

Matteo Marsili

CONTACT INFORMATION

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PERSONAL INFORMATION

Born in Rome, 4th of January 1966. Italian citizen. Divorced, no children.

RESEARCH INTERESTS

Statistical physics, non-equilibrium critical phenomena, disordered systems, probability theory and stochastic processes, complex networks, information theory and high-dimensional statistical inference. Interdisciplinary applications of statistical physics, including modeling socio-economic phenomena and financial markets, game theory, biological networks and systems neuroscience.

EDUCATION

Ph.D., *Dottorato* in Physics at SISSA, Trieste (1994)

- Subject: Non-equilibrium critical phenomena in disordered systems

M.Sc., *Laurea* in Physics, University of Rome “La Sapienza”, Feb. 1990

- Subject: Multi-fractal properties of fractal growth processes (*Magna cum Laude*)

High school diploma at *Liceo Scientifico* “L. Pasteur” (1984).

EMPLOYMENT RECORD

2014 - present Senior Research Scientist in the Quantitative Life Science Section of the Abdus Salam ICTP, Trieste.

2002 - 2013 Research scientist in the Condensed Matter and Statistical Physics sector of the Abdus Salam ICTP, Trieste (From June 2002).

2010 - 2012 Visiting Scientist and member of Collegio Docenti EMI at IMT, Lucca Italy.

1999 - 2002 Permanent position as researcher at Istituto Nazionale per la Fisica della Materia (INFM), SISSA, Trieste (From Jan. 1999).

1997 - 1999 Assistant professor in Statistical Physics at SISSA, Trieste, Italy (from Nov. 1997)

1997 - 1995 *Assistant Docteur* at the Institut de Physique Théorique, Université de Fribourg, Switzerland (from Nov. 1995).

1995 - 1994 Post doctoral research position in the Department of Theoretical Physics of the University of Manchester (from Nov. 1994).

ACADEMIC ACTIVITIES

- Coordinator of the activities of the Quantitative Life Sciences section of the Abdus Salam ICTP (since 2014)
- Coordinator of the activities in Statistical Physics of the CMSP section of the Abdus Salam ICTP (2007-2014)
- Organization of conferences, workshops and schools, at ICTP, Trieste, including:

- Series of Spring Colleges on the Physics of Complex Systems, ICTP Trieste (2013-2019)
 - Series of Winter Schools in Quantitative Systems Biology, ICTP Trieste and ICTS Bangalore (2012-2019)
 - Joint ICGEB-ICTP-APCTP Workshop on Systems Biology and Molecular Economy of Microbial Communities, ICTP Trieste (2017).
 - Workshop on the Economy of a Cell: Resource Allocation, Trade-Offs and Efficiency in Living Systems, ICTP Trieste (2014).
 - School on Large Scale Problems in Machine Learning (20 -31 August 2012).
 - Workshop on Market Microstructure: Design, Efficiency and Statistical Regularities, (21 - 15 March 2011).
 - 2nd Conference on Systems Biology and New Sequencing Techniques (2 - 4 November 2011).
 - Advanced School on Complexity, Adaptation and Emergence in Marine Ecosystems, ICTP Trieste (18 - 27 October 2010).
 - School and Conference: From Biological Networks to Cellular Function: Evolution, Dynamics and Spatial Organization, ICTP Trieste (8 - 12 June 2009).
 - Workshop "The Statistical Physics of Financial Markets" (ICTP Trieste, April 20-21 2007)
 - School and Workshop on Structure and Function of Complex Networks (ICTP Trieste, May 16-28 2005)
- Coordinator of the International Master's programme on Physics of Complex Systems for ICTP.
 - Coordinator of the programme on Environmental and Ecological Economics (EEE), a joint project of Beijer Institute (Stockholm), Fondazione Eni E. Mattei (FEEM, Venice) and The Abdus Salam ICTP (2002-2006). Including the organization of more than 25 training and research events.
 - Team coordinator for scientific projects:
 - EU-ITN Netadis:statistical Physics Approaches to Networks Across Disciplines (FP7) (2012-2015).
 - EU-STREP project GENetic NETworks: Emergence and Complexity (FP6) (2006-2009).
 - EU NEST-STREP project ComplexMarkets, (2005 - 2008).
 - Italian FISR project High Frequency Dynamics in Financial Markets (2004 - 2006).
 - EU RTN STIPCO: Statistical physics of Information Processing and Combinatorial Optimisation (HPRN-CT-2002-00319) (2002 - 2005).

EDITORIAL
ACTIVITY
TEACHING

Scientific director of Journal of Statistical Mechanics: Theory and Experiment

- Courses taught in the last ten years at Abdus Salam ICTP, Trieste (Statistical mechanics), SISSA, Trieste and IMT Lucca (Advanced probability theory).
- Supervision of PhD students
 - Ryan John Abat Cubero, "Statistical mechanics of samples, efficient representations and criticality" SISSA Trieste (2014 - 2018)
 - Valerio Volpati, "Statistical Mechanics approach to the sustainability of economic ecosystems" SISSA Trieste (2012 - 2016)
 - William Clifford-Brown, "Modeling and inference of financial networks" SISSA Trieste (2011 - 2012)

