Yujia Wei

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Professional Profile

Research Fellow in Multiphysics and Computer Vision at Cranfield University (UK), specializing in fluid-structure interactions, wave-structure interaction, and AI driven physical modelling. Holds a PhD from the University of Strathclyde with years of expertise in CFD modellings. Passionate about solving complex problems with fluids, structures and energies.

Key Achievements

- Published in top journals with 11 papers.
- Working for intelligence computing for Airbus Project.
- Leading guest editor in Special issue "Hydroelasticity of Marine Structures: From Ships to Offshore Renewables".
- Awarded the GFIL Future Frontiers Fund for innovative research in 2024.

Core Skills

- Computational Modeling: Expertise in CFD, FEA, AI using OpenFOAM, ABAQUS, ANSYS, pytorch, etc.
- Programming Capability: Years experience in C++, Python, and open-source software development.
- Data Analysis and Machine Learning: Proficient in data handling and applying ML/DL techniques.
- Project Management: Experience leading research projects & problem-solving & international collaboration.

Education

Ph.D in Naval Architecture, Ocean Engineering, University of Strathclyde — Sept 2019 – Mar 2023

- **Thesis:** Fluid-structure interaction models on the hydroelastic analysis of containerships in waves.

MSC, in Naval Architecture, Ocean Engineering, University of Strathclyde — Sept 2018 – Jun 2019

- GPA: Distinction

BSC, in Naval Architecture, Ocean Engineering, University of Strathclyde — Sept 2013 – Jun 2017

- GPA: Honor

Experience

Research Fellow, Cranfield University (UK)-Airbus — Mar 2024 – Current

- Lead research in an EPSRC joint project with Cranfield University and Airbus.
- Developed an innovative surrogate model using Graph Neural Networks (GNN) to significantly reduce computational costs compared to traditional CFD modeling.
- Implemented transfer learning techniques for high-compression hydraulic systems analysis, enabling mixed-precision classification and performance prediction under extreme conditions.
- Created a Reduced Order Model (ROM) to accelerate Fluid-Structure Interaction (FSI) simulations by integrating GNN architecture with physics-informed constraints.
- Tools Used: pytorch, OpenFOAM, Python, GPU computing.

Research Fellow, Cranfield University (UK) — Mar 2023 – Mar 2024

- Research in fluid-structure interaction modelling for renewable energy applications focuses on structural optimization for floating solar panels, wave energy converters, and offshore wind turbines.
- Tools Used: OpenFOAM, Abaqus, MATLAB/Simulink, High-Performance Computing (HPC).

Research Assistant, University of Strathclyde — Jan 2021 – Nov 2022

- Contributed to an EU project by designing a marine logistics course.

Publications

Throughout my career, I have a great track record with 11 published journals and 3 conference papers focusing on innovative solutions for ocean engineering, renewable energy and sustainability for offshore marine structures. The list of my three most relevant works is below.

1. **Wei, Y.**, Yu, S., Jin, P., Huang, L., Elsherbiny, K., Tezdogan, T. (2024). Coupled analysis between catenary mooring and VLFS with structural hydroelasticity in waves. *Marine Structures*, 93, 103516.
2. **Wei, Y.**, Wang, C., Chen, W., Huang, L. (2024). Array analysis on a seawall-type of deformable wave energy converters. *Renewable Energy*, 120344.
3. **Wei, Y.**, Zou, D., Zhang, D., Zhang, C., Ou, B., Riyadi, S., Huang, L. (2024). Motion characteristics of a modularized floating solar farm in waves. *Physics of Fluids*, 36(3).

Projects

LandOne (Airbus) 2024

- Developed a robust, scalable deep-learning framework for academic use.
- Facilitated cross-disciplinary collaboration with industry partners for various research needs.
- Tools Used: Python, Pytorch, Doxygen, Git

Solar2Wave (Helix Solar) 2023

- Hydroelasticity analysis on a modular solar farm system in the wind, wave and current conditions.
- Tools Used: OpenFOAM, MBDyn, ANSYS

Ship hydroelasticity (Bureau Veritas) 2019

- Developed an integrated CFD-multibody FSI framework to analyze ship hydroelasticity in waves.
- Comprehensive analysis of ship hydroleastcity in focused wave and damaged ship conditions.
- Tools Used: C++, OpenFOAM, MBDyn, ABAQUS

Research Awards

The excellent quality of peer reviewer (05/2024): Research certificate in Ocean Engineering (ELSEVIER).

Pool of Experts (PoE) (03/2024): Pool of Experts (PoE) of the United Nations Regular Process.

Principal Investigator (07/2023): GFIL Future Frontiers Fund (FFF) - "Experimental Analysis on Integration of Wave Energy Converter onto Large-Scale Modular Floating Photovoltaic Platform." Funding: £7,562.

Researcher (11/2019): Maritime Logistics Engineering and Management (MarLEM). Funding: £42,579.

Professional Membership

Ocean Engineering (OE) peer reviewer:
Actively providing valuable feedback on submitted papers and enhancing the quality of research for the journal.

Associate member of the Royal Society of Naval Architects (OMAE):
Participating in meetings and events related to naval architecture and contributing to the organization's activities.

Associate member of the Royal Society of Naval Architect (RINA):
Participating in meetings and events related to naval architecture and contributing to the organization's activities.