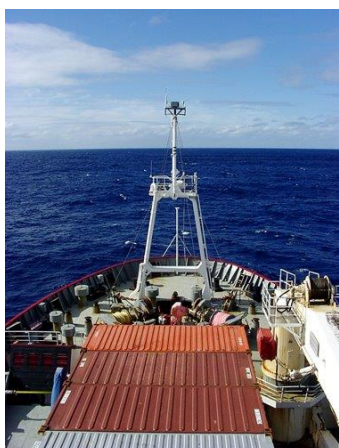


Great Western Four+ Doctoral Training Partnership (GW4+ DTP)

The microscopic world of nature in seawater: Which phytoplankton cells use N-osmolytes?



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Scientific Background: Seawater houses a microscopic world of nature, invisible to the naked eye, essential to the life support for our planet. These tiny cells use compounds called osmolytes to survive in a salty environment, and these osmolytes, particularly the ones containing nitrogen have great environmental relevance in marine ecosystems, providing **essential nutrients** (C, N) for planktonic marine bacteria, and their breakdown by microbes can release **climate active trace gases** such as methylamines. Despite their importance, we know very little about which phytoplankton (microscopic algae cells) use nitrogen-containing osmolytes (N-osmolytes), particularly in natural ecosystems.

This PhD is an exciting opportunity to create a step change in our understanding of which phytoplankton use N-osmolytes in coastal and open ocean environments. The approach is state of the art, combining flow cytometry cell sorting of natural phytoplankton assemblages with analytical chemistry detection of N-osmolytes. The result will provide novel and extremely timely datasets which will aid understanding of biogeochemical nitrogen cycling, and potential hotspots of sources of methylamines to the atmosphere. The student will:

- Carry out a novel seasonal study at the Western Channel Observatory sorting major phytoplankton groups using flow cytometry and LC/MS to detect their N-osmolyte composition.
- Participate in an Atlantic Meridional Transect cruise (AMT, www.amt-uk.org/) to determine the N-osmolyte composition of phytoplankton groups across both productivity gradients and an oceanic gyres.
- Perform size fractionation experiments to determine N-osmolyte content of the larger phytoplankton fraction too large to sort by flow cytometry.



Requirements and Research environment: We seek an excellent, enthusiastic student with attention to detail to carry out research in coastal and open ocean environments. Candidates must be prepared to go to sea for a period of up to 8 weeks. He/she must achieve at least a 2:1 BSc Honours in a physical or biological science, be capable of independent and team work and be excited about working across disciplines. Based at Plymouth Marine Laboratory this studentship will be carried out in a multidisciplinary research environment with access to unique fieldwork platforms. PML offers a dynamic working environment with a mixed population of students, scientists and support staff. Candidates are encouraged to contact the lead supervisor (ruai@pml.ac.uk) for further information.

