

## Curriculum Vitae (last update: 14 March 2024)

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### Employment

Junior Group Leader, Institute of Environmental Engineering, ETH Zürich 09/2021 – present  
Mentors: Prof. Roman Stocker and Prof. Sebastian Bonhoeffer

Postdoctoral Fellow, Institute of Environmental Engineering, ETH Zürich 09/2018 – 08/2021  
Mentor: Prof. Roman Stocker

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### Education

PhD in Physical Applied Mathematics, Massachusetts Institute of Technology, USA 09/2013 – 06/2018  
Advisor: Prof. Jörn Dunkel

Master of Advanced Study in Mathematics (Part III), University of Cambridge, UK 09/2012 – 06/2013  
Awarded Distinction

Master of Physics, University of Oxford, UK 09/2008 – 06/2012  
Awarded First Class Degree

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### Awards & Honors

SNF Ambizione Grant, 09/2021 – 08/2025  
ETH Postdoctoral Fellowship, 09/2018 – 08/2020  
Johnson Prize for a research paper, MIT Mathematics, 2018  
Housman Award for Excellence in Teaching, MIT Mathematics, 2017  
MIT Presidential Fellowship, 09/2013 – 06/2014  
Dr. J. A. J. Whelan Prize in Mathematics, Christ's College, University of Cambridge, 2013  
The Gibbs Prize for the best use of experimental apparatus in a MPhys Project, University of Oxford, 2012  
Mansfield College Scholarship for excellent exam results, University of Oxford, 09/2009 – 06/2012  
UK EPSRC summer project (with Prof. Amalia Coldea), 07/2011 – 08/2011

### Graduate students supervision

Matti Zbinden, PhD student, ETH, Spring 2022 – present

### Bachelor and Master students supervision

Alessio Häseli, Bachelor thesis, ETH, *How often do bacteria exchange genes in a turbulent flow?*, Spring 2023  
Yao Zhou, Master Project, ETH, *The effects of bacterial encounters on conjugation rates*, Fall 2022  
Pit Mathieu, *Computational study of fluid flow gradients in microfluidic devices with a focus on bacterial attachment in a model porous medium*, Bachelor thesis, ETH, Spring 2020

### Invited talks

Horizontal Gene Transfer and Mobile Elements, KITP, Santa Barbara (USA), July-August 2024  
Coherence Correlations Complexity Seminar, Wrocław University of Science and Technology (Poland), June 2024

Physical Mathematics Seminar, MIT, Cambridge (USA), May 2024  
Principles of Microbial Ecosystems Collaborative Annual Meeting, Simons Foundation, New York (USA), September 2023  
NCCR Microbiomes Seminar, online (Switzerland), June 2023  
Soft Matter and Statistical Physics Seminar, Warsaw University, Warsaw (Poland), June 2023  
Principles of Microbial Ecosystems Collaborative Annual Meeting, Simons Foundation, New York (USA), August 2022  
18th International Symposium on Microbial Ecology, Lausanne (Switzerland), August 2022  
Microbial ecology for engineering biology, Theo Murphy scientific meeting, Oxfordshire (UK), March 2022  
Principles of Microbial Ecosystems Collaborative, Annual Meeting (online), September 2021  
Frontiers in Computational Methods for Active Matter, EPFL CECAM, Lausanne (Switzerland), February 2020  
Soft Matter and Statistical Physics Seminar, Warsaw University, Warsaw (Poland), January 2020  
Colloquium, Center for Theoretical Physics, Polish Academy of Sciences, Warsaw (Poland), January 2020  
Max Planck Institute for Dynamics and Self-Organization, Göttingen (Germany), December 2018  
Physics of Living Systems, MIT, Cambridge (USA), March 2018  
Prakash Lab, Stanford University, Stanford (USA), December 2017  
Widely Applied Mathematics Seminar, Harvard University, Cambridge (USA), December 2017  
Biophysical Modeling Group, Flatiron Institute, New York (USA), October 2017

### **Contributed conference & seminar talks**

Physics of Microbial Motility, Paris (France), November 2022  
Latsis Symposium 2022: The Origin and Prevalence of Life, Zurich (Switzerland), August - September 2022  
Annual Meeting of the Swiss Society for Microbiology, Lausanne (Switzerland), August - September 2022  
Biology for Physics, Barcelona (Spain), July 2022  
Microscale Ocean Biophysics 6.0, Mallorca (Spain), May 2022  
APS March Meeting, online (USA), March 2022  
NCCR Microbiomes Workshop, online (Switzerland), April 2021  
APS March Meeting, online (USA), March 2021  
Batchelor Centenary Event, Cambridge (UK), March 2020 (cancelled due to Covid19)  
American Physical Society (APS) March Meeting, Boston (USA), March 2019  
APS March Meeting, Los Angeles (USA), March 2018  
APS Division of Fluid Dynamics Meeting (DFD), Denver (USA), November 2017  
Brown/Boston University Dynamics & PDE Seminar, Brown University (USA), April 2017  
APS March Meeting, New Orleans (USA), March 2017  
APS DFD Meeting, Portland (USA), November 2016  
APS March Meeting, Baltimore (USA), March 2016

