

CURRICULUM VITAE OF FABIO LEONI

PERSONAL DATA

Full Name: Fabio Leoni.
Sex: Male.
Citizenship: Italian.
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EDUCATION AND EMPLOYMENTS

From March 2020 to present: Research Associate.
Institution: “*Sapienza University of Rome*”, Rome, Italy.
Collaborators: John Russo.

From June 2018 to February 2020 (1.7 years): Research Associate.
Institution: “*University of Bristol*”, Bristol, UK.
Collaborators: John Russo.

From May 2016 to July 2016 (3 months): Post-doc position.
Institution: “*Universitat de Barcelona*”, Barcelona, Spain.
Collaborators: Giancarlo Franzese.

From November 2015 to January 2016 (3 months): Post-doc position.
Institution: “*Universitat de Barcelona*”, Barcelona, Spain.
Collaborators: Giancarlo Franzese.

From October 2013 to September 2015 (2 years): Post-doc position.
Institution: “*Tel Aviv University*”, Tel Aviv, Israel.
Collaborators: Yair Shokef.

From December 2011 to April 2012 (1.4 years): Post-doc position.
Institution: “*Universitat de Barcelona*”, Barcelona, Spain.
Collaborators: Giancarlo Franzese.

From April 2010 to October 2011 (1.5 years): Post-doc position.
Institution: “*Groupe Instabilités et Turbulence*”, (GIT) CEA-Saclay, France.
Collaborators: Elisabeth Bouchaud.

From March 2009 to February 2010 (1 year): Post-doc position.
Institution: “*Laboratoire de Physique Théorique de la Matière Condensée*”, (LPTMC)
CNRS of Paris, France.
Collaborators: Eduard Kierlik, Martin-Luc Rosinberg, Gilles Tarjus.

From November 2005 to February 2009 (3.3 years): Ph.D. student in Physics.
Institution: “*Sapienza Università di Roma*”, Italy.
Supervisors: Stefano Zapperi, Luciano Pietronero.
Thesis project: “*Fluctuations in Deforming Materials*”.
Defense date of the thesis: 5 February 2009.

May 2005: Degree in Physics.
Institution: “*Sapienza Università di Roma*”, Italy.
Supervisors: Andrea Gabrielli, Andrea Baldassarri, Luciano Pietronero.
Master thesis title: “*Non-equilibrium phase transition in absorbing states: the BARW2 model in a gradient of probability*”.
Final marks: 110/110.

July 1996: Scientific High School Certificate.

CONFERENCES AND TALKS

5-10 September 2021: Summer school “*Ultrastable Glasses: New perspectives for an old problem*”, Miraflores de la Sierra, Madrid (Spain).

28 June - 1 July 2021, Talk: “*Amorphous and crystalline order in supercooled water*”, Cecam workshop “*Local structure meets machine learning in soft matter systems*”, online event.

12-14 June 2019, Poster: “*Neural networks for nucleation*”, Roma Tre Congress on Water under Extreme Conditions, Rome (Italy).

3-7 June 2019, Poster: “*Neural networks for nucleation*”, International Soft Matter Conference, Edinburg (United Kingdom).

11-12 April 2019, Talk: “*Neural networks for nucleation*”, Workshop “*Water UK*” 2019, Bristol (United Kingdom).

6-10 June 2016, Talk: “*Molecular dynamics simulations of low-temperature phase transitions in a nanoconfined water-like liquid*”, XXV Sitges conference on statistical mechanics, Barcelona (Spain).

4-7 May 2015, Poster: “*Entropic selection within highly degenerate ground state: colloidal and deformable Ising antiferromagnets.*”, International Workshop on Dynamics in Viscous Liquids IV, Montpellier (France).

1 December 2013, Poster: *“Influence of confining walls on the dynamics and structural behavior of an anomalous fluid.”*, 59th Annual Meeting of the Israel Physical Society (IPS), Rehovot (Israel).

21-26 July 2013, Poster: *Influence of nanostructured walls on the thermodynamics, dynamics and structural properties of a complex fluid*, 7th International Discussion Meeting on Relaxations in Complex Systems, Barcelona (Spain).

