

Gianmarco Spera

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Research interest

I am a Ph.D. student in the Theory of Complex Systems group at the Laboratoire Matière et Systèmes Complexes, MSC Lab. There, I work under the supervision of Marc Durand, François Graner, and Julien Tailleur. I am interested in statistical mechanics and its application to biological systems. In particular, my work focuses on studying, both theoretically and analytically, the emerging physics of active systems starting from their microscopic description.

Education

Ph.D. student in theoretical physics 2020 - now

Université Paris Cité, Laboratoire Matière et Systèmes Complexes

Thesis: Are biological cells just another type of active particles? Supervisors: Marc Durand, François Graner, and Julien Tailleur.

Master Degree in Physics 2020

University of Rome La Sapienza, Grade: 110/110 cum laude

Thesis title: Statistical analysis and theoretical modeling of swarming behavior in mosquitoes. Thesis advisor: Irene Giardina.

Bachelor Degree in Physics 2018

University of Rome La Sapienza, Grade: 110/110 cum laude

Thesis title: Critical phenomena and Ising model. Thesis advisor: Mauro Lucio Papinutto.

Visiting

Massachusetts Institute of Technology (MIT) Oct-Nov 2023

Hosted by Prof. Julien Tailleur

Yukawa Institute for Theoretical Physics (YITP) July 2023

Hosted by Prof. Hisao Hayakawa

Teaching activity

Teaching assistant Mechanics 2022-2023

IUT Paris Pajol

Teaching assistant Real Analysis 2019-2020

University of Rome La Sapienza

Awards

Excellence Programme in Physics 2017

Classes: real analysis, potential theory, classical gravity, and critical phenomena.

Skills

Languages: Italian: Native language. English: Advanced. French: Advanced

Programming: C, C++, Python, Matlab, awk, bash, and Mathematica.

Talks, Conferences, and Summer Schools

2024

Journées de Physique Statistique. Paris (France). Contributed talk.

2023

Harvard University David Nelson group. Cambridge (USA). Seminar.

Boston University Pankaj Mehta and Kirill Korolev groups. Boston (USA). Seminar.

Brandeis University Michael Hagan group. Waltham (USA). Seminar.

Physics of Living Systems MIT. Cambridge (USA). Seminar.

Statphys28. Tokyo (Japan). Contributed talk.

Perspectives on Non-Equilibrium Statistical Mechanics. Kyoto (Japan). Poster presentation.

Yukawa Institute for Theoretical Physics. Kyoto (Japan). Seminar.

Frontiers in nonequilibrium physics. Kyoto (Japan). Poster presentation.

AMSCE. Dresden (Germany). Poster presentation.

Laboratoire Matière et Systèmes Complexes. Paris (France). Seminar.

Journées de Physique Statistique. Paris (France). Contributed talk.

2022

Active Matter: The Next 25 Years 2022. Leiden (Netherlands). Poster presentation.

EDPIF. Paris (France). Contributed talk.

MSC non-permanents. Paris (France). Contributed talk.

New frontiers in liquid matter. Paris (France). Poster presentation.

Disorder in complex systems. Paris (France). Summer school.

APS March meeting. Chicago (USA). Contributed talk.

2021

Multiscale integration in biological systems. Paris (France) . Flash talk.

News from Disordered Elastic Systems. Spetses (Greece). Conference.

Fundamental problems in statistical Physics. Brunico (Italy). Summer school.

Glassy systems and inter-disciplinary applications. Cargèse (France). Summer school.

Publications

- [1] Gianmarco Spera, Charlie Duclut, Marc Durand, and Julien Tailleur. Nematic torques in scalar active matter: when fluctuations favor polar order and persistence. *arXiv preprint arXiv:2301.02568*, 2023, accepted for publication in Physical Review Letters.