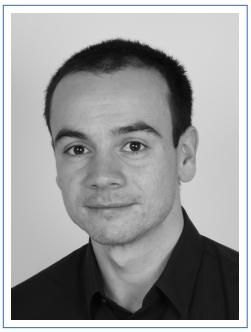
Étienne Fodor

Postdoctoral Research Associate

✉ e.fodor@damtp.cam.ac.uk
efodorphysics.github.io
French | Born on January, 6 1990

DAMTP
Centre for Mathematical Sciences
University of Cambridge
Wilberforce Road
CB3 0WA, United Kingdom



Education

2013 – 2016 **PhD in Theoretical Physics**, Université Paris Diderot | Summa cum laude.
Tracking nonequilibrium in living matter and self-propelled systems
Main topics | Nonequilibrium statistical mechanics, Biophysics, Active matter
Supervisors | Paolo Visco, Frédéric van Wijland

2012 – 2013 **Master in Physics – 2nd year**, École Normale Supérieure de Paris.
ICFP - Macroscopic Physics and Complexity

2011 – 2012 **Agrégation de Physique**, École Normale Supérieure de Cachan.
National competitive exam for teachers in classes préparatoires and in first years of French Universities

2010 – 2011 **Master in Physics – 1st year**, École Normale Supérieure de Lyon.

2009 – 2010 **Bachelor in Physics**, École Normale Supérieure de Lyon.

Research

Selected papers

- T. Nemoto, É. Fodor, M. E. Cates, R. L. Jack, and J. Tailleur
Optimizing active work: Dynamical phase transitions, collective motion and jamming
Phys. Rev. E **99**, 022605 (2019)

- C. Nardini, É. Fodor, E. Tjhung, F. van Wijland, J. Tailleur, and M. E. Cates
Entropy production in field theories without time-reversal symmetry: Quantifying the non-equilibrium character of active matter
Phys. Rev. X **7**, 021007 (2017)

- É. Fodor, C. Nardini, M. E. Cates, J. Tailleur, P. Visco, and F. van Wijland
How far from equilibrium is active matter?
Phys. Rev. Lett. **117**, 038103 (2016)
Selected as Editor's Suggestion – Highlighted in Physics (2016)

- É. Fodor,* W. W. Ahmed,* M. Almonacid,* M. Bussonnier, N. S. Gov, M.-H. Verlhac, T. Betz, P. Visco, and F. van Wijland
Nonequilibrium dissipation in living oocytes
EPL (Europhys. Lett.) **116**, 30008 (2016)

- É. Fodor,* M. Guo,* N. S. Gov, P. Visco, D. A. Weitz, and F. van Wijland
Activity-driven fluctuations in living cells
EPL (Europhys. Lett.) **110**, 48005 (2015)
Selected as editor's choice – Highlighted in Europhysics News 46/5 (2015)

* Equal contribution of these authors to this work

Preprints

- P. Pietzonka, É. Fodor, C. Lohrmann, M. E. Cates, U. Seifert
  Autonomous engines driven by active matter: Energetics and design principles
  arXiv:1905.00373
- L. Tociu, É. Fodor, T. Nemoto, and S. Vaikuntanathan
  How dissipation constrains fluctuations in driven liquids: Diffusion, structure and biased interactions
  arXiv:1808.07838

Complete list of publications

[16] V. Démery and É. Fodor
Driven probe under harmonic confinement in a colloidal bath
J. Stat. Mech. **2019**, 033202 (2019)

[15] T. Nemoto, É. Fodor, M. E. Cates, R. L. Jack, and J. Tailleur
Optimizing active work: Dynamical phase transitions, collective motion and jamming
Phys. Rev. E **99**, 022605 (2019)

[14] É. Fodor, H. Hayakawa, J. Tailleur, and F. van Wijland
Non-Gaussian noise without memory in active matter
Phys. Rev. E **98**, 062610 (2018)

[13] É. Fodor and M. Cristina Marchetti
The statistical physics of active matter: From self-catalytic colloids to living cells
Physica A **504**, 106 (2018)

[12] D. Martin, C. Nardini, M. E. Cates, and É. Fodor
Extracting maximum power from active colloidal heat engines
EPL (Europhys. Lett.) **121**, 60005 (2018)
Selected as editor's choice – Featured in Highlights of 2018

[11] W. W. Ahmed,* É. Fodor,* M. Almonacid,* M. Bussonnier, N. S. Gov, M.-H. Verlhac, P. Visco, F. van Wijland, and T. Betz
Active mechanics reveal molecular-scale force kinetics in living oocytes
Biophys. J. **114**, 1667 (2018)

[10] É. Fodor,* V. Mehandia,* J. Comelles, R. Thiagarajan, N. S. Gov, P. Visco, F. van Wijland, and D. Riveline
Spatial fluctuations at vertices of epithelial layers: Quantification of regulation by Rho pathway
Biophys. J. **114**, 939 (2018)

