Jordan McCarney
Curriculum Vitae

School of Mathematical Sciences,
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Education

2022— 2026 **Ph.D. in Mathematics**
"Mathematical Aspects of Internal Wave-Current Interactions"
University College Cork (UCC), Advisor: Dr. David Henry.

2018— 2022 **B.Sc. in Theoretical Physics**
"Roulettes and Pedal Curves: Generation of Road-Wheel Pairs"
National University of Ireland, Galway (NUIG) [now University of Galway.]

Research Interests

Ordinary and Partial Differential Equations, Nonlinear Analysis, Geophysical Fluid Dynamics, Water Waves, Atmospheric Flows, Wave-Current Interactions, Free-Boundary Problems.

Publications

2025

[1] D. Devine and **J.McCarney**. Flow underlying coupled surface and internal waves with lower layer vorticity. *In preparation.*

[2] T.Lyons and **J.McCarney**. Nonlinear temperature dependent enthalpies in exact nonlinear mountain waves, *Differential Integral Equations, in press.*

[3] T.Lyons and **J.McCarney**. Temperature dependent precipitation in exact nonlinear mountain waves, *J. Math. Fluid Mech.*, 27(3)

2024

[4] **J.McCarney.** Nonhydrostatic internal waves in the presence of mean currents and rotation, *J. Math. Phys.*, 65(4)

2023

[5] **J.McCarney.** Exact internal waves in the presence of mean currents and rotation, *J. Math. Phys.*, 64(7)

Awards and Prizes

I received this award for my independent research article [4].

2024   **Postgraduate Publication of the Year**
UCC College of Science, Engineering and Food Science.

Invited Research Presentations

2025

18 Nov   **Oberseminar Analysis und Theoretische Physik**
Leibniz University, Hannover, Germany. (Oral presentation)

16-19 Jun   **"Modelling of fluid propagation: mathematical theory and numerical approximation"** International Centre for Mathematical meetings,
Castro Urdiales, Spain. (Oral presentation)

2 Apr   **Mathematics and Physics Seminar**
SETU, Waterford, Ireland. (Oral presentation)

26 Mar   **PDE Seminar**
UCC, Cork, Ireland. (Oral presentation)

2024

28-30 Aug   **"Water Waves-Mathematical Theory and Applications"**
Plymouth, UK. (Poster and short presentation)

27-31 May   **EWM-EMS Summer School: "Water Waves and Nonlinear Dispersive Equations"**
Mittag-Leffler Institute, Stockholm, Sweden. (Poster and short presentation)

Invited Visits to Research Institutes

2025

16-19 Jun   **International Centre for Mathematical Meetings**, Castro Urdiales, Spain.
"Modelling of fluid propagation: mathematical theory and numerical approximation".

2024

27-31 May	**Mittag-Leffler Institute**, Stockholm, Sweden. EWM-EMS Summer School: "Water Waves and Nonlinear Dispersive Equations".

2023

22-25 May	**Erwin Schrödinger Institute**, Vienna, Austria. "The Dynamics of Planetary-scale Fluid Flows".

Supervision

2026

B.Sc. Mathematical Sciences Thesis
Ms. Megan Flynn, "Topological degree theory and its applications".

Teaching

Teaching Assistant - UCC
AM4063 Partial Differential Equations with Applications II
AM3063 Partial Differential Equations with Applications I
AM3052 Introduction to Fluid Mechanics and Wave Theories
AM2071 Transform and Variational Methods

Tutor - UCC
AM2061 Computer Modelling and Numerical Techniques
AM1052 Introduction to Mechanics

Tutor - NUIG
Physics Undergraduate Problem Solving - One-on-one tutorial support sessions for 1st year physics students

2024	**Pedagogical Development - UCC** Successfully completed "PG6003 Teaching and Learning for Graduate Studies".

Referee Activity

I have been invited to act as a referee for the following international research journals:

- *Journal of Mathematical Physics,*
- *Nonlinear Analysis: Real World Applications,*
- *Qualitative Theory of Dynamical Systems.*