

FRANCESCO MORI

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PROFESSIONAL SUMMARY

I am a theoretical physicist at Harvard University, supported by the Center of Mathematical Sciences and Applications and a Shuman Educational Research Grant. My research spans nonequilibrium statistical physics, active matter, animal navigation, and machine learning.

RESEARCH EXPERIENCE

Research Associate

Sept. 2025 - Present

Center of Mathematical Sciences and Applications, Harvard University.

Leverhulme-Peierls Fellow (independent postdoctoral position)

Oct. 2022 - Sept. 2022

Rudolf Peierls Centre for Theoretical Physics, Department of Physics, University of Oxford

Junior Research Fellow, New College, Oxford.

Oct. 2022 - Sept. 2022

Research Visitor, City University of New York.

Feb. 2025 - Present

Part-time consultant, Scroll Prize, Inc.

Sept. - June. 2025

Contributing to the [Vesuvius challenge](#). Image reconstruction of ancient papyri (pre-79 AD).

Ph.D. in Theoretical Physics, Université Paris-Saclay

Oct. 2019 - June 2022

Laboratory of Theoretical Physics and Statistical Models (LPTMS), Orsay.

Supervisor: Satya Majumdar.

Title: *Extreme value statistics of stochastic processes: from Brownian motion to active particles.*

TEACHING

Abilitazione Scientifica Nazionale

2025

Accredited to hold Associate Professor positions in Italian universities. (Sections 02/A2 and 02/B2)

Qualification aux fonctions de maître de conférences

2024

Accredited to hold lecturer positions in French universities. (Section 28 - Theoretical Physics)

Stipendiary Lecturer, New College (Oxford)

2023

Mathematical Methods, Thermal Physics.

Tutor, Oxford Study Abroad Program

2023

Biological Physics.

Teaching assistant, Université Paris-Saclay

2021 - 2022

Computer Science, Statistical Physics.

FUNDING

Shuman Educational Research Grant 9-month research grant.

2025

Lockey Fund Award (USA) Travel award to attend scientific conferences in the USA.

2024

Lockey Fund Award (Europe) Travel award to attend scientific conferences in Europe.

2024

Astor Travel Scholarship Travel fund for visits to the USA.

2024

Leverhulme-Peierls Fellowship

2022

"intended to support the most talented theoretical physicists worldwide at an early stage of their careers"

One of three top candidates among more than 100 applicants.

New College JRF Travel Allowance

2022

AWARDS

Université Paris-Saclay International Master's Scholarship 1-year master program at Paris-Saclay University.	2018
Erasmus Scholarship 6-month exchange program at Paris-Saclay University.	2018
Alta Scuola Politecnica 2017 Excellence path for the top 1% of master students of Politecnico di Torino and Milano.	
Physics of Complex Systems Travel Grant 6-month exchange program at SISSA and ICTP (Trieste, Italy).	2017
Young Talent Project Travel Grant 6-month exchange program at Lund University (Sweden)	2016
Young Talent Project Excellence program for the top 5% of bachelor students of Politecnico di Torino.	2014

EDUCATION

M. Sc. in Physics of Complex Systems , Université Paris-Saclay Ranking: 1/42, GPA: 18.6/20	Sept. 2018 - Jul. 2019
M. Sc. in Physics of Complex Systems , Politecnico di Torino GPA: 30.00/30, Final mark: 110/110 cum laude.	Oct. 2017 - Jul. 2019
M. Sc. in Engineering Physics , Politecnico di Milano Final mark: 110/110 cum laude.	Oct. 2017 - Jul. 2019
Intern Student , LPTMS, Orsay (with Satya Majumdar).	Mar. 2019 - Jun. 2019
iMat Project (Project on natural language processing and materials science) European Materials Modelling Council, Alta Scuola Politecnica.	Jun. 2018 - Sept. 2019
Visiting student , SISSA and ICTP (Trieste, Italy).	Sept. 2017 - Feb. 2018
Visiting student , Lund University (Sweden).	Aug. 2016 - Feb. 2017
B. Sc. in Applied Mathematics , Politecnico di Torino GPA: 29.29/30, Final mark: 110/110 cum laude.	Oct. 2014 - Jul. 2017

MENTORSHIP

Yaprak Onder (Oxford undergraduate) Currently Ph.D. student at Harvard University.	2023
Costantino Di Bello (Université Paris-Saclay master's) Currently Ph.D. student at the University of Potsdam. This internship resulted in the publication Phys. Rev. E 108 , 014112 (2023).	2021
Marco Biroli (École normale supérieure de Paris master's) Currently Ph.D. student at Paris-Saclay University. This internship resulted in the publication J. Phys. A 55 , 244001 (2022).	2021

ACADEMIC SERVICE AND OUTREACH

Volunteer , Squishy Science Sunday (outreach activity at the APS March Meeting)	Mar. 2025
Assessor for master project Oxford Interdisciplinary Bioscience DTP	Apr. 2024

Reviewer

Mar. 2021 - Present

SciPost, Cambridge University Press, Nat. Commun., PRL, PRE, J. Phys. A: Math. Theor., J. Stat. Mech, Physica A.

