Dr Nathaniel Ross Baurley

1. Education

2018 – 2022	**PhD in Geography (Minors) – University of Southampton** Thesis Title: 'Insights into the seasonal dynamics of the lake-terminating glacier Fjallsjökull, southeast Iceland, inferred using ultra-high resolution repeat UAV imagery.' Supervisors: Professor Jane Hart, Dr Eli Lazarus External Examiner: Professor Neil Glasser
2015 – 2017	**MSc in Glaciology (Distinction) – Aberystwyth University** Dissertation: 'The influence of tephra mobilisation and redistribution on the surface albedo, surface roughness and rate of surface ablation on Sólheimajökull, southern Iceland.'
2012 – 2015	**BSc in Geography (First Class Honours) – Aberystwyth University** Dissertation: 'Investigating the effect of a thick layer of debris cover on ablation rates on the surface of Glacier Noir, France.'

2. Employment

March 2025 –	**Postdoctoral Research Associate (University of Bologna)** ▪ Use GIS-based mapping and InSAR to create an inventory of rock glaciers in the Val d'Aosta, Italian Alps, based off their geomorphology and kinematics
Nov 2024 – March 2025	**SENSE CDT Outreach Officer (NERC funded; School of Earth and Environment, University of Leeds)** ▪ Developing outreach materials to encourage secondary school students to choose an environmental science career
July 2022 – August 2024	**Postdoctoral Research Associate (University of Southampton)** ▪ Generation of surface velocity datasets from Sentinel-1 satellite imagery for a number of soft-bedded glaciers globally ▪ Identifying seasonal, annual, and multi-annual patterns in the data and linking these to both climatic and glaciologic factors ▪ Organising and undertaking two field trips to Iceland in the summer of 2023, involving the collection of high-resolution UAV data over a large calving glacier, and the deployment of several low-cost GNSS sensors on the surface of two glaciers ▪ Use these field data, alongside the satellite-derived velocity data, to provide insights into the key processes influencing soft-bedded glaciers, and how they may respond in future ▪ Involved collaborative work with internal and external colleagues (e.g., writing research papers, conference presentations, overseas fieldwork)
Oct 2018 – June 2022	**PGR Demonstrator for the School of Geography and Environmental Science (University of Southampton)**

- Leading and assisting computer practical sessions covering glaciology, GIS, remote sensing, and photogrammetry
- Running multiple help and drop-in sessions for computer practicals, assignments, module revision, and dissertation assistance for 1st, 2nd, and final year undergraduates, as well as MSc students
- Marking a number of 1st and 2nd year undergraduate modules, assessing short and long answer questions, statistical analysis, and GIS
- Playing a key organisational and teaching role across multiple field courses in the UK and overseas, supporting module leads by monitoring and maintaining field equipment, upholding safety in hazardous areas, and running group projects independently

3. Recognition & Awards

2022	"Highly Commended" for the Geography and Environmental Science Mary Edwards ECR Award for Excellence in Teaching
2019	Winner of "Best Poster" at the Geography and Environmental Science Postgraduate Conference (University of Southampton)

4. Research Activity

4.1. Research Funding (5)

2021	**Mount Everest Foundation Fieldwork Grant**: £1350
2021	**Royal Geographical Society Postgraduate Research Award**: £1000
2019	**Quaternary Research Association New Research Workers' Award**: £1500
2019	**Mount Everest Foundation Fieldwork Grant**: £600
2019	**Royal Geographical Society Postgraduate Research Award**: £1500

4.2. Peer-Reviewed Publications (7)

1)	Hart, J.K., Martinez, K., **Baurley, N.R.**, Robson, B.A. and Andrews, A. (2025). Different styles of subglacial soft bed hydrology: Examples from Breiðamerkurjökull and Fjallsjökull, Iceland. *Earth Surface Processes and Landforms, 50*(2). https://doi.org/10.1002/esp.70014
2)	**Baurley, N.R.**, Tomsett, C., Hart, J.K., 2022. Assessing UAV-based laser scanning for monitoring glacial processes and interactions at high spatial and temporal resolutions. *Frontiers in Remote Sensing, 3*. https://doi.org/10.3389/frsen.2022.1027065
2)	Hart, J.K., Young, D.S., **Baurley, N.R.**, Robson, B.A. and Martinez, K., 2022. The seasonal evolution of subglacial drainage pathways beneath a soft-bedded glacier. *Communications Earth & Environment*, *3*(1), pp.1-13. https://doi.org/10.1038/s43247-022-00484-9