- Francesca Mancini, "Optimally information processing regulatory networks" SISSA Trieste (2010 - 2015)
 - Luca Caniparoli, "Information theory approach to genetic transcription control" SISSA Trieste (2009 - 2013)
 - Giancarlo De Luca, "Stochastic dynamics of adaptive networks" SISSA Trieste (2009 - 2013)
 - Iacopo Mastromatteo, "Statistical inference in complex systems" SISSA Trieste (2009 - 2012)
 - Daniele De Martino, "Congestion phenomena in complex networks" SISSA Trieste (2007 - 2011)
 - Fabio Caccioli, "Systemic instability in models of random financial markets with many assets" SISSA Trieste (2007 - 2011)
 - Giacomo Raffaelli "Correlations instabilities in financial markets" (2001-2005) currently working on Investment and Trading Policies at Deloitte Consulting (Milan, Italy).
 - Andrea De Martino "Replica symmetry breaking in the minority game" SISSA Trieste (1998 - 2001). Currently researcher at CNR, University of Rome, "La Sapienza".
 - Lorenzo Giada "Data Clustering" SISSA Trieste (1998 - 2001). Currently working on Financial Modeling at Banca Italease.
 - Da Silva Luis Eduardo Araripe Gomes (Brazil, sandwich PhD student).
- Supervision of Master Students
 - Rocco Mantovani, University of Bologna, Italy (2018).
 - Luigi Gresele, International Master PCS, Italy (2017). Currently PhD in Max Planck - Tubingen.
 - Cristina Pinneri, International Master PCS, Italy (2016). Currently PhD in Max Planck - Tubingen.
 - Alberto Beretta, International Master PCS, Italy (2016).
 - Federico Devalle, International Master PCS, Italy (2016). Currently PhD in Universitat Pompeu Fabra and University of Lancaster.
 - Carlo Campajola, International Master PCS, Italy (2016). Currently PhD in Scuola Normale, Pisa.
 - Riccardo Della Vecchia, University of Padova, Italy (2015). Currently PhD in Bocconi Univ.
 - Daniele Darienzo, University of Trieste, Italy (2014). Currently PhD in Bocconi Univ.
 - Patrick Zoi, University of Trieste, Italy (2009). Currently at Banca d'Italia.
 - Enrico Kuchler, University of Trieste, Italy (2008), Currently at Generali Asset Allocation.
 - Emanuele Pugliese, Univ. of Rome "La Sapienza" (2008). Currently PhD student in Economics at Sant'Anna school, Pisa, Italy.
 - Andrea Veglio, University of Trieste, Italy (2006). Currently PhD at University of Torino, Italy.
 - Paolo Pin, Master on Modeling Complex Realities, ICTP. Currently assistant professor in Economics at University of Siena, Italy.
 - Mary J. Omero, Univ. of Fribourg (2007).

BOOKS

- Minority Games: Interacting Agents in Financial Markets, D. Challet, M. Marsili, Y-C. Zhang Oxford University Press (2005).
- The complex dynamics of economic interaction, M. Gallegati, A. P. Kirman and M. Marsili Eds., Springer Lect. Notes in Economics and Math. Sciences Vol. 531 (2004).

- Proceedings of the NATO Advanced Research Workshop: Application of physics in economic modelling, Prague, February 8-10, 2002, Bouchaud, JP and Marsili, M and Roehner, BM and Slanina, F Eds., Physica A, Vol. 299 N. 1-2 (2001).

PUBLICATIONS

Representative publications:

1. R Cubero, M Marsili, Y Roudi Minimum Description Length codes are critical *Entropy*,20 (10), 755, 2018
2. A Beretta, C Battistin, C de Mulatier, I Mastromatteo, M Marsili The Stochastic complexity of spin models: Are pairwise models really simple? *Entropy*,20 (10), 739, 2018
3. M Bardoscia, G Livan, M Marsili Statistical mechanics of complex economies *Journal of Statistical Mechanics: Theory and Experiment* 2017 (4), 043401
4. JP Jerico, FP Landes, M Marsili, IP Castillo, V Volpati When does inequality freeze an economy? *Journal of Statistical Mechanics: Theory and Experiment* 2016 (7), 073402
5. M Marsili, I Mastromatteo, Y Roudi On sampling and modeling complex systems *Journal of Statistical Mechanics: Theory and Experiment*, 2013 (09), P09003
6. K. Anand, P. Gai, M. Marsili Rollover risk, network structure and systemic financial crises. *J. Econ. Dyn. and Control*, 36:1088-1100, 2012.
7. Dall'Asta L, Marsili M, Pin P. Collaboration in social networks. *Proc. Nat. Acad. Sci. USA*,109:4395-4400, 2012.
8. C. Martelli, A. De Martino, E. Marinari, M. Marsili, and I. Perez Castillo. Identifying essential genes in Escherichia coli from a metabolic optimization principle. *Proc. Nat. Acad. Sci. USA*, 106(8):2607–2611, 2009.
9. Bianconi G, Pin P, Marsili M Assessing the relevance of node features for network structure. *Proc. Nat. Acad. Sci. USA*,106:11433-11438, 2009.
10. F. Caccioli, M. Marsili, P. Vivo Eroding market stability by proliferation of financial instruments. *Eur. Phys. J B*, 71:467-479, 2009.
11. Andrea De Martino and Matteo Marsili. Statistical mechanics of socio-economic systems with heterogeneous agents. *J. Phys. A*, 39(43):R465–R540, 2006.
12. Marc Bailly-Bechet, Antoine Danchin, Mudassar Iqbal, Matteo Marsili, and Massimo Vergassola. Codon usage domains over bacterial chromosomes. *Plos Comp. Biology*, 2(4):263–275, 2006.
13. George C. M. A. Ehrhardt, Matteo Marsili, and Fernando Vega-Redondo. Phenomenological models of socioeconomic network dynamics. *Phys. Rev. E*, 74(3, Part 2), 2006.
14. M Marsili, F Vega-Redondo, and F Slanina. The rise and fall of a networked society: A formal model. *Proc. Nat. Acad. Sci. USA*, 101(6):1439–1442, 2004.
15. M Marsili, R Mulet, F Ricci-Tersenghi, and R Zecchina. Learning to coordinate in a complex and nonstationary world. *Phys. Rev. Lett.*, 87(20), 2001.