

# Michele Salvi

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## Personal

Born on March 22, 1985 in Rome, Italy.

Italian Citizenship.

## Education and academic positions

**2023- ...** Associate Professor, Mathematics Department, Università degli Studi di Tor Vergata, Rome.

**2020- 2023** Ricercatore di tipo B (assistant professor), Mathematics Department, Università degli Studi di Tor Vergata, Rome.

**2019- 2020** Maître de conférences (assistant professor), Laboratoire de Probabilités, Statistiques et Modélisations (LPSM), Paris Diderot university – Université de Paris.

**2018-2019** Postdoc in Mathematics, École Polytechnique and INRA, Paris.

**2016-2018** Marie Skłodowska-Curie Individual Fellowship, Paris-Dauphine University.

**2013-2015** Postdoc in Mathematics, TU Munich.

**2010-2013** Ph.D. in Mathematics, TU Berlin, *summa cum laude*. Thesis:  
*The Random Conductance Model: local times large deviations, law of large numbers and effective conductance.*  
Supervisor: Prof. Dr. Wolfgang König. Date of defense: 22nd April 2013.

**2012** Visitor of Prof. Marek Biskup at UCLA (US) in April and October, supported by an ESF Exchange grant (RGLIS).

**2007-2009** Master degree in Mathematics, Roma 3 University, 110/110 magna cum laude. Thesis:  
*The Cut-off phenomenon for Monte Carlo Markov chains*, supervised by Prof. Fabio Martinelli.

**2008** Erasmus student, Universidad Complutense, Madrid.

**2004-2007** Bachelor of Mathematics degree, Roma 3 University, 110/110 magna cum laude.

## Funding and grants

**2023** Participant to the PRIN project “GRAFIA: Geometry of Random Fields and Applications”.

**2022** PI of the project ASPRO, Asymptotic Properties in Probability, 7200€, funded by Tor Vergata University.

**2016-2018** Marie Skłodowska-Curie Individual Fellowship.

**2012** (October) ESF Short Visit grant for visiting Prof. Marek Biskup at UCLA, in the context of the program Random Geometry of Large Interacting Systems and Statistical Physics (RGLIS).

**2012** (April and May) ESF Exchange grant for visiting Prof. Marek Biskup at UCLA, in the context of the program Random Geometry of Large Interacting Systems and Statistical Physics (RGLIS).

## Research abroad

**2022** NUS, Singapore (Singapore) - collaboration with Prof. Rongfeng Sun, three months.

**2019** NYU Shanghai, Shanghai (China) - collaboration with Dr. Joseba Dalmau, two weeks.

**2015-2019** La Sapienza university, Rome (Italy) - collaboration with Prof. Alessandra Faggionato, about three weeks per year.

**2016** NYU, New York City (US) - collaboration with Prof. Scott Armstrong, one week.

**2013** Aix-Marseille university, Marseille (France) - collaboration with Dr. Alexandre Gaudillière, one week.

**2012** UCLA, Los Angeles (US) - collaboration with Prof. Marek Biskup, two months.

## Awards

**2015** Prize as best Teaching Assistant in Mathematics at TU Munich (2nd place).

**2010** BMS (Berlin Mathematical School) "Initiative of Excellence" Scholarship.

**2007** INdAM (National Institute for Advanced Mathematics "Francesco Severi") Scholarship in Mathematics (4th classified in Italy).

**2004** Roma 3 University Scholarship for first year Mathematics students (1st classified).

## Teaching and professional activities

### Supervision

**2022** Stage of Flavia Carafone, Master degree in Physics, University of Tor Vergata: *Tempo di mixing su grafi a conduttanze crescenti*.

**2022** Co-supervision of the master thesis of Massimo Chialastri, Master degree in Mathematics, University of Tor Vergata: *La disuguaglianza di Grothendieck: un approccio probabilistico*.

**2019** Co-supervision of Etienne Pinsard, Master 2 at Université Paris Diderot, Paris Sorbonne, Paris-Sud. 4 months stage: *Large random graphs: simulation and data analysis for the study of infections spread*.

