James Bridgwater Court

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MEng (1st Class Hons.) in Mechanical Engineering from the University of Bath, and over 8 years' experience of working at a PhD level within the research and innovation funding space for marine renewables. Experience in integrating high-fidelity numerical modelling of marine renewable energy devices with control system and power take-off modelling. Productive collaborations with energy developers within a project funding framework.

Research interest: Maximising the contribution of renewables to electricity supply through diversification of sources. Employing expertise in high-order numerical modelling and deep learning techniques to make affordable, bankable high-fidelity simulations of marine renewable energy devices a reality.

Broader interest in employing programming to make the most of technological advancements.

Education

Oct 2015-Jul 2021: PhD In Mechanical Engineering, University of Bath (Paused)

Co-Simulation of Hydrodynamics and Power-Take-Off Dynamics for Wave Energy Converters

Experience and proficiencies:

- Use of OpenFOAM for CFD in co-simulation with Simulink for power take-off and control modelling to test validity of commonly-used simplifying assumptions.
  - Validation and verification of new code.
  - Customisation of iterative solution algorithm for co-simulation whilst preserving accuracy.
    - R for validation, verification and postprocessing of CFD results.
    - C++ for modifications to OpenFOAM.
    - Matlab & Simulink for co-simulation interface and PTO & control modelling.
  - Effective communication and collaboration with peers and supervisors.
  - National and international presentation of research, to both specialist and non-specialist audiences.
  - Experience in publication of conference and journal papers.
  - Contribution to regular project funding reports.

Key finding:

- Commonly used modelling simplifications impractical for technological development, however higher-fidelity modelling financially unviable.
  - Promising methodology identified employing quantitative deep learning to reduce the cost of high-fidelity modelling approaches.

1st Oct 2010-July 2015: MEng (1st Class Honours) Mechanical Engineering, University of Bath

- Awarded James Clayton Undergraduate Scholarship by IMechE.
- Master’s level proficiencies: Advanced Control, System Modelling & Simulation, Computational Fluid Dynamics, Heat Transfer and Fluid Power.
- Dissertation project: Novel Control Strategies for the CCell Wave Energy Converter

Sept 2002-June 2009: The Judd School, Tonbridge

- A-levels: Mathematics (A), Further Mathematics (A), Physics (A), French (A). AS levels: Chemistry
- Merits in Advanced Extension Awards for Physics and French
- GCSEs: 7 A*s, 3 As

Employment history

July 2021-Ongoing: Career Break

Had to end PhD research due to cancer treatment – since completed with no ongoing symptoms – combined with the coronavirus pandemic.

This has been a useful time for exploring national and international funding streams for innovative technologies within the areas of coastal engineering, renewable energy and sustainability arising from my earlier work.

November 2018-October 2019: Research Assistant in Medical Robotics, University of Bath

Developing assistive device employing computer vision to inform surgical drilling

Experience and proficiencies:

- Project management.
- Effective collaboration with consortium partners.
- Simulation of computer vision system using OpenCV within C++ and Python.
- Liaising with and presenting regularly to project partners to maintain funding.
- Development of device prototypes.
- Proactive adaptations to focus group responses.
- Contributions to published project research output.

February-September 2014: Researcher, Zyba Renewables Ltd

Company developing CCell Wave Energy Converter

Experience and proficiencies:

- Project management within Proof of Concept project.
- Determination of system costs using analytical modelling with R and Excel.
- Use of CFD calculations in OpenFOAM to determine optimum device geometry.
- Presented at project consortium board meetings, contributed to quarterly funding reports.

July-December 2012, July-September 2013: Student Engineer, Wind Prospect Ltd

International wind energy consultancy firm

- Research projects looking at data for operational sites and comparing to retrospective Wind Resource Assessments
- In-depth analysis of results using Excel and VBA

September 2009-September 2010: Student Engineer, Waukesha Magnetic Bearings Ltd

Developer and supplier of active magnetic bearings for turbomachinery

- Use of AutoCAD to generate schematics and cable diagrams
- Commissioning visit to client

IT Skills

Programming:

R (Advanced); Matlab (Intermediate); C++, VBA, Python (Experienced beginner)

Other:

OpenFOAM for multiphase, multi-DoF body motion wave-structure interaction simulations (Advanced); SolidWorks/Solid Edge (Intermediate); AutoCAD (Intermediate); ANSYS CFX (Intermediate); 20-Sim (Intermediate); Simulink (Intermediate); Git (Intermediate); WEC-Sim (Intermediate)

Languages:

English (Native); French (Fluent); German (Intermediate); Spanish and Italian (Good)

Interests

Active family life involving travel, music, theatre and cycling.

Other work

July 2021-Ongoing

Ad hoc bar and waiting shifts

Professional Membership

Formerly Associate member of the IMechE, interested in pursuing chartership once in post.

Volunteer Roles

Co-production of children's workshops at festivals.
Distribution of supplies through local food bank.
Event co-ordinator and volunteer within the local community.

References

Dr Andrew Hillis, Senior Lecturer in the Department of Mechanical Engineering at the University of Bath: A.J.Hillis@bath.ac.uk
Prof. Andrew Plummer, Professor in the Department of Mechanical Engineering at the University of Bath: A.R.Plummer@bath.ac.uk

Publication List

Conference papers:

- J. Bridgwater Court, D. Chandel, N. Sell, A. Plummer, and A. Hillis, "Modelling of array interactions for a curved OWSC using OpenFOAM," in Proceedings of the Twelfth European Wave and Tidal Energy Conference (A. Lewis, ed.), (University College Cork, Ireland), pp. 776-1–776-10, EWTEC, Aug 27–Sep 1 2017. ISSN: 2309-1983.

Poster presentations at Third Annual PRIMaRE conference (2016), Maynooth Wave Energy Workshop 2016, University of Bath HPC Symposium 2018

Oral presentations of research at Third Annual PRIMaRE conference (2016), Twelfth European Wave and Tidal Energy Conference (2017)