Interviewer, University College (Oxford)

Dec. 2022

Undergraduate Physics admissions

Organizer, Cross-TP discussions

Oct. 2022 - Mar. 2023

Journal club across all areas of Theoretical Physics in Oxford

Organizer, Fête de la science (outreach activity for high-school students)

Oct. 2021

PUBLICATIONS (* KEY PAPERS)

25. (*) F. Mignacco and **F. Mori**, "A statistical physics framework for optimal learning", preprint arXiv:2507.07907 (2025).
24. R. J. Ewart, P. Reichherzer, S. Ren, S. Majeski, **F. Mori**, M. L. Nastac, A. F. A. Bott, M. W. Kunz, A. A. Schekochihin, "Cosmic-ray transport in inhomogeneous media", preprint arXiv:2507.19044 (2025).
23. **F. Mori** and F. Mignacco. "Analytic theory of dropout regularization", preprint arXiv:2505.07792 (2025).
22. (*) **F. Mori**, S. Sarao Mannelli, and F. Mignacco. "Optimal Protocols for Continual Learning via Statistical Physics and Control Theory," ICLR 2025 and J. Stat. Mech. 084004 (2025).
 - Accepted for poster presentation at the NeurIPS 2024 workshop Mathematics of Modern Machine Learning.
 - Accepted for poster presentation at COSYNE 2025.
21. (*) **F. Mori** and L. Mahadevan, "Optimal switching strategies for navigation in stochastic settings", J. R. Soc. Interface 22 (227), 20240677 (2025).
20. **F. Mori**, S. N. Majumdar, and P. Vivo. "Cost of excursions until first crossing of the origin for random walk and Lévy flights: An exact general formula", Phys. Rev. Research **6**, 043053 (2024).
19. K. S. Olsen, D. Gupta, **F. Mori**, S. Krishnamurthy, "Thermodynamic cost of finite-time stochastic resetting", Phys. Rev. Research **6**, 033343 (2024).
18. A. Mummery, **F. Mori**, and S. Balbus, "The dynamics of accretion flows near to the innermost stable circular orbit", Mon. Not. R. Astron. Soc. **529**, 1900 (2024).
17. (*) **F. Mori**, S. Bhattacharyya, J. M. Yeomans, and S. P. Thampi, "Viscoelastic confinement induces periodic flow reversals in active nematics", Phys. Rev. E **108**, 064611 (2023).
16. S. N. Majumdar, **F. Mori**, and P. Vivo, "Nonlinear-Cost Random Walk: exact statistics of the distance covered for fixed budget", Phys. Rev. E **108** (6), 064122 (2023).
15. C. Di Bello, A. K. Hartmann, S. N. Majumdar, **F. Mori**, A. Rosso, and G. Schehr, "Current fluctuations in stochastically resetting particle systems", Phys. Rev. E **108**, 014112 (2023). **Highlighted as an Editors' Suggestion.**
14. S. N. Majumdar, **F. Mori**, and P. Vivo, "The cost of diffusion: nonlinearity and giant fluctuations", **Phys. Rev. Lett.** **130**, 237102 (2023).
13. (*) B. De Bruyne and **F. Mori**, "Resetting in Stochastic Optimal Control", Phys. Rev. Research **5**, 013122 (2023).
12. (*) **F. Mori**, K. S. Olsen, and S. Krishnamurthy, "Entropy production of resetting processes", Phys. Rev. Res. **5**, 023103 (2023).

