Microbial succession and activity during soil formation in glacial forefields

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2. **Summary**: Glaciers in the Northern Hemisphere are retreating and their forefields present a unique opportunity to investigate the initial phases of soil weathering/formation and microbial succession in terrestrial cold habitats. The importance of primary autotrophic microbial colonisers (e.g., cyanobacteria) relative to allochthonous sources and compared to recycling of ancient organic carbon during the initial phase of soil establishment in Arctic environments is still debated. In glacial forefields, microbes that colonise both glacial surfaces and subglacial debris may provide an important inoculum for the development of microbial communities in the forefields.

The main aim of the project is to assess the relative importance between microbial activity and external inputs for the formation of soil in cold habitats. The research will involve laboratory experiments and key microbial metabolic measurements (e.g., net C metabolism, N fixation, organic carbon utilisation), in relation to physical and chemical characteristics of soils of different age.

3. **Added value**

- This is a multi-disciplinary project and the student will have the opportunity to be part of a team of microbial ecologists, geochemists, molecular biologists and modellers within the Bristol Glaciology Centre in School of Geographical Sciences at the University of Bristol. It will give opportunity to employ diverse techniques, such as culturing of relevant organisms, geochemistry (e.g., analyses of organic and inorganic nutrients) and microbial activity (e.g., primary and secondary production, N fixation). The project will involve analyses and experimentation within the Low Temperature Experimental Facility which
has been established in the School of Geographical Sciences (LOWTEX: http://www.lowtex.co.uk/).

- The School of Geographical Sciences, Bristol is an RAE 6* Department with a formal Graduate School and excellent facilities for research including high performance computing, software, library and all laboratory logistic support essential to the success of such a project.

- The student will be directly involved in a NERC funded project (NE/J02399X/1) “Microbial succession from ice to vegetated soils in response to glacial retreat” which includes a team of scientists, PhD students and post-docs currently working on the mineralogy, metagenomes and biogeochemical modelling of glacial forefields.