



Professor Martyn Tranter
B.Sc., Ph.D.(UEA)

Professor of Polar Biogeochemistry

Office B1, 12 Berkeley Square
University Road,
Clifton, Bristol BS8 1SS
([See a map](#))

+44 (0) 117 42 82357
m.tranter@bristol.ac.uk

Summary

I have a long term research interest in the biogeochemical processes that impact on the composition of melt waters flowing on, in and under glaciers and ice sheets, and the chemical changes the water induces in the aerosol and debris it encounters. I was involved in the discovery of microbial life in subglacial environments, and leading the research consequences that this paradigm shift for the discipline has entailed. These include: (1) the production of labile forms of nutrients, such as Fe, from glacially crushed rock, which makes an important contribution to the fertilisation of the Southern Ocean via ice berg rafting of debris; (2) the prediction of life in sub-ice sheet environments, sustained by REDOX processes resulting from the comminution of bedrock; and (3) the greater likelihood that life may be sustained in wet sub-icesheet environments in other ice-covered parts of the Universe.

A current area of great interest, championed by Jon Telling, is that some of the thermomechanical energy generated by the glacial erosion of silicate bedrock is converted in free radicals on the seared silicate and sulphide surfaces, which in turn generate a spectrum of oxidising and reducing agents when wetted, so potentially providing energy sources for a spectrum of subglacial microbes. A recent paper in *Nature Geosciences* (8, 851-855) provides evidence for the inorganic production of hydrogen gas in subglacial environments, and is the next potential paradigm shift in the study of subglacial biogeochemistry.

My work has also demonstrated that a spectrum of microorganisms actively grow and change the geochemistry of waters on the surfaces of glaciers and ice sheets. The work has ultimately led to the funding of the Black and Bloom project, which is about to test the hypothesis that pigmented algae growing on the surface of the Greenland Ice Sheet are causing darkening, which results in enhanced melting of the south west sector of the Ice Sheet.

Biography

Fellowships and Awards

2015-16 University of Bristol Research Fellow

2011- Fellow of the Royal Geographical Society

2010-11 Senior Leverhulme Research Fellow.

2010 Awarded the Polar Medal.

1996-99 Visiting Professor, INRS-Eau, Université du Quebec.

1996-97 University of Bristol Research Fellow.

Committees

2013- **NERC Panel C Core Member**

2010- **Chair, IGS** (International Glaciological Society), **Nominations Committee**

2008-13 **NERC Peer Review College**

2007-10 **IGS Nominations Committee**

Editorial Boards

2015- Chief Co-Editor, **Frontiers in Geochemistry**

2013- Associate Editor, **Journal of Glaciology**

Previous Appointments

1993-99 Reader in Physical Geography, Geography, UoB.

1992-93 Lecturer in Physical Geography, Geography, UoB.

1986-1992 Lecturer in Geochemistry, Oceanography, University of Southampton.

1985-1986 Lecturer in Sedimentary Geochemistry, ENV, UEA.

1984-5 PDRF, ENV, UEA.

Qualifications

1982 Ph. D., Environmental Sciences, UEA.

1978 B. Sc. (Hons.) in Environmental Sciences, UEA.

Memberships

Organisations

[School of Geographical Sciences](#)

Research groups

- [Bristol Glaciology Centre](#)

Teaching

- [Academic teaching staff](#)

Recent publications

- Kumar, N, Ramanathan, AL, Tranter, M, Sharma, P, Pandey, M, Ranjan, P & Raju, NJ, 2019, '[Switch in chemical weathering caused by the mass balance variability in a Himalayan glacierized basin: a case of Chhota Shigri Glacier](#)'. *Hydrological Sciences Journal*, vol 64., pp. 179-189
- Nicholes, M, Williamson, C, Tranter, M, Holland, A, Poniecka, E, Yallop, M, Anesio, A & , 2019, '[Bacterial dynamics in supra glacial habitats of the Greenland Ice Sheet](#)'. *Frontiers in Microbiology*, vol 10.

- Malard, LA, Šabacká, M, Magiopoulos, I, Mowlem, M, Hodson, A, Tranter, M, Siegert, MJ & Pearce, DA, 2019, '[Spatial Variability of Antarctic Surface Snow Bacterial Communities](#)'. *Frontiers in Microbiology*, vol 10.
- Perini, L, Gostinčar, C, Anesio, AM, Williamson, C, Tranter, M & Gunde-Cimerman, N, 2019, '[Darkening of the Greenland Ice Sheet: Fungal Abundance and Diversity Are Associated With Algal Bloom](#)'. *Frontiers in Microbiology*, vol 10., pp. 557
- Hawkings, JR, Hatton, JE, Hendry, KR, Souza, GFd, Wadham, JL, Ivanovic, RF, Kohler, TJ, Stibal, M, Beaton, A, Lamarche-Gagnon, G, Tedstone, A, Hain, MP, Bagshaw, E, Pike, J & Tranter, M, 2018, '[The silicon cycle impacted by past ice sheets](#)'. *Nature Communications*, vol 9.
- Hawkings, JR, Benning, LG, Raiswell, R, Kaulich, B, Araki, T, Abyaneh, M, Stockdale, A, Koch-Müller, M, Wadham, JL & Tranter, M, 2018, '[Bioavailable ferrous iron bearing nanoparticles in glacial sediments](#)'. *Earth and Planetary Science Letters*, vol 493., pp. 92-101
- Nash, MV, Anesio, AM, Barker, G, Tranter, M, Varliero, G, Eloe-Fadrosh, EA, Nielsen, T, Turpin-Jelfs, T, Benning, LG & Sánchez-Baracaldo, P, 2018, '[Metagenomic insights into diazotrophic communities across Arctic glacier forefields](#)'. *FEMS Microbiology Ecology*, vol 94.
- Williamson, CJ, Anesio, AM, Cook, J, Tedstone, A, Poniecka, E, Holland, A, Fagan, D, Tranter, M & Yallop, ML, 2018, '[Ice algal bloom development on the surface of the Greenland Ice Sheet](#)'. *FEMS Microbiology Ecology*, vol 94.
- Poniecka, E, Bagshaw, L, Tranter, M, Sass, H, Williams, C & Anesio, A, 2018, '[Rapid development of anoxic niches in supraglacial ecosystems](#)'. *Arctic, Antarctic, and Alpine Research*, vol 50.
- Hawkings, JR, Wadham, JL, Benning, LG, Hendry, KR, Tranter, M, Tedstone, A, Nienow, P & Raiswell, R, 2017, '[Ice sheets as a missing source of silica to the polar oceans](#)'. *Nature Communications*, vol 8.

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