

CURRICULUM VITAE

ALESSANDRO SARRACINO

ADDRESS

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PERSONAL DETAILS

Gender: Male
Date of birth: 22nd of December, 1981
Place of birth: Naples, Italy
Present Citizenship: Italian

EDUCATION AND ACADEMIC CAREER

- 12/2013– Research fellowship in the group of O. Bénichou at the LPTMC, Université Pierre et Marie Curie, Paris.
- 12/2009–11/2013 Research fellowship (from the GRANULARCHAOS project funded by MIUR) in the group of A. Puglisi and A. Vulpiani at the CNR-ISC and Department of Physics, University of Rome “Sapienza”, Italy.
- 05/2009-11/2009 Research fellowship (from PRIN) at the Department of Mathematics and Informatics, University of Salerno, Italy.
- 01/2009 Ph.D. in Physics from the University of Salerno, Italy, with a Thesis on “Nonlinear fluctuation-dissipation relations: analytical derivation and numerical applications”. Thesis Advisor Professor Marco Zannetti.
- 10/2005 Laurea Degree in Physics from the University Federico II of Naples, Italy, with a Thesis on “Segregation and dynamic instabilities in granular mixtures”, with the mark 110/110 *cum laude*. Thesis Advisor Professor Antonio Coniglio.

RESEARCH INTERESTS

Nonequilibrium statistical mechanics: fluctuation-dissipation relations, entropy production and Fluctuation Theorems. Applications to aging models, disordered systems and granular media.

Driven granular systems: nonequilibrium fluctuating hydrodynamics.

Models of Brownian motors: applications to granular systems; role of nonlinear frictional forces.

Anomalous transport: generalized Einstein relation on complex geometries; negative differential mobility in a driven lattice gas.

SCIENTIFIC ACTIVITY

29 publications in peer-reviewed journals (4 PRLs, 1 PLoS)

2 book chapters

5 publications in peer-reviewed conference proceedings

PUBLICATIONS IN PEER-REVIEWED JOURNALS

1. *Diffusion and Subdiffusion of Interacting Particles on Comblike Structures*
O. Bénichou, P. Illien, G. Oshanin, A. Sarracino, R. Voituriez
Phys. Rev. Lett. **115**, 220601 (2015)
2. *Coarsening in granular systems*
A. Baldassarri, A. Puglisi, A. Sarracino
Comptes Rendus Physique **16**, 291 (2015)
3. *Microscopic theory for negative differential mobility in crowded environments*
O. Bénichou, P. Illien, G. Oshanin, A. Sarracino, R. Voituriez
Phys. Rev. Lett. **113**, 268002 (2014)
4. *Nonequilibrium fluctuation-dissipation theorem and heat production*
E. Lippiello, M. Baiesi and A. Sarracino
Phys. Rev. Lett. **112**, 140602 (2014)
5. *Nonequilibrium Brownian motion beyond the effective temperature*
A. Gnoli, A. Puglisi, A. Sarracino, A. Vulpiani
PLoS ONE **9**, e93720 (2014)
6. *Fluctuations in partitioning systems with few degrees of freedom*
L. Cerino, G. Gradenigo, A. Sarracino, D. Villamaina, A. Vulpiani
Phys. Rev. E **89**, 042105 (2014)

7. *Time asymmetry of the Kramers equation with nonlinear friction: fluctuation-dissipation relation and ratchet effect*
A. Sarracino
Phys. Rev. E **88**, 052124 (2013)
8. *Rare events and scaling properties in field-induced anomalous dynamics*
R. Burioni, G. Gradenigo, A. Sarracino, A. Vezzani, A. Vulpiani
J. Stat. Mech. (2013) P09022
9. *Fluctuation relations without uniform large deviations*
G. Gradenigo, A. Sarracino, A. Puglisi and H. Touchette
J. Phys. A: Math. Theor. **46**, 335002 (2013)
10. *Non-equilibrium fluctuations in frictional granular motor: experiments and kinetic theory*
A. Gnoli, A. Sarracino, A. Petri, and A. Puglisi
Phys. Rev. E **89**, 052209 (2013)
11. *Ratchet effect driven by Coulomb friction: the asymmetric Rayleigh piston*
A. Sarracino, A. Gnoli, and A. Puglisi
Phys. Rev. E **87**, 040101(R) (2013)
12. *Brownian ratchet in a thermal bath driven by Coulomb friction*
A. Gnoli, A. Petri, F. Dalton, G. Gradenigo, G. Pontuale, A. Sarracino, and A. Puglisi
Phys. Rev. Lett. **110**, 120601 (2013)
13. *Entropy production in non-equilibrium fluctuating hydrodynamics*
G. Gradenigo, A. Sarracino, and A. Puglisi
J. Chem. Phys. **137**, 014509 (2012)
14. *Einstein relation in superdiffusive systems*
G. Gradenigo, A. Sarracino, D. Villamaina, and A. Vulpiani
J. Stat. Mech. L06001 (2012)
15. *Non-equilibrium fluctuations in a driven stochastic Lorentz gas*
G. Gradenigo, U. Marini Bettolo Marconi, A. Puglisi, and A. Sarracino
Phys. Rev. E **85**, 031112 (2012)
16. *Dynamics of a massive intruder in a homogeneously driven granular fluid*
A. Puglisi, A. Sarracino, G. Gradenigo, and D. Villamaina
Granular Matter **14**, 235 (2012)
17. *Structure factors in granular experiments with homogeneous fluidization*
A. Puglisi, A. Gnoli, G. Gradenigo, A. Sarracino, and D. Villamaina
J. Chem. Phys. **136**, 014704 (2012)
18. *Non-equilibrium length in granular fluids: From experiment to fluctuating hydrodynamics*
G. Gradenigo, A. Sarracino, D. Villamaina, and A. Puglisi
Europhysics Letters **96**, 14004 (2011)

