

C.V. OF FABIO MARTINELLI

- **Personal Data:** Born 01-03-1956 in Rome, Italy. Citizenship: Italian.
- **Education and Training:**
 - Master Degree in physics cum laude, Rome '79, advisor Prof. G. Jona-Lasinio.
 - CNR-scholarship in mathematical physics ('80-'81).
 - Postdoc in mathematical physics at the Ruhr-University (Germany), advisor Prof. S. Albeverio ('81-'83).
- **Appointments:**
 - Full Professor in Mathematics (Univ. Roma Tre '98-present).
 - Full Professor in Mathematics (Univ. of Aquila, '94-'98).
 - Associate Professor in Mathematics (Univ. of Roma 1, '87-'94).
 - Assistant Professor in Mathematics (Univ of Roma 1 '84-'87).
 - Assistant Professor in Mathematics (Univ. of Trento '83-'84).
- **Other appointments:** visiting Research Scientist at “Microsoft Research Inc.” (2013)
- **Awards:** Prize “E.Persico” of the Accademia Nazionale dei Lincei for three consecutive years ('75-79). Prize “B. Finzi” for mathematical physics of the “Accademia Lombarda delle Scienze”, (2000). Marie–Curie fellowship (2000). Miller visiting professorship at UC Berkeley (2002).
- **Main Invited Lectures and Courses:**
 - Twice plenary speaker at the “International Congress on Mathematical Physics”.
 - Invited lecturer: the Saint Flour “Probability Summer School” ('97), Brazilian Summer School in Probability Theory ('99), Summer School on Mathematical Physics (Jerusalem '01), Summer School in Mathematical Statistical Mechanics (Prague '06) .
 - Plenary speaker at the meeting “Theory of Computation & The Sciences” (Berkeley '02).
 - Keynote speaker at the workshop “Markov-Chain Monte Carlo Methods” (Newton Institute '08)

- Keynote speaker at the workshop “Pacific North-West Probability Seminar” (Seattle ’13)
- Plenary speaker Congresso Unione Matematica Italiana (2015)
- Plenary speaker Second Italian Meeting on Probability and Mathematical Statistics (2019)
- **Research Projects:**
 - Organizer of two workshops: “Statistical mechanics of interfaces” (Cortona ’96) and “Probability Theory, Phase Transitions and Computational Complexity” (Cortona ’00).
 - Co-organizer of a four months research period at the MSRI (Mathematical Science Research Institute) in Berkeley on “Markov chains in algorithms and statistical physics” (’05).
 - Organizer of the special session “Probability Theory” for the International Congress of Mathematical Physics (’06).
 - Co-organizer of a special semester on “Interacting particle systems, Statistical Mechanics and Probability Theory” at the Institute H. Poincaré (’08).
 - Co-organizer of the “INHOMOGENEOUS RANDOM SYSTEMS 2011” in Paris.
 - Principal investigator of the European Advanced Grant “Phase Transitions in Random Evolutions of Large Scale Systems” (2009-2012, Euro 1,248,000).
 - Co-organizer of a workshop at the BIRS center on “Markov Chains with Kinetic Constraints and Applications” .
 - member of the research tema of the Starting Research Grant “Malig” of the European Research Council, principal investigator C. Toninelli (Paris).
- **Professional Counseling:**
 - I served on an international panel to appoint a chair in mathematics at the University of Goteborg (2000) and at the University of Utrecht (2012).
 - I served on an international panel of the Deutsche Forschung Gemeinschaft for a four years research program in “Mathematical Biology” (2011).
- **Editorial activity:** Member of the editorial board of *Journal of Statistical Physics* (’94-97), *Annales de l’Institut Henri Poincaré* (’97-’06), *Journal of Potential Analysis* (’97-’06), *Probability Theory and Related Fields* (2000-2008), *Alea* (2013). Since 2016 I am co-managing editor of *Probability Theory and Related Fields* together with Prof. M. Ledoux.

