

DR. ALISON BANWELL

(she/her)

Research Scientist III

Earth Science and Observation Center (ESOC)

Cooperative Institute for Research in Environmental Sciences (CIRES)

University of Colorado Boulder, USA.

alison.banwell@colorado.edu

EDUCATION

- 2008 - 2013: **Ph.D. Glaciology** (UK Natural Environment Research Council (NERC) funded). Scott Polar Research Institute, *University of Cambridge*, UK.
- 2004 - 2008: **B.Sc. Geology & Physical Geography** (First Class, with Honours). *University of Edinburgh*, UK.

EMPLOYMENT

- 2024 - present **Research Scientist III**, Cooperative Institute for Research in Environmental Sciences (CIRES), *University of Colorado Boulder*, USA
- 2021 - 2024 **Research Scientist II**, CIRES, *University of Colorado Boulder*, USA
- 2020 - 2021 **Research Scientist I**, CIRES, *University of Colorado Boulder*, USA
- 2018 - 2020 **CIRES Postdoctoral Visiting Fellow**, *University of Colorado Boulder*, USA.
- 2015 - 2018 **Leverhulme Early Career Research Fellow**, Scott Polar Research Institute, Department of Geography, *University of Cambridge*, UK.
- 2013 - 2016 **Junior Research Fellow**, St Catharine's College, University of Cambridge. While based at the Scott Polar Research Institute, *University of Cambridge*, UK.
- 2013 - 2013 **Postdoctoral Scholar**, advised by Prof. Doug MacAyeal, Department of Geophysical Sciences, *University of Chicago*, USA.

RESEARCH AIM

To investigate the impact of Earth's changing climate on the cryosphere; more specifically, glacier, ice-sheet, and ice-shelf melt, hydrology, and dynamics, with a primary focus on the Antarctic and Greenland ice sheets. I use a multi-disciplinary approach, combining in-situ field observations, satellite remote-sensing and process-based modeling to better understand ice dynamics in response to surface meltwater processes.

PUBLICATIONS

IN REVIEW

53. Datta-Barua, S., Parvizi, R. Khan, S., Baverel, A., Johnson, R., **Banwell A. F.**, *in review*. Lake Ice Surface Type Correlation with GNSS Surface Reflectivity, *IEEE Transactions on Geoscience and Remote Sensing*.
52. *Glen, E., Leeson, A. A., **Banwell, A. F.**, Maddalena, J., Corr, D., Noël, B., and McMillan, M. *in review* A comparison of supraglacial meltwater features throughout contrasting melt seasons: Southwest Greenland, *Cryosphere Discussions* [preprint], <https://doi.org/10.5194/egusphere-2024-23>.

PUBLISHED

- 51 peer-reviewed publications, inc. 14 as first author and 17 led by advisees.
- *H-Index* of 25 with >2400 citations (Google Scholar).

(* indicates first authorship by an advisee)

51. Dunmire, D., Subramanian, A.C, Hossain, E., Gani, M.O. **Banwell, A.F.**, Younas, H., and Myers, B. *in press*, Greenland Ice Sheet wide supraglacial lake evolution and dynamics: insights from the 2018 and 2019 melt seasons, *Earth and Space Science*. Preprint: <https://doi.org/10.31223/X5871P>
50. *Dell, R.L., Arnold, N.S., Willis, I.C., **Banwell, A.F.** de Roda Husman, S. 2024, Substantial contribution of slush to meltwater area across Antarctic ice shelves, *Nature Geoscience*.
<https://doi.org/10.1038/s41561-024-01466-6>
49. **Banwell, A.F.**, Willis, I.C., Stevens, L.A., Dell, R.L. and MacAyeal, D.R., 2024, Observed meltwater-induced flexure and fracture at a doline on George VI Ice Shelf, Antarctica. *Journal of Glaciology*. 1–14.
<https://doi.org/10.1017/jog.2024.31>
48. MacFerrin, M., Mote, T., **Banwell, A.F.**, Yin, Z., and Scambos, T., 2024: Ice-sheet surface mass balance [in ‘State of the Climate in 2023’]. *Bull. Amer. Meteor. Soc.*, 105 (8), S343–S345,
<https://doi.org/10.1175/BAMS-D-24-0099.1>
47. *Ochwat, N. E., Scambos, T. A., **Banwell, A. F.**, Anderson, R. S., MacLennan, M. L., Picard, G., Shates, J. A., Marinsek, S., Margonari, L., Truffer, M., and Pettit, E. C. 2024, Triggers of the 2022 Larsen B multi-year landfast sea ice breakout and initial glacier response, *The Cryosphere*, 18, 1709–1731,
<https://doi.org/10.5194/tc-18-1709-2024>
46. *Dunmire, D., Wever, N, **Banwell, A.F.** Lenaerts, J. 2024, ‘Future (2015-2100) Antarctic-wide ice-shelf firn air depletion from a statistical firn emulator’, *Nature Communications Earth and Environment*. 5, 100 (2024). <https://doi.org/10.1038/s43247-024-01255-4>
45. Hanna, E. et al (29 authors including **Banwell A.F.**), 2024, ‘ Short- and long-term variability of the Antarctic and Greenland ice sheets’, *Nature Reviews Earth and Environment*,
<https://doi.org/10.1038/s43017-023-00509-7> **INVITED**
44. *Parvizi, R., Khan, S., **Banwell, A.F.**, Datta-Barua, S., 2024, Surface reflectivity variations of global navigation satellite system signals from a mixed ice and water surface, *Navigation*. 71(1).
<https://doi.org/10.33012/navi.614>
43. *Gantayat, P., **Banwell, A. F.**, Leeson, A. A., Lea, J. M., Petersen, D., Gourmelen, N., and Fettweis, X. 2023, A new model for supraglacial hydrology evolution and drainage for the Greenland ice sheet (SHED v1.0), *Geoscientific Model Development*, 16, 5803–5823, <https://doi.org/10.5194/gmd-16-5803-2023>.
42. *Ochwat, N., **Banwell, A.**, Scambos T. 2023, Larsen B Fast Ice Breakout and Initial Glacier Response, Antarctica and the Southern Ocean Sidebar 1 *Bull. Amer. Meteor. Soc.*, 104, S322–S365,
<https://doi.org/10.1175/BAMS-D-23-0077.1>
41. MacFerrin, M., Mote, T., **Banwell, A.F.**, and Scambos, T. 2023, Ice sheet seasonal melt extent and duration [in ‘State of the Climate in 2022’]. *Bulletin of the American Meteorological Society*. 104 (9), S339–S341, <https://doi.org/10.1175/BAMS-D-23-0077.1>
40. **Banwell, A.F.**, Burton, J., Cenedese, C., Golden, K., Åström, J. 2023, Physics of the Cryosphere, *Nature Reviews Physics*. <https://doi.org/10.1038/s42254-023-00610-2> **INVITED**
39. **Banwell, A.F.**, Wever, N., Dunmire, D., Picard, G. 2023, Quantifying Antarctic-wide ice-shelf surface melt volume using microwave and firn model data: 1980 to 2021, *Geophysical Research Letters*. 50, e2023GL102744. <https://doi.org/10.1029/2023GL102744>
38. Picard, G., Leduc-Leballeur, M., **Banwell, A. F.**, Brucker, L., and Macelloni, G. 2022. The sensitivity of satellite microwave observations to liquid water in the Antarctic snowpack, *The Cryosphere*,
<https://doi.org/10.5194/tc-16-5061-2022>
37. Coffey, N. B, MacAyeal, D. R., Copland, L., Mueller, D. R., Sergienko, O. V., **Banwell, A. F.**, Lai, C. 2022, Enigmatic surface rolls of the Ellesmere Ice Shelf, *Journal of Glaciology*. 1–12.
<https://doi.org/10.1017/jog.2022.3>
36. *Dell, R., **Banwell. A.F.**, Willis, I., Arnold, N., Halberstadt, A.R.W., Chudley, T.R., Pritchard, H. 2022, Supervised classification of slush and ponded water on Antarctic ice shelves using Landsat 8 imagery, *Journal of Glaciology*, 68(268), 401–414, <https://doi.org/10.1017/jog.2021.114>
35. MacFerrin, M., Mote, T., **Banwell, A.F.**, and Scambos, T. Ice sheet seasonal melt extent and duration [in ‘State of the Climate in 2021’]. *Bulletin of the American Meteorological Society*., 103 (8), S325–S329,
<https://doi.org/10.1175/BAMS-D-22-0078.1>

