Project Title: Unravelling the physical drivers of glacier lake outburst flooding

Lead Institution/Department: University of Bristol, School of Geographical Sciences
Primary Supervisor: Dr Liz Bagshaw
Co-Supervisors: Dr Fabien Maussion, School of Geographical Sciences; Dr Kasia Warburton, School of Geographical Sciences; Dr Rob Storrar, Sheffield Hallam University.

Project Summary

Glacial lake outburst floods (GLOFs) from ice-dammed lakes represent a major hazard to millions of people. This project will use remote and in situ sensing of a glacier-dammed lake in Iceland to understand the processes that control GLOFs, to parameterise a model that better predicts when GLOFs will occur.

Project Details

Glacier tourism in Iceland has increased rapidly, but a death in an Icelandic ice cave in 2024 was a stark reminder that tourism in dynamic environments is not guaranteed to be safe. We need better tools to understand how and when glacial lake outburst floods will occur, so this project will conduct a targeted monitoring programme at a glacier in Iceland that is known to flood. The project will monitor a glacier with two ice-dammed lakes that have been observed to drain at least once per year over the last ~10 years. We will use remote sensing, including uncrewed aerial vehicle surveys, to assess long-term behaviour of the lakes in response to meteorological drivers and ice thinning. We will also monitor the field site directly, by measuring ice and lake temperatures and detecting water flows, including within the ice cave. The observations will be used to parameterize a model of ice dammed lake drainage that can account for changing ice dam height and water temperature and predict how the magnitude/frequency of GLOFs will evolve at Breiðamerkurjökull in the future. The project offers training from specialists in field and remote observation, glacier modelling, all in collaboration with local partners who will use the research findings to better predict GLOFs and ensure safe access to changing glacier landscapes.

References

- Livingstone, S., Storrar, R., Doyle, S., Thorpe, S., Moffatt, A., Sole, A., … & Booth, A. (2025). Ice dynamic and hydrological response to ice-dammed lake drainages at Isunnguata Sermia, West Greenland. Journal of Glaciology (in review, https://eartharxiv.org/repository/view/9664/)

- Storrar, R. D., Jones, A. H., & Evans, D. J. A. (2017). Small-scale topographically-controlled glacier flow switching in an expanding proglacial lake at Breiðamerkurjökull, SE Iceland. Journal of Glaciology, 63(240), 745-750.

Essential/Desirable Skills

The project may have the opportunity for fieldwork, for which full training will be provided, but candidates should note that this is not a necessity. Spatial data analysis skills would be particularly beneficial.

Entry Requirements

You must have a UK 2:1 honours degree or higher in a relevant subject. You can also have its international equivalent.

If English is not your first language, you will need an International English Language Testing System (IELTS) overall score of 6.5, with a minimum of 6.0 in all components. Visit our English language proficiency pages to find out about other qualifications we accept.

Useful Links

- https://www.bristol.ac.uk/geography/courses/postgraduate/
- https://www.bristol.ac.uk/study/postgraduate/research/geographical-sciencesphysicalgeography/
- Flood-CDT Projects | National Oceanography Centre

How To Apply

The deadline for application is **8 January 2026**. Please apply to the 'Geography (PhD)' here: https://www.bristol.ac.uk/study/postgraduate/apply/.