6-8 June 2013, Talk: *“Influence of the nanostructure of prefunctionalized walls on the dynamics and the thermodynamics of a solution of globular proteins.”*, FINS Initiative Symposium, Trondheim (Norway).

7-8 February 2013, Poster: *“Influence of the nanostructure of prefunctionalized walls on the dynamics and the thermodynamics of a solution of globular proteins.”*, Waterspain 2013 conference, Zaragoza (Spain).

4-8 June 2012, Poster: *“Influence of the nanostructure of prefunctionalized walls on the dynamics and the thermodynamics of a solution of globular proteins.”*, XXIII Sitges conference on statistical mechanics, Sitges, Barcelona (Spain).

24 May 2012, Poster: *“Influence of the nanostructure of prefunctionalized walls on the dynamics and the thermodynamics of a solution of globular proteins.”*, complexitat.CAT conference on statistical mechanics, Barcelona (Spain).

21-25 March 2011, Talk: *“Statistics of crazes in polymeric glasses”*, 5th International Workshop on Flow and Fracture of Advanced Glasses (FFAG-5), St Malo (France).

27, 28 Genuary 2011, Talk: *“Hétérogénéités du verre et réponse mécanique”*, Journées de Physique Statistique 2011, ESPCI, Paris (France).

26 November 2009, Talk: *“Aging in the Stick-Slip Motion of a Sheared Granular Medium”*, Institut de Physique Théorique (IPhT) CEA, Saclay (France).

5 October 2009, Talk: *“Aging in the Stick-Slip Motion of a Sheared Granular Medium”*, Laboratoire de Physique Théorique et Hautes Energies (LPTMC) CNRS, Paris (France).

22 Genuary 2009, Talk: *“Fluctuations in Deforming Materials”*, National Center of CNR-INFN, S3, Nanostructures and Biosystems at Surfaces, Modena (Italy).

23 June 2008, Poster: *“Stick-Slip Motion of a Sheared Granular Medium”*, XIII Convegno Nazionale di Fisica Statistica e dei Sistemi Complessi, Parma (Italy).

June 2008, Poster: *“Fluctuations and Collective Behavior in a Dislocation Pile-up”*, Unsolved Problems on Noise (UPoN 2008), École Normale Supérieure de Lyon (France).

22 October 2007, Talk: *“Grain Boundary diffusion in a Peierls-Nabarro potential”*, ISI institute of Torino (Italy).

9 July 2007, Poster: “*Grain Boundary diffusion in a Peierls-Nabarro potential*”, Statphys23, the XXIII IUPAP international conference on statistical physics, Genova (Italy).

4 July 2007, Poster: “*Grain Boundary diffusion in a Peierls-Nabarro potential*”, Statphys23 satellite conference “Fluctuations and Scaling in Materials”, Todi (Italy).

27 March - 4 April 2006, Workshop: “*Non-equilibrium Dynamics of Interacting Particle Systems*”, Isaac Newton institute, Cambridge University (United Kingdom).

RESEARCH INTERESTS

Non equilibrium phase transitions;
lattice models in statistical mechanics;
stochastic and disordered systems;
nanoconfined fluids;
constrained models and jamming;
properties of water;
machine learning methods applied to soft matter;
Monte Carlo and molecular dynamics simulations.

COMPUTER SKILLS

Operative Systems: Unix/Linux, Mac OS X, Microsoft Windows.
Programming languages: Fortran, C, Python, Matlab, Mathematica, Bash.

LANGUAGES

Italian, mother tongue.
English, fluent.
French, fluent.
Spanish, fluent.

PUBLICATIONS

15. F. Leoni, C. Calero and G. Franzese, “*Nanoconfined fluids: Uniqueness of water compared to other liquids*”, *ACS Nano* **15** (12), 19864-19876 (2021).

14. J. Russo, **F. Leoni**, F. Martelli, and F. Sciortino, “*The physics of Empty Liquids: from Patchy particles to Water*”, *Rep. Prog. Phys.* **85**, 016601 (2022).

