

Albane Théry

Simons Postdoctoral Fellow, Center for Mathematical Biology
University of Pennsylvania, Philadelphia, US

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Research Interests: Biological Physics, Soft and Active Matter, Fluid Mechanics

RESEARCH POSITIONS

University of Pennsylvania, Center for Mathematical Biology – US **2022-present**
Simons Postdoctoral Fellow, Department of Mathematics
Mentors: Yoichiro Mori, Arnold Mathijssen, Paulo Arratia
In ongoing interdisciplinary collaborations, I am studying the role of suspended particles and polymers on bacterial motility, and showed that upstream contamination is enhanced in complex fluids.
I am also developing numerical methods to investigate boundary-driven flows and self-organisation in spherical geometries.

EDUCATION

PhD in Applied Mathematics, University of Cambridge – UK, Thesis advisor: Eric Lauga **2018-2022**
Confinement-mediated accumulation and collective dynamics of microswimmers.
I built theoretical and numerical models for active particles in confined geometries. In particular, I studied the role of hydrodynamic interactions in setting the self-organisation of biased swimmers in channels, and the emergence of chiral patterns in drops. I also studied the relative importance of hydrodynamic and contact interactions for algae trapped in foams.

MS in Physics, ENS Paris – Paris, France **2017-2018**
ICFP Master Program in Biological Physics and Soft Matter

Ingénieur, École polytechnique – Paris, France **2014-2018**
Master's degree in Mechanics, with courses in Mathematics, Physics, Biology and Mechanics

RESEARCH EXPERIENCE

Physics & Astronomy department, McMaster University – Hamilton, ON, Canada **July-August 2018**
Collective dynamics of magnetotactic bacteria in a channel,
Experiments on bacterial self-organisation.
Advisor: Kari Dalnoki-Veress.

MMN lab, Institut Pierre-Gilles de Gennes – Paris, France **March-June 2018**
Deformation of elongated droplets in a confinement gradient,
Microfluidic experiments on the dynamics of drops in patterned channels.
Advisor : Marie-Caroline Jullien.

DAMTP, University of Cambridge – United Kingdom **March-June 2017**
Stochastic motion of a sphere propelled by attached bacteria,
Advisor: Eric Lauga.

PUBLICATIONS

- Enhanced bacterial upstream swimming is enhanced in shear-thinning fluids,
B. Torres Maldonado*, [A. Théry](#)*, R. Tao, Q. Brosseau, A. Mathijssen, and P. Arratia, (in preparation)
- Enhanced bacterial upstream swimming in complex fluids,
D. Cao, R. Tao, [A. Théry](#), A. Mathijssen, and Y. Wu, (in preparation)
- Helical Locomotion in Dilute Suspensions,
A. Zambrano, [A. Théry](#), E. Lauga, R. Zenit, (in preparation).
- Controlling confined collective organization with taxis,
[A. Théry](#), A. Chamolly, E. Lauga, *Physical Review Letters*, 2024.
- Hydrodynamic interactions of squirmers above a wall,
[A. Théry](#), C. Maass, E. Lauga, *Royal Society Open Science*, 2023
- Rebound and scattering of motile *Chlamydomonas* algae in confined chambers,
[A. Théry](#), Y. Wang, M. Dvoriashyna, C. Eloy, F. Elias and E. Lauga, *Soft Matter*, 2021
- Self-organisation and convection of confined magnetotactic bacteria,
[A. Théry](#), L. Le Nagard, J.C. Ono-dit-Biot, C. Fradin, K Dalnoki-Veress, E Lauga, *Scientific Reports*, 2020
- A stochastic model for bacteria-driven microswimmers,
C.E. López, [A. Théry](#), E. Lauga, *Soft Matter*, 2019

SELECTED TALKS

Invited

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| Northwestern University, Swimmers in complex and confined environments. | Jan 2024 |
| Soft Matter Theory Seminar, UPenn, Contamination in complex fluids. | Oct 2023 |
| University of Chile, Self-organization in confinement. | June 2023 |
| Center for Fluid Mechanics seminar, Brown University: Swimming in confinement. | March 2023 |
| MathBio seminar, NJIT, Microswimmers in complex fluids: propulsion and rheotaxis. | Feb 2023 |
| AMS Western Sectional Meeting, (U. of Utah) Tuning self-organization of biased microswimmers through confinement. | Oct 2022 |
| Princeton Analysis of Fluid Seminar, Controlling confined collective organization with taxis. | Jan 2022 |
| Biophysical Modeling Seminar, Flatiron Institute, New York. | Jan 2022 |
| U. Penn Mathematical Biology Seminar. | Jan 2022 |

Contributed

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| Division of Fluid Dynamics (DFD) APS meeting (Washington DC),
Enhanced rheotaxis in complex fluids | Nov 2023 |
| DFD meeting (Indianapolis, US), Confined squirmers: interactions, contacts and clusters. | Nov 2022 |
| BioActive Fluids (Liverpool), Symmetry breaking and self-organisation in a drop. | June 2022 |
| UK Fluid Conference (online), Hydrodynamic interactions of sedimenting squirmers. | Sep 2021 |
| DFD meeting (online), <i>Chlamydomonas</i> scattering in foam. | Nov 2020 |
| DFD meeting (Seattle, US), Bacterial magneto-convection. | Nov 2019 |
| BIFD international symposium (Limerick, Ireland), Bacterial magneto-convection. | July 2019 |

TECHNICAL SKILLS

Computing: MATLAB, Mathematica, COMSOL, Python

Languages: English (fluent), French (native), Italian (advanced), Spanish (elementary)

TEACHING

Lecturer and Teaching Assistant

Mathematical Biology (Math 5861, graduate elective), lecturer, UPenn Fall 2023

Fluids Part II, (year 3), supervisions (TA), Cambridge Fall 2019, 2021 and 2022

Mathematical Biology Part II (year 3), supervisions, Cambridge Winter 2020, 2021 and 2022

Undergraduate projects advisor (UPenn):

Chenxi Leng, independent study: Learning strategies for predation in microswimmers. Fall 2023

Ivy Liu, FERBS program: Tracer advection by motile *Chlamydomonas* algae. 2021 - present

ACADEMIC SERVICE

Organiser, weekly U. Penn Mathematical Biology Seminar. 2022-24

Stimulus Outreach Program for Science in a UK primary school. 2018-19

Reviewer, *Physical Review Fluids*, *Physical Review Letters*, *Journal of Fluid Mechanics*.