- **Grant Reviewing:** National Science Foundation (US), National Science Foundation (Israel), National Science Foundation (Netherlands), National Science Foundation (Spain).
- **Journal Refereeing:** Communications in Mathematical Physics, Annals of Probability, Probability Theory and Related Fields, Annales de l'Institut Henri Poincaré, Journal of Statistical Physics, Random Structures and Algorithms.
- **Students:** P. Caputo, A. Faggionato (now both Associated Prof. in Rome), G. Posta (Associate Prof. Milano), A. Bianchi (Researcher, Padova), C. Roberto (Full Professor in Paris.).

- **Funding ID:**

- ERC Advanced Grant 2009-2012 (1,248,000 Euros)
- PRIN (2008): head of the local research unit in Roma Tre;
- PRIN (2012): principal investigator;
- PRIN (2015): principal investigator.

- **Overview of scientific activity** I have coauthored more than 70 research papers in leading international academic journals such as *Comm. Math. Phys*, *J. of Statistical Physics*, *Probability Theory and Related Fields*, *Ann. Inst. H. Poincaré*, *Ann. Appl. Prob.*, *Ann. of Probability*, *European J. of Mathematics*, *Comm. Pure and Appl. Math*.

My publication record comprises main contributions to mathematical physics and probability theory on different topics like *probabilistic methods in quantum mechanics*, *random Schroedinger operators*, *random perturbations of dynamical systems*, *metastability phenomena*, *Poincaré and logarithmic Sobolev inequalities*, *phase transitions in statistical mechanics*, *quantum spin models*, *mixing times of randomized algorithms*. Some of the key results obtained in the above areas went definitely beyond the state of the art at that time. Examples include:

- Detailed quantitative analysis of instabilities of tunneling phenomena in the semi-classical limit of quantum mechanics, a series of papers which prompted subsequent important contributions by B. Simon and Helffer-Sjöstrand;
- The first proof of Anderson localization in dimension greater than one with J. Frohlich, E. Scoppola and T. Spencer and the first (and only one until a recent contribution by

- J. Bourgain) proof of Anderson localization with Bernoulli random potential;
- The proof of exponential relaxation towards the equilibrium Gibbs measure of attractive stochastic spin models in the whole uniqueness region;
 - The first detailed analysis with sharp constants of the stochastic Ising model in the phase coexistence region;
 - Completely new proof (after the work by H.T Yau) of the Poincaré and log-Sobolev inequalities for stochastic lattice gases;
 - Quantitative sharp analysis of the energy gap of asymmetric quantum XXZ models via interacting particle systems representation and Poincaré inequalities for lattice gases;
 - Analysis of the stochastic Ising model and other spin systems (independent sets and colorings) on trees inside a pure phase;
 - Recent breakthrough on the rigorous analysis of kinetically constrained spin models, a hot topic in the physics of glasses, where the only mathematical contribution by D. Aldous and P. Diaconis was confined to a one dimensional model and where our results corrected some of the conjectures made by the physicists.
 - First *quasi-polynomial* bound on the mixing time of the stochastic Ising model at low temperature.
 - Stochastic evolution of random surfaces and its connection with random dimer tilings and mean curvature motion.
- **International recognition and diffusion** Because of this body of work I have been invited as visiting professor for periods up to a year in prestigious research institutions such as *Institute des Hautes Etudes Scientifiques, Courant Institute, Newton Institute, Theory Group at Microsoft Research, University of California (UCLA, Irvine, Berkeley)*.
 In 1997 I was invited to lecture in the prestigious French summer school in Probability Theory (Saint Flour), a major recognition for any probabilist.
 In 2000 I was awarded the prize B. Finzi for mathematical physics and a Marie-Curie fellowship to support the one year research in Roma Tre of Dr. C. Roberto, a student from Toulouse.

In 2001 A. Sinclair, 1996 ACM Godel prize, and Y. Peres, 2001 Loeve Prize in Probability, invited me to compete for a prestigious Miller Visiting Professorship at UC Berkeley. I was awarded the professorship and I joined them for a year in Berkeley. At about the same time H. Kesten (Cornell) asked me to write a long survey about *Relaxation times of Markov chains in statistical mechanics and combinatorial structures* for *Encyclopedia of Mathematics*.

Since 1994 I served on the board of some of the best journals in probability theory and mathematical physics and I was part of the program committees of several international conferences.