19. *Fluctuating hydrodynamics and correlation lengths in a driven granular fluid*
G. Gradenigo, A. Sarracino, D. Villamaina, and A. Puglisi
J. Stat. Mech. P08017 (2011)
20. *Estimate of temperature and its uncertainty in small systems*
M. Falcioni, D. Villamaina, A. Vulpiani, A. Puglisi, and A. Sarracino
Am. J. Phys. **79**, 777 (2011)
21. *On anomalous diffusion and the out of equilibrium response function in one-dimensional models*
D. Villamaina, A. Sarracino, G. Gradenigo, A. Puglisi, and A. Vulpiani
J. Stat. Mech. L01002 (2011)
22. *The ratchet effect in an ageing glass*
G. Gradenigo, A. Sarracino, D. Villamaina, T. S. Grigera and A. Puglisi
J. Stat. Mech. L12002 (2010)
23. *Irreversible dynamics of a massive intruder in dense granular fluids*
A. Sarracino, D. Villamaina, G. Gradenigo and A. Puglisi
Europhysics Letters **92**, 34001 (2010)
24. *Identification of the critical temperature from non-equilibrium time-dependent quantities*
E. Lippiello and A. Sarracino
Europhysics Letters **90**, 60001 (2010)
25. *Granular Brownian motion*
A. Sarracino, D. Villamaina, G. Costantini, and A. Puglisi
J. Stat. Mech. P04012 (2010)
26. *Fluctuations of two-time quantities and non-linear response functions*
F. Corberi, E. Lippiello, A. Sarracino, and M. Zannetti
J. Stat. Mech. P04003 (2010)
27. *Fluctuation-dissipation relations and field-free algorithms for the computation of response functions*
F. Corberi, E. Lippiello, A. Sarracino, and M. Zannetti
Phys. Rev. E **81**, 011124 (2010)
28. *Nonlinear response and fluctuation dissipation relations*
E. Lippiello, F. Corberi, A. Sarracino, and Marco Zannetti
Phys. Rev. E **78**, 041120 (2008)
29. *Nonlinear susceptibilities and the measurement of a cooperative length*
E. Lippiello, F. Corberi, A. Sarracino, and M. Zannetti
Phys. Rev. B **77**, 212201 (2008)

Publications in peer-reviewed conference proceedings

1. *Coulomb friction driving Brownian motors*
A. Manacorda, A. Puglisi, A. Sarracino
Commun. Theor. Phys. **62**, 505 (2014)

2. *Scaling properties of field-induced superdiffusion in Continuous Time Random Walks*
R. Burioni, G. Gradenigo, A. Sarracino, A. Vezzani, A. Vulpiani
Commun. Theor. Phys. **62**, 514 (2014)
3. *Einstein relation in systems with anomalous diffusion*
G. Gradenigo, A. Sarracino, D. Villamaina, and A. Vulpiani
Acta Physica Polonica B **44**, 899 (2013)
4. *The out of equilibrium response function in sub-diffusive systems*
G. Gradenigo, A. Puglisi, A. Sarracino, A. Vulpiani and D. Villamaina
Physica Scripta **86**, 058516 (2012)
5. *Species segregation and dynamical instability of horizontally vibrated granular mixtures*
M. Pica Ciamarra, A. Sarracino, M. Nicodemi, and A. Coniglio
In Traffic and Granular Flow 2005, A. Schadschneider, T. Poschel, T.; Kühne, R.; Schreckenberg, M.; Wolf, D.E. (Eds.) (2007)

Book chapters

1. *Out-of-equilibrium generalized fluctuation-dissipation relations*
G. Gradenigo, A. Puglisi, A. Sarracino, D. Villamaina, and A. Vulpiani
in “Nonequilibrium Statistical Physics of Small Systems: Fluctuation Relations and Beyond” (Wiley-VCH, Weinheim, 2013) R. Klages, W. Just, C. Jarzynski (Eds.)
2. *Large deviations of Brownian motors*
A. Sarracino and D. Villamaina
in “Large deviations in physics” Series: Lecture Notes in Physics (Springer, 2014) F. Cecconi, M. Cencini, A. Puglisi, D. Vergni and A. Vulpiani (Eds.)

