathematics.
- (Spring 2012) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2011) *Probability Theory* (course + recitations), Bachelor's Degree in Mathematics.
- (Spring 2011) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Spring 2005) *Stochastic Processes* (recitations), Master's Degree in Mathematics [teacher: Gianmario Tessitore].

- (Spring 2004) *Stochastic Processes* (recitations), Master's Degree in Mathematics [teacher: Daniela Bertacchi].
- (Spring 2004) *Probability and Statistics* (recitations), Bachelor's Degree in Mathematics [teacher: Daniela Bertacchi].

*At the University of Padova*

- (Spring 2011) *Stochastic Calculus* (course), Master's Degree in Mathematics [in collaboration with David Barbato].
- (Spring 2010) *Statistics* (recitations), Bachelor's Degree in Molecular Biology [teacher: Paolo Dai Pra].
- (Spring 2010) *Stochastic Calculus* (course), Master's Degree in Mathematics.
- (Spring 2009) *Probability and Statistics* (recitations), Bachelor's Degree in Mathematics [teacher: Paolo Dai Pra].
- (Spring 2009) *Stochastic Calculus* (course), Master's Degree in Mathematics.
- (Spring 2008) *Probability Theory* (course), Bachelor's Degree in Engineering, University of Padova (I) [in collaboration with Caterina Sartori].
- (Spring 2008) *Probability and Statistics* (recitations), Bachelor's Degree in Mathematics [teacher: Paolo Dai Pra].
- (Spring 2008) *Statistical Methods for Biology* (recitations), Bachelor's Degree in Biology [teacher: Paolo Dai Pra].
- (Spring 2007) *Statistical Methods for Biology* (recitations), Bachelor's Degree in Molecular Biology [teacher: Paolo Dai Pra].
- (Spring 2007) *Statistical Methods for Biology* (recitations), Bachelor's Degree in Biology [teacher: Paolo Dai Pra].

*At the University of Zurich*

- (Spring 2006) *Linear Algebra II* (recitations), Bachelor's Degree in Mathematics [teacher: Erwin Bolthausen].
- (Fall 2005) *Linear Algebra I* (recitations), Bachelor's Degree in Mathematics [teacher: Erwin Bolthausen].

*At Politecnico di Milano*

- (Spring 2003) *Probability and Statistics* (on-line recitations), Bachelor's Degree in Engineering [teacher: Elio Piazza].
- (Spring 2003) *Probability and Statistics* (numerical laboratory), Bachelor's Degree in Engineering [teacher: Elio Piazza].