ANDREW STYLES

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Atmospheric, Oceanic and Planetary Physics
University of Oxford
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EDUCATION

2019 - present
University of Oxford, UK
DPhil (PhD) in Physical Oceanography

2015 - 2019
University of Oxford, UK
Master's degree in Physics (MPhys)
Physics of the Atmospheres and Oceans major option
Theoretical Physics major option
First Class Honours (75%)

RESEARCH EXPERIENCE

2019 - present
DPhil Project
Ocean Physics group, University of Oxford

'The dynamics of the Weddell Gyre'
Supervisors: Prof. David Marshall and Dr. Mike Bell

Project Aim: To identify the leading order dynamics of the Weddell Gyre. Vorticity budgets, idealized models, and Lagrangian trajectory analyses are used to identify the internal forces and surface boundary conditions that constrain the horizontal circulation.

October 2018 - April 2019
MPhys Project
Geophysical Fluid Dynamics group, University of Oxford

'A laboratory model of the oceanic meridional overturning circulation'
Supervisor: Prof. Peter Read

Project Aim: To study the dynamical processes in a laboratory annulus experiment acting as an analogue to the North Atlantic basin. Infrared imaging and particle imaging velocimetry are used to study the development and stability of western boundary currents.

July 2018 – September 2018
Undergraduate Research Project
National Centre for Earth Observation, University of Leicester

'Investigating trace gas concentrations during the 2017 Boreal wildfire season'
Supervisors: Dr. Jeremy Harrison and Dr. David Moore

Project Aim: To estimate trace gas concentrations during the 2017 Boreal wildfire seasons using the Reference Forward Model (RFM) and spectra collected by the Infrared Atmospheric Sounding Intrerferometer (IASI).

PUBLICATIONS

Styles, A. F., Bell, M. J., Marshall, D. P., & Storkey, D. (2022). Spurious forces can dominate the vorticity budget of ocean gyres on the C-grid. *Journal of Advances in Modeling Earth Systems*, 14, e2021MS002884. https://doi.org/10.1029/2021MS002884

Styles, A. F., Marshall, D. P., Bell, M. J. The Sensitivity of an Idealized Weddell Gyre to Horizontal Resolution. *Journal of Geophysical Research: Oceans* (Submitted)
Preprint: https://doi.org/10.22541/essoar.167591042.21189159/v1

Sallée, J. B., and co-authors including **Styles, A. F.** Southern Ocean Carbon and Heat Impact on Climate. *Philosophical Transactions* (Revised)

AWARDS

2022 — **Outstanding Presentation Award**
Received a prize for the best talk at the Challenger Society Ocean Modelling annual meeting.

2019 - 2023 — **NERC studentship**
Awarded a fully funded place on the NERC Environmental Research DTP at the University of Oxford covering tuition, stipend, and research grant (Approx. £100,000).

2019 - 2023 — **Met Office CASE studentship**
Awarded a minimum of £1000 per year towards my DPhil project and access to Met Office computational resources and expertise.

July 2018 – September 2018 — **SURE summer studentship**
Awarded funding to carry out a summer research project at the University of Leicester (approx £1500).

2015 – 2019 — **Undergraduate awards**
Received the Met Office Academic Partnership prize (2019) for my MPhys research project.
Awarded a Lincoln College Exhibitioner prize (2016), a Scholarship prize (2017), and a Lord Crewe Scholarship prize (2018) for exceptional performance in preliminary, second year, and third year exams respectively.

RELEVANT RESEARCH SKILLS

- Numerical modelling of geophysical flows using the *NEMO Community Ocean Model.*
- Data analysis and visualization in *Python*, including the use of *Dask* when handling large datasets.
- Deploying and analyzing Lagrangian particle trajectories with *TRACMASS.*
- Open-source software development, including the use of *git* and automated testing.
- Created a diagnostic software package, *VCAN*, which is being actively developed.
- Experienced user of: *Python, Fortran, MATLAB, Julia, RStudio,* and *IDL.*
- Experienced user of Linux HPC systems such as *ARCHER2* and *Monsoon2.*
- A natural public speaker who reached the final of Nottingham University's national debating competition.

INVITED TALKS

November 2022	Sorbonne Université, Paris, France
October 2022	University of Exeter, Exeter, UK
May 2021	Met Office, Exeter, UK

TEACHING

2020 – 2022

Tutor at the University of Oxford

Conducted tutorials and problem classes for undergraduate students.

Taught a third-year fluid dynamics course for physicists and a third-year vector calculus course for earth scientists.

Responsible for the setting and marking of mock exams.

Provided written feedback for master's students taking the Physics of the Atmosphere and Oceans major option.

2020 – 2022

Demonstrator at the University of Oxford

Demonstrated for the postgraduate *Advanced Quantitative Methods* course. The course explores numerical methods used in contemporary and historic climate models.

February 2017

Teaching Physics in Schools

Visited a local state school in Oxford over six weeks to research common misconceptions in physics.

Taught A-level, GCSE, and Key Stage 3 classes.

OUTREACH

March 2022 (Upcoming)

Super Science Saturday: "Connected Planet"

Organising an outreach activity at the Oxford University Museum of Natural History.

Introducing primary school students to the idea of a connected ocean; the session focusses on coral reef connectivity and ocean plastics.

July 2017 - August 2019

UNIQ summer school

Academically and pastorally responsible for prospective physics students from disadvantaged backgrounds.

Lead workshops on university applications and interview skills.

SERVICE

2022 – Present

Peer review

Reviewer for the *Journal of Advances in Modeling Earth Systems* and *Ocean Dynamics*.

2022 – Present

DPhil student rep

Representing student interests on the Atmospheric, Oceanic and Planetary Physics sub-department committee.

2022 – Present

Working Group on EDI

Leading efforts to monitor and improve EDI within the Atmospheric, Oceanic and Planetary Physics sub-department.

GRADUATE COURSES

- *Ocean circulation*, University of Oxford (2020)
- *Geophysical Fluid Dynamics,* University of Oxford (2020)
- *Continuous Integration in Software Development*, University of Oxford (2020)
- *HPC: Introduction to advanced research computing and effective cluster use*, University of Oxford (2020)
- *Advanced Quantitative Methods*, University of Oxford (2019)
- *Scientific writing and presentations*, University of Oxford (2019)

PRESENTATIONS (*** talk // * poster)

December 2022	AGU General Assembly 2022 ***, *
September 2022	Challenger Society Ocean Modelling meeting ***
May 2022	EGU General Assembly 2022 ***
September 2021	Challenger Society Ocean Modelling meeting ***
April 2021	EGU General Assembly 2021 ***

REFEREES

Prof. David Marshall
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Dr. Mike Bell
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