ORGANIZATION OF INTERNATIONAL WORKSHOP

June 2012 “Non-equilibrium fluctuation-response relations”, Isola del Giglio (Gr), Italy

CONFERENCES, TALKS & SUMMER SCHOOLS

July 2015 “Non standard transport”, L’Aquila, Italy.

May 2015 **Talk** at “IV Workshop on Dynamics in Viscous Liquids”, Montpellier, France.

Avril 2015 **Seminar** at Physics Department of University of Rome Sapienza, Italy.

February 2015 **Seminar** at Physics Department of University of Leuven, Belgium.

January 2015 **Talk** at “Workshop on recent Developments In Non-Equilibrium Physics: Luxembourg out of Equilibrium”, Luxembourg.

September 2014 “Strolling on Chaos, Turbulence and Statistical Mechanics”, Rome, Italy.

September 2014 The Beg Rohu Summer School, “Nonequilibrium Statistical Mechanics and Active Matter”, France.

November 2013 Poster at “Conference on Friction and Energy Dissipation in Man-made and Biological Systems”, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy.

September 2013 Poster at “Large deviations and rare events in physics and biology”, University of Rome Sapienza, Italy.

July 2013 **Talk (invited)** at 7th IDMRCS, Barcelona, Spain.

July 2013 **Talk** at “Small system nonequilibrium fluctuations, dynamics and stochastics, and anomalous behavior”, KITPC, Beijing, China.

April 2013 **Seminar** at Dipartimento di Fisica, University of Padua, Italy.

March 2013 Poster (**Best poster session award**) at “38th Conference of the Middle European Cooperation in Statistical Physics”, Trieste, Italy.

March 2013 **Seminar** at LPTMC, Université Pierre et Marie Curie Paris VI, France.

November 2012 “Grandes déviations et systèmes de particules en interaction, états stationnaires hors équilibre”, IHP Paris, France.

- June 2012 **Talk (invited)** at “XVII Convegno Nazionale di Fisica Statistica e dei Sistemi Complessi”, Parma, Italy.
- June 2012 “Non-equilibrium fluctuation-response relations”, Isola del Giglio (Gr), Italy.
- June 2012 “Frontiers in Statistical Physics and Complex Systems”, Catania, Italy.
- January 2012 **Seminar** at LPTHE, Université Pierre et Marie Curie Paris VI, France.
- January 2012 **Talk** at “Journées de Physique Statistique”, Paris, France.
- October 2011 “Foundations and Applications of Non-Equilibrium Statistical Mechanics”, Stockholm, Sweden.
- September 2011 **Talk** at the “ZCAM conference on Granular and Active Fluids”, Zaragoza, Spain.
- March 2011 Poster at “Workshop on Dynamics in Viscous Liquids III”, Roma, Italy.
- September 2010 Poster at “Anomalous Transport: from Billiards to Nanosystems”, Sperlonga, Italy.
- July 2010 **Talk** at the “XXIV IUPAP International Conference on Statistical Physics”, Cairns, Australia.
- June 2010 **Talk (invited)** at the “XV Convegno di Fisica Statistica”, Parma, Italy.
- September 2009 Poster at the International Summer School “Fundamental Problems in Statistical Physics XII”, Leuven, Belgium.
- May 2009 **Seminar** at ISC-CNR, University Sapienza Roma, Italy
- August–September 2007 “Les Houches Predoctoral School in Statistical Physics”
- September 2006 “IV Workshop on non equilibrium phenomena in supercooled fluids, glasses and amorphous materials”, Pisa, Italy.

TEACHING AND PROFESSIONAL EXPERIENCE

- 2012–2013 Co-supervision of two master thesis at University of Rome Sapienza.
- 02/2009–07/2009 Assistance in the course of “Physics” for the 1st year graduating students, in the Department Mathematics and Informatics of the University of Salerno.
- Spring 2008 Integrative lessons of Physics held in the University of Salerno for the 1st year graduating students.
- Referee of journal papers submitted to: New Journal of Physics; Physical Review E; Europhysics Letters; Physica A; Journal of Statistical Mechanics: Theory and Experiment; Journal of Physics A: Mathematical and Theoretical; Journal of Statistical Physics

COMPUTER SKILLS

MATHEMATICA[®]
L^AT_EX typesetting package
C, FORTRAN
Linux, Unix

LANGUAGE KNOWLEDGE

Italian	native
English	good (both written and spoken)
French	good (both written and spoken)

REFERENCES

Olivier Bénichou

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