Stuart William David Grieve

Senior Lecturer in Physical Geography

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Appointments

2021– **Fellow of the Digital Environment Research Institute**, Queen Mary University of London
2021– **Senior Lecturer in Physical Geography**, Queen Mary University of London
2018–2021 **Lecturer in Physical Geography**, Queen Mary University of London
2017–2018 **Research Software Developer**, University College London
2017 **Lecturer in Physical Geography**, Queen Mary University of London
2016–2017 **Postdoctoral Research Associate**, University of Edinburgh
Topographic analysis and landslide modelling software.
2016 **Research Assistant**, Cardiff University

Education

2018–2020 **Postgraduate Certificate Academic Practice (PGCAP)** Queen Mary University of London

2013–2016 **Ph.D. in Atmospheric and Environmental Sciences** University of Edinburgh
Uncovering signatures of geomorphic process through high resolution topography.
Supervisors: Professor Simon M Mudd and Dr Tristram C Hales (Cardiff University)

2011–2012 **M.Sc. in Geographical Information Science** (Distinction) University of Edinburgh
Thesis Title: *An automated analysis of the southern San Andreas Fault to explore topography's relationship with tectonics.*
Supervisor: Professor Simon M Mudd

2007–2011 **B.Sc. (Hons.) in Geology and Physical Geography** (2:1) University of Edinburgh
Thesis Title: *The Influence of Climate Change on Landslide Sediment Yields in the Northern Lake District.*

Awards

QMUL Education Awards
2021 Online Learning Champion *nominee*
2021 Assessment and Feedback Champion *nominee*
2021 Innovative Use of Technology Award *nominee*
2019 Innovative Teaching Award *nominee*
2019 Technology Enhanced Learning Award *nominee*
2019 Teacher of the Year *nominee*

2018 **Software Sustainability Institute Fellowship**
Awarded to support my work developing sustainable geoscience software

2017 **Wiley Award** from the British Society for Geomorphology
Awarded for the best paper published in *Earth Surface Processes and Landforms* in 2016

Ph.D. Student Supervision

2022– **Owen James** NERC London DTP Studentship: *Shoreline and Beach Volumetric Change Assessment and Prediction Using Machine Learning Techniques.*

2021– **Stefan Baternay** QMUL Principal's Studentship: *High resolution topographic analysis to reconstruct Martian landscape evolution.*

2021– **Matt Allen** UKRI AI4ER CDT: *Automated tree species classification from forest Terrestrial Laser Scanning Data.*

2020– **Nan Wu** Lloyds Register Foundation: *Fate and behaviour of microplastics in the natural environment.*

2020– **Shudan Xue** China Scholarship Council Studentship: *Erosion of Coastal Historic Landfills – Waste Release from East Tilbury landfill.*

2020– **William Flynn** NERC London DTP Studentship: *Novel High-Resolution Three-Dimensional Mapping of Vegetation Using Unmanned Aerial Vehicles (UAV) and Structure from Motion Photogrammetry (SfM).*

2020-2021 **Harry Owen** NERC London DTP Studentship: *Climate Change and Biomass Dynamics: Novel Methods in Extracting Forest Biophysical Properties.*

Postdoctoral Research Supervision

2022– **Milto Miltiadou** UKRI FLF tied PDRA: *Next generation forest dynamics modelling using remote sensing data.*

2021– **Harry Owen** UKRI FLF tied PDRA: *Next generation forest dynamics modelling using remote sensing data.*

Research Statement

My research aims to develop an understanding of how signals of change, such as those driven by tectonics or the environment, manifest in the surface morphology of the Earth and other planetary bodies. In particular, I aim to bridge the gap between numerical models, remotely sensed data and field observations and I conduct such research through the development of open source software which facilitates reproducible analysis, with a particular focus on the processing of high resolution topographic data. Such software allows repeatable experiments to be performed on both terrestrial and planetary landscapes, at a range of scales spanning individual hillslopes to continental scale features. I also work on the development and application of cutting edge GIS and computer science techniques to enhance surface process research, through the analysis of complex spatial information combined with novel data collection approaches and high performance computing.

