Maria Chiara Angelini

Dipartimento di Fisica, ed. Marconi, Sapienza Università di Roma, [redacted]

Personal Information

Family name, First name:	Angelini, Maria Chiara
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
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Education

2020:	Habilitation for the position of Associate Professor in Mathematical Physics, *Italy*
7th February 2013:	Ph.D in Physics, Sapienza U. of Rome (IT) *Title:* Renormalization group and critical properties of Long Range models, *Supervisor:* [redacted])
Sep. 2009:	Ranked first among ~ 70, admission test for Ph.D program, Sapienza U. of Rome
2009:	MSc in Physics [*110/110 cum laude*], Sapienza U. of Rome (IT) *Title:* Entropic effects in the SG transition at null temperature *Supervisor:* [redacted] Graduate studies with an average mark of 29.81/30.
2007:	BSc in Physics [*110/110 cum laude*], Sapienza U. of Rome (IT) *Title:* Optimized Monte Carlo methods *Supervisor:* [redacted] Graduate studies with an average mark of 29.69/30.

Fields of Research Interest

Statistical mechanics, disordered systems, renormalization group, inference and optimization problems.

Current Position

Sep 2018 – Today: Temporary Assistant Professor, Physics Department, Sapienza U. of Rome (IT)

Previous Positions

Oct 2014 – Sep 2018:	Postdoctoral researcher, Physics Department,Sapienza U. of Rome (IT)
Nov 2012 – Oct 2014:	Postdoctoral researcher, ERC project NPRGGlass, Institut de Physique Théorique, CEA/Saclay (France).
Oct 2011 – Nov 2011:	Visitor, Tokyo Institute of Technology, Tokyo (Japan).

Training and supervision

Currently I am the advisor of 2 master students. I have been the advisor of various bachelor students, the co-advisor of 1 master student ([redacted] now Ph.D. student at University of Oregon). I followed [redacted] (now post-doc at ENS,Paris) during part of her Ph.D ([redacted]). Since 2020, I am external tutor for the Lab2go project with high-school students inside the PCTO (former school-work programme).

Teaching activities

2018 – Today: Lecturer for *Scientific Programming*, Sapienza U. of Rome (IT)
Students Opinion about the teacher (OPIS): 3.48/4
(OPIS average over Physics Department: 3.08/4)
2018 – Today: Lecturer for *Monte Carlo methods*, in Honours Programmes, Sapienza U. of Rome (IT)
2015 – 2018: Teaching assistant for *Scientific Programming*, Sapienza U. of Rome (IT)
2013: Masterclass *Dyson hierarchical model* (6 hours) at IPhT, CEA Saclay (FR)
2010: Teaching assistant for *Mechanics*, Sapienza U. of Rome (IT)

Organization of scientific meetings

2021: Main organizer for a 4 weeks Nordita program *Hard Problems: Beyond Equilibrium Methods*, funded with €43K – postponed to 2022 due to COVID-19 crisis

Reviewing activities

2021: Member of the Ph.D. defence committee for [redacted], Sapienza U. of Rome (IT) and Universidad Complutense de Madrid (SP)

Referee for Physical Review Letters, Physical Review B, Physical Review E, Journal of Statistical Physics, Journal of Statistical Mechanics, SciPost, Europhysics Letters, Physica A, Digital Signal Processing

Career breaks

Feb 2015 – Jul 2015: [redacted]
Nov 2016 – Apr 2017: [redacted]
Dec 2019 – May 2020: [redacted]

Current grants

(see project titles below)

Project title	Funding source	Amount	Period	Role
1.	Nordita	43K€	2022	PI
2.	Sapienza	4K€	2019–2022	PI
3.	INFN	5K€	2021	Team member
4.	Sapienza	13K€	2020–2022	Team-member
5.	Regione Lazio, Italy	149830€	2021–2023	Team member

Finished projects

Project title	Funding source	Amount	Period	Role
6.	Sapienza	2780€	2016	PI
7.	MIUR, Italy	835100€	2012 – 2015	Team Member
8.	ERC-StG	1010800€	2011–2017	Team Member

List of project titles

1. Nordita-program entitled: "Hard Problems: Beyond Equilibrium Methods"
2. Gruppo di rinormalizzazione attorno alla soluzione di Bethe per Random Field Ising Model e Spin Glass in

campo.
3. Equilibrium and Non-Equilibrium Statistical Mechanics of disordered systems, paradigms and Applications
4. Out of equilibrium relaxation dynamics in complex landscapes: from the Sherrington-Kirkpatrick model to the spherical mixed p-spin model and the planted constraint satisfaction problems
5. Nano-imaging endoscopico innovativo mediante tecniche di machine learning - NanoProbe
6. Disordered models: links and differences with glassy physics
7. Statistical mechanics of disordered and complex systems
8. Non Perturbative Renormalization Group Theory of Glassy Systems