3) **Baurley, N.R.** 2021. Late-summer glaciological analysis of Fjallsjökull, using ultra high-resolution repeat unmanned aerial vehicle imagery. *Quaternary Newsletter*, *152*, pp.28-42.

4) **Baurley, N.R.**, Robson, B. and Hart, J.K., 2020. Long-term impact of the proglacial lake Jökulsárlón on the flow velocity and stability of Breiðamerkurjökull glacier, Iceland. *Earth Surface Processes and Landforms, 45*(11), pp.2647-2663. https://doi.org/10.1002/esp.4920

5) **Baurley, N.R.** and Hart, J.K. (*in review*). Short-term increases in velocity at a lake-calving glacier driven by thermal notch formation and subsequent calving failure. *Arctic, Antarctic and Alpine Research*.

6) **Baurley, N.R.**, Andrews, A., Robson, B., Attia, S., Martinez, K. and Hart, J.K. (*in review*). Contrasting dynamic behaviour of six lake-terminating glaciers draining the Vatnajökull Ice Cap and links to bedrock topography. *Remote Sensing in Earth Systems Sciences*.

7) Andrews, A., **Baurley, N.R.,** Dash, J., and Hart, J.K. (*in review*). Seasonal and Sub-Seasonal Variations in Proglacial Lake Area Revealed by High Spatial Resolution PlanetScope Satellite Imagery. *Remote Sensing Applications: Society and Environment*.

4.3. Conference Presentations (5)

2022 'Assessing UAV-based laser scanning for monitoring glacial processes and interactions at high spatial and temporal resolutions.' International Glaciological Society British Branch Meeting (IGS BB), Edinburgh, 30th August-1st September.

2021 'Insights into the seasonal dynamics of the lake-terminating glacier Fjallsjökull, south-east Iceland, inferred using ultra-high resolution repeat UAV imagery.' IGS BB, (online), 6th-8th September.

2021 'Insights into the seasonal dynamics of the lake-terminating glacier Fjallsjökull, south-east Iceland, inferred using ultra-high resolution repeat UAV imagery.' EGU General Assembly 2021, (online), 19th-30th April, EGU21-677, https://doi.org/10.5194/egusphere-egu21-677

2020 'Assessing glacier dynamics using ultra-high resolution repeat UAV surveys.' Conference Presentation at the Geography and Environmental Science Postgraduate Conference, (online), University of Southampton, 10th-11th September.

2019 'Recent changes in glacier surface velocity at Breiðamerkurjökull, Iceland: Response to climate change?' Poster Presentation at the Geography and Environmental Science Postgraduate Conference, University of Southampton, 13th-14th June.

4.4. Relevant Research Skills (13)

- **Overseas glacial fieldwork** (e.g., Iceland, European Alps)
- **3D surveying techniques** (e.g., UAVs, dGPS, LiDAR)
- **Glacial field techniques** (e.g., discharge measurements, geomorphic mapping, spectrometry and ablation measurements)
- **Photogrammetry** and **3D processing software** (e.g., Agisoft Metashape Pro, CloudCompare)
- **GIS software** (e.g., ArcGIS Pro, QGIS)
- **GIS-based mapping** (extensive experience of digitising features from both satellite and UAV imagery, including glacier front positions; calving fronts; proglacial lakes; subglacial plumes; surface crevasses; supraglacial lakes; and calved icebergs)
- **GIS techniques** (e.g., working with raster & vector data; spatial analyses; change detection; statistical analyses; cartographic creation)
- **Glacier velocity analyses** (extensive experience of deriving glacier velocities from SAR satellite imagery (e.g., Sentinel-1; TerraSAR-X; ERS-2) and optical UAV imagery)
- **Glacier velocity toolboxes** (e.g., SNAP, CIAS)
- **Remote sensing techniques** (e.g., spectral indices, supervised and unsupervised classification)
- **Cloud-computing software** (e.g., Google Earth Engine)
- **Coding/process automation** (e.g., Python)
- **Microsoft applications** (e.g., Word, Excel, PowerPoint)