Teaching Statement

My teaching, as with my research, focuses on the implementation and application of quantitative and computational methods, as a framework to understand Earth surface processes. I am passionate about engaging students to interpret landscapes and the processes which act upon them both in a classroom and field setting. I have experience of teaching theoretical and applied GIS, either within the context of physical geography or a number of other

disciplines (transport planning, infrastructure, crime research, archaeology) at both an undergraduate and postgraduate level. Aside from teaching physical geography and GIS, I also enjoy teaching scientific programming to students, giving them a grounding in data analysis and visualisation which can be employed throughout their time in education and beyond. Such skills are vital for students and I believe I am well placed to teach these skills within a physical science context.

Other Employment

2015–2016 **GIS Consultant and Field Course Leader**, GeoBus, University of St Andrews
2012–2013 **GIS Trainee** Forth Crossing Bridge Constructors

Publications

†denotes student author.

2021 Gailleton, B., Mudd, S.M., Clubb, F.J., **Grieve, S.W.D.**, Hurst, M.D., *Impact of changing concavity indices on channel steepness and divide migration metrics.* J. Geophys. Res. Earth Surf. [URL] [BibTeX]

2021 Gabet, E.J., Mudd, S.M., Wood, R.W., **Grieve, S.W.D.**, Binnie, S.A., Dunai, T.J., *Hilltop Curvature Increases with the Square Root of Erosion Rate.* J. Geophys. Res. Earth Surf. [URL] [BibTeX]

2020 **Grieve, S.W.D.**, Clubb, F.J., Mudd, S.M., *Reproducible topographic analysis.* In Tarolli, P., Mudd S.M. (Ed.) Remote Sensing of Geomorphology. [URL] [BibTeX]

2020 Clubb, F.J., Mudd, S.M., Hurst, M.D., **Grieve, S.W.D.**, *Differences in channel and hillslope geometry record a migrating uplift wave at the Mendocino Triple Junction.* Geology. [URL] [BibTeX]

2019 Chen, S-a, Michaelides, K., **Grieve, S.W.D.**, Singer, M.B., *Aridity is expressed in river topography globally.* Nature. [URL] [BibTeX]

2019 Hurst, M.D., **Grieve, S.W.D.**, Mudd, S.M., Clubb, F.J., *Detection of channel-hillslope coupling along a tectonic gradient.* Earth Planet. Sci. Lett. [URL] [BibTeX]

2018 **Grieve, S.W.D.**, Hales, T.C., Parker, R.N, Mudd, S.M., Clubb, F.J., *Controls on zero-order basin morphology.* J. Geophys. Res. Earth Surf. [URL] [BibTeX]

2017 **Grieve, S.W.D.**, *spatial-efd: A spatial-aware implementation of elliptical Fourier analysis.* J. Open Source Softw. [URL] [BibTeX]

2016 **Grieve, S.W.D.**, Mudd, S.M., Hurst, M.D., *How long is a hillslope?* Earth Surf. Process. Landforms. [URL] [BibTeX]

2016 **Grieve, S.W.D.**, Mudd, S.M., Hurst, M.D., Milodowski, D.T., *A nondimensional framework for exploring the relief structure of landscapes.* Earth Surf. Dynam. [URL] [BibTeX]

2016 **Grieve, S.W.D.**, Mudd, S.M., Milodowski, D.T., Clubb, F.J., Furbish, D.J., *How does grid-resolution modulate the topographic expression of geomorphic processes?* Earth Surf. Dynam. [URL] [BibTeX]

2016 Parker, R.N., Hales, T.C., Mudd, S.M., **Grieve, S.W.D.**, Constantine, J.A., *Colluvium supply in humid regions limits the frequency of storm-triggered landslides.* Sci. Rep. [URL] [BibTeX]

2016 Mudd, S. M., Harel, M.-A., Hurst, M. D., **Grieve, S.W.D.**, and Marrero, S. M., *The CAIRN method: Automated, reproducible calculation of catchment-averaged denudation rates from cosmogenic radionuclide concentrations*, Earth Surf. Dynam. [URL] [BibTeX]