13. **F. Leoni** and J. Russo, “Nonclassical Nucleation Pathways in Stacking-Disordered Crystals”, **Phys. Rev. X.** **11**, 031006 (2021).
12. F. Martelli, **F. Leoni**, F. Sciortino, and J. Russo, “Connection between liquid and non-crystalline solid phases in water”, **J. Chem. Phys.** **153**, 104503 (2020).
11. **F. Leoni**, R. Shi, H. Tanaka, and J. Russo, “Crystalline clusters in mW water: Stability, growth, and grain boundaries”, **J. Chem. Phys.** **151**, 044505 (2019).
10. **F. Leoni** and Y. Shokef, “Attraction controls the entropy of fluctuations in isosceles triangular networks”, **Entropy** **20**, 122 (2018).
9. **F. Leoni** and Y. Shokef, “Attraction controls the inversion of order by disorder in buckled colloidal monolayers”, **Phys. Rev. Lett.** **118**, 218002 (2017).
8. **F. Leoni** and G. Franzese, “Effects of confinement between attractive and repulsive walls on the thermodynamics of an anomalous fluid”, **Phys. Rev. E** **94**, 062604 (2016).
7. **F. Leoni** and G. Franzese, “Structural behavior and dynamics of an anomalous fluid between attractive and repulsive walls: Templating, molding, and superdiffusion”, **J. Chem. Phys.** **141**, 174501 (2014).
6. **F. Leoni** and S. Zapperi, “Dislocation mutual interactions mediated by mobile impurities and the conditions for plastic instabilities”, **Phys. Rev. E** **89**, 022403 (2014).
5. **F. Leoni**, E. Kierlik, M.-L. Rosinberg and G. Tarjus, “Spontaneous imbibition in disordered porous solids: a theoretical study of helium in silica aerogels”, **Langmuir** **27**, 8160-8170 (2011).
4. E. Kierlik, **F. Leoni**, M.-L. Rosinberg and G. Tarjus, “Spontaneous imbibition in a slit pore: a lattice-gas dynamic mean field study”, **Mol. Phys.** **109**, 1143-1157 (2011).
3. **F. Leoni**, A. Baldassarri, F. Dalton, A. Petri, G. Pontuale and S. Zapperi, “Friction memory in the stick-slip of a sheared granular bed”, **J. of Non-Cryst. Solids** **357**, 749-753 (2011).
2. **F. Leoni** and S. Zapperi, “Slip line growth as a critical phenomenon”, **Phys. Rev. Lett.** **102**, 115502 (2009).
1. **F. Leoni** and S. Zapperi, “Grain Boundary diffusion in a Peierls-Nabarro potential”, **J. Stat. Mech.** P12004 (2007).

PARTICIPATION IN PROJECTS

Participation as Ph.D. student to the project *TRIGS: Triggering of instabilities in materials and geosystems*.

Funding entity: The European Commission.

Period: from 2007 to 2009.

Amount: 1700000 €.

Investigator responsible: Prof. Stefano Zapperi.

Participation as postdoc to the project ANR-06-BLAN-0098: *Un système modèle pour les transitions de phase en milieu désordonné : l'adsorption de l'hélium dans les aérogels.*

Funding entity: The French National Agency of Research.

Period: from 2006 to 2009.

Amount: 350000 €.

Investigator responsible: Prof. Pierre-Etienne Wolf.

Participation as research associate to the project *Softwater*.

Funding entity: European Research Council, starting grant.

Period: from 2018 to 2023.

Investigator responsible: Dr. John Russo.

ORGANISATION OF CONFERENCES

11-12 April 2019: Workshop Water UK, Bristol (United Kingdom).

Organisers: Prof. John Russo, and Fabio Leoni.

9-13 July 2007: Statphys23, the XXIII IUPAP international conference on statistical physics, Genova (Italy).

Chairman: Prof. Luciano Pietronero.

Secretary: Prof. Stefano Zapperi.

Participation to the organization of the conference: informatic, communication and organizational support.

GRANTS AND AWARDS

Annual grant (3357 €) for the year 1997, from ADISU (*Azienda per il Diritto allo Studio Universitario*) for academic merits.

Annual grant (3099 €) for the year 1999, from ADISU (*Azienda per il Diritto allo Studio Universitario*) for academic merits.

Winner of the Ph. D. contest in the year 2005 at *Università Roma tre*, Italy.

Winner of the Ph. D. contest in the year 2005 at *Sapienza Università di Roma*, Italy.