GRAHAM PATRICK BENHAM

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Education

10/2014 - 08/2018	DPhil Mathematics St Anne's College, University of Oxford, UK
09/2010 - 06/2014	MSci Mathematics (1st Class) University College London, UK

Professional Experience

05/2026 -	Associate Professor of Marine Fluid Dynamics Department of Mechanical Engineering University College London, UK
11/2025 - 05/2026	Associate Professor
05/2023 - 10/2025	Assistant Professor School of Mathematics and Statistics University College Dublin, Ireland
04/2022 - 04/2023	Departmental Lecturer in Applied Mathematics Mathematical Institute and Christ Church College University of Oxford, UK
01/2020 - 12/2021	Postdoctoral Researcher Institute for Energy and Environmental Flows University of Cambridge, UK
09/2018 - 09/2019	Postdoctoral Researcher LadHyX (Laboratoire d'Hydrodynamique X) Ecole Polytechnique, France

Career Breaks

09/2025 - 04/2026	Parental Leave - 20% Full Time Employment (FTE)

Awards, Prizes and Fellowships

2025	European Research Council (ERC) Starting Grant
2024	Climate Fellowship Award, Earth Institute, UCD

2024-2026	OCIAM Visiting Research Fellowship, Mathematical Institute, University of Oxford
2019	Chris Reddick Prize, InFoMM CDT, University of Oxford
2018	G Research DPhil Prize in Mathematics and Data Science
2017	SIAM Best Student Presentation Award British Applied Maths Colloquium, University of Surrey
2017	Graduate Development Scholarship St Anne's College, University of Oxford

Teaching Experience

2023 -	Lecturer, UCD *Partial Differential Equations, Multivariable Calculus for Engineers II, Maths of Sustainability and Environment, Applied Complex Variables* Applied and Computational Mathematics, 3rd and 4th year
2022 - 2023	Lecturer, Mathematical Institute, Oxford *Topics in Fluid Mechanics* Mathematics, Part C
2022 - 2023	Tutor, Christ Church College, Oxford *Dynamics, Geometry, Constructive Maths, Differential Equations I & II, Quantum Theory, Mathematical Biology, Probability, Waves and Fluids* Mathematics, Prelims and Part A
Jul 2022	Graduate Instructor *Fluid Dynamics of Sustainability and the Environment* Summer School Ecole Polytechnique, France
2020 - 2021	Tutor, St Catharine's College, Cambridge *Electromagnetism, Classical Mechanics, Thermodynamics* Physics, Part IB Natural Sciences
Jul 2020	Graduate Instructor UK Graduate Modelling Camp, University of Oxford
May 2020	Graduate Instructor ICMS Graduate Modelling Camp, ICMS, Edinburgh
2016 - 2017	Tutor, St Anne's College, Oxford *Dynamics, Geometry, Quantum Theory, Continuous Maths*

	Mathematics, Prelims, Part A
2014 - 2017	Class Tutor, Mathematical Institute, University of Oxford *Waves and Compressible Flow, Applied PDE's, Nonlinear Systems, Viscous flow.* Mathematics, Part A

Supervised Postdocs

2025 -	Saurabh Kumar, School of Maths and Stats, UCD VistaMilk project on *Modelling Soil Moisture in Irish Soils*

Supervised Graduate Students

2024 -	Daire O'Donovan, School of Maths and Stats, UCD PhD project on *Interactions between waves and multiple floating bodies*
2022 -	Gabriel Cairns, OCIAM, University of Oxford (with I.J. Hewitt) PhD project on *Subglacial drainage and seawater intrusion*
2024	Rory Ward, OCIAM, University of Oxford (with I.J. Hewitt) MSc project on *Optimisation of a rotating energy storage device*
2023	Mustafa Akman, UCD MSc project on *Network-based analysis of fluid dynamics in porous media*
2019	Rafid Bendimerad, LadHyX (with C. Clanet & M. Benzaquen) MSc project on *Wave drag in finite depth water*
2019	Xavier Yeponde, LadHyX (with C. Josserand & A. Huerre) MSc project on *Solidification in a conduit*
2018	Bastien Garitaine, LadHyX (with C. Clanet & M. Benzaquen) Internship on *Wave drag on asymmetric boats (experiments)*
2018	Louis Richard, LadHyX (with C. Clanet & M. Benzaquen) Internship on *Wave drag on asymmetric boats (numerics)*

Publications (h-index: 10)

[24] G Cairns, GP Benham, IJ Hewitt. Groundwater feedbacks on ice sheets and subglacial hydrology. Submitted, 2026.

[23] RC Ward, GP Benham, IJ Hewitt. Optimal operation of floating flywheel energy storage under fluctuating electricity. Submitted, 2026.

[22] RC Ward, IJ Hewitt, GP Benham. Optimal sail angles to drive circular motion. Submitted, 2026.