2016 Clubb, F.J., Mudd. S.M., Attal, M., Milodowski, D.T., and **Grieve, S.W.D.**, *The relationship between drainage density, erosion rate, and hilltop curvature: implications for sediment transport processes*, J. Geophys. Res. Earth Surf. [URL] [BibTeX]

2014 Mudd, S.M., Attal, M., Milodowski, D.T., **Grieve, S.W.D.**, Valters, D.A., *A statistical framework to quantify spatial variation in channel gradients using the integral method of channel profile analysis.* J. Geophys. Res. Earth Surf. [URL] [BibTeX]

Conference Presentations

Invited Talks

2019 **Grieve, S.W.D.**, *Lasers, landslides and bendy bananas.* Presented at The School of Geography, Queen Mary University of London.

2017 **Grieve, S.W.D.**, *Geomorphic insight from high resolution topography: Is it reproducible?* Wiley Award Keynote Lecture, BSG Annual General Meeting, Hull

2016 **Grieve, S.W.D.**, *Uncovering signatures of geomorphic process through high resolution topography.* Presented at The Hutton Club, University of Edinburgh.

2015 **Grieve, S.W.D.**, *Reproducible geographic analysis: Insights from geomorphology.* Presented at GIS Update, Edinburgh.

Oral Presentations

2022 Wu, N.†, Spencer, K.L., **Grieve, S.W.D.**, Manning, A.J., *The Estuary as a Natural Water Treatment Plant for Micrplastics.* Presented at the EGU General Assembly, Vienna.

2021 Owen, H.J.F, **Grieve, S.W.D.**, Lines, E.R., *Three-dimensional structural plasticity in Mediterranean forests.* Presented at the British Ecological Society Annual Meeting, Liverpool.

2021 Wu, N.†, Spencer, K.L., **Grieve, S.W.D.**, Manning, A.J., *A systematic study on the interaction between microplastics and cohesive sediments.* Presented at INTERCOH 2021, Online.

2020 Heppell C.M., Bartlett, A., Beechey, A., Jennings, P., Soteriou, H., Rhys, H., Schaefer, B., Beck, C., Treves, R., **Grieve, S.W.D.**, Wu, Y., Haklay, M., Dinnadge, R., Wishart, J., *ChessWatch: An on-line observatory for the River Chess.* Presented at the British Ecological Society Aquatic SIG Annual Meeting, Online.

2019 **Grieve, S.W.D.**, Singer, M.B., Chen, S-a, Michaelides, K., *Understanding rivers using the Space Shuttle, LSDTopoTools and HPC.* Presented at RSLondonSouthEast 2019, London.

2018 Singer, M.B., **Grieve, S.W.D.**, Chen, S-a, Michaelides, K., *Climatic Signatures Within the World's Rivers.* Presented at the AGU Fall Meeting, Washington, D.C.

2018 Clubb, F.J., Mudd, S.M., Hurst, M.D., **Grieve, S.W.D.**, *Tectonics vs. eustasy: fluvial terraces, channel profiles, and hillslopes at the Mendocino Triple Junction, California* Presented at the EGU General Assembly, Vienna.

2018 Alegre, R., Georgoulas, A., **Grieve, S.W.D.**, Robson, E., *Democratizing ancient Mesopotamian research through digital scholarship* Presented at the IEEE 14th International Conference on e-Science, Amsterdam.

2017 Mason, L., Hetherington, J., O'Reilly, M., Yong, M., Jersakova, R., **Grieve, S.W.D.**, Perez-Suarez, D., Klapaukh, R., Craster, R.V. and Matar, O.K., *Working research codes into fluid dynamics education: a science gateway approach.* Presented at The APS Division of Fluid Dynamics, Denver.

2016 Mudd, S.M., Sinclair, H.D., LeDivellec, T., Dallas, K., **Grieve, S.W.D.**, *A single event in the Ladakh Himalaya resulted in erosion equivalent to grater than 1000 years of the average erosion rate.* Presented at the BSG Annual General Meeting, Plymouth.