[9] C. Nardini, É. Fodor, E. Tjhung, F. van Wijland, J. Tailleur, and M. E. Cates
Entropy production in field theories without time-reversal symmetry: Quantifying the non-equilibrium character of active matter
Phys. Rev. X **7**, 021007 (2017)

[8] É. Fodor,* W. W. Ahmed,* M. Almonacid,* M. Bussonnier, N. S. Gov, M.-H. Verlhac, T. Betz, P. Visco, and F. van Wijland
Nonequilibrium dissipation in living oocytes
EPL (Europhys. Lett.) **116**, 30008 (2016)

[7] É. Fodor, C. Nardini, M. E. Cates, J. Tailleur, P. Visco, and F. van Wijland
How far from equilibrium is active matter?
Phys. Rev. Lett. **117**, 038103 (2016)
Selected as Editor's Suggestion – Highlighted in Physics (2016)

[6] É. Fodor, H. Hayakawa, P. Visco, and F. van Wijland
Active cage model of glassy dynamics
Phys. Rev. E **94**, 012610 (2016)

[5] E. Ben Isaac, É. Fodor, P. Visco, F. van Wijland, and N. S. Gov
Modeling the dynamics of a tracer particle in an elastic active gel
Phys. Rev. E **92**, 012716 (2015)

[4] W. W. Ahmed, É. Fodor, and T. Betz
Active cell mechanics: Measurement and theory
Biochimica et Biophysica Acta - Mol. Cell Res. **1853**, 3083 (2015)

[3] É. Fodor,* M. Guo,* N. S. Gov, P. Visco, D. A. Weitz, and F. van Wijland
Activity-driven fluctuations in living cells
EPL (Europhys. Lett.) **110**, 48005 (2015)
Selected as editor's choice – Highlighted in Europhysics News 46/5 (2015)

[2] É. Fodor, D. S. Grebenkov, P. Visco, and F. van Wijland
Generalized Langevin equation with hydrodynamic backflow: equilibrium properties
Physica A **422**, 107 (2015)

[1] É. Fodor, K. Kanazawa, H. Hayakawa, P. Visco, and F. van Wijland
Energetics of active fluctuations in living cells
Phys. Rev. E **90**, 042724 (2014)

Conferences, seminars and summer schools

2019 **StatPhys – Out-of-equilibrium aspects**, Buenos Aires | Contributed talk.
International Soft Matter Conference, Edinburgh | Contributed talk.
Statistical Physics of Complex Systems Conference, Nordita, Stockholm | Contributed talk.
Institute of Physics – Computational Soft Matter, University of Amsterdam | Seminar.
Colloids as a Toolbox for Statistical Mechanics, University of Cambridge | Co-organizer.

2018 **LiPhy Laboratory**, Université Grenoble Alpes | Seminar.
Charles Coulomb Laboratory, Université de Montpellier | Seminar.
ESPCI – Gulliver Laboratory, Paris | Seminar.
Why Measure Entropy Production?, Princeton University | Invited talk.
Nonequilibrium Collective Dynamics, Technische Universität Berlin | Contributed talk.
Stochastic Thermodynamics: Experiment and Theory, MPI, Dresden | Poster.
World Congress of Biomechanics – Non-equilibrium Biomechanics, Dublin | Co-chair.
St Catherine's College – Graduate Research Seminars, Cambridge | Seminar.
Fundamental Problems in Active Matter, Aspen Center for Physics | Contributed talk.
Research Colloquium Series, California State University, Fullerton | Seminar.
Statistical Mechanics Meeting, University of California, Berkeley | Poster.
Active Matter Session, University of California, Berkeley | Invited talk.

2017 **DAMTP – Soft Matter Seminar**, University of Cambridge | Seminar.
Stochastic Thermodynamics, Active and Driven Systems, ICTS, Bangalore | Poster.

Fundamental Problems in Statistical Physics summer school, Bruneck.
SIAM-IMA Annual Conference, University of Cambridge | Contributed talk.
Edwards Centre Mini Conference, University of Cambridge | Contributed talk.
Open Statistical Physics, Milton Keynes | Contributed talk.
DAMTP – BioLunch Seminar, University of Cambridge | Seminar.
Edwards Centre Mini Conference, University of Cambridge | Poster.

2016 **School of Mathematical Sciences**, Queen Mary University of London | Seminar.
DAMTP – Soft Matter Seminar, University of Cambridge | Seminar.
StatPhys – Biological Physics, Lyon | Contributed talk.
MSC Laboratory Seminar, Université Paris Diderot | Seminar.
Yukawa Institute for Theoretical Physics, Kyoto University | Seminar.
Non-Gaussian Workshop, Kyoto University | Contributed talk.