List of publications

- M.C.A., P Fachin, S de Feo, *Mismatching as a tool to enhance algorithmic performances of Monte Carlo methods for the planted clique model*, arXiv preprint arXiv:2106.0572 (2021).
- M.C.A., C. Lucibello, G. Parisi, G. Perrupato, F. Ricci-Tersenghi, T. Rizzo, *The loop expansion around the Bethe solution at zero temperature predicts an upper critical dimension equal to 8 for spin glass models in a field*, arXiv preprint arXiv:2103.17080 (2021).
- G Gradenigo, M.C.A., L Leuzzi, F Ricci-Tersenghi, *Solving the fully-connected spherical-spin model with the cavity method: equivalence with the replica results*, J. Stat. Mech. 113302 (2020).
- M.C.A., G. Parisi and F. Ricci-Tersenghi, *Comment on 'Real-space renormalization-group methods for hierarchical spin glasses'*, J. Phys. A: Math. Theor. **53** 418001 (2020).
- M.C.A., C. Lucibello, G. Parisi, F. Ricci-Tersenghi, T. Rizzo, *New loop expansion for the Random Magnetic Field Ising Ferromagnets at zero temperature*, PNAS **117**, 2268-2274 (2020).
- M.C.A., F. Ricci-Tersenghi, *Monte Carlo algorithms are very effective in finding the largest independent set in sparse random graphs*, Phys. Rev. E. 100, 013302 (2019).
- M. C. A., *Parallel Tempering for the planted clique problem*, J. Stat. Mech. (2018) 073404.
- M.C.A., G. Parisi, F. Ricci-Tersenghi, *One-loop topological expansion for spin glasses in the large connectivity limit*, EPL (Europhysics Letters) 121 (2), 27001 (2018).
- A. Altieri, M.C.A., C. Lucibello, G. Parisi, F. Ricci-Tersenghi, T. Rizzo, *Loop expansion around the Bethe approximation through the M-layer construction*, J. Stat. Mech. (2017) 113303.
- M.C.A., Giulio Biroli, *Real Space Migdal-Kadanoff Renormalisation of Glassy Systems: Recent Results and a Critical Assessment*, Journal of Statistical Physics, 1-23 (2017).
- M.C.A., Giulio Biroli, *Real space renormalization group theory of disordered models of glasses*, Proceedings of the National Academy of Sciences, 114 (13), 3328 (2017).
- M.C.A., F. Caltagirone, F. Krzakala, L. Zdeborova, *Spectral Detection on Sparse Hypergraphs*, Proc. 53th Annual Allerton Conference on Communication, Control, and Computing (2015).
- F. Krzakala, L. Zdeborova, M.C.A., F. Caltagirone, Statistical Physics of Inference and Bayesian Estimation, http://indico.ictp.it/event/a14244/material/10/0.pdf
- M.C.A. , Giulio Biroli, *Spin Glass in a Field: a New Zero-Temperature Fixed Point in Finite Dimensions*, Phys. Rev. Lett. 114, 095701 (2015).
- M.C.A. , Giulio Biroli, *The Super-Potts glass: a new disordered model for glass-forming liquids*, Phys. Rev. B 90, 220201(R) (2014).
- M.C.A., G. Parisi and F. Ricci-Tersenghi, *Relations between Short Range and Long Range Ising models*, Phys. Rev. E 89, 062120 (2014).
- M.C.A., Ph.D. Thesis, *Renormalization group and critical properties of Long Range models*, http://hdl.handle.net/10805/2105 (2013).
- M.C.A., G. Parisi and F. Ricci-Tersenghi, *Ensemble Renormalization Group for Disordered Systems*, Phys. Rev. B 87, 134201 (2013).
- M.C.A., F. Ricci-Tersenghi, Y. Kabashima, *Compressed sensing with sparse, structured matrices*, Proc. Fifti-eth Annual Allerton Conference on Communication, Control, and Computing, p. 808 (2012).
- M.C.A. and F. Ricci-Tersenghi, *Entropic long range order in a 3D spin glass model*, J. Stat. Mech. P02002 (2011).

Conference and Seminar Presentations

- *Loop expansion around the Bethe solution for disordered models.*

  - 23 June 2021, contributed talk, "I Conference of the Italian Society of Statistical Physics - SIFS", Parma – online event.
- *How to solve sparse hard inference problems: (Replicated) Simulated Anneling vs Bayes optimal algorithms*
  - 3 July 2020, invited TNTgroup webinar
- *New loop expansion around the Bethe approximation and its application to disordered models.*
  - 11 September 2019, invited talk, "40 years of Replica Symmetry Breaking (RSB40)", Rome.
- *Real space Renormalization Group for Spin-Glasses: Migdal-Kadanoff vs Topological expansion*
  - 26 July 2016, invited talk, "Renormalisation Group Theory of Disordered Systems", satellite meeting of STATPHYS26, Paris.
- *Real Space Renormalization Group Theory of spin glasses and disordered Models of Glasses*
  - 22 July 2016, contributed talk, StatPhys26, Lyon.
- *Spin Glass in a Field: a surprising New Zero-Temperature Fixed Point in Finite Dimensions*
  - 1 December 2014, invited talk, IPhT, CEA, Saclay.
- *Relations between Short Range and Long Range Ising models*
  - 28 April 2014, invited talk, IPhT, CEA, Saclay.
- *Looking for a disordered model of finite dimensional glasses*
  - 31 January 2014, "Rencontre de Physique Statistique", Paris.
  - 25 September 2013, invited talk to "XCIX Congresso Nazionale Societa' Italiana di Fisica", Trieste.
- *Ensemble Renormalization Group for Disordered Systems*
  - 30 March 2012, invited talk to "Rejuvenating Concepts in Glass Physics", Paris.
  - 23 February 2012, "On the Bridge between Statistical physics and Optimization, Inference and Learning", Les Houches workshop.
  - 7 February 2012, ICTP, Trieste
  - 24 October 2011, Tokyo Institute of Technology, Yokohama
- *Entropic long range order in a 3D spin glass model*
  - 18 February 2011, "Statistical physics of complexity, optimization, and systems biology", Torino-Bardonecchia (Italy)