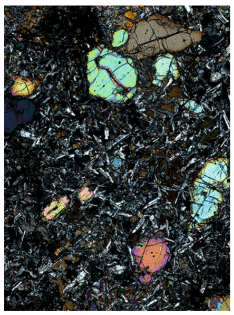
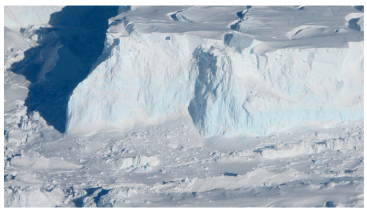
Exploring terrestrial geological evidence for past glaciation and volcanism in the Thwaites Glacier catchment, Antarctica

Supervisors: Joanne Johnson (British Antarctic Survey), Dylan Rood (Imperial College London), Brent Goehring (Tulane University), and Stephen Roberts (British Antarctic Survey)





This studentship is part of the NERC-NSF International Thwaites Glacier Collaboration, ITGC, which is a joint UK-US $25M research program aiming to significantly improve our understanding of the future evolution of the massive Thwaites Glacier in West Antarctica and its likely contribution to sea level change in the coming decades and centuries. This studentship is an exciting opportunity to be involved with over 100 scientists working together in one of the most rapidly changing regions of the world.

The project will investigate the evidence for past glaciations and volcanism in the Thwaites Glacier catchment of West Antarctica, using state-of-the-art geochemical methods on rock samples collected from volcanic peaks next to major ice streams in the area.

Objectives are to: 1) map the distribution of glacial deposits in the catchment using high-resolution satellite imagery, 2) to determine the timing and duration of past fluctuations in ice thickness over several millennia, to provide a broader context for the late Holocene changes that will be investigated via subglacial bedrock drilling by the parent project, "Geological history constraints on the magnitude of grounding line retreat in the Thwaites Glacier system" (GHC), and 3) to characterize the geochemical composition and eruptive history of volcanic bedrock in the Thwaites Glacier catchment, to support analysis of the GHC drill core samples.

Based primarily at British Antarctic Survey, the student will prepare samples for cosmogenic surface exposure dating in two world-leading laboratories: the CosmIC laboratory at Imperial College London, and at Tulane University Cosmogenic Nuclide Laboratory, New Orleans (USA). They will also have the opportunity to utilize micro-analytical techniques such as electron probe micro-analysis and laser ablation ICP-MS, as well as isotopic dating methods such as Ar-Ar. The project would suit a candidate with an exceptionally strong geochemical and/or petrological background, who also has a keen interest in glacial geomorphology and climate change. Willingness to develop skills in a range of laboratory techniques is essential, and previous experience of using GIS software would be an advantage.

As part of the International Thwaites Glacier Collaboration, the student will be offered the chance to participate in Early Career Researcher Retreats, both in the UK and USA, and will be fully integrated into the wider GHC project. The project will enable the student to develop expertise in a range of geochemical techniques and approaches, including micro-analytical techniques, laboratory preparation of samples for surface exposure dating, accelerator mass spectrometry, and radiometric dating methods. The student will have the opportunity to engage with researchers across the wide range of disciplines involved in the ITGC program; this includes glaciologists, numerical modellers, marine and terrestrial geologists and oceanographers, all in the field of climate change science. Thus the studentship will provide a unique experience to undergo rigorous training in multiple facets of geochemistry combined with participation in a program of huge societal relevance.