2015 **LiPhy Laboratory**, Université Grenoble Alpes | Seminar.
Physics-Biology Interface Seminar, Université Paris Sud | Seminar.
DAMTP – Soft Matter Seminar, University of Cambridge | Seminar.
Lorentz Center – Active Liquids, Leiden University | Contributed talk.
Yukawa Institute for Theoretical Physics, Kyoto University | Seminar.
Kyoto Winter School for Statistical Mechanics, Kyoto University.
Luxembourg out of Equilibrium, University of Luxembourg | Poster.

2014 **MSC Laboratory – Physique du vivant**, Université Paris Diderot | Seminar.
Beg Rohu summer school, Saint-Pierre Quiberon.
Condensed Matter in Paris, Université Paris Descartes | Contributed talk.
Physics and Biological Systems, Université Paris Sud | Poster.
MSC Laboratory – Theory Group, Université Paris Diderot | Seminar.
ESPCI – Journées de Physique Statistique, Paris | Contributed talk.
Mini Stat Mech Meeting, University of California, Berkeley | Poster.

Research associate visits

2019 **James Franck Institute**, University of Chicago | 2 weeks.
Inviting professor | Suriyanarayanan Vaikuntanathan

2015 – 2016 **Yukawa Institute for Theoretical Physics**, Kyoto University | 2 months/year.
Inviting professor | Hisao Hayakawa

Internships

2013 **Master – 2nd year**, Université Paris Diderot | 16 weeks.
Modeling active forces in living cells
Supervisors | Paolo Visco, Frédéric van Wijland

2011 **Master – 1st year**, University of Oxford | 12 weeks.
Complete characterization and control of extreme ultraviolet pulses from high harmonic generation
Supervisors | Adam S. Wyatt, Ian A. Walmsley

2010 **Bachelor**, Université de Genève | 8 weeks.
CARS microspectroscopy using a single laser source
Supervisors | Jérôme Extermann, Luigi Bonacina, Jean-Pierre Wolf

Teaching and supervision

2017 – 2018 **Part III project**, DAMTP – University of Cambridge | 8 months.
Designing a macroscopic active heat engine
Part III student | Timothy Ekeh (University of Cambridge)

2016 – 2017 **Internship supervision**, DAMTP – University of Cambridge | 5 months.
Tracer dynamics in an active medium
Master student | David Martin (École Normale Supérieure de Paris)

2013 – 2016 **Physics tutorials**, Université Paris Diderot | 64 hours/year.
First-year University training in medical Physics

2012 – 2013 **Physics tutorials**, Lycée Fénelon, Paris | 23 hours.
Classes préparatoires

2010 – 2011 **Physics tutorials**, Lycée la Martinière Monplaisir, Lyon | 60 hours.
Classes préparatoires

Computing experience

Linux systems, Mathematica, LaTeX, Programming in C and PYTHON

Review service

EPL - J. Stat. Mech. - Nat. Phys. - New J. Phys. - Phys. Rev. E - Phys. Rev. Lett. - Phys. Rev. X

Scholarships, fellowships and prizes

2017 – 2020 **Junior Research Fellowship**, St Catherine's College, Cambridge.

2017 – 2020 **Oppenheimer Research Fellowship**, University of Cambridge.

2017 3^{rd} **PhD prize** | **Institut des Systèmes Complexes**, Paris.

2017 **Best talk prize** | **SIAM-IMA Annual Conference**, University of Cambridge.

2015 **Best talk prize** | **Lorentz Center – Active Liquids**, Leiden University.

2013 – 2016 **Teaching Assistantship**, Université Paris Diderot.

2013 – 2016 **PhD Scholarship**, École Normale Supérieure de Cachan.

2011 – 2013 **Master Scholarship**, École Normale Supérieure de Cachan.

Academic references

Prof. Michael E. Cates
DAMTP, Centre for Mathematical Sciences
University of Cambridge
Wilberforce Road
CB3 0WA, United Kingdom
m.e.cates@damtp.cam.ac.uk

Prof. Frédéric van Wijland
Laboratoire Matière et Systèmes Complexes
UMR 7057 CNRS/P7, Université Paris Diderot
10, rue Alice Domon et Léonie Duquet
75205 Paris Cédex 13, France
fvw@univ-paris-diderot.fr

Dr. Julien Tailleur
Laboratoire Matière et Systèmes Complexes
UMR 7057 CNRS/P7, Université Paris Diderot
10, rue Alice Domon et Léonie Duquet
75205 Paris Cédex 13, France
julien.tailleur@univ-paris-diderot.fr

Dr. Suriyanarayanan Vaikuntanathan
James Franck Institute
Department of Chemistry
University of Chicago
Chicago, IL 60637
svaikunt@uchicago.edu