

# FRANCESCO MORI

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Rudolf Peierls Centre for Theoretical Physics, Parks Rd, Oxford (UK).

<https://www.physics.ox.ac.uk/our-people/morif>

## RESEARCH INTERESTS

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- Out-of-equilibrium statistical physics
- Active Matter
- Stochastic Thermodynamics

## PROFESSIONAL EXPERIENCE

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**Leverhulme-Peierls Fellow**, Rudolf Peierls Centre for Theoretical Physics *Oct. 2022 - Present*  
Department of Physics, University of Oxford

**Non-Stipendiary Junior Research Fellow**, New College, Oxford. *Oct. 2022 - Present*

## EDUCATION

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**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.*

**M. Sc. in Physics of Complex Systems**, Université Paris-Saclay *Sept. 2018 - Jul. 2019*

Ranking: 1/42, GPA: 18.6/20

**M. Sc. in Physics of Complex Systems**, Politecnico di Torino *Oct. 2017 - Jul. 2019*

GPA: 30.00/30, Final mark: 110/110 cum laude.

**M. Sc. in Engineering Physics**, Politecnico di Milano *Oct. 2017 - Jul. 2019*

Final mark: 110/110 cum laude.

**B. Sc. in Applied Mathematics**, Politecnico di Torino *Oct. 2014 - Jul. 2017*

GPA: 29.29/30, Final mark: 110/110 cum laude.

## AWARDS

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**Leverhulme-Peierls Fellowship** *2022*

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

**Université Paris-Saclay International Master’s Scholarship (€ 10,000).** *2018*

**Alta Scuola Politecnica** *2017*

Excellence path for the top 1% of master students of Politecnico di Torino and Milano.

**Young Talent Project** *2014*

Excellence program for the top 5% of bachelor students of Politecnico di Torino.

## PUBLICATIONS AND PREPRINTS

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19. F. Mori and L. Mahadevan, “Optimal switching strategies for navigation in stochastic settings”, preprint arXiv:2311.18813 (2023).

18. K. S. Olsen, D. Gupta, F. Mori, S. Krishnamurthy, “Thermodynamic cost of finite-time stochastic resetting”, preprint arXiv:2310.11267 (2023).

17. S. N. Majumdar, F. Mori, and P. Vivo, ‘Nonlinear-Cost Random Walk: exact statistics of the distance covered for fixed budget’, preprint arXiv:2310.08966 (2023). (Accepted in Phys. Rev. E).
16. F. Mori, S. Bhattacharyya, J. M. Yeomans, and S. P. Thampi, ‘Viscoelastic confinement induces periodic flow reversals in active nematics’, preprint arXiv:2307.14919 (2023). (Accepted in Phys. Rev. E).
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).

## MENTORSHIP

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Yaprak Onder (Oxford undergraduate)	<i>2023</i>
Costantino Di Bello (Université Paris-Saclay master’s)	<i>2021</i>
Marco Biroli (École normale supérieure de Paris master’s)	<i>2021</i>

## TEACHING

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<b>Stipendiary Lecturer</b> , New College (Oxford) Mathematical Methods and Thermal Physics.	2023
<b>Tutor</b> , Oxford Study Abroad Program Biological Physics.	2023
<b>Teaching assistant</b> , Université Paris-Saclay Computer Science and Statistical Physics.	2021 - 2022

## OTHER EXPERIENCE

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<b>Reviewer</b> Cambridge University Press, Nat. Commun., PRL, PRE, J. Phys. A: Math. Theor., J. Stat. Mech, Physica A.	Mar. 2021 - Present
<b>Interviewer</b> , University College (Oxford) Undergraduate Physics admissions	Dec. 2022
<b>Organizer</b> , Cross-TP discussions Journal club across all areas of Theoretical Physics in Oxford	Oct. 2022 - March 2023
<b>Organizer</b> , Fête de la science (outreach activity for high-school students)	Oct. 2021
<b>Intern Student</b> , LPTMS, Orsay (with Satya Majumdar).	Mar. 2019 - Jun. 2019
<b>iMat Project</b> (Project on natural language processing and materials science) European Materials Modelling Council, Alta Scuola Politecnica.	Jun. 2018 - Sept. 2019
<b>Visiting student</b> , SISSA and ICTP (Trieste, Italy).	Sept. 2017 - Feb. 2018
<b>Visiting student</b> , Lund University (Sweden).	Aug. 2016 - Feb. 2017

## INVITED TALKS

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<b>Saturday Mornings of Theoretical Physics</b> (outreach activity for Oxford Physics alumni) Oxford University (United Kingdom).	2023
<b>Theoretical Physics Colloquium</b> Oxford University (United Kingdom).	2022
<b>Large Deviations, Extremes and Anomalous Transport in Non-equilibrium Systems</b> The Erwin Schrödinger International Institute for Mathematics and Physics (Austria).	2022
<b>Nordita Scientific Program “Are there universal laws in nonequilibrium physics”</b> Nordita Institute, Stockholm (Sweden).	2022

## INVITED SEMINARS

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<b>UCSB Soft Matter Seminar</b> University of California, Santa Barbara.	2023
<b>Soft Condensed Matter Seminar</b> New York University.	2023
<b>IPHT Seminar</b> Institut de Physique Théorique, Saclay.	2023
<b>LOMA Seminar</b> Laboratoire Ondes et Matière d’Aquitaine, Bordeaux.	2023
<b>Disordered System Seminar</b> King’s College London.	2022

<b>Statistical Physics and Complexity Webinar Series</b> University of Edinburgh.	<i>2022</i>
<b>LuxStatMech seminar</b> University of Luxembourg.	<i>2022</i>
<b>LPTMC seminars</b> Laboratoire de Physique Théorique de la Matière Condensée, Paris.	<i>2022 and 2023</i>
<b>SIFS Young Seminar</b> Italian Society of Statistical Physics.	<i>2022</i>
<b>ICTS Statistical Physics Journal Club</b> International Centre for Theoretical Sciences, Bangalore.	<i>2021</i>

## CONTRIBUTED TALKS

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<b>Journée “Physique et Vivant”</b> Institut Jacques Monod (Paris).	<i>2023</i>
<b>Nordita Workshop: Fluctuations and First-Passage Problems</b> Nordita Institute, Stockholm (Sweden).	<i>2023</i>
<b>4th Course on Multiscale Integration in Biological Systems</b> Institut Curie, Paris (France).	<i>2021</i>
<b>Journée Systèmes &amp; Matière Complexes (contributed)</b> Université Paris-Saclay, Paris (France).	<i>2021</i>