2015 **Grieve, S.W.D.**, Mudd, S.M., Hurst, M.D., *Constraining hillslope sediment flux using high resolution topographic data.* Presented at the BSG Annual General Meeting, Southampton.

2015 Clubb, F.J., Mudd, S.M., Attal, M., Milodowski, D.T., **Grieve, S.W.D.**, *The Relationship between Drainage Density, Erosion Rate, and Hilltop Curvature: Implications for Sediment Transport Processes.* Presented at the BSG Annual General Meeting, Southampton.

Poster Presentations

2022 **Grieve, S.W.D.**, Owen, H.J.F., Ruiz-Benito, P., Lines, E.R., *Linking forests and landscapes in four dimensions.* Presented at the BSG Annual Meeting, Northumbria.

2021 Allen, M.J.[†], Owen, H.J.F., **Grieve, S.W.D.**, Lines, E.R., *Automated tree species classification from forest Terrestrial Laser Scanning data.* Presented at the British Ecological Society Annual Meeting, Liverpool.

2021 Xue, S.[†], Spencer, K.L., **Grieve, S.W.D.**, *A global perspective on the future impacts of brownfield and solid waste disposal sites in the coastal zone.* Presented at ECSA 58 - EMECS 13: Estuaries and coastal seas in the Anthropocene, Online.

2021 Mudd, S.M., Gabet, E.J., Wood, R.W., **Grieve, S.W.D.**, Binnie, S.A, Dunai, T.J., *Rapidly eroding hilltops are surprisingly smooth: ridgetop curvature varies with the square root of erosion rate.* Presented at vEGU2021: Gather Online.

2020 **Grieve, S.W.D.**, Mudd, S.M., Clubb, F.J., Singer, M.B., Michaelides, K., Chen, S-a, *Inverting fluvial network topology to understand landscape dynamics.* Presented at EGU2020: Sharing Geoscience Online.

2020 Wheatland, J., Spencer, K.L., **Grieve, S.W.D.**, Gu, C., Carr, S., Manning, A., Bushby, A., Botto, L. *A New 3D Descriptor for Irregularly Shaped Suspended Sediment Aggregates.* Presented at EGU2020: Sharing Geoscience Online.

2020 Gailleton, B., Mudd, S.M., Clubb, F.J., Hurst, M.D., **Grieve, S.W.D.**, *Importance of concavity for interpreting rates and patterns of landscape evolution from river profiles.* EGU2020: Sharing Geoscience Online.

2019 Clubb, F.J., Mudd, S.M., **Grieve, S.W.D.**, Hurst, M.D., Gailleton, B., Milodowski, D.T., Valters, D., Goodwin, G., *LSDTopoTools: open-source software for topographic analysis.* Presented at the AGU Fall Meeting, San Francisco.

2019 **Grieve, S.W.D.**, Mudd, S.M., Clubb, F.J., Singer, M.B., Michaelides, K., Chen, S-a, *Fingerprinting landscape dynamics through fluvial network topology.* Presented at the BSG Annual General Meeting, Sheffield.

2019 Bourne, A.J., Davis, S.M., Abbott, P.M., **Grieve, S.W.D.**, *Determining possible controls on Icelandic volcanism during the last glacial period: an examination of the Greenland ice-core tephra framework.* Presented at The 20th Congress of the International Union for Quaternary Research (INQUA) 2019, Dublin.

2019 **Grieve, S.W.D.**, Hales, T.C., Parker, R.N., Mudd, S.M., Clubb, F.J., *Relationships between zero order basin morphology and sediment transport.* Presented at the EGU General Assembly, Vienna.

2018 Chen, S-a, Michaelides, K., **Grieve, S.W.D.**, Singer, M.B., *Climatic Controls on River Longitudinal Profiles Globally.* Presented at the AGU Fall Meeting, Washington, D.C.

2018 **Grieve, S.W.D.**, Hales, T.C., Parker, R.N., Mudd, S.M., Clubb, F.J., *Understanding the relationship between colluvial hollow morphology and hillslope processes.* Presented at the EGU General Assembly, Vienna.