### Reviewing

Referee reviewer for the *Journal of Statistical Physics*, *Annales de l'Institut Henri Poincaré*, *Electronic Journal of Probability*, *Electronic Journal of Statistics*, *Electronic Communications in Probability*, *ALEA*. Collaborator of *Mathematical Reviews* and *Zentralblatt MATH*.

### Organization of conferences and events

**2024** 4<sup>th</sup> Italian Meeting on Probability and Mathematical Statistics, Rome, Italy (organising committee).

**2023** 5<sup>th</sup> HPRT Summer school and workshop organized by the universities of Hokkaido, Pisa, Tor Vergata and Torino, Turin, Italy.

- 2023 Mini-course by Boris Hanin (Princeton): Neural Networks and Gaussian Processes, Tor Vergata University, Rome, Italy.
- 2022 Contributed session “Random processes on complex networks” at the 3<sup>rd</sup> Italian Meeting on Probability and Mathematical Statistics, Bologna, Italy.
- 2022 Workshop: A Day on Random Graphs, Tor Vergata University, Roma, Italy.
- 2019 Mini-course by Scott Armstrong (NYU): An introduction to Quantitative Stochastic Homogenization, École Polytechnique, Paris, France.
- 2012 PhD seminars for the Berlin graduate school IRTG, Berlin, Germany.

### Teaching

- 2023 Lecturer: Probability theory, Computer Science Department, Tor Vergata University.
- 2022, 2023 Lecturer: High Dimensional Probability and Statistics, Math Department, Tor Vergata University.
- 2021, 2022 (fall) Lecturer: Geometria, Engineering Department, Tor Vergata University.
- 2021 (spring) Lecturer for the course Geometria, Engineering Department, Tor Vergata University.
- 2020 Lecturer: Algebra 2, Paris-Diderot University.
- 2020 Main TA: Limit Theorems for Stochastic Processes, Paris-Diderot University.
- 2020 Main TA: Stochastic Processes, Paris-Diderot University.
- 2018 Lecturer: Statistics I, Paris-Dauphine University.
- 2015 Lecturer: Actuarial Risk, TU Munich.
- 2014, 2015 Main TA: Stochastic Analysis, TU Munich.
- 2014 Main TA: Probability Theory, TU Munich.
- 2011, 2012, 2013 Collaborator for the tutorials: Probability 2, TU Berlin.
- 2009, 2010 University tutor: Probability 2, Roma 3 University.
- 2007, 2009 University tutor: Probability 1, Roma 3 University.

### Internships

- 2015 Assenagon GmbH - Equity Portfolio Management team.  
Main tasks: Statistical estimation of correlation matrices between stock prices; translation of new theoretical results into algorithms, programming in Matlab.
- 2013 Deutsche Bank, Quant Institute - Risk Analytics & Instruments, Portfolio Validation team.  
Main tasks: Analysis of time-series related to Operational Risk of the bank; study of rating migration matrices in Credit Risk.

## Research interests and publications

**Probability Theory:** Random Walks in Random Media, Random Graphs, Large Deviations, Homogenization Theory, Statistical Mechanics, Mixing Times for Markov Chains, Stochastic Algorithms, Neural Networks.

