



Applied and Computational Mathematics Seminar

Title: A Numerical and Experimental Investigation on the Interaction Between Meteorological Conditions and Ocean Waves

Speaker: Claire Bergin (UCD)

Date: Wed 12th February 2025 at 10:00AM

Location: (See abstract)

Abstract: This seminar will take place in Science East E1.19.

This talk summarises the key points of my thesis. It focuses on lesser investigated meteorological features, rainfall and atmospheric pressure, and their interaction with ocean waves. These are investigated using experimental, observational, and numerical methods. First, the wave measurements of a small data buoy and large meteorological buoy are compared with a long standing large data buoy off the west coast of Ireland.

Next, the effect of rainfall intensities on vertical surface displacements, as well as energy dissipation is investigated. Two different scales of experiment were deployed. One focused on small scale, high frequency waves in a lake, and the other investigated larger scale wave fields found at sea. The two new methodologies devised for in-situ experiments are outlined and their results presented. To build on this research, the first numerical investigation of rainfall on a monochromatic wave was designed and run. It was found that for non-breaking waves, an increase in rainfall intensity leads to increased energy dissipation.

Finally, a study is presented following reports of strange tidal activity across north-west Europe in the summer of 2022. After analysing atmospheric pressure and tidal data, it can be concluded that the dramatic tidal activity witnessed by locals was in fact a series of meteotsunamis.