[21] D O'Donovan, MD Bustamante, O Devauchelle, GP Benham. Achieving optimal locomotion using self-generated waves. J. Fluid Mech., 1029, 2026.

[20] G Cairns, GP Benham, IJ Hewitt. Groundwater dynamics beneath a marine ice sheet. The Cryosphere, 19(9), pp.3725-3747, 2025.

[19] GP Benham, SJ Thomson, O Devauchelle. On wave-driven propulsion. J. Fluid Mech., 987, 2024.

[18] GP Benham. Anisotropy distorts the spreading of a fixed volume porous gravity current. Proc. R. Soc. A., 479(2279), p.20230271, 2023.

[17] GP Benham. The near-field shape and stability of a porous plume. J. Fluid Mech., 955, 2023.

[16] GP Benham, JA Neufeld, and AW Woods. Axisymmetric gravity currents in anisotropic porous media. J. Fluid Mech., 952, 2022.

[15] GP Benham, O Devauchelle, SW Morris, and JA Neufeld. Gunwale bobbing. Phys. Rev. Fluids, 7(7), p.074804, 2022. (*Editor's Choice*).
Featured in Physics Magazine and **Nature** as a *Research Highlight*.

[14] KP Gilmore, CK Sahu, GP Benham, JA Neufeld, and MJ Bickle. Leakage dynamics of fault zones: experimental and analytical study with application to CO_2 storage. J. Fluid Mech., 931, 2022.

[13] C Harris, S Jackson, GP Benham, A Muggeridge, and S Krevor. The impact of heterogeneity on the capillary trapping of CO_2 in the Captain sandstone. Int. J. Greenh. Gas Con. 112:103511, 2021.

[12] GP Benham, MJ Bickle, and JA Neufeld. Two-phase gravity currents in layered porous media. J. Fluid Mech., 911, 2021.

[11] T Babb, GP Benham, J Bows, R Gonzalez-Farina, KB Kiradjiev, WT Lee, and S Tibos. Predicting lift-off time when deep-frying potato dough snacks. SIAM J. Appl. Math., 81(2):574–590, 2021.

[10] GP Benham, MJ Bickle, and JA Neufeld. Upscaling multiphase viscous-to-capillary transitions in heterogeneous porous media. J. Fluid Mech., 922, 2021.

[9] GP Benham, R Bendimerad, M Benzaquen, and C Clanet. Hysteretic wave drag in shallow water. Phys. Rev. Fluids, 5(6):064803, 2020.

[8] GP Benham, C Cohen, E Brunet, and C Clanet. Brachistochrone on a velodrome. Proc. R. Soc. A, 476(2238):20200153, 2020.

[7] GP Benham, JP Boucher, R Labbé, M Benzaquen, and C Clanet. Wave drag on asymmetric bodies. J. Fluid Mech., 878:147–168, 2019.

[6] R Mondal, GP Benham, S Mondal, P Christodoulides, N Neokleous, and K Kaouri. Modelling and optimisation of water management in sloping coastal aquifers with seepage, extraction and recharge. J. Hydrol., 571:471–484, 2019.

[5] GP Benham, IJ Hewitt, CP Please, and PAD Bird. The effect of inner swirl on confined coaxial flow. (submitted), 2018.

[4] GP Benham, IJ Hewitt, CP Please, and PAD Bird. Optimal control of diffuser shapes for non-uniform flow. J. Eng. Math., 113(1):65–92, 2018.

[3] GP Benham, AA Castrejon-Pita, IJ Hewitt, CP Please, RW Style, and PAD Bird. Turbulent shear layers in confining channels. J. Turbul., 19(6):431–445, 2018.

[2] GP Benham, K Hildal, CP Please, and RA Van Gorder. Solidification of silicon in a one-dimensional slab and a two-dimensional wedge. Int. J. Heat Mass Transf., 98:530–540, 2016.

[1] GP Benham, K Hildal, CP Please, and RA Van Gorder. Penetration of molten silicon into a bed of fines. Int. Commun. Heat Mass Transf., 75:323–327, 2016.

Other Publications

[2] GP Benham. Mathematical modelling and optimisation of Venturi-enhanced hydropower. DPhil Thesis, University of Oxford, 2018.

[1] GP Benham. Vortex dynamics in sharp edged domains. Masters thesis, University College London, 2014.