### Published articles and preprints

- [14] L. Makowiec, M. Salvi, R. Sun, *Diameter of uniform spanning trees on random weighted graphs*, preprint arXiv:2311.01808 (2023).
- [13] V. Cammarota, D. Marinucci, M. Salvi, S. Vigogna, *A quantitative functional central limit theorem for shallow neural networks*, preprint arXiv:2306.16932 (2023).
- [12] V. Bansaye, M. Salvi, *Branching process and homogenization for epidemics on spatial random graphs*, preprint arXiv:2301.04890 (2023).
- [11] A. Cipriani, M. Salvi, *Scale-free percolation mixing time*, *Stochastic Processes and their Applications*, 167 (2024).
- [10] Q. Berger, M. Salvi, *Scaling limit of sub-ballistic 1D random walk among biased conductances: a story of wells and walls*, *Electronic Journal of Probability* 25, 1–43 (2020).
- [9] J. Dalmau, M. Salvi, *Scale-free percolation in continuous space: quenched degree and clustering coefficient*, *Journal of Applied Probability* 58 (1), 106–127 (2021).
- [8] A. Faggionato, M. Salvi, *On the regularity of velocity and diffusivity of 1d random walks in random environment*, *ALEA Lat. Am. J. Probab. Math. Stat.* 16, 1213–1248 (2019).
- [7] Q. Berger, M. Salvi, *Scaling of sub-ballistic 1d random walks among random conductances*, *Markov Processes and Related Fields*, 25, 171–187 (2019).
- [6] A. Faggionato, N. Gantert, M. Salvi, *Einstein Relation and linear response in one-dimensional Mott Variable Range Hopping*, *Annales de l'Institut Henri Poincaré*, Vol. 55, No. 3, 1477–1508 (2019).
- [5] M. Salvi, F. Simenhaus, *Random walk on a perturbation of the infinitely-fast mixing interchange process*, *Journal of Statistical Physics*, 171(4), 656–678, (2018).
- [4] A. Faggionato, N. Gantert, M. Salvi, *The velocity of 1D Mott variable range hopping with external field*, *Annales de l'Institut Henri Poincaré*, Vol. 54, Nr. 3, 1165–1203, (2018).
- [3] M. Biskup, M. Salvi, T. Wolff, *A central limit theorem for the effective conductance: I. Linear boundary data and small ellipticity contrasts*, *Commun. Math. Phys.* 328, no. 2, 701–731, (2014).
- [2] N. Berger, M. Salvi, *On the speed of Random Walk among Random Conductances*, *ALEA Lat. Am. J. Probab. Math. Stat.*, Vol. X, 1063–1083, (2013).
- [1] W. König, T. Wolff, M. Salvi, *Large deviations for the local times of a random walk among random conductances*, *Electronic Communications in Probability* 17, <http://ecp.ejpecp.org/article/view/1820>, (2012).

### Other publications

- [O3] M. Salvi, *The Random Conductance Model: Local times large deviations, law of large numbers and effective conductance*, Ph.D. thesis under the supervision of Prof. Wolfgang König, 2013.
- [O2] M. Salvi, *On the speed of Random Walk among Random Conductances*, in *Oberwolfach Reports* no. 6/2012, 45–46, 2012.
- [O1] M. Salvi, *The Cut-off phenomenon for Monte Carlo Markov chains*, Master thesis, under the supervision of Prof. Fabio Martinelli, 2009.

## Talks and seminars

- 2023** (invited) SPA 2023, 43rd Conference on Stochastic Processes and their Applications, Lisboa, Portugal.
- 2023** (invited) Localization phenomena, CIRM, Marseille, France.
- 2022** NUS Probability Seminars, National University of Singapore, Singapore.
- 2022** Third Italian Meeting on Probability and Mathematical Statistics, Bologna, Italy.
- 2022** (invited) Pavia-Milano Seminar series on Probability and Mathematical Statistics (PMS)<sup>2</sup>, Italy.
- 2021** Presentation seminars, Università di Tor Vergata, Rome, Italy.
- 2021** (invited) Seminars in Probability and Finance, Università degli studi di Padova, Italy.
- 2020** Seminari di probabilità, Università di Tor Vergata, Rome, Italy.
- 2020** NetSci2020 – satellite conference Statistical Mechanics Methods for Networks, online.
- 2020** (invited) Séminaire de probabilités d'Orsay, Paris-Sud university, France.
- 2020** Groupe de travail LPSM, Paris-Diderot, France.
- 2019** (invited) Probability and Statistics seminar series, TU Delft, Netherlands.
- 2019** (invited) LUISS seminars, LUISS Guido Carli, Rome, Italy.
- 2019** Journée de rentrée LPSM, Paris-Diderot, France.
- 2019** (invited) Séminaire "Grahps and epidemiology", École Polytechnique, Paris, France.
- 2019** Second Italian Meeting on Probability and Mathematical Statistics, Vietri sul mare, Italy.
- 2019** (invited) Probability seminars, NYU Shanghai, China.
- 2019** Réunion ANR CADENCE, Institute Systems Complexes, Paris, France.
- 2019** Séminaires unité MaIAGE, INRA, Paris, France.
- 2019** (invited) Séminaire de probabilités, statistique et applications LMA UMR 7348, Poitiers, France.
- 2018** (invited) Workshop FDT on Fluctuation-dissipation relations, FRUMAM, Marseille, France.
- 2018** (invited) Séminaires de Probabilités, École Polytechnique, Paris, France.
- 2017** (invited) Séminaires de Probabilités, UPEC, Paris, France.
- 2017** 39th Conference on Stochastic Processes and their Applications, Moscow, Russia.
- 2017** (invited) MIP, Leiden University, Netherland.
- 2017** (invited) Les Probas du Vendredi, LPMA, Paris, France.
- 2016** Séminaire Analyse-Probabilités, Université Paris-Dauphine, France.
- 2016** Probability World Congress, Fields Institute, Toronto, Canada.
- 2015** Stochastic Methods in Finance and Physics, Heraklion, Greece.
- 2015** (invited) YEP XII on Random walks in random environment, Eurandom, Eindhoven, Netherlands.