34. *Dunmire, D., **Banwell, A. F.**, Wever, N., Lenaerts, J. T. M., and Datta, R. T. 2021 Contrasting regional variability of buried meltwater extent over 2 years across the Greenland Ice Sheet, *The Cryosphere*, 15, 2983–3005, <https://doi.org/10.5194/tc-15-2983-2021>
33. MacAyeal, D.R., Sergienko, O. V., **Banwell, A. F.**, Macdonald, G. J. Willis, I.C., and Stevens, L.A. 2021. Treatment of ice-shelf evolution combining flow and flexure, *Journal of Glaciology*. 1 -18, <https://doi.org/10.1017/jog.2021.39>
32. **Banwell, A. F.**, Datta, R. T., Dell, R. L., Moussavi, M., Brucker, L., Picard, G., Shuman, C. A., and Stevens, L. A. 2021, The 32-year record-high surface melt in 2019/2020 on the northern George VI Ice Shelf, Antarctic Peninsula, *The Cryosphere*, 15, 909–925, <https://doi.org/10.5194/tc-15-909-2021>
31. *Dunmire, D., Lenaerts, J. T. M., **Banwell, A. F.**, Wever, N., Shragge, J., Lhermitte, S., et al. 2020, Observations of buried lake drainage on the Antarctic Ice Sheet. *Geophysical Research Letters*. 47, e2020GL087970, <https://doi.org/10.1029/2020GL087970>
30. *Dell, R., Arnold, N., Willis, I., **Banwell, A.**, Williamson, A., Pritchard, H. and Orr, Andrew. 2020, Lateral meltwater transfer across an Antarctic ice shelf, *The Cryosphere*, 14, 2313–2330, <https://doi.org/10.5194/tc-14-2313-2020>
29. *Law R, Arnold N, Benedek C, Tedesco M, **Banwell A**, Willis I., 2020, Over-winter persistence of supraglacial lakes on the Greenland Ice Sheet: results and insights from a new model. *Journal of Glaciology* 66(257), 362–372. <https://doi.org/10.1017/jog.2020.7>
28. MacAyeal, D.R., Willis, I.C., **Banwell, A.F.**, Macdonald, G.J., and Goodsell, B., 2020, Diurnal lake-level cycles on ice shelves driven by meltwater input and ocean tidal tilt, *Journal of Glaciology*. 1–17. <https://doi.org/10.1017/jog.2019.98>
27. Robel, A., and **Banwell, A. F.** 2019. A speed limit on ice shelf collapse through hydrofracture. *Geophysical Research Letters*, <https://doi.org/10.1029/2019GL084397>
26. **Banwell, A.F.**, Willis, I.C., Macdonald, G.J., Goodsell, B., MacAyeal, D.R. 2019, Direct Measurements of Ice-Shelf Flexure caused by Surface Meltwater Ponding and Drainage, *Nature Communications*, 10, 730, <https://doi.org/10.1038/s41467-019-08522-5>
25. Siegert M, Atkinson A, **Banwell A**, Brandon M, Convey P, Davies B, Downie R, Edwards T, Hubbard B, Marshall G, Rogelj J, Rumble J, Stroeve J and Vaughan D, 2019, The Antarctic Peninsula Under a 1.5°C Global Warming Scenario. *Frontiers of Environmental Science* 7:102, <https://doi.org/10.3389/fenvs.2019.00102> **INVITED**
24. *Macdonald, G.J., **Banwell, A.F.**, Willis, I.C., Mayer, D., Goodsell, B., MacAyeal, D.R., 2019, Formation of pedestalled, relict lakes on the McMurdo Ice Shelf, Antarctica. *Journal of Glaciology*, <https://doi.org/10.1017/jog.2019.17>
23. MacAyeal, D.R., **Banwell, A. F.** Okal, E. A. Lin, J. Willis, I. C. Goodsell, B., Macdonald, G. J. 2019, Diurnal Seismicity Cycle Linked to Subsurface Melting on an Ice Shelf, *Annals of Glaciology*. <https://doi.org/10.1017/aog.2018.29>
22. Bell, R., **Banwell, A. F.**, Trusel, L., Kingslake, J. 2018, Antarctic Surface Hydrology & Impacts on Ice Sheet Mass Balance, *Nature Climate Change Nature Clim Change* 8, 1044–1052. <https://doi.org/10.1038/s41558-018-0326-3> **INVITED**
21. *Williamson, A.G., **Banwell, A.F.**, Willis, I.C., Arnold, N.S. 2018b. Dual-satellite (Sentinel-2 & Landsat 8) remote sensing of supraglacial lakes in Greenland. *The Cryosphere*. 12, 3045–3065 <https://doi.org/10.5194/tc-12-3045-2018>
20. *Macdonald, G.J., **Banwell, A.F.**, MacAyeal, D.R. 2018, Seasonal evolution of supraglacial lakes on a floating ice tongue, Petermann Glacier, Greenland. *Annals of Glaciology*, <https://doi.org/10.1017/aog.2018.9>
19. *Williamson, A.G., Willis, I.C., Arnold, N.S., **Banwell, A.F.** 2018a. Controls on rapid supraglacial lake drainage in West Greenland: An Exploratory Data Analysis approach. *Journal of Glaciology*, <https://doi.org/10.1017/jog.2018.8>
18. **Banwell, A.F.** 2017, Glaciology: Ice-Shelf Stability Questioned, *Nature - News and Views*, 544, 306-307 <https://doi.org/10.1038/544306a> **INVITED**

