## GLANAM PhD Project

**Background:** Bordering the North Atlantic, the British-Irish Ice Sheet (BIIS) is known to have been sensitive to climatic and oceanic forcing at a variety of timescales throughout the Quaternary. Whilst our understanding of the behaviour of the BIIS is generally improving, there are still large sectors of this ice sheet for which we have little or no chronological control and for which maximum extent and timing of subsequent retreat are unresolved. This is particularly true for the western Irish shelf onto which recent work suggests the BIIS expanded as far as the shelf edge. Unstudied marine geophysical and geological data are available from the shelf in this area and offer an unprecedented opportunity to resolve these key issues for this sector of the BIIS.

**Objective:** We propose to develop a detailed time-constrained reconstruction of the dynamic behaviour of the BIIS on the Irish continental margin. The results will allow temporal offshore-onshore correlation, which will be used to better understand ice sheet growth and decay for this sector of the BIIS.

**Research methodology:** (1) Sedimentological analysis and radiocarbon dating of marine sediment cores from shelf glacial moraines; (2) ship-based seismic surveying on the western Irish shelf; (3) Cosmogenic Nuclide sampling and dating of boulders and outcrops along the western Irish coastline; (4) reconstructing the former ice flow trajectory by synthesising the onshore and offshore landform record into a GIS framework.

**Key findings:**

* The last BIIS extended to the shelf edge at ca. 55°N, whilst grounded further inshore to the south. The depositional pattern at the shelf edge suggests a rather thin, fast flowing ice stream reaching the Donegal Bay shelf break during past glaciations.
* The ice sheet left behind a large mid-shelf morainic system at the edge of the Slyne Basin, and some smaller moraines as far as south as 52.3°N. Structural bedrock highs served as ice sheet “sticky spots” south of 54.5°N.
* A grounded ice sheet retreated from the outer shelf towards the coastline to the east from 22 cal ka BP. Dynamic ice sheet retreat occurred between 18.8 -14.2 cal ka BP at the Clew Bay moraine and offshore Belmullet.
* CosmogenicNuclide (CN) dates from onshore and radiocarbon dates from offshore Killala Bay moraines constrain a short-lived readvance during Killard Point Stadial in Co Mayo. Initial retreat back onshore must have happened before or during the Oldest Dryas leaving the south-western Ox mountains ice free by approx. 15.7±0.7 ka.

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**If required use figure captions as follows:**

Fig.1 Map of the western Irish shelf showing different depositional patterns and sedimentary processes during the Quaternary.

Fig.2 Core description and core correlation in southern Donegal Bay.