5. Teaching Activity

5.1. Teaching Qualifications (1)

2024	**Associate Fellow of Advance Higher Education (AdvanceHE)** ▪ Undertaken via the PREP framework at the University of Southampton

5.2. Teacher Training (3)

2023	**Facilitation Techniques for Engaging Seminars and Classes (University of Southampton)**
2022	**Introduction to Doctoral Supervision (University of Southampton)**
2017	**Orientation to Teaching and Demonstrating (University of Southampton)**

5.3. Student Supervision (1)

2022 – Present	**Co-supervisor for a PhD student in Geography and Environmental Science (University of Southampton)** ▪ PhD title: 'Investigating short-term variations in ice-marginal lake area using high resolution imagery and its relationship with glacier dynamics at Fjallsjökull and Breiðamerkurjökull, Iceland' ▪ Involves regular meetings (both in-person and online), assisting with data collection, data processing and writing, and providing pastoral support

5.4. Guest Seminars/Lectures (2)

2024	**'Investigating glacial processes via UAVs: A case study from Fjallsjökull, Iceland'** – Seminar for the Geospatial research group at the University of Bergen, Norway
2022, 2023	**'Glacier Calving: A Very Brief Introduction'** – Guest lecture for the 3rd year undergraduate module "Glaciers in a Changing Climate"

5.5. Teaching Assistant (15 modules, over 800 hours total)

- Throughout my PhD I actively demonstrated on a number of modules across multiple disciplines in Geography and Environmental Science, including glaciology, GIS, remote sensing, geomorphology and field skills. This comprised large lectures, computer/laboratory practicals, small group settings and 1-1 supervision

6. Academic Service and Outreach

6.1. Organisational Roles (2)

2021 – Present	**International Glaciological Society (IGS) Early Career Research Group (EGG) Committee member and President (2023/2024)** ▪ Aim is to enhance the experience of cryosphere ECRs (socially and academically), while being welcoming and inclusive to all ▪ Organise activities such as social and networking events, both online and at conferences (e.g., IGS BB meetings). ▪ Personally led the design and implementation of an ECR conference grant to provide disadvantaged students the opportunity to present their work at IGS conferences – first grant round advertised December 2023
2018 – 2022	**Postgraduate Representative at both school and faculty level meetings** ▪ Collating the opinions, questions, and concerns of fellow geography postgraduates to feed back to the school or faculty ▪ Actively pushed for a change in the way demonstrating was allocated within the school to ensure a fairer and more transparent process ▪ Pushed for faculty-level mental health training for those PGRs demonstrating and teaching on overseas field courses

6.2. Conference Organisation and Convening (3)

2024	**EGU General Assembly 2024 (in person)** Co-convenor of the session "Observing the Cryosphere: Advances in remote and close-range sensing"
2022	**IGS BB (in person)** Organiser and convenor of ECR activities as part of IGS EGG
2021	**IGS BB (online)** Co-chair of the session "Remote Sensing of the Cryosphere 2"

6.3. Review Work (2)

2023	Reviewer for US NSF Proposal

2023 – present	Reviewer for journals including Cold Regions Science and Technology, The Cryosphere, and Drone Technology

6.4. Outreach Roles

2019, 2023, 2024	**'Glacial Goo' Practical: Southampton Science and Engineering Festival (SOTSEF)** https://www.sotsef.co.uk/ ▪ Team leader - involved planning, sourcing materials and building the two glacial valleys (2019), and then setting up and running the stand in both years ▪ Explained to visitors the processes behind glaciers, demonstrating their flow through the use of 'goo' ▪ Tailored response and content depending on age group (~5-90 years of age) – illustrates ability to engage and communicate with non-specialists

Referees

Professor Jane Hart
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Professor Jo Nield
(Professional colleague and knowledge of co-teaching on various modules)
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