Dr Ashley Brereton D.O.B 22/05/1987

Contact information

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Academic Positions

2020-present:
Post-doctoral research associate - Florida Atlantic University

2018-2020:
Post-doctoral research associate - Yonsei university

From 2013-2019:
Post-doctoral research associate - National Oceanography Centre

Visiting research fellow - Dept. of Mathematics, University of Liverpool

Research interests

Turbulence modelling, Regional ocean model development, Fluid dynamics, Large-Eddy Simulation, Plankton population dynamics, Bio-physical interaction

Key skills

- Extensive development and analysis of a variety of ocean and CFD models
- Skilled with Matlab, Python, FORTRAN, C++, Bash, Linux, Openmp and MPI
- Advanced high performance computing knowledge

Education

University of Liverpool

Ph.D., Applied Mathematics, 2014

Thesis: Phytoplankton aggregations in turbulent flow
Advisor: Dr. David Lewis

University of Liverpool

BSc. (1st class hons), Mathematics, 2009

Professional preparation

I have been a postdoctoral research associate for the past 6 years. I have specialised mainly in the development of ocean models, from small scale turbulence resolving models (Large-eddy simulation) to large scale oceanic models (NEMO, FVCOM). This has involved working extensively with model FORTRAN code and pre/post processing large data sets both model and observational with python and matlab. I specialise in high performance computing (HPC) and recently served as the representative for the scientific computing advisory group in the national oceanography centre.

Currently, I am interested in the dynamics of phytoplankton in the ocean, particularly the spatial patterns they make in spite of the turbulence that surrounds them. This involves understanding the nature of Lagrangian particle motions and how they interact with a complex turbulent fluid.

Professional preparation (cont.)

Aside from science, I have a passion for teaching. I have tutored privately for the past decade in mathematics, from elementary school age to undergraduate level to mentoring PhD students. I have also ran programming courses for students and colleagues, with content ranging from graphic visualisation methods to parallel programming techniques.

Journal Publications

Article in review**: Brereton, A**., Noh, Y. and Raasch, S A simple mechanism for the formation of phytoplankton thin layers simulated by large-eddy simulation. *Marine Ecology Progress Series*

Blackford, J., Alendal, G., Avlesen, H., **Brereton, A**., Cazenave, P.W., Chen, B., Dewar, M., Holt, J. and Phelps, J., 2020. Impact and detectability of hypothetical CCS offshore seep scenarios as an aid to storage assurance and risk assessment. *International Journal of Greenhouse Gas Control*, *95*, p.102949.

James, M.K., Polton, J.A., **Brereton, A**., Howell, K.L., Nimmo-Smith, W.A.M. and Knights, A.M., 2019. Reverse engineering field-derived vertical distribution profiles to infer larval swimming behaviors. *Proceedings of the National Academy of Sciences*, *116*(24), pp.11818-11823.

Brereton, A., Tejada-Martínez, A.E., Palmer, M.R. and Polton, J.A., 2019. The perturbation method-A novel large-eddy simulation technique to model realistic turbulence: Application to tidal flow. *Ocean Modelling*, *135*, pp.31-39.

Brereton, A., Siddons, J. and Lewis, D.M., 2018. Large-eddy simulation of subsurface phytoplankton dynamics: an optimum condition for chlorophyll patchiness induced by Langmuir circulations. *Marine Ecology Progress Series*, *593*, pp.15-27.

Lewis, H. W., **et al.** 2018. The UKC2 regional coupled environmental prediction system. *Geoscientific Model Development*, *11*(1), pp.1-42.

Graham, J.A., O'Dea, E., Holt, J., Polton, J., Hewitt, H.T., Furner, R., Guihou, K., **Brereton, A**., Arnold, A., Wakelin, S. and Sanchez, J.M.C., 2018. AMM15: a new high-resolution NEMO configuration for operational simulation of the European north-west shelf. *Geoscientific Model Development*, *11*(2), p.681.

Lewis, D.M., **Brereton, A**. and Siddons, J.T., 2017. A large eddy simulation study of the formation of deep chlorophyll/biological maxima in un-stratified mixed layers: The roles of turbulent mixing and predation pressure. *Limnology and Oceanography*, *62*(5), pp.2277-2307.

Wolf, J., Yates, N., **Brereton, A**., Buckland, H., De Dominicis, M., Gallego, A. and O'Hara Murray, R., 2016. The Scottish shelf model. Part 1: shelf-wide domain. *Scottish Marine and Freshwater Science*, *7*(3), p.151.

Hughes, V., **Brereton, A**. and Gold, E., 2013. Reference sample size and the computation of numerical likelihood ratios using articulation rate. *York Papers in Linguistics*, *13*, pp.22-46.

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Conference and invited talks	International workshop on modelling the ocean, Wuxi 2019
	Microscale ocean biophysics meeting, Whistler 2019
	PICES annual meeting, Yokohama 2018
	Mathematics and computing colloquium, Liverpool Hope university 2018
	American geophysical union conference, Portland 2018
	49th International Liege Colloquium on Ocean Dynamics, 2017
	70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, 2017
	Challenger Society Conference, Liverpool, 2016
	Turbulence Days, Warnemünde, 2015
	National Oceanography centre, Liverpool, 2014
	British Applied Mathematics Colloquium, Leeds, 2013
Referees	Available on request