SAM HARTHARN-EVANS

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Researcher studying stratified flows through laboratory experiments and lab-scale simulations. Applies a combined laboratory and numerical approach to geophysical flows, analysing using multi-disciplinary background. Confident communicating results through engaging presentations, and producing graphics and animations.

RESEARCH EXPERIENCE

Senior Research Assistant: **Fluid Dynamics of the Ice Shelf Ocean Boundary Layer**

Northumbria University Sept 2023 - present

Supervisors: Prof. Adrian Jenkins

- Development of a laboratory setup to study ice shelf-ocean boundary layer processes.
- Adapted numerical model (SPINS) to this novel problem in stratified fluids, to understand laboratory setup required.
- Supported the preparation of a NERC Pushing the Frontiers Grant as Researcher Co-lead.

PhD Research: **Internal Solitary Waves in Ice Covered Waters**

Newcastle University Sept 2019 - Sept 2023

- Laboratory investigation into Internal Solitary Waves in Ice-Covered Waters, developing techniques for flow visualisation and analysis (using Particle Image Velocimetry and Particle Tracking Velocimetry), designing and executing experiments in stratified fluid flows.
- Published each chapter in a high ranking peer-reviewed journal.
- Use of High Performance Computing facilities to model fluid flows. Processing, analysis and presentation of model and laboratory data.

NERC ONE Planet DTP Funded (grant [NE/S007512/1])

Research Exchange: **Understanding Mixing in Internal Wave Simulations**

University of Waterloo Jun-Jul 2022

- Six week research exchange to work at University of Waterloo, Canada with Prof. Marek Stastna on a new method of understanding mixing in the SPINS numerical model.

Supported by Turing Global Fellowship

EDUCATION

PhD Applied Mathematics

Newcastle University Sept 2019 – Jan 2024

Thesis: **Experimental and Numerical Modelling of Boundary Effects on Internal Solitary Waves** - Supervisors: Dr. Magda Carr, Prof. Andrew Willmott, Prof. Adrian Jenkins

- Awarded runner up for 2024 Osborne Reynolds PhD competition for oral presentation and written summary of PhD work.

IT & COMPUTING

Microsoft Office	●●●●●
MATLAB	●●●●●
LaTeX	●●●●○
DigiFlow: Advanced image processing for fluid mechanics	●●●●○
SLURM / HPC	●●●○○
Affinity Designer (vector graphics editor)	●●●○○

Experience with Make, Python, Arduino, Git/GitHub and C++

ADMIN & TEACHING

UK Polar Network | Co-President

Sept 2023 – Sept 2024

Co- Vice President

Sept 2024 – Sept 2025

- Managed the UKPN's committee, to support UK Polar Early Career Researchers.
- Strategic planning of the UKPN's activities, priorities and governance structures
- Representing UKPN, and polar ECRs in a variety of different forums, including the British Antarctic Territory.

Teaching

- Delivered in-class assistance, demonstrating the use of Python for mathematical problem solving for MAS-1803 first year introductory programming module.
- Marked assignments for first year statistics course, and second year Fluid Dynamics problem sheets.
- Co-supervised two MMath Students and two BSc Physics students on projects, facilitating use of the SPINS numerical model.
- Associate Fellow of Higher Education Academy (2023).

MSc Physical Oceanography - **First**

Bangor University 2018 – 2019

Thesis: **How does Siberian river outflow impact the onset and duration of sea ice formation and melt** - Supervisor: Dr. Yueng-Djern Lenn

- Awarded Darbyshire Postgraduate Prize for the best postgraduate student in Marine Physical Sciences, and £6250 Nautilus Scholarship - given to support MSc students in Ocean Sciences awarded the highest grades for their BSc.