2017 Clubb, F.J., Mudd, S.M., Hurst, M.D., **Grieve, S.W.D.**, *Unsteady Landscapes: Fluvial Terraces, Channel Profiles, and Hillslopes at the Mendocino Triple Junction, California.* Presented at the AGU Fall Meeting, New Orleans.

2016 Hales, T.C., Parker, R.N., Mudd, S.M., **Grieve, S.W.D.**, *How do Colluvial Hollows Fill?* Presented at the AGU Fall Meeting, San Francisco.

2016 Hurst, M.D., **Grieve, S.W.D.**, Mudd, S.M., *Coupled analysis of hillslope and channel metrics for erosion rates in a tectonically active landscape.* Presented at the AGU Fall Meeting, San Francisco.

2016 **Grieve, S.W.D.**, Mudd, S.M., Milodowski, D.T., Clubb, F.J., Furbish, D.J., *How does the resolution of topographic data impact the measurement of geomorphic processes?* Presented at the BSG Annual General Meeting, Plymouth.

2016 Mudd, S.M., Hurst, M.D., **Grieve, S.W.D.**, Milodowski, D.T., Clubb, F.J., Attal, M.*Detecting geomorphic processes and change with high resolution topographic data.* Presented at the EGU General Assembly, Vienna.

2015 Mudd, S.M., **Grieve, S.W.D.**, Milodowski, D.T., Hurst, M.D., Clubb, F.J., Valters, D.A., *LSDTopoToolBox: Open source geomorphology.* Presented at the BSG Annual General Meeting, Southampton.

2015 Clubb, F.J., Mudd, S.M., Attal, M., Milodowski, D.T., **Grieve, S.W.D.**, *The Relationship between Drainage Density, Erosion Rate, and Hilltop Curvature: Implications for Sediment Transport Processes.* Presented at the AGU Fall Meeting, San Francisco.

2015 Parker, R.N., Hales, T.C., Mudd, S.M., **Grieve, S.W.D.**, *Precipitation and soil accumulation history modifies future landslide hazard.* Presented at the AGU Fall Meeting, San Francisco.

2015 Parker, R.N., Hales, T.C., Mudd, S.M., **Grieve, S.W.D.**, *Climate change has limited impact on soil-mantled landsliding.* Presented at the EGU General Assembly, Vienna.

2014 **Grieve, S.W.D.**, Mudd, S.M., Hales, T.C., *How long is a hillslope?* Presented at the AGU Fall Meeting, San Francisco.

2014 Mudd, S.M., Attal, M., Milodowski, D.T., **Grieve, S.W.D.**, Valters, D.A., *A statistical technique for identifying channels of different steepness in transient landscapes.* Presented at the EGU General Assembly, Vienna.

Classroom Teaching Experience (Course Level)

2022 Research Design and Methods, Lecturer (M.Sc.)
2021– Ideas and Practice in Geography and Environmental Science, Tutor (1st year)
2020 Research Design, Convener (2nd year)
2019– Advanced Geospatial Science, Convener (3rd year)
2019 Fieldwork in Physical Geography and Environmental Science, Lecturer (1st year)
2019 Progress in Physical Geography and Environmental Science, Lecturer (3rd year)
2019– Geospatial Science, Lecturer (2nd year)
2018 Environmental Hazards, Lecturer (3rd year)
2018– Geomorphology, Lecturer, Convener (2nd year)
2018– Geography in the World, Lecturer (1st year)
2018– Independent Geographical Study/Project in Environmental Science, Supervisor (3rd year)
2017–2018 Research Software Engineering with Python, Lecturer (M.Sc.)
2016 Quantitative Methods in Earth Sciences, Laboratory Demonstrator (3rd year)
2015 Geomorphology, Laboratory Demonstrator and Tutor (2nd year)
2014–2015 Object Oriented Software Engineering Principles, Laboratory Demonstrator (M.Sc.)
2014–2015 Object Orientated Software Engineering: Spatial Algorithms, Laboratory Demonstrator (M.Sc.)
2014–2015 Principles of Geographical Information Science, Laboratory Demonstrator (M.Sc.)
2014–2015 Introduction To Spatial Analysis, Laboratory Demonstrator (M.Sc.)
2014–2015 Distributed GIS, Laboratory Demonstrator (M.Sc.)
2014–2015 Spatial Modelling, Laboratory Demonstrator (M.Sc.)
2014 Earth Surface Systems Course Assistant (1st year)
2014 Fundamental Methods in Geography, Laboratory and Field Demonstrator (2nd year)
2013–2016 Geo-Visualisation, Laboratory Demonstrator (M.Sc.)
2013–2015 Advanced Spatial Database Methods, Laboratory Demonstrator (M.Sc.)
2013–2015 Further Spatial Analysis, Laboratory Demonstrator (M.Sc.)
2013–2014 Earth Surface Systems, Laboratory Demonstrator and Tutor (1st year)