17. **Banwell, A.F.**, Willis, I.C., Goodsell, B., Macdonald, G.J., Mayer, D., Powell, A. and MacAyeal, D.R. 2017. Calving and Rifting on McMurdo Ice Shelf, Antarctica *Annals of Glaciology*. 58(75pt1):78-87 <https://doi.org/10.1017/aog.2017.12>
16. *Williamson, A.G., Arnold, N.S., **Banwell, A.F.**, Willis, I.C., 2017. A Fully Automated Supraglacial lake area and volume Tracking ('FAST') algorithm: development and application using MODIS imagery of West Greenland. *Remote Sensing of Environment*, 196:113-133, <https://doi.org/10.1016/j.rse.2017.04.032>
15. **Banwell, A.F.**, Hewitt, I., Willis, I.C., Arnold, N.S. 2016. Moulin density controls drainage development beneath the Greenland Ice Sheet. *Journal of Geophysical Research Earth Surface*, 121, 2248–2269, <https://doi.org/10.1002/2015JF003801>
14. **Banwell, A. F.** & MacAyeal, D. R. 2015, Ice-shelf fracture due to viscoelastic-flexure stress induced by fill/drain cycles of supraglacial lakes. *Antarctic Science*, 27(6):587-597 <https://doi.org/10.1017/S0954102015000292>
13. MacAyeal, D. R., Sergienko, O. V., **Banwell, A. F.** 2015, A Model of Viscoelastic Ice-Shelf Flexure. *Journal of Glaciology*, 61(228), 635-645, <https://doi.org/10.3189/2015JoG14J169>
12. *Mayaud, J., **Banwell, A.F.**, Arnold, N.S., Willis, I.C. 2014, Modeling the response of subglacial drainage at Paakitsoq, W Greenland, to 21st century climate change, *Journal of Geophysical Research Earth Surface*, 119(12), 2619–2634. <https://doi.org/10.1002/2014JF003271>
11. Anderson, B., Willis, I., Goodsell, B., **Banwell, A.**, Owens, I., Mackintosh, A., Lawson, W. 2014. Diurnal to decadal ice velocity and water pressure variations on Franz Josef Glacier (Ka Roimata O Hine Hukatere), New Zealand. *Arctic, Antarctic and Alpine Research*. 46(4), 919-932, <https://doi.org/10.1657/1938-4246-46.4.919>
10. **Banwell, A.F.**, Cabellero, M., Arnold, N., Glasser, N., Cathles, L.M., MacAyeal, D. 2014. Supraglacial lakes on the Larsen B Ice Shelf, Antarctica, and Paakitsoq Region, Greenland: a comparative study. *Annals of Glaciology*. 55(66), <https://doi.org/10.3189/2014AoG66A049>
9. Arnold, N.S., **Banwell, A.F.**, Willis, I.C. 2014, High-resolution modelling of the seasonal evolution of surface water storage on the Greenland Ice Sheet, *The Cryosphere*, 8, 1149-1160, <https://doi.org/10.5194/tc-8-1149-2014>
8. **Banwell, A. F.**, MacAyeal, D., Sergienko, O. 2013b. Break-up of the Larsen B Ice Shelf Triggered by Chain-Reaction Drainage of Supraglacial Lakes. *Geophysical Research Letters*. 40,5872–5876. <https://doi.org/10.1002/2013GL057694>. Featured in *Nature Research Highlights* ('Anatomy of an Ice Shelf's Demise', 503(441), <https://doi.org/10.1038/503441d>) & *Eos Trans. AGU* ('Chain reaction led to breakup of Larsen B Ice Shelf', 95(8), 76 <https://doi.org/10.1002/2014EO080009>).
7. **Banwell, A. F.**, Willis, I., & Arnold, N. 2013a. Modelling subglacial water routing at Paakitsoq, W Greenland. *Journal of Geophysical Research Earth Surface*. 118, 1282–1295, <https://doi.org/10.1002/jgrf.20093>.
6. Tedesco, M., Willis, I., Hoffman, M., **Banwell, A.**, Alexander, P. 2013. Ice dynamic response to slow and fast surface lake drainage on the Greenland Ice Sheet. *Environmental Research letters*, 8034007, <https://doi.org/10.1088/1748-9326/8/3/034007>
5. **Banwell, A.F.**, Arnold, N., Willis, I., Tedesco, M., & Ahlstrom, A. 2012b. Modelling supraglacial water routing and lake filling on the Greenland Ice Sheet. *Journal of Geophysical Research Earth Surface*. 117, F04012, <https://doi.org/10.1029/2012JF002393>
4. **Banwell, A.F.**, Willis, I., Arnold, N., Messerli, A., Rye, C., Ahlstrom, A. 2012a. Calibration and validation of a high resolution surface mass balance model for Paakitsoq, West Greenland. *Journal of Glaciology*. 58(212) 1047-1062, <https://doi.org/10.3189/2012JoG12J034>
3. Gulley, J., Walthard, P., Martin, J., **Banwell, A.F.**, Benn, D., Catania, G. 2012. Seasonal evolution of dye-trace breakthrough curves: the effects of changes in roughness. *Journal of Glaciology*. 58(211) <https://doi.org/10.3189/2012JoG11J115>
2. Tedesco, M., Luthje, M., Steffen, K., Steiner, N., Fettweiss, X., Willis I, Bayou, N., **Banwell, A. F.** 2012. Measurement and modeling of ablation of the bottom of supraglacial lakes in Western Greenland. *Geophysical Research Letters*. 39, L02502, <https://doi.org/10.1029/2011GL049882>

1. Covington, M.D., **Banwell, A.F.**, Gulley, J., Saar, M.O., Willis, I., Wicks, C.M. 2012. Quantifying the effects of glacier conduit geometry & recharge on proglacial hydrograph form. *Journal of Hydrology*, 414–415, pp. 59-71 <https://doi.org/10.1016/j.jhydrol.2011.10.027>

CONFERENCE PROCEEDINGS

3. Datta-Barua, S., **Banwell A. F.**, Parvizi, R. Baverel, A. Allen, C. Weedman, A., Garcia, L., Larson, K. 'First (Reflected) Light: GNSS Reflectometry on the McMurdo Ice Shelf,' Proceedings of the 37th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2024), Baltimore, Maryland, September 2024, pp. 3587-3599. <https://doi.org/10.33012/2024.19941>
2. Datta-Barua, S., Parvizi, R., **Banwell, A. F.**, Khan, S. 2023, 'GNSS Reflectometry Correlation with Camera Images for Surface Type Determination,' Proceedings of the 36th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2023), Denver, Colorado, September 2023, pp. 3257-3266. <https://doi.org/10.33012/2023.19456>
1. *Parvizi, R., Khan, S., **Banwell, A.F.**, Datta-Barua, S., 2021, Statistical Analysis of Surface Reflectivity with GNSS Reflected Signals from a Mixed Ice and Water Surface, Proceedings of the 34th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2021), St. Louis, Missouri, September 2021, pp. 3945-3955. <https://doi.org/10.33012/2021.18108>

DATASETS

2. **Banwell, A. F.**, MacAyeal, D. R., Willis, I.C., Stevens, L.A., Dell, R. L., 2024, Antarctica - George VI Ice Shelf 2019-2022, The GAGE Facility operated by EarthScope Consortium, GPS/GNSS Observations Dataset, <https://doi.org/10.7283/MZVS-XY14>.
1. **Banwell, A.F.**, Willis, I.C., Stevens, L.A., Dell, R.L. and MacAyeal, D.R., 2024, 'Dataset for: Banwell et al. 2024, 'Observed meltwater-induced flexure and fracture at a doline on George VI Ice Shelf, Antarctica', Journal of Glaciology.' U.S. Antarctic Program (USAP) Data Center. <https://doi.org/10.15784/601771>

REPORTS

2. Siegert, M. J., Atkinson, A., **Banwell, A.**, Brandon, M., Convey, P., Davies, B., Downie, R., Edwards, T., Hubbard, B., Marshall, G., Rogelj, J., Rumble, J., Stroeve, J. and Vaughan, D. 2019. The Antarctic Peninsula under a 1.5°C global warming scenario -What change is it locked into? Grantham Institute Briefing note No. 10, Imperial College London, UK. **INVITED**
1. Kingslake, J., Trusel, L., **Banwell, A.**, Bell, R., Das, I., DeConto, R., Tedesco, M., Lenaerts, J. Schoof, C., 2019, Report on Antarctic surface hydrology workshop, Lamont Doherty Earth Observatory, 2018, U.S. Antarctic Program (USAP) Data Center. doi: 10.15784/601170.

BOOK CONTRIBUTIONS

Banwell, A. F (2016) 'The Greenland Ice Sheet', 'The Antarctic Ice Sheet', and 'Grounding Line' in Thomas, D.S.G. (editor) The Dictionary of Physical Geography, Wiley-Blackwell, pp. 648, ISBN: 978-1-118-78233-0

GRANTS

IN REVIEW

2025 - 2028: **Lead PI**, NSF Antarctic Glaciology (#2514811): 'Exploring Antarctic Ice Shelf Growth and Decay Processes due to Decadal Climate Variability' In collaboration with Co-I T. Scambos and Postdoc N. Ochwat (\$841k to CU Boulder).

