

Christopher Howland

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EDUCATION

UNIVERSITY OF CAMBRIDGE

PHD IN APPLIED MATHEMATICS

Aug 2020 | Cambridge, UK
Department of Applied Mathematics and Theoretical Physics

UNIVERSITY OF OXFORD

MMATH IN MATHEMATICS

Jun 2016 | Oxford, UK
Mathematical Institute
Double First Class Honours

LINKS

Github:// [chowland](#)
LinkedIn:// [cjhowland](#)
Twitter:// [@chowlandGFD](#)

COURSES

STUDIED

Computational Methods in Fluids
Fluid Dynamics of Climate
Fluid Dynamics of the Environment
Numerical Solution of DEs
Finite Element Methods for PDEs

SUPERVISED

Differential Equations
Fluid Dynamics
Hydrodynamic Stability
Variational Principles
Quantum Mechanics
Mathematics for Natural Sciences

SOFTWARE SKILLS

LANGUAGES

Highly experienced:
Fortran • Python
LaTeX • Shell
Experienced:
Julia • MATLAB
Familiar:
HTML • XML

TOOLS

Git • GitHub Actions • Jupyter
Linux • WSL • VSCode • Pluto.jl
MkDocs • ParaView • SLURM

LIBRARIES

Highly experienced:
MPI • HDF5 • FFTW
NumPy • Matplotlib • Pandas
Familiar:
PyTorch • Plotly

EXPERIENCE

UNIVERSITY OF TWENTE | POSTDOCTORAL RESEARCHER

Sep 2020 - Present | Enschede, NL

- Using numerical simulations to study effect of turbulence on ice melting
- Developed new phase-field model using multiple-resolution technique to efficiently simulate the shape evolution of melting objects in a turbulent flow
- Implemented immersed boundary method for studying pore-scale flow
- Successful grant application for 30m CPU hours on Cartesius supercomputer
- Studied Dutch language to CEFR level B1

UNIVERSITY OF CAMBRIDGE | POSTGRADUATE RESEARCHER

Oct 2016 – Aug 2020 | Cambridge, UK

- Performed idealised numerical simulations of stratified turbulence to improve the understanding of breaking waves in the ocean interior
- Contributed to development of HDF5 routines and Python post-processing for open-source simulation code DIABLO

WOODS HOLE OCEANOGRAPHIC INSTITUTION | GFD FELLOW

Jun 2018 – Aug 2018 | Woods Hole, MA, USA

- 7 week research project to investigate effect of rotation on turbulent plumes
- Performed dye experiments and image analysis with bespoke MATLAB codes

UNIVERSITY OF OXFORD | SUMMER RESEARCH INTERN

Jun 2015 – Aug 2015 | Oxford, UK

- High speed experiments investigating drop impact dynamics on soft solids

RESEARCH ACTIVITIES

- **7 invited seminars** including for the Journal of Fluid Mechanics, Imperial College London, and University of Cambridge
- **11 conference talks**, including at the AGU Ocean Sciences Meeting, the APS Division of Fluid Dynamics Meeting, and the European Turbulence Conference
- **5 conference posters** including at the AMS Conference on Atmospheric and Oceanic Fluid Dynamics and the Ocean Mixing Gordon Research Conference
- **Peer reviewer of 16 articles** including for Journal of Fluid Mechanics, Physical Review Letters, and Journal of Advances in Modelling Earth Systems

AWARDS

2019	(x2)	Pembroke College Teaching Awards for Student Feedback
2018	top 10	Geophysical Fluid Dynamics (GFD) Fellowship
2016	1 st of 6	Christopher Prior Prize for Final Year Exams
2015	2 nd of 146	Institute for Mathematics and its Applications Prize

SELECTED PUBLICATIONS

- ¹C. J. Howland, C. S. Ng, R. Verzicco, and D. Lohse, “Boundary layers in turbulent vertical convection at high Prandtl number”, *Journal of Fluid Mechanics* **930**, A32 (2022).
- ²C. J. Howland, J. R. Taylor, and C. P. Caulfield, “Quantifying mixing and available potential energy in vertically periodic simulations of stratified flows”, *J. Fluid Mech.* **914**, A12 (2021).
- ³C. J. Howland, J. R. Taylor, and C. P. Caulfield, “Mixing in forced stratified turbulence and its dependence on large-scale forcing”, *J. Fluid Mech.* **898**, A7 (2020).
- ⁴C. J. Howland, A. Antkowiak, J. R. Castrejón-Pita, S. D. Howison, J. M. Oliver, R. W. Style, and A. A. Castrejón-Pita, “It’s Harder to Splash on Soft Solids”, *Phys. Rev. Lett.* **117**, 184502 (2016).