NERC-funded Research Experience Placement (REPs) Summer 2025

Project title
Exploring Mesozooplankton Dynamics around South Georgia using Imaging Technologies

Lead supervisor
Vicky Fowler

Project description
Zooplankton are a critical component of the marine ecosystem, transferring energy and nutrients from primary producers to higher trophic levels; influencing ocean carbon storage through their role in the biological carbon pump; and as indicators of environmental change. In the waters around South Georgia (Scotia Sea), the zooplankton community supports globally important populations of higher predators such as seals, penguins and whales, and sustains valuable commercial fisheries. However, the Southern Ocean (SO) is experiencing rapid warming, making understanding changes in zooplankton communities a priority for ongoing management and conservation of the ecosystem. Over the past 40 years British Antarctic Survey (BAS) scientists have collected zooplankton samples from around South Georgia, providing an excellent time series. Traditionally, zooplankton samples are collected using nets and analysed using microscopy. However, this can be challenging, time-consuming and costly (both in terms of finances and carbon) to achieve at the resolution required to recognise emerging trends and provide detailed monitoring. New approaches are therefore being developed including imaging technologies and machine-learning techniques, these offer the possibility to obtain a range of ecological parameters at reduced financial and carbon costs, as well as increasing temporal and spatial resolutions.

This project will utilise zooplankton samples collected during previous field campaigns around South Georgia. Samples will be analysed through the use of a laboratory based ZooScan imager. Images will be classified using EcoTaxa (an online machine assisted learning platform) and analysed for metrics such as abundance, diversity and size spectra to examine mesozooplankton trophic structures, and spatial and temporal variability around South Georgia. Microscope taxonomy may also be utilised to verify the ZooScan image classifications.

Project restrictions
None noted.

Working arrangements
Integration into the Ecosystems team at BAS will be through attending team meetings and seminars. Due to BAS's flexible approach, these are hybrid with participants attending both in person and online, allowing remote work. Once samples have been processed through the ZooScan in the laboratories at BAS, the student will work closely with supervisors to carry out image classification and analysis remotely using online platforms.