ACTIVE

2024 - 2027: **Institutional PI**, NSF Antarctic Glaciology #2332480: 'Collaborative Research: Ice-Shelf Rumpiling and its Influence on Ice-Shelf Buttressing Processes' In collaboration with Lead PI

- D. MacAyeal (U. Chicago) and Co-PI Seth Campbell (U. Maine) (\$514k to CU Boulder, ~\$1M total).
- 2024 - 2027: **Co-I**, NASA GRACE-FO: *'Improved Static and Time-Variable Gravity Signals from GRACE Follow-On Laser Ranging Interferometer Measurements'* in collaboration with Lead PI K. Ghobadi-Far (\$800k total to CU Boulder).
- 2023 - 2026: **Lead PI**, NASA Cryosphere #21-07-0113 *'Ice-Shelf Hydrological Evolution and Impacts on Future Ice-Shelf Stability'*, in collaboration with Co-PIs R. Buck (Columbia University) and L. Smith (Brown University) (~\$200k to CU Boulder, ~\$627k total).
- 2023 - 2026: **Lead PI**, NSF Antarctic Glaciology #2213702: *'Collaborative Research: Improving model representations of Antarctic ice-shelf instability due to surface meltwater processes'* in collaboration with Co-PIs B. Lipovsky (U. Washington), J. Cuzzone (UCLA) and D. MacAyeal (U. Chicago), (~\$363k to CU Boulder, ~\$1M total).
- 2022 - 2026: **Co-I**, NSF *'Harnessing the Data Revolution (HDR)'*, *'HDR Institute: iHARP - Harnessing the Data and Model Revolution in the Polar Regions'*, in collaboration with PI V. Janeja (U. Maryland) Co-PIs A. Subramanian (CU Boulder), J. Wang (U. Maryland), M. Morlighem (Dartmouth), S. Shekhar (U. Minnesota) and A. Aschwanden (U. Alaska, Fairbanks) (\$1M to CU Boulder, \$15M total).
- 2020 - 2024: **Institutional PI**, NSF Antarctic Instrumentation & Facilities #1940473: *'EAGER: Collaborative Research: Mapping Melting Glacial Surfaces with GNSS Reflectometry'*, in collaboration with Lead PI S. Datta-Barua (Illinois Institute of Technology) and Co-I K. Larson (\$192k to CU Boulder, ~\$700k total).
- 2019 - 2024: **Lead PI**, NSF Antarctic Glaciology #1841607: *'NSFGEO-NERC: Ice-shelf Instability Caused by Active Surface Meltwater Production, Movement, Ponding and Hydrofracture'*, in collaboration with Co-PIs D. MacAyeal (Chicago), L. Stevens (Columbia University/Oxford, UK), and NERC Co-PI I. Willis (Cambridge, UK) (\$617k to CU Boulder, ~\$1M total).

COMPLETED

- 2021 - 2023: **PI**, CIRES Innovative Research Program (IRP): *'Antarctic-wide analysis of surface/near-surface melt on ice-shelves from 1979 to 2021 using microwave radiometer and scatterometer data'* (\$30k).
- 2019 - 2022: **Co-I**, NASA FINESST grant: *'Subsurface lake formation, drainage, and impacts on the stability of the Antarctic ice sheet'* with PI Lenaerts and our PhD Student Devon Dunmire (both CU Boulder) (\$135k to CU Boulder).
- 2018 - 2021: International Project Partner, UK NERC Standard Grant: *'Meltwater-Ice-sheet Interactions and the Changing Climate of Greenland'* (not Co-PI due to no UK university faculty position), in collaboration with Co-PIs A. Leeson (Lancaster, UK), I. Hewitt (Oxford, UK) D. Goldberg and N. Gourmelen (Edinburgh, UK) and A. Le Brocq (Exeter, UK).
- 2018 - 2020: CIRES *'Visiting Research Fellowship'* (~\$130k)
- 2015 - 2017: Senior Personnel (and Fieldwork Lead), NSF grant #1443126: *'Impact of Supraglacial Lakes on Ice-Shelf Stability'*, with PI MacAyeal (U. Chicago) (not Co-PI due to no US university affiliation in 2015).
- 2015 - 2018: Leverhulme/Newton Trust (UK) *'Early Career Fellowship'* (£120k/\$151k, total salary and research money).
- 2014: Antarctic Science Ltd (UK). *'Antarctic Science International Bursary'* (£3,700/\$4,700).
- 2013 - 2016: St Catharine's College (U. Cambridge) *'Junior Research Fellowship'* (£60k/\$76k total salary).
- 2011: Royal Geographical Society (UK); Dudley Stamp Memorial Fund (£500/\$650).
- 2010: National Geographic Society (US) *'Young Explorer'* grantee (\$5k).
- 2010: Beatrice Shaw Fund award, University of Cambridge (£900/\$1,200).
- 2010: PI, Svalbard Science Forum (EU) *'Arctic Field Grant'* for independent field research (£4,200/\$5,500).

- 2008 - 2012: CASE PhD studentship with Geological Survey of Denmark and Greenland (GEUS) to supplement NERC PhD grant (£3,000/\$3,800).
- 2008 - 2012: Natural Environment Research Council (NERC) ‘*Doctoral Training Grant*’, Scott Polar Research Institute, University of Cambridge (£50,000/\$63,000 total salary & research money).
- 2008 - 2012: Natural Environment Research Council (NERC) ‘*Doctoral Training Grant*’, Department of Geography, University of Durham (£50,000/\$63,000 total salary & research money) (*Declined in preference of Cambridge*)

AWARDS

- 2016: Antarctic Service Medal of the USA.
- 2011: Dow Chemical Company’s ‘*Sustainability Innovation Student Challenge*’. First Prize at University of Cambridge (£6000 prize).
- 2011: St Catharine's College (U. Cambridge) ‘*Graduate Prize for Distinction in Research*’.
- 2010: National Geographic Society ‘*Young Explorer*’ award.
- 2010: International Arctic Science Committee (IASC) workshop presentation award.
- 2003: UK Royal Geographic Society, ‘*Senior Geographer of the Year*’

SCIENCE TEAM INVOLVEMENT

- 2021 - 2023: **Land Ice Co-Lead and Institutional PI** of the **Science Team** for ‘**VITAL**’ (Vegetation, Ice, and Topography from swath Altimetric Lidar’), a proposal (ultimately unsuccessful) that targeted NASA’s Earth Systems Explorers (ESE) mission. In collaboration with Lockheed Martin (Lead PI: L. Koenig) and Virginia Tech (Deputy Lead PI: M. Willis). Participated in bi-weekly Science Team meetings in the two-years lead-up to the proposal’s submission.

PRESENTATIONS

CONFERENCE PRESENTATIONS

(*First author only, since 2012*)

- Banwell, A.F., Glazer, E., Buck, W.R., Esthenser, S., Savignano, M., Stearns, L., Smith, L., Boghosian, A. 2024, Impact of Competing Processes of River Incision, Basal Melt, Tidal Loading, and Viscoelastic Flexure Rebound on Ice-Shelf Estuary Formation, AGU General Assembly (C11D-0488), Washington DC, 2024.
- Banwell, A.F., Willis, I., Stevens, L., Dell, R., and MacAyeal, D. 2024, Observed meltwater-induced flexure and fracture at a doline on north George VI Ice Shelf, Antarctica, West Antarctic Ice Sheet (WAIS) Workshop, University of Florida, Gainesville. November, 2024.
- Banwell, A.F., Willis, I., Stevens, L., Dell, R., and MacAyeal, D., 2024, Observed and modelled meltwater-induced flexure and fracture at a doline on north George VI Ice Shelf, Antarctica, EGU General Assembly 2024, Vienna, Austria, 14–19 Apr 2024, EGU24-12334, <https://doi.org/10.5194/egusphere-egu24-12334>, 2024.
- Banwell, A.F., Wever, N., Picard, G. and Dunmire, D. 2022, Quantifying Antarctic-wide ice-shelf surface melt from 1980 to 2021, International Glaciological Society (IGS) Cryosphere 2022, Reykjavik, Iceland. **INVITED**
- Banwell, A.F., MacAyeal, Dell, R., D., Willis, I., Stevens, L., 2022-8-28: Preliminary Analysis of Melt-Induced Ice-Shelf Flexure on George VI Ice Shelf Observed with GNSS. International Glaciological Society (IGS) Cryosphere 2022, Reykjavik, Iceland.
- Banwell, A.F., Impacts of surface melt and hydrology on Antarctic ice-shelf dynamics and break-up, American Physical Society (APS) March Meeting, 2021, **INVITED**