11. **F. Mori**, S. N. Majumdar, and G. Schehr, "Time to reach the maximum for a stationary stochastic process", Phys. Rev. E **106**, 054110 (2022).
10. M. Biroli, **F. Mori**, and S. N. Majumdar, "Number of distinct sites visited by a resetting random walker", J. Phys. A: Math. Theor. **55**, 244001 (2022).
9. **F. Mori**, G. Gradenigo, and S. N. Majumdar, "First-order condensation transition in the position distribution of a run-and-tumble particle in one dimension", J. Stat. Mech. 103208 (2021).
8. (*) **F. Mori**, S. N. Majumdar, and G. Schehr, "Distribution of the time of the maximum for stationary processes", Europhys. Lett. **135**, 30003 (2021). **Highlighted as an Editors' Choice.**
7. **F. Mori**, P. Le Doussal, S. N. Majumdar, and G. Schehr, "Condensation transition in the late-time position of a run-and-tumble particle", Phys. Rev. E **103**, 062134 (2021).
6. S. N. Majumdar, **F. Mori**, H. Schawe, and G. Schehr, "Mean perimeter and area of the convex hull of a planar Brownian motion in the presence of resetting", Phys. Rev. E **103**, 022135 (2021).
5. **F. Mori**, P. Le Doussal, S. N. Majumdar, and G. Schehr, "Universal properties of a run-and-tumble particle in arbitrary dimension", Phys. Rev. E **102**, 042133 (2020). **Highlighted as an Editors' Suggestion.**
4. B. Lacroix-A-Chez-Toine, **F. Mori**, "Universal survival probability for a correlated random walk and applications to records" J. Phys. A: Math. Theor. **53**, 495002 (2020).
3. (*) **F. Mori**, P. Le Doussal, S. N. Majumdar, and G. Schehr, "Universal survival probability for a d -dimensional run-and-tumble particle", **Phys. Rev. Lett.** **124**, 090603 (2020).
2. **F. Mori**, S. N. Majumdar, and G. Schehr, "Distribution of the time between maximum and minimum of random walks", Phys. Rev. E **101**, 052111 (2020).
1. (*) **F. Mori**, S. N. Majumdar, and G. Schehr, "Time between the maximum and the minimum of a stochastic process", **Phys. Rev. Lett.** **123**, 200201 (2019).

INVITED TALKS

Statistical Physics & Machine Learning: moving forward Institut d'Études Scientifiques de Cargèse (France).	2025
Paris Biological Physics Community Day École normale supérieure (Paris).	2024
Workshop: Stochastic Systems in Active Matter Isaac Newton Institute (Cambridge).	2024
Workshop: New Vistas in Stochastic Resetting The Higgs Centre for Theoretical Physics (Edinburgh).	2024
Saturday Mornings of Theoretical Physics (outreach activity for Oxford Physics alumni) University of Oxford.	2023
Theoretical Physics Colloquium University of Oxford.	2022
Large Deviations, Extremes and Anomalous Transport in Non-equilibrium Systems The Erwin Schrödinger International Institute for Mathematics and Physics (Austria).	2022
Nordita Scientific Program "Are there universal laws in nonequilibrium physics" Nordita Institute, Stockholm (Sweden).	2022

INVITED SEMINARS

Mathematical Physics Group Seminar	2025
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University of Bologna.

Disordered System Seminar

2022 and 2025

King's College London.

Condensed Matter Seminar

2025

University of Massachusetts Amherst.

Soft Matter Seminar

2025

University of California, Berkeley.

ML Nosh Lunch Seminar

2025

University of Oxford.

Soft Matter Group Away Day

2024

University of Oxford.

Soft Matter Seminar

2023

University of California, Santa Barbara.

Soft Condensed Matter Seminar

2023

New York University.

IPhT Seminar

2023

Institut de Physique Théorique, Saclay.

LOMA Seminar

2023

Laboratoire Ondes et Matière d'Aquitaine, Bordeaux.

Statistical Physics and Complexity Webinar Series

2022

University of Edinburgh.

LuxStatMech seminar

2022

University of Luxembourg.

LPTMC seminars

2022, 2023, and 2024

Laboratoire de Physique Théorique de la Matière Condensée, Paris.

SIFS Young Seminar

2022

Italian Society of Statistical Physics.

ICTS Statistical Physics Journal Club

2021

International Centre for Theoretical Sciences, Bangalore.

CONTRIBUTED TALKS

Journée "Physique et Vivant"

2023

Institut Jacques Monod (Paris).

Nordita Workshop: Fluctuations and First-Passage Problems

2023

Nordita Institute, Stockholm (Sweden).

4th Course on Multiscale Integration in Biological Systems

2021

Institut Curie, Paris (France).

Journée Systèmes & Matière Complexes

2021

Université Paris-Saclay, Paris (France).

CONFERENCES AND SCIENTIFIC PROGRAMS

APS March Meeting

2025

Anaheim (USA).

KITP program: Deep Learning from the Perspective of Physics and Neuroscience KITP, Santa Barbara (USA).	2024
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APS March Meeting Minneapolis (USA).	2024
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Computational and Systems Neuroscience (COSYNE) Montréal (Canada).	2023
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SUMMER SCHOOLS

Cargese summer school: Energy, Information and Evolution in Biology Cargese Institute for Scientific Studies (France)	2024
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Les Houches summer school: Theoretical Biophysics Les Houches Physics School (France)	2023
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Les Houches summer school: Statistical Physics & Machine learning Les Houches Physics School (France)	2022
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Beg Rohu Summer School: Statistical mechanics & emergent phenomena in biology Beg Rohu (France)	2021
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Fundamental Problems in Statistical Physics XV Brunico (Italy)	2021
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Spring College on the Physics of Complex Systems ICTP (Trieste, Italy)	2019
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