

## Microbial activity on glaciers and ice sheets: an integrated modelling and empirical approach.

### Advisors:

James Bradley, *Queen Mary University of London, UK*  
Anne Jungblut, *Natural History Museum, UK*  
Kate Heppell, *Queen Mary University of London, UK*

### Location:

Queen Mary University of London, UK.  
The Natural History Museum, London.



**Summary:** Glaciers and ice sheets are important microbe-dominated ecosystems, that are undergoing rapid changes due to climate change. Supraglacial (glacier surface) ecosystems contain organisms from all three domains of life, which drive carbon and nutrient cycling, and cause ice darkening, thus enhancing ice mass loss. Advances to understanding microbial and biogeochemical processes on glacier and ice sheet surfaces, and their significance on local and global biogeochemical cycles, requires the development of robust numerical models and their integration with experimental data. This PhD project will bridge the gap between modelling and empirical research by developing a process-based model for glacier surface habitats, informed by measurements of microbial communities and their activity on glacier surfaces. The microbial-biogeochemical model will be calibrated by experiments designed to inform model parameters, and will be used to investigate feedbacks between microbial activity and environmental change, and quantify carbon and nutrient fluxes across glacier and ice sheet surfaces. This project will involve both computational modelling and laboratory techniques, and Arctic fieldwork (circumstances depending). The student will work at the forefront of cryosphere-ecosystem research, gaining key skills in numerical modelling, experimental techniques, and fieldwork. The student will collaborate within a multi-disciplinary team across Queen Mary University of London and the Natural History Museum. The project would suit a student with an interest in polar geomicrobiology and numerical modelling.

**Policy Impact of Research:** This research has relevance for decision making on climate change mitigation and adaptation, as well as conservation.

**How to apply:** Opportunities for funding include London NERC DTP and QMUL Principal's Postgraduate Research Studentships. For further information about the project, eligibility and future application deadlines in 2020/21, please contact Dr James Bradley ([james.bradley@qmul.ac.uk](mailto:james.bradley@qmul.ac.uk)).

**Eligibility Criteria and Candidate Profile:** Scholarship opportunities are available to candidates of any nationality. Candidates must hold a degree in the natural or physical sciences (e.g. Biology, Earth Sciences, Chemistry, Physics, Mathematics, Geography, or related discipline). I am looking for highly motivated, independent students with good communication skills. Previous research experience and knowledge of microbiology, biogeochemistry and/or modelling is desirable.

### English Language:

If you are from a non-English speaking country, you will need to provide evidence of English language ability according to the QMUL policy for postgraduate students. For candidates who have not yet met these requirements, we will include this as part of your offer conditions.

For further information on the research area, please visit: <http://www.jbradleylab.com>