

# Undergraduate Research Project Proposal

## Wave Star Wave Energy Converter Modelling

The growing demand for environmentally friendly and sustainable energy solutions has ignited a heightened interest in harnessing the power of ocean waves as a promising source of renewable energy. The Wave Star Energy Converter (WSEC) is a technology designed to capture and convert the energy from ocean waves into electricity. This project focuses on modelling and simulating the Wave Star Energy Converter to assess its performance and practicality for power generation. The project involves mathematical modelling, simulation, and analysis of the WSEC system under various wave conditions to evaluate its efficiency and potential as a viable energy solution.

The objective of this project is to develop a comprehensive numerical model of the Wave Star Energy Converter (WEC) utilizing advanced hydrodynamic simulation techniques. Our aim is to create a detailed mathematical representation that encompasses mechanical, hydrodynamic, and electrical behaviours. We will implement this mathematical model into simulation software such as MATLAB and simulate the behaviour of the WSEC system under varying wave conditions, considering different wave heights, periods, and directions. Additionally, we will analyse the performance metrics of the WSEC, including power output, efficiency, and dynamic response, for various operational scenarios.

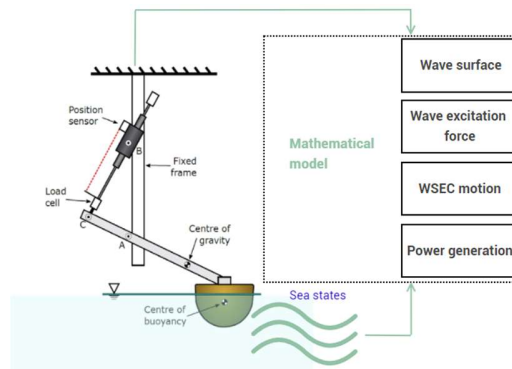


Fig. 1 – The Wave Star Wave Energy Converter (WEC) that captures energy across a spectrum of diverse sea states.

**Special requirements:** Matlab. No ethical approval is required.

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