Federico Ghimenti

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Webpage

Research Activity

2024-2027 **SITP Postdoctoral fellow**, *Stanford Institute of theoretical Physics*, Independent postdoctoral fellowship.

2021–2024 **PhD**, *Université Paris Cité*, Laboratoire Matière et Systèmes Complexes.
Supervisor: Frédéric van Wijland **Title**: *Irreversible sampling of glassy systems*

Education

2019–2021 **M. Sc.**, *ENS ICFP*.
Theoretical Physics, **Final Grade**: 17.2/20

2016–2019 **B. Sc.**, *Sapienza University of Rome*.
Physics, **Final grade**: *110/110 cum laude*

2011–2016 **Diploma**, *Liceo Scientifico Talete*, Rome.
High School education, **Final grade**: *100/100*

Internships

2021 **M2 Internship**, *Laboratoire Matière et Systèmes Complexes, Université de Paris Cité*, **Supervision**: Frédéric Van Wijland. **Project**: *Accelerating Brownian Dynamics*.

2020 **M1 Internship**, *LPENS, Paris*.
Supervision: Giulio Biroli, Gilles Tarjus, Misaki Ozawa. **Project**: *Plastic flow of two-dimensional solids*

Teaching

2024 *Teaching assistant*, Logical Electronics (Bachelor, 1st year) IUT Université Paris Cité

2023 *Teaching assistant*, Electromagnetism (Bachelor, 2nd year) IUT Université Paris Cité

2023 *Teaching assistant*, Logical Electronics (Bachelor, 1st year), IUT Université Paris Cité

2022 *Teaching assistant*, Optics (Bachelor, 1st year) IUT Université Paris Cité

2022 *Teaching assistant*, Logical Electronics (Bachelor, 1st year), IUT Université Paris Cité

Publications

14. **FG**, L. Berthier, J. Kurchan, and F. van Wijland. "Clever algorithms for glasses work by time reparameterization". ***Proceedings of the National Academy of Sciences*** 123 (2026).

13. M. Del Gaudio, **FG**, and S. Ganguli. "Short-term plasticity recalls forgotten memories through a trampoline mechanism". *Preprint arXiv:2511.22848* (2025).

12. **FG**, A. Sriram, A. Yamamura, H. Mabuchi, and S. Ganguli. "The geometry and dynamics of annealed optimization in the coherent Ising machine with hidden and planted solutions". *Preprint arXiv:2510.21109* (2025).

11. C. Hargus, **FG**, J. Tailleur, and F. Van Wijland. "Passive objects in a chiral active bath: From microscopic to macroscopic". *Physical Review E* 112 (2025).

10. C. Hargus, **FG**, J. Tailleur, and F. van Wijland. "Odd dynamics of passive objects in a chiral active bath". ***Physical Review Letters*** 135 (2025).

9. Y. Nishikawa, **FG**, L. Berthier, and F. van Wijland. "Irreversible swap algorithms for soft sphere glasses". *Physical Review E* 111 (2025).

8. H. Pan, J. V. Roggeveen, E. Berg, J. Carrasquilla, D. Chowdhury, S. Ganguli, **FG**, J. Hasik, H. Hunt, H.-C. Jiang, et al. "CMT-Benchmark: A Benchmark for Condensed Matter Theory Built by Expert Researchers". *preprint arXiv:2510.05228* (2025).

7. L. Berthier, **FG**, and F. van Wijland. "Monte Carlo simulations of glass-forming liquids beyond Metropolis". *The Journal of Chemical Physics* 161 (2024).

6. **FG**, L. Berthier, G. Szamel, and F. van Wijland. "Transverse forces and glassy liquids in infinite dimensions". *Physical Review E* 109 (2024).

5. **FG**, L. Berthier, G. Szamel, and F. van Wijland. "Irreversible Boltzmann samplers in dense liquids: Weak-coupling approximation and mode-coupling theory". *Physical Review E* ***(Editors' Suggestion)*** 110 (2024).

4. **FG**, L. Berthier, and F. van Wijland. "Irreversible Monte Carlo algorithms for hard disk glasses: From event-chain to collective swaps". ***Physical Review Letters (Editors' Suggestion)*** 133 (2024).

3. **FG**, M. Ozawa, G. Biroli, and G. Tarjus. "Shear-induced phase behavior and topological defects in two-dimensional crystals". *Physical Review B* 109 (2024).

2. **FG**, L. Berthier, G. Szamel, and F. van Wijland. "Sampling efficiency of transverse forces in dense liquids". ***Physical Review Letters (Editors' Suggestion)*** 131 (2023).

1. **FG** and F. van Wijland. "Accelerating, to some extent, the p-spin dynamics". *Phys. Rev. E* 105 (2022).

Awards and fellowships

2024–2027 **SITP postdoctoral fellowship**, 247500 $

2021–2024 **PhD fellowship** from Ecole Doctorale Paris Ile de France (EDPIF), 57600 €

2019–2021 **ICFP scholarship** for International students, 32000 €

2016–2019 **Excellent Student** at *Sapienza University of Rome*.

Talks and Posters

Jan 2026 Contributed poster, Berkeley Statistical Mechanics Meeting, Berkeley, California

Jul 2025 Contributed Talk, StatPhys29, Florence, Italy

Jul 2025 Poster, Youth in high dimensions, ICTP Trieste, Italy

Jan 2025 Research seminar in the Theoretical Chemistry Department, UC Berkeley, California

Apr 2024 Interview Talk at Stanford Institute of Theoretical Physics, Stanford, California

Jan 2024 Short talk, *Journeé de Physique Statistique*, Paris, France

Sep 2023 Talk, Probabilistic sampling for physics, Paris, France

Jun 2023 Seminar, M. Michel's group, Université Clermont - Auvergne, France

May 2023 Poster, Cecam workshop on *Mesoscale modelling of driven disordered materials: from glasses to active matter*, Lausanne, Switzerland

Mar 2023 Seminar, K. Miyazaki's group, Nagoya, Japan

Mar 2023 Seminar, A. Ikeda and H. Ikeda group, Tokyo, Japan

Mar 2023 Seminar, H. Yoshino Lab, Osaka, Japan

Feb 2023 Seminar, Yukawa Institute for Theoretical Physics, Kyoto, Japan

Apr 2022 Poster, Cecam workshop on *Numerical techniques for nonequilibrium steady states*, Mainz, Germany

Jun 2022 Poster, *The Beg Rohu Summer School*, poster, Saint Pierre Quiberon, France

Academic service

2025– **Organizer** – Stanford's Theoretical Biophysics Journal Club

2024– **Reviewer** – Physical Review Letters, Physical Review E

Computer Skills

Languages C, Python, HTML, Latex, Mathematica

Softwares Ovito, Excel, PowerPoint

Other

Languages **Italian** (mothertongue), **English** (fluent), **French** (fluent)

Interests Piano, hiking, climbing, music