- Banwell, A. F., Datta, R. T., Dell, R. L., Moussavi, M., Brucker, L., Picard, G., Shuman, C. A., and Stevens, L. A. 2020, **INVITED** (virtual). Record surface meltwater ponding on the Northern George VI Ice Shelf, Antarctic Peninsula, during the 2019/2020 melt season, AGU Fall Meeting 2020 (C050-08)
- Banwell, A.F., Dell, R., Dunmire, D., MacAyeal, D., Stevens, L.A. and Willis, I.C., 2020 (virtual). Ice-shelf instability due to surface meltwater systems on the George VI Ice Shelf. EGU General Assembly, (<https://doi.org/10.5194/egusphere-egu2020-6190>).
- Banwell, A. F., Macdonald, G., Willis, I. Goodsell, B., MacAyeal, D. 2018. Formation of pedestalled, relict lakes on the McMurdo Ice Shelf, Antarctica, and effect on ice-shelf stability. West Antarctic Ice Sheet (WAIS) Workshop. **INVITED**
- Banwell, A. F., MacAyeal, D., Willis, I., Macdonald, G., Goodsell, B. Flexural response of the McMurdo Ice Shelf to surface lake filling and drainage. 2018, Workshop on Antarctic Surface Hydrology and Future Ice Shelf Stability, Lamont-Doherty Earth Observatory Palisades, New York **INVITED**
- Banwell, A. F., MacAyeal, D., Willis, I., Macdonald, G., Goodsell, B. 2017. Flexural-response of the McMurdo Ice Shelf to surface lake filling and drainage. AGU Fall Meeting 2017 (C24C-01), **INVITED**
- Banwell, A. F., MacAyeal, D., Macdonald, G., Willis, I., Goodsell, B. 2016. Flexural-response of the McMurdo Ice Shelf to surface lake filling and drainage. International Glaciological Society (IGS) International Symposium, University of Colorado Boulder, USA.
- Banwell, A. F., MacAyeal, D., Willis, I., Macdonald, G., Goodsell, B. 2017, Flexural-response of the McMurdo Ice Shelf to surface lake filling and drainage. International Glaciological Society (IGS) British Branch Meeting, Lancaster University, UK.
- Banwell, A. F., Hewitt, I., Willis, I., Arnold, N. 2016. Moulin density controls drainage development beneath the Greenland Ice Sheet. EGU General Assembly (EGU2016-310)
- Banwell, A. F., Hewitt, I., Willis, I., Arnold, N. 2015. Subglacial hydrology at Paakitsoq, Insights from two hydrological models. International Glaciological Society (IGS) British Branch Meeting, Durham University, UK.
- Banwell, A. F., Hewitt, I., Willis, I., Arnold, N. 2015. Subglacial hydrology at Paakitsoq, Insights from two hydrological models. International Glaciological Society (IGS) International Symposium, Hofn, Iceland.
- Banwell, A. F. and MacAyeal, D. 2015, Ice-shelf fracture due to viscoelastic-flexure stress induced by fill/drain cycles of supraglacial lakes. International Glaciological Society (IGS) International Symposium, Hofn, Iceland.
- Banwell, A. F, MacAyeal, D. and Sergienko, O., Rosier, S., Gudmundsson, H. 2013. Chain-reaction drainage of surface lakes triggered the Larsen B Ice Shelf break-up: a continuation. International Glaciological Society (IGS) International Symposium, Chamonix, France.
- Banwell, A. F., Willis, I., Arnold, N. 2013. Modelling subglacial water routing at Paakitsoq, W Greenland. AGU Fall Meeting (C33B-0729) **INVITED**
- Banwell, A. F., MacAyeal, D. and Sergienko, O. 2013. Chain-Reaction Drainage of Supraglacial Lakes Triggered the Larsen B Ice Shelf Break-Up. AGU Fall Meeting (C43D-06)
- Banwell, A. F., Cabellero, M., Arnold, N., Glasser, N., Cathles, L.M., MacAyeal, D. 2013 Supraglacial lakes on the Larsen B, Antarctica, and Paakitsoq, Greenland: a comparative study. IGS International Symposium, Beijing, China.
- Banwell, A. F., MacAyeal, D. and Sergienko, O. 2013. Chain-Reaction Drainage of Supraglacial Lakes Triggered Capsizes-Driven Break-Up of Larsen B Ice Shelf, IGS British Branch Meeting, Loughborough University, UK.
- Banwell, A.F., Arnold, N., Willis, I., Tedesco, M., & Ahlstrom, A. 2012, Modelling supraglacial water routing, lake filling, and subglacial water routing for the Paakitsoq region, West Greenland. International Glaciological Society (IGS) International Symposium, University of Alaska Fairbanks, USA.
- Banwell, A.F., Willis, I., Arnold, N., Tedesco, M., & Messerli, A., Ahlstrom, A. 2011, Parameterization and testing of a surface melt and water routing model for the Greenland Ice Sheet, AGU Fall Meeting (C23D-0520).

INVITED SEMINARS

- May 2024: ‘Antarctic ice shelf surface melt and hydrology, and implications for dynamics and break-up’, Earth and Space Sciences, University of Washington, USA. *In person.*
- March 2024: ‘Antarctic ice shelf surface melt and hydrology, and implications for dynamics and break-up’, ETH Zurich, Switzerland. *Via Zoom.*
- January 2024: ‘Antarctic ice shelf surface melt and hydrology, and implications for dynamics and break-up’, National Snow and Ice Data Center (NSIDC), CU Boulder, USA. *Via Zoom*
- December 2023: ‘GPS in Glaciology’, Crary Lab Science Talk, McMurdo Station, Antarctica. *In person.*
- November 2023: ‘Life as a researcher in Antarctica’, Mechanical, Material, and Aerospace Engineering Department, Illinois Institute of Technology, USA. *Via Zoom* from McMurdo Station, Antarctica.
- December 2022: ‘Ice-shelf Instability Caused by Surface Meltwater’, Science talk series, Rothera Research Station, Antarctica. *In person.*
- April 2022: ‘Impacts of surface melt and hydrology on Antarctic ice-shelf dynamics and break-up’, Hydrologic Sciences, University of Nevada Reno, USA. *In person.*
- October 2019: ‘Ice-Shelf Instability due to Surface Meltwater Ponding & Drainage’, Earth Science and Observation Center, CIRES, CU Boulder, USA. *In person.*
- October 2018: ‘Ice-Shelf Flexure and Fracture due to Surface Meltwater Ponding and Drainage’, Atmospheric and Oceanic Sciences, CU Boulder, USA. *In person.*
- February 2018: ‘Surface Meltwater Ponding and Drainage Causes Ice-Shelf Flexure & Fracture’, Department of Applied Mathematics and Theoretical Physics (DAMPT), U. Cambridge, UK. *In person.*
- November 2017: ‘Flexural response of the McMurdo Ice Shelf to meltwater lake filling and draining’, Scott Polar Research Institute, University of Cambridge, UK. *In person.*
- October 2013: ‘Surface Meltwater Lakes on the Greenland and Antarctic Ice Sheets’, The Royal Society, London, UK. *In person.*

TEACHING

Over the past 15 years, during my time at the University of Cambridge and the University of Colorado Boulder, I have developed extensive undergraduate teaching experience in Earth Science and Physical Geography. This has included designing and delivering numerous guest lectures, supervising lab classes, leading small-group tutorials, mentoring undergraduate theses, teaching on field courses, and undertaking various examining responsibilities. Beyond undergraduate teaching, I have advised numerous graduate students, including six PhD and three Masters students, with three currently under my supervision (two PhD and one Masters).

UNDERGRADUATE TEACHING INTERESTS

Glaciology, polar earth observation, satellite remote-sensing, climate science, hydrology, GIS, geomorphology, coastal systems, natural hazards, field techniques.

UNDERGRADUATE TEACHING EXPERIENCE

- 2019 - 2024: *Guest Lecturer* for various upper-level undergraduate courses at CU Boulder, including ‘The Cryosphere: Earth’s Icy Environments’ in the Dept. of Geological Sciences, and ‘Ice Sheets and Climate’ in The Dept. of Atmospheric and Oceanic Sciences. Designed lecture content and contributed to course assessment.
- 2013 - 2018: *College Teaching Associate* for Physical Geography, St Catharine’s College, University of Cambridge, UK. Designed and led small-group tutorials covering a range of Physical Geography topics to First Year undergraduates.
- 2010 - 2017: *Fieldtrip leader* on 4 separate week-long fieldtrips to the Swiss Alps (Arolla; 2010, 2013, 2015, and Loetschental; 2017), U. Cambridge Physical Geography Department. Led the

glaciology component of the field trips in addition to 8 weeks of follow-up lab work and final assessment.