BSc (Hons) Marine Biology & Oceanography - **First**

Bangor University 2015 – 2018

Dissertation: **What would the global climate implications of turning off the rivers flowing into the Arctic Ocean be?** Supervisor: Prof. Tom Rippeth

Wirral Grammar School for Boys

Bebington, Wirral 2008 – 2015

- A Levels in Biology (**A***), Mathematics (**A***), Further Mathematics (**A**), Geography (**A**) & General Studies (**A**)
- **11 GCSEs A*-B**

VOLUNTEERING

Secretary | UniBrass Foundation

Feb 2019 – Present

- Collaborated with a team of trustees and 50 volunteers to put on 2-3 large arts events a year, to increase student participation in brass banding.
- Produced agendas, minutes and trustees annual reports, and other charity administration.
- Wrote, reviewed, and ensured compliance of charity policies, including EDI, Data Protection, Health and Safety, Safeguarding, and Financial Procedures.
- Running outreach projects to increase awareness of university brass bands with youth band players; website renovation and maintenance; fundraising and grant applications.
- Taking on full legal responsibilities of Charity Trustee.
- Represented UniBrass as a volunteer at other brass band events, working with professional musicians and young people to deliver seamless events

Peer review

Assisted peer review of 5 articles submitted to Journal of Fluid Mechanics, Communications Earth & Environment, Geophysical Research Letters, and Physical Review Fluids.

Outreach

Sept 2021 - Sept 2022

Organised and delivered the ONE Planet Outreach scheme as part of a team of PGR students, which delivered over 7 events educating the public on issues relating to environmental change including on-campus school visits, a science fair at the Hancock Museum.

Treasurer | UK Polar Network

Sept 2021 – Sept 2023

- Managed the finances of the UKPN, to support UK Polar Early Career Researchers.
- Performed strategic budgeting to enable project groups to plan activities for the year

PUBLICATIONS

- **Hartharn-Evans, S.G.**, Stastna, M. & Carr, M. (2024). A new approach to understanding fluid mixing in process-scale models. *Nonlinear Process. Geophys.* https://doi.org/10.5194/npg-31-61-2024
- **Hartharn-Evans, S.G.**, Carr, M. & Stastna, M. (2024). Interactions between Internal Solitary Waves and Sea Ice. *Geophys. Res. Lett.* https://doi.org/10.1029/2023JC020175
- **Hartharn-Evans, S.G.**, Stastna, M. & Carr, M. (2022). Dense pulses formed from fissioning internal waves. *Environ Fluid Mech* https://doi.org/10.1007/s10652-022-09894-x
- **Hartharn-Evans, S. G.**, Carr, M., Stastna, M., & Davies, P. (2022). Stratification effects on shoaling internal solitary waves. *Journal of Fluid Mechanics*, **933**, A19. https://doi.org/10.1017/jfm.2021.1049

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SELECTED PRESENTATIONS & CONFERENCES

Maths on Ice Forum | Oral Presentation | **Online** | 19 Sept 2024 | *The ice-ocean interface in a lab: Internal Solitary Waves and Meltwater Plumes*

Osborne Reynolds Day PhD Competition | Oral Presentation | **Manchester** | 5 July 2024 | *Experimental and Numerical Modelling of Boundary Effects on Internal Solitary Waves*
Runner up for the Osborne Reynolds Day PhD Competition Forum for Research into Ice Shelf Processes (FRISP) | Poster | **Bremerhaven, Germany** | 19 - 24 Jun 2024 | *Ice Shelf Ocean Boundary Layers at the Laboratory Scale*

EGU24 General Assembly | **Oral Presentation** | Vienna | *14–19 Apr 2024*
A new approach to understanding fluid mixing in process-study models of stratified fluids

BRIDGE Group Seminar | Invited Seminar | **Bristol** | 14th Mar 2023 | *Transformation of Internal Waves on a slope: The effects of Stratification*

Hull University Fluids Group | Invited Seminar | **Hull** | 16th Feb 2022 | *Experimental and numerical modelling of internal solitary waves*

Challenger 150 Conference | Oral Presentation | **London** | 5th Sept 2022 | *The Interaction of Internal Solitary Waves and Sea Ice in the Laboratory*
Ocean Modelling SIG: Understanding the “how and where” of mixing from shoaling internal waves using joint probability distributions

IX International Symposium on Stratified Flows ISSF | Oral Presentation | **Cambridge** | 29th Aug 2022 | *The interaction of internal solitary waves and sea ice in the laboratory*

Leeds Fluids CDT Conference | Invited Oral Presentation | 17th Jun 2021 | *Stratification effects on Shoaling Internal Solitary Waves*

vEGU 2021 | vPICO Poster & Lightning Talk | 26th Apr 2021 | *Stratification effects on shoaling Internal Solitary Waves*
Awarded virtual Outstanding Student Poster Presentation