- 2014 PIMS Summer School, University of British Columbia, Canada.
- 2014 Columbia University Probability Seminars, New York City, US.
- 2013 LATP Séminaires de Probabilités et statistiques, Marseille, France.
- 2013 (invited) YEP X on Random Polymers, Eurandom, Eindhoven, Netherlands.
- 2012 (Poster) Workshop: Interacting Particle Systems and Related Topics, Firenze, Italy.
- 2012 UCLA Probability Seminars, Los Angeles, US.
- 2012 Workshop: Interplay of Analysis and Probability in Physics, Oberwolfach, Germany.
- 2011 7th Cornell Probability Summer School, Cornell University, US.
- 2011 IRTG Seminars, TU Berlin, Germany.

## Conferences

- 2023 SPA 2023, 43rd Conference on Stochastic Processes and their Applications, Lisboa, Portugal.
- 2023 Localization phenomena, CIRM, Marseille, France.
- 2022 Third Italian Meeting on Probability and Mathematical Statistics, Bologna, Italy.
- 2021 Linear Response: Rigorous Results and Applications, Lausanne, Switzerland.
- 2020 NetSci2020 – satellite conference Statistical Mechanics Methods for Networks, online.
- 2019 Second Italian Meeting on Probability and Mathematical Statistics, Vietri sul mare, Italy.
- 2019 Walking through the Brownian zoo, Paris, France.
- 2018 Workshop FDT on Fluctuation-dissipation relations, FRUMAM, Marseille, France.
- 2017 39th Conference on Stochastic Processes and their Applications, Moscow, Russia.
- 2017 Random Walks with Memory, CIRM, Marseille, France.
- 2017 Stochastic dynamics out of equilibrium, Institut Henri Poincaré, Paris, France.
- 2017 New trends in Mathematical Physics at the interface of Analysis and Probability, UCL, London, England.
- 2016 Probability World Congress, Fields Institute, Toronto, Canada.
- 2015 Stochastic Methods in Finance and Physics, Heraklion, Greece.
- 2015 YEP XII Workshop on Random walks in random environment, Eurandom, Eindhoven, Netherlands.
- 2014 PIMS Summer School, University of British Columbia, Canada.
- 2013 Dynamical and disordered systems, CIRM, Marseille, France.
- 2013 Equilibrium statistical mechanics, CIRM, Marseille, France.
- 2013 YEP X Probability school on Random Polymers, Eurandom, Eindhoven, Netherlands.
- 2012 Workshop: Scaling Limits in Models of Statistical Mechanics, Oberwolfach, Germany.

**2012** Workshop: Interacting Particle Systems and Related Topics, Firenze, Italy.

**2012** MSRI Workshop: Random Walks and Random Media, Berkeley, US.

**2012** Workshop: Interplay of Analysis and Probability in Physics, Oberwolfach, Germany.

**2011** BMS Summer School: Random Motions and Random Graphs, Berlin, Germany.

**2011** 7th Cornell Probability Summer School, Cornell University, US.

**2010** 6th Ph.D. Student Conference in Stochastics, Zürich, Switzerland.

**2010** IRTG Summer School, Disentis, Switzerland.

**2009** PIMS Summer School, University of British Columbia, Canada.

## Other skills

**Languages** Italian (mothertongue), English (fluent), French (fluent), Spanish (good), German (good).

**Informatics**  $\LaTeX$ , HTML, Office.

**Programming** C, R, Matlab.