### **Posters**

NCCR Microbiomes Annual Meeting, online (Switzerland), June 2021  
Principles of Microbial Ecosystems Collaborative, virtual meeting, September 2020  
Fluid Physics of Life, Dresden (Germany), October 2019  
Marine Particles and Phycospheres, Ascona (Switzerland), May 2019  
Microscale Ocean Biophysics, Whistler (Canada), January 2019  
Complex Motion in Fluids, University of Cambridge (UK), September 2017  
DFG International Conference on Microswimmers, Bonn (Germany), October 2016

## Workshops

ENSA Mental Health First Aid course, online (Switzerland), February 2022

Topology in Complex Fluids, Leiden (The Netherlands), May 2018

## Teaching

Introduction to Environmental Engineering, Water Science and Engineering (Lecturer), ETH, October 2022

Computational Science and Engineering I (Lecturer), MIT, Summer 2016

Differential equations (Teaching Assistant), MIT, Fall and Spring 2016, Fall 2017

## Service

Lead moderator on the ARC platform: An open web-platform for request/supply matching for a prioritized and controlled COVID-19 response in Switzerland

Initiator and organizer of ‘LiMMat’ – the Living Matter Seminar Series, Stocker Lab

Reviewer for peer-review journals (*Phys. Rev. Lett.*, *Proc. Natl. Acad. Sci. U.S.A.*, *Nat. Comm.*, *Sci. Adv.*, *J. Fluid Mech.*, *Phys. Rev. Fluids*, *Soft Matter*, *Environ. Sci. Technol.*)

## Publications (\* joint first authors, if more than one)

1. N. Romeo, J. Słomka, J. Dunkel and K. J. Burns, Vortex line entanglement in active Beltrami flows, *J. Fluid Mech.*, 982: A12, 2024
2. U. Pfreundt\*, J. Słomka\*, G. Schneider, A. Sengupta, F. Carrara, V. Fernandez, M. Ackermann and R. Stocker, Controlled motility in the cyanobacterium *Trichodesmium* regulates aggregate architecture, *Science*, 380: 830-835, 2023
3. J. Słomka, U. Alcolombri, F. Carrara, R. Foffi, F. J. Peaudecerf, M. Zbinden and R. Stocker, Encounter rates prime interactions between microorganisms, *Interface Focus*, 13: 20220059, 2023
4. J.-A. Arguedas Leiva\*, J. Słomka\*, C. C. Lalescu, R. Stocker and M. Wilczek, Elongation enhances encounter rates between phytoplankton in turbulence, *Proc. Natl. Acad. Sci. U.S.A.*, 119: e2203191119, 2022
5. G. Savorana, J. Słomka, R. Stocker, R. Rusconi and E. Secchi, A microfluidic platform for characterizing the structure and rheology of biofilm streamers, *Soft Matter*, 18: 3878-3890, 2022
6. J.-D. Courcol, C. F. Invernizzi, Z. C. Landry, M. Minisini et al., ARC: An open web-platform for request/supply matching for a prioritized and controlled Covid-19 response, *Front. Public Health*, 9: 607677, 2021
7. J. Słomka and R. Stocker, Bursts characterize coagulation of rods in a quiescent fluid, *Phys. Rev. Lett.*, 124: 258001, 2020
8. J. Słomka, U. Alcolombri, E. Secchi, R. Stocker and V. I. Fernandez, Encounter rates between bacteria and sinking particles, *New J. Phys.*, 22: 043016, 2020
9. J. Słomka and R. Stocker, On the collision of rods in a quiescent fluid, *Proc. Natl. Acad. Sci. U.S.A.*, 117: 3372-3374, 2020
10. J. Słomka, A. Townsend and J. Dunkel, Stokes’ second problem and reduction of inertia in active fluids, *Phys. Rev. Fluids*, 3: 103304, 2018
11. J. Słomka, P. Suwara and J. Dunkel, The nature of triad interactions in active turbulence, *J. Fluid Mech.*, 841: 701–731, 2018
12. O. Mickelin\*, J. Słomka\*, K. J. Burns, D. Lecoanet, G. M. Vasil, L. M. Faria and J. Dunkel, Anomalous chained turbulence in actively driven flows on spheres, *Phys. Rev. Lett.*, 120: 164503, 2018

13. J. Słomka and J. Dunkel, Spontaneous mirror-symmetry breaking induces inverse energy cascade in 3D active fluids, *Proc. Natl. Acad. Sci. U.S.A.*, 114: 2119-2124, 2017
14. J. Słomka and J. Dunkel, Geometry-dependent viscosity reduction in sheared active fluids, *Phys. Rev. Fluids*, 2: 043102, 2017
15. J. Słomka and J. Dunkel, Generalized Navier-Stokes equations for active suspensions, *Eur. Phys. J. Spec. Top.*, 224: 1349-1358, 2015