2009 - 2018: *Undergraduate tutor and lab class lecturer* (all years), Dept. Geography, U. Cambridge, UK. Designed and led small-group Glaciology tutorials to Second- and Third-Year undergraduates, as well as GIS and modeling-focussed computer lab classes (Part IB: 'Physical and Environmental Geography: Glacial Processes', and Part II: 'Glacial Environments').

ADVISING AND MENTORING

UNDERGRADUATE STUDENTS

- 2021 - 2023: Anna Kilpatrick, University of Chicago. Analyzed our automatic weather station data in combination with timelapse photo data, acquired as part of our NSF-funded field project.
- 2022 - 2022: Lan Tran, Illinois Institute of Technology. Helped to plan/test camera set-up for field deployment in Antarctica. Funded by our NSF EAGER grant.
- 2018 - 2019: Kayla Franklin, University of Chicago. Prepared and tested all automatic weather station equipment before deployment in Antarctica. Now employed in Earth Science-related industry.
- 2009 - 2018: Dissertation advisor/mentor for Third-Year Undergraduate students pursuing glaciology dissertations, Dept. Geography, U. Cambridge, UK.

GRADUATE STUDENTS (MASTERS)

- 2023 - present: Michela Savignano, '*Ice-shelf estuaries: identification, formation, and implications for ice shelf stability from remote sensing observations*', Department of Geography, CU Boulder.
- 2012 - 2013 Jerome Mayaud: '*Modelling meltwater drainage in the Paakitsoq region, western Greenland, and its response to 21st century climate change*', Department of Geography, U. Cambridge.

GRADUATE STUDENTS (PHD)

- 2023 - present: Ethan Carr, '*Investigating Greenland glacial lake outburst floods*', Department of Geography, CU Boulder.
- 2020 - present: Emily Glen, '*Meltwater Ice-Sheet interactions and the changing climate of Greenland*', Lancaster University, UK.
- 2018 - 2022: Devon Dunmire, '*Buried lake formation, drainage, and impacts on Antarctic ice sheet stability*', ATOC, CU Boulder. Successful defense Sep. 2022.
- 2017 - 2021: Rebecca Dell, '*Investigating the surface hydrology of Antarctic ice shelves using remote sensing and machine learning*', U. Cambridge. Successful defense Jul. 2021.
- 2014 - 2019: Grant Macdonald, '*Evaluating the surface hydrology of ice shelves*', Dept. Geophysical Sciences, U. Chicago; co-advisor with D. MacAyeal. Successful defense Nov. 2019.
- 2014 - 2018: Andrew Williamson, '*Remote sensing of supraglacial lakes on the Greenland Ice Sheet*', U. Cambridge. Successful defense May 2018.

POSTDOCS

- 2024 - present: Naomi Ochwat, CIRES, CU Boulder. Lead advisor.
- 2022 - 2023: Devon Dunmire, ATOC, CU Boulder. Co-advisor with A. Subramanian (funded by our NSF HDR 'iHARP' grant). Mentor.
- 2021 - 2023: Rebecca Dell, Scott Polar Research Institute, University of Cambridge, UK (funded by an ESA fellowship). Mentor.

- 2021 - 2023: Prateek Gantayat, Lancaster University, UK. Co-advisor with A Leeson (funded by our NERC Standard Grant: '*Meltwater-Ice-sheet Interactions and the Changing Climate of Greenland*').
- 2020 - 2023: Roohollah Parvizi, Illinois Institute of Technology. Co-advisor with S. Datta-Barua (funded by our NSF EAGER grant).

EXAMINING

GRADUATE EXAMINING/COMMITTEE INVOLVEMENT

- 2022 - 2024: Ian McDowell (PhD), 'Advancing Observational and Modeling Capabilities of Meltwater – Firn Interactions in Ice Sheet Percolation Zones' Hydrologic Sciences, University of Nevada, Reno, USA.
- 2022 - 2024: Naomi Ochwat (PhD), '*From Antarctic sea ice unleashing glaciers to Alaskan icefalls releasing ogives: investigations of glacier processes using remote sensing, field data, and numerical modeling*', Geological Sciences, CU Boulder.
- 2022 - 2023: Ethan Carr (Masters), '*Investigating Greenland glacial lake outburst floods*', Department of Geography, CU Boulder.
- 2013 - 2018: Examiner (annually) for the *MPhil in Polar Studies*, Department of Geography, University of Cambridge, UK.

FIELDWORK EXPERIENCE

- Nov/Dec 2023: Field *Leader* (and Co-PI) for NSF-funded project on the McMurdo Ice Shelf, Antarctica: '*Mapping Melting Glacial Surfaces with GNSS Reflectometry*'.
- Oct - Dec 2022: Field *Leader* (and Lead PI) for NSF-funded project on the George VI Ice Shelf, Antarctic Peninsula: '*Ice-shelf Instability Caused by Active Surface Meltwater Production, Movement, Ponding and Hydrofracture*'.
- Oct/Nov 2019: Field *Leader* (and Lead PI) for NSF-funded project on the George VI Ice Shelf, Antarctic Peninsula: '*Ice-shelf Instability Caused by Active Surface Meltwater Production, Movement, Ponding and Hydrofracture*'.
- 2015 - 2017: Field *Leader* (and International Collaborator) for 3 separate field deployments (each ~6 weeks) on the McMurdo Ice Shelf, Antarctica. Funded by NSF grant '*Impact of Supraglacial Lakes on Ice-Shelf Stability*' (PI: MacAyeal).
- Apr/May 2010: Field *Leader* (and Lead PI) mapping subglacial channels and installing pressure sensors under Rieperbreen, Svalbard. Funded by my Svalbard Science Forum '*Arctic Field Grant*' (~6 weeks).
- Nov/Dec 2009: Field team *Member* with D. Benn and J. Gulley mapping glacier caves in the Ngzumpa and Khumbu glaciers in the Nepal Himalaya (~6 weeks).
- Jun. 2011: Field team *Member* with M. Tedesco monitoring surface meltwater lakes and processes on the Greenland Ice Sheet (~4 weeks).
- 2010 - 2017: *Lecturer* and glaciology lead for U. Cambridge Geography Department teaching fieldtrips (each 1 week-long) to Arolla (2010, 2013, 2015) and Loetschental (2017), Switzerland.
- Jun 2009: Field team *member* with A. Hubbard monitoring surface meltwater lakes and processes on the Greenland Ice Sheet (~2 weeks).
- Aug/Oct 2009: Field team *member* with J. Gulley mapping subglacial channels in Hansbreen, Svalbard (~8 weeks).