Research Grants (€2.1M Total)

2025	ERC Starting Grant (€1.5M) SurFSUP - Surfing on Free Surfaces by Undulating Propulsion 1x PhD (4 years) and 3x Postdoc (2 years) + lab equipment, travel etc.
2024	VistaMilk II SFI Centre (€306k) Soil Modelling Group (Co-I with Lennon O'Naraigh & Saoirse Tracy) PhD (4 years) and Postdoc (2.5 years) funding on moisture transport in Irish soils
2023	Enterprise Ireland (€16k) Seed funding for writing my ERC Starting Grant Proposal
2022	Marie Curie Global Individual Fellowship (€277k) Total score: 95.0% (successful) 3 years of funding between MIT and Ecole Polytechnique *I declined this successful grant because I was awarded a Lectureship at the same time*

Presentations

2026	Applied and Computational Maths Seminar, IACM-FORTH, Crete

2025	European Fluid Dynamics Conference 2, UCD, Ireland. Applied Maths Seminar, University of Birmingham
2024	Rencontre du Non-Linéaire Conference, Université de Paris Cité; MACSI Seminar, University of Limerick; APS Division of Fluid Dynamics, Salt Lake City, USA; PDE Seminar, University of Athens
2023	Applied Maths Seminar, University of Warwick; Seminar at IPGP, Université de Paris; BAMC, Bristol; 3ME Seminar, TU Delft; Lecture at Cargèse Summer School on Waves and Vortices, Corsica; Seminar at the Earth Institute, UCD
2022	Fluids seminar, Imperial College London; Waves seminar, Engineering, University of Oxford; CCS workshop seminar, University College Dublin; Fluids seminar, DAMTP, University of Cambridge; OCIAM seminar, University of Oxford; Nonlinear Dynamics seminar, University of Manchester
2021	Sports Physics Conference, Lyon, France; Institute of Theoretical Geophysics seminar, University of Cambridge; Mathematical Geoscience seminar, University of Oxford; Isotope coffee seminar, Department of Earth Sciences, University of Cambridge; Geophysical and Environmental Processes seminar, DAMTP, University of Cambridge
2020	Applied maths seminar, University of Cardiff; Applied maths seminar, University College London; Seminar, BP Institute, University of Cambridge
2019	Applied maths seminar, University of Limerick, Ireland; APS Division of Fluid Dynamics, Seattle, USA
2018	Fluid dynamics seminar, LadHyX, Ecole Polytechnique, France; Presentation for the French Navy visit to LadHyX; Annual presentation with industrial sponsor, VerdErg Renewable Energy, London
2017	BAMC, University of Surrey; Woolly Owl Competition, DAMTP, University of Cambridge; APS Division of Fluid Dynamics, Denver, USA; Complex Motion in Fluids, Girton College, University of Cambridge; InFoMM Annual Meeting, Mathematical Institute, University of Oxford; Annual presentation with industrial sponsor, VerdErg Renewable Energy, London
2016	BAMC, University of Oxford; OCIAM seminar, Mathematical Institute, University of Oxford; InFoMM Annual Meeting,

	Mathematical Institute, University of Oxford; Annual presentation with industrial sponsor, VerdErg Renewable Energy, London
2015	InFoMM Annual Meeting, Mathematical Institute, University of Oxford; Elkem Silicon, Kristiansand, Norway

Conferences Organised

Dec 2022	Workshop on Mathematical Modelling in Carbon Capture and Storage Co-organisation of workshop at University College Dublin
Jun 2022	Colin Please Retirement Conference Co-organisation of a conference for the retirement of my former DPhil supervisor, Prof. Colin Please

Summer Schools, Workshops & Study Groups

2020	Participant: Innovative mathematics for the modern industrial strategy workshop, Isaac Newton Institute, Cambridge
2018	Participant: Maths with Industry Study Group (MISG), Adelaide, Australia; 138th European Study Group with Industry (ESGI), University of Bath; 146th ESGI, Cyprus
2017	Participant: Complex Motion in Fluids summer school, Girton College, University of Cambridge
2017	Visitor: GFD summer school, Woods Hole Oceanographic Institute, USA
2016	Participant: 125th ESGI, Cyprus University of Technology, Limassol, Cyprus; 116th ESGI, University of Durham
2016	Participant: 11th OpenFOAM Workshop, Guimarães, Portugal
2015	Participant: 107th ESGI, University of Manchester

Peer Review

Academic Journals:

Journal of Fluid Mechanics, Journal of Sports Engineering, Physical Review Fluids, Proceedings of the Royal Society A

Review of Research Grants:

Natural Environment Research Council (NERC), UK

Panels

Outreach Committee, School of Maths and Stats, UCD, 2023 -

Selection Committee for Stipendiary Lectureship in Pure Mathematics Christ Church College, University of Oxford, 2023

Undergraduate admissions at Christ Church College, 2022; St Anne's College, 2016

Outreach

"How do ducks move in water", Interview for *The Sports Engineering Podcast*, Spotify

Organising the *Women in Mathematics Day* at UCD, May 9th 2024

Research talks at *Keble Mathematics Subject Taster Day* (x 2), Oxford, Feb & Mar 2023

Research showcase to the Minister of Sport and the Minister of Higher Education, LadHyX, 2019

Research showcase to high school students, LadHyX, 2019

Mathemagicians walking tour of the city of Oxford, Oxford Maths Festival, 2017

Participated as a mathematician on TV show: Dara O'Briain's School of Hard Sums, Series 1 - 3, 2011 - 2013