Applications to Melody Clark by midnight Sunday 18th June
Interviews will take place either end of the week of 19th June or early in the week starting 26th June. Studentship must be confirmed by 30th June.

Title: Exploitation of polar algal strains for future biotech
Lead Supervisor: Professor Melody Clark, British Antarctic Survey,mscl@bas.ac.uk
Co-Supervisor(s): Dr Matt Davey, Department of Plant Sciences, mpd39@cam.ac.uk
Professor Alison Smith, Department of Plant Sciences, as25@cam.ac.uk

Background: Oceans cover approximately 75% of the planet's surface, and are estimated to contain 80% of the World's biodiversity. They encompass a wide range of habitats, from deep oceans, hydrothermal vents, through hypersaline lakes to frozen seas and provide us with a natural catalogue of highly adapted organisms capable of thriving under extreme conditions. These represent tailor-made biological systems for potential biotechnological exploitation (Rothschild & Mancinelli, 2001; Margesin & Feller, 2010), particularly those organisms living in very cold conditions, psychrophiles, which have evolved biomolecules with physical, chemical and catalytic features that could be of great value across many biotechnological processes (Struvay & Feller, 2012), including low energy solutions to industrial processes. Polar algae, specifically diatoms, represent a tractable renewable source of novel cold-adapted compounds.

References: Rothschild, L.J. & Mancinelli, R.L. (2001) Life in extreme environments. Nature. 409, 1092; Margesin, R. & Feller, G. (2010) Biotechnological applications of psychrophiles. Environmental Technology. 31, 835; Struvay, C. & Feller, G. (2012) International Journal of Molecular Sciences. 13, 11643

Project summary: Unicellular marine algae are an extremely diverse group of organisms, many of which have evolved unique strategies to adapt to different environmental conditions and this translates in a great richness in potentially novel and unexplored metabolic compounds. Polar algae are particularly poorly explored as a source of novel compounds and are also poorly represented in the national culture collection (CCAP) at the Scottish Association of Marine Sciences. The aim is to use polar algae from the CCAP and also isolate new strains from the natural environment. Evaluate the performance of the chosen algal strains under different growth conditions, including those outside of their optimum range to stimulate the production of "stress" compounds. These metabolites will be characterised via metabolite MS analyses and any novel compounds identified screened for potentially useful proteins via in vitro assays.

The student will work with both strains from the CCAP and isolate new strains from the natural environment (subject to a successful CASS (Collaborative Antarctic Science Scheme) application for Antarctic field work). Strains will initially be grown in specialised facilities at BAS, with a 3-6 month placement at Algaplex to optimise growth conditions and scale-up of cultures for selected strains, identified as Thallassiosira in the first instance. Cultures will be grown under different environmental conditions to optimise growth conditions and also stimulate the production of potentially useful "stress" proteins. Metabolites will be extracted and analysed at the University of Cambridge Plant Sciences Dept. Novel metabolites will be screened for potentially useful compounds for society via the commercial partners (Algaplex, a4f, SAMS Ltd and Glycomar) and European colleagues in the EMBRC (European Marine Biological Resources Consortium), specifically CNRS, NICE, Stazione Zoologica Anton Dohrn, Naples and the Helmholtz Centre for Infectious Research, Braunschweig.

Requirements:
· BSc and/or Masters in a biological (marine or plant preferred) or biochemical discipline.
· Ability to travel and work abroad for 3-6 months industrial placement and also spend time in Oban for training in algal culture and preservation techniques.
· If CASS application is successful for Antarctic fieldwork, the student will need to pass a BAS medical.