SERVICE

- Apr 2025: EGU General Assembly 2025 session convener; ‘*Hydrology of ice sheets, ice shelves and glaciers*’.
- Dec 2024: AGU Annual Meeting 2024 session convener; ‘*C003. Advancing Our Understanding of Ice-Shelf Processes*’
- Apr 2024: EGU General Assembly 2024 session convener; ‘*Hydrology of ice sheets, ice shelves and glaciers*’.
- Feb 2024: *NASA Cryosphere 2023* panel membership.
- Dec 2023: AGU Fall Meeting 2023 session convener; ‘*Understanding Ice-Shelf Processes*’.
- May 2023: Invited speaker and mentor at the NSF-funded *Polar Postdoc Leadership Workshop*, organized by the Polar Science Early Career Community Office (PSECCO) at the CU Boulder Mountain Research Station. Delivered presentations, participated in panel discussions, and mentored 20 polar science postdocs, helping equip them with the skills and training necessary to become future leaders in the field.
- Apr 2022: Committee/panel member for the CIRES Innovative Research Program (IRP) award scheme.
- 2021 - present: Science Alliance member of *Protect our Winters (POW)*, a non-profit, non-partisan, climate advocacy group (<https://protectourwinters.org/alliance/alison-banwell/>). Attended two POW ‘Science Summits’ (Jun. 2022 and Apr. 2023) and two POW Leadership Summits (Sep. 2023 and 2024). Gave a science talk to the POW Staff at their annual meeting in Boulder, CO (Mar. 2024) in addition to speaking at a variety of public outreach events.
- 2012 - present: Regular external proposal reviewer for federal funding agencies including: *US National Science Foundation (NSF) Office of Polar Programs* (x13 total), *UK Natural Environment Research Council (NERC)*; x3 total), *New Zealand Antarctic Research Institute* (x1 total), *Netherlands Antarctic Program* (x1).
- 2012 - present: Regular reviewer for international journals including: *Nature*, *Nature Communications*, *Science Advances*, *J. Geophysical Research*, *Geophysical Research Letters*, *The Cryosphere*, *Remote Sensing*, *Earth and Planetary Science Letters*, *Journal of Glaciology*, *Annals of Glaciology*, *Cold Regions Science and Technology*.
- 2021 - present: Mentor for the *CIRES Mentoring Scheme*, CU Boulder.
- Dec 2021: AGU Fall Meeting 2021 session convener, ‘*Understanding Ice-Shelf Processes*’.
- Apr - Jun 2021: Invited organizational committee member for the NSF-funded ‘*Crevasse Risk Management and Safety Workshop*’, consisting of weekly meetings over 3 months, followed by a 2-day workshop.
- Dec 2020: AGU Fall Meeting 2020 session convener, ‘*Understanding Ice-Shelf Processes*’.
- Mar 2019: Invited contributor to and author of scientific report for UK’s Foreign and Commonwealth Office (FCO) Polar Regions Department, focusing on ‘*The Antarctic Peninsula under a 1.5°C global warming scenario*’, led by M. Siebert.
- Feb 2018: Invited Organizing Committee member for the NSF-funded workshop on ‘*Antarctic Surface Hydrology and Future Ice-Shelf Stability*’, Lamont Doherty Earth Observatory, Columbia University, New York.
- Dec 2017: AGU Fall Meeting 2017 session convener, ‘*C005: Antarctic Ice Shelves: surface and basal processes, instability and breakup*’.
- Dec 2013: AGU Fall Meeting 2013 session convener, ‘*C011: Glacier, Ice Cap, & Ice Sheet Hydrology*’.
- 2010 - 2012: *UK Polar Network* Committee Member.

OUTREACH

HIGH-SCHOOL STUDENT MENTORING

- 2023 - 2024: Nina Hankewycz, Dobbs Ferry High School, New York. Nina acquired WorldView imagery from the Polar Geospatial Center to analyze the temporal and spatial evolution of the ice-shelf compression rumples near to the NZ Scott Base Antarctica.
- 2021 Ella Xu, Naperville High School, Illinois. Now a student at Yale majoring in Earth Science. Ella designed and tested a time-lapse camera for deployment on the George VI Ice Shelf, Antarctica, as part of our NSF grant #1841607 (*NSFGEO-NERC: Ice-shelf Instability Caused by Active Surface Meltwater Production, Movement, Ponding and Hydrofracture*).

TALKS TO HIGH-SCHOOL STUDENTS/ PUBLIC

- Two separate outreach seminars to 11-12 age students via Zoom from McMurdo Station, Antarctica. Entitled '*Science and life in Antarctica*' (Nov. 2023).
- Guest speaker for '*Antarctica In Sight Live: Antarctica and the Climate Crisis*' webinar, organized by the UK Antarctic Heritage Trust, <https://www.youtube.com/watch?v=uaxUUmR4vn8> (April 25, 2022).
- Lecturer for a public talk about Antarctic climate/science in Millennium Park, Chicago, in association with two concerts called '*The White Wanderer*' on February 1, 2020 (<https://vimeo.com/27677216>). These concerts were the work of the Chicago-based artist collective, Luftwerk, who I have been collaborating with since 2017. These concerts were influenced by both seismic data from the Ross Ice Shelf, and from the breaking away of the Larsen C Ice Shelf's iceberg (A68) in 2017. An abstract was presented at the AGU Fall Meeting 2022 in support of this work (MacAyeal. D., Young. K., Backmeier. P., Gallero. S., Banwell. A. (2022), '*White Wanderer Requiem: Music inspired by the cryoseismology of the last days of iceberg B15A*' (SY52A-08)).
- Guest Lecturer for *London International Youth Science Forum* for age 16 -18 award-winning, international students. Lecture title: '*Rapid melting of the Greenland and Antarctic Ice Sheets*' (Jul. 2014, 2015, 2017, 2018).
- Lecturer for *University of Cambridge Science Festival* showing how temporary automatic weather stations can be used to collect data on glaciers/ice sheets/shelves (Feb. 2009 and 2010).
- Guest Lecturer for '*Reach Cambridge*' international summer school for age 16 -18 age students (2009).

MEDIA COVERAGE OF MY RESEARCH

- *Physics Today*: Grant, A., '*Antarctic ice shelves are prone to slush*', 77 (9), 18 (Sep. 2024). <https://doi.org/10.1063/pt.uvhq.trps>
- *AGU's Eos*: Besl, J. (2024), '*Antarctic ice doughnuts may hold the key to shelf collapse*', *Eos*, 105, Jun. 2024, <https://doi.org/10.1029/2024EO240256>.
- *Polar Journal*: '*Antarctic ice shelves can break under the weight of meltwater lakes*', Hager, J., Jun. 2024, <https://polarjournal.ch/en/2024/06/18/antarctic-ice-shelves-can-break-under-the-weight-of-meltwater-lakes/>
- *Boulder's Daily Camera*: '*Boulder scientists show Antarctic ice shelves fracture under weight of meltwater lakes*', Jun. 2024, <https://www.dailycamera.com/2024/06/12/boulder-scientists-show-antarctic-ice-shelves-fracture-under-weight-of-meltwater-lakes/>
- *Phys.org*: '*Ice shelves fracture under weight of meltwater lakes, study shows*', May 2024, https://phys.org/news/2024-05-ice-shelves-fracture-weight-meltwater.html#google_vignette.
- *Environmental News Network*: '*Ice Shelves Fracture Under Weight of Meltwater Lakes*', May 2024, <https://www.enn.com/articles/74548-ice-shelves-fracture-under-weight-of-meltwater-lakes>.
- *Phys.org*: '*Antarctic ice shelves experienced only minor changes in surface melt since 1980, study finds*', Jun. 2023, <https://phys.org/news/2023-06-antarctic-ice-shelves-experienced-minor.html>.
- *NSIDC*: '*Widespread melting and ponded water on the Peninsula Ice Shelves*' Feb. 7, 2023, <https://nsidc.org/ice-sheets-today/analyses/widespread-melting-and-ponded-water-peninsula-ice-shelves>.