Field Teaching Experience (Course Level)

2022 Getting started in Geography and Environmental Research (1st year)
2017, 2019 Fieldwork in Physical Geography and Environmental Science (1st year)
2014–2015 Cyprus field course (4th year honours)
2014 Fundamental Field Methods in Geography (2nd year)

Service

2021– **Director of Graduate Studies (Physical Geography and Environmental Science)** School of Geography, Queen Mary University of London.
2021 **Co-Convener** EGU Session GM2.7, *Advances in geomorphometry and landform mapping: possibilities, challenges and perspectives.* vEGU2021: Gather Online.
2021– **Grant Reviewer** NASA Mars Data Analysis Program

2021 **Ph.D. Examiner**: Thomas Lawrence, *Quantification of Micro-Scale Floc Porosity Characteristics Utilising 3D Microtomography*.

2020-2021 **Deputy Director of Examinations** School of Geography, Queen Mary University of London.

2019– **Panel Member** Software Sustainability Institute Fellowship programme.

2020 **Judge at NERC DTP Environmental Hackathon.**

2020 **Co-Convener** EGU Session GM2.1, *Advances in geomorphometry and landform mapping: possibilities, challenges and perspectives.* EGU2020: Sharing Geoscience Online.

2020 **Co-Convener** EGU Short Course SC1.2, *Testing geoscientific code in Python: what, how, and why you should be doing it.* EGU2020: Sharing Geoscience Online.

2019 **Convener** EGU Short Course SC1.36, *Making high resolution topographic analysis more reproducible with LSDTopoTools.* EGU General Assembly, Vienna.

2019– **Grant Reviewer**: NERC Constructing a Digital environment

2019 **Ph.D. Examiner**: Gabriel Connor-Streich, *Graph theoretical analysis of braided rivers.*

2018–2020 **Academic lead on engagement, retention and success** School of Geography, Queen Mary University of London.

2018– **Academic Advisor** For B.Sc. Geography and B.Sc. Environmental Science programs at Queen Mary University of London.

2014– **Journal Peer Reviewer**: Geological Society of America Bulletin; Geophysical Research Letters; Geomorphology; International Journal of Geographical Information Science; Journal of Geophysical Research: Earth Surface; Water Resources Research; Icarus; Scientific Reports; The Journal of Hydrology; The Journal of Open Source Software; Earth Surface Dynamics; Entropy; Earth Surface Processes and Landforms; Reference Module in Earth Systems and Environmental Sciences

2014–2015 **Session Chair** M.Sc. GIS postgraduate conference, University of Edinburgh.

Funding Received

2021 QMUL Undergraduate Research Bursary Scheme: *Mapping channel head morphology under a changing climate*
P.I. **Stuart W. D. Grieve**
Award: **£1,000**

2021 Code for Science and Society Event Fund: *Reproducible Silicon Landscapes*
P.I. **Stuart W. D. Grieve**
Co. I Fiona J. Clubb
Award: **£14,314**

2020 NERC COVID-19 Public Engagement Grant: *ChessWatch: a co-designed online observatory for the River Chess*
P.I. Catherine M. Heppell
Co. I: **Stuart W. D. Grieve**
Award: **£10,000**

2020 