- *NSF Highlight*: ‘10 NSF-funded studies that show the challenges and complexities of climate change’, Apr. 2021, <https://beta.nsf.gov/science-matters/10-nsf-funded-studies-show-challenges-and-complexities-climate-change>.
- *NASA Landsat Science*: ‘Extreme Melt on Antarctica’s George VI Ice Shelf’, Feb. 2021, <https://landsat.gsfc.nasa.gov/article/extreme-melt-antarcticas-george-vi-ice-shelf>.
- *Environmental News Network (ENN)*: ‘Extreme Melt on Antarctica’s George VI Ice Shelf’, Mar. 2021, <https://www.enn.com/articles/67246-extreme-melt-on-antarctica-s-george-vi-ice-shelf>.
- *Boulder’s Daily Camera*: ‘CU Boulder scientists find Antarctica’s George VI ice shelf experienced record melting in recent summer’, Mar. 2021, <https://www.dailycamera.com/2021/03/13/cu-boulder-scientists-find-antarcticas-george-vi-ice-shelf-experienced-record-melting-in-recent-summer/>.
- *NASA Earth Observatory*: ‘Widespread Melt on the George VI Ice Shelf’, Jan. 2020 <https://earthobservatory.nasa.gov/images/146189/widespread-melt-on-the-george-vi-ice-shelf>.
- *UK Metro*: Nasa discovers Antarctic ice shelf melting at ‘worrying’ and record-breaking rate, Jan. 2020, <https://metro.co.uk/2020/01/23/nasa-discovers-antarctic-ice-shelf-melting-worrying-record-breaking-rate-12109534/>.
- *EE News*: ‘Scientists see huge ice shelf ‘flex’ for first time’, Feb. 14 2019 <https://www.eenews.net/articles/scientists-see-huge-ice-shelf-flex-for-first-time/>.
- *Space Daily*: ‘Ice shelves buckle under weight of meltwater lakes’ Feb 14. 2019 https://www.spacedaily.com/reports/Ice_shelves_buckle_under_weight_of_meltwater_lakes_999.html.
- *Scientific American*: ‘Antarctica’s Ice Shelves Get a Bounce from Ephemeral Lakes’, 2019 <https://www.scientificamerican.com/article/antarctica-s-ice-shelves-get-a-bounce-from-ephemeral-lakes/>.
- *Daily Mail*: ‘Meltwater lakes created by warmer summers are causing Antarctic ice shelves to buckle and break experts warn after expedition confirms computer simulation findings’, 2019, <https://www.dailymail.co.uk/sciencetech/article-6699499/Warmer-summer-causing-Antarctic-ice-shelves-bend.html>.
- *IFL Science*: ‘Meltwater Lakes Are Causing Antarctic Ice Shelves To Buckle Under The Weight’, 2019, <https://www.iflscience.com/environment/meltwater-lakes-are-causing-antarctic-ice-shelves-to-buckle-under-the-weight-/>.
- *Forbes*: ‘Thousands Of ‘Quakes’ Rock Antarctica’s Ice Shelves At Night - Here’s Why’, 2019, <https://www.forbes.com/sites/robinandrews/2019/02/28/thousands-of-quakes-rock-antarcticas-ice-shelves-at-night-heres-why/#5f6e087233ae>,
- University of Cambridge’s Science Magazine, *BlueSci*: ‘Breaking up at Sea, the great collapse of an ice shelf’, issue 42, p. 12–13, 2018 (https://issuu.com/bluesci/docs/pdf_online), and the associated ‘*BlueSci Podcast*’, <https://www.listennotes.com/podcasts/bluesci-podcast/ep-2-elizabeth-murchison-buJXAlqBQyH/>.
- *Science Daily*: ‘Is Antarctica becoming more like Greenland?’ 2018, <https://www.sciencedaily.com/releases/2018/11/181120125806.htm>.
- *AGU’s EOS*: Kornei, K. ‘Rare glacial river drains potentially harmful lakes’, EOS, 99, 2018 <https://doi.org/10.1029/2018EO101071>.

OTHER CONTRIBUTIONS TO MEDIA OUTLETS

- *Protect our Winters (POW) Science Blog*, as a member of the POW Science Alliance, Apr 2024, <https://protectourwinters.org/how-can-gps-monitor-glacier-ice-melt-a-proof-of-concept-field-test-in-antarctica/>.
- *Protect our Winters (POW) Science Blog*, as a member of the POW Science Alliance, Jan 2023, <https://protectourwinters.org/an-expedition-to-a-rapidly-melting-glacier/>.
- *AFP Fact Check*: ‘Misleading posts claim record Antarctica cold disproves global warming’ Oct 22, 2021 <https://factcheck.afp.com/http%253A%252F%252Fdoc.afp.com%252F9Q68LD-1>.
- *The Independent*: ‘Melting of Antarctica’s Larsen C Ice Shelf at 40-year record high, study says’, Nov 6, 2020 <https://www.independent.co.uk/environment/antarctica-ice-shelf-larsen-c-melt-b1642993.html>.
- *Live Science*: ‘Half of Antarctic ice shelves could collapse in a flash, thanks to warming’, Aug 26, 2020 <https://www.livescience.com/antarctic-ice-shelf-cracks-melting.html>.

- *Science*: ‘Coronavirus forces United States, United Kingdom to cancel Antarctic field research’, Jun 12, 2020, <https://www.sciencemag.org/news/2020/06/coronavirus-forces-united-states-united-kingdom-cancel-antarctic-field-research>.
- *The Revelator*; ‘Antarctica: Too big to melt’, May 2020, <https://therevelator.org/antarctica-melting/>.
<https://www.wbur.org/hereandnow/2020/02/17/antarctica-iceberg-breaks-off>.
- *National Geographic*; ‘A huge iceberg just broke off West Antarctica’s most endangered glacier’, Feb 2020, <https://www.nationalgeographic.com/science/2020/02/antarctica-pine-island-glacier/>.
- *National Geographic*; ‘How Antarctica is melting from above and below’, 2019
<https://www.nationalgeographic.com/science/2019/10/how-antarctic-melting-above-below-ice-sheet/>.
- *Earther*: ‘This Part of Antarctica Was Not Supposed to Be Shrinking’, 2019,
<https://earther.gizmodo.com/this-part-of-antarctica-was-not-supposed-to-be-shrinkin-1831740968>.
- *Carbon Brief*: ‘Sea level rise due to Antarctic ice melt has tripled over past five years’, 2018
https://www.carbonbrief.org/sea-level-rise-due-antarctic-ice-melt-has-tripled-over-past-five-years?utm_source=TwitterVid&utm_campaign=AntarcticIce0618.
- *Carbon Brief*: ‘Foehn winds causing Antarctica’s Larsen C ice shelf to melt in winter’, 2018,
<https://www.carbonbrief.org/foehn-winds-causing-antarcticas-larsen-c-ice-shelf-to-melt-in-winter>.
- *Earther*: ‘Antarctica Is Losing An Unfathomable Amount of Ice’, 2018, <https://earther.com/antarctica-is-losing-an-unfathomable-amount-of-ice-1826799202>.
- *Gizmodo*: ‘Why Did an Enormous Chunk of West Antarctica Suddenly Start Melting?’, 2017
<https://gizmodo.com/why-did-an-enormous-chunk-of-west-antarctica-suddenly-s-1796152023>.
- *Wall Street Journal*: ‘Water on Antarctic Ice Shelves a Wider, Older Phenomenon Than Thought’, 2017,
<https://www.wsj.com/articles/water-on-antarctic-ice-shelves-a-wider-older-phenomenon-than-thought-1492621721>.
- *Climate Central*: ‘Antarctic Surface Melt More Widespread Than Thought’, 2017,
<http://www.climatecentral.org/news/antarctic-surface-melt-widespread-21364>.
- *The Independent*: ‘Vast rivers and waterfalls discovered across Antarctica’, 2017,
<https://www.independent.co.uk/environment/antarctica-rivers-waterfalls-discovered-south-pole-ice-shelf-nature-columbia-university-a7691361.html>.

PODCAST AND RADIO INTERVIEWS

- ‘Breaking the Ice Ceiling’, on the *Caroline Gleich Show*. Caroline is a professional ski mountaineer and climate activist. Her Breaking the Ice Ceiling series interviews leading female polar scientists. (<https://www.audacy.com/podcast/the-caroline-gleich-show-88e0d/episodes/breaking-the-ice-ceiling-dr-alison-banwell-ep-38-35bca>), Dec. 2021.
- ‘*Ordinarily Extraordinary - Conversations with women in STEM*’ (115. Dr. Alison Banwell - Glaciologist; Glacier Scientist; PhD in Polar Studies), <https://podcasts.apple.com/us/podcast/115-dr-alison-banwell-glaciologist-glacier-scientist/id1517307796?i=1000630136656>, Oct. 2023.
- *BBC Radio 4*: ‘*Women’s Hour*’: 20 minute interview about women conducting fieldwork in Antarctica., <https://www.bbc.co.uk/programmes/m0012s7l>, Dec. 2021.
- BBC Radio 4 Today Program* on climate change: 10-minute interview, recorded while doing fieldwork in Antarctica. Guest Edited by Greta Thunberg, Dec. 2019. *Link to program no longer available*.
- *BBC Radio 4 Today* on effects of Covid-19 on Antarctic fieldwork. Interview, Nov. 2020. *Link to program no longer available*.
- *The World (Public Radio International)* on NPR: ‘Antarctica’s hydrofracture risk’, <https://www.pri.org/file/2020-08-26/antarctica-s-hydrofracture-risk>, Aug. 2020.
- *NPR, Here and Now*: ‘An Iceberg Triple The Size Of San Francisco Breaks Off Antarctica's Most Endangered Glacier’, Feb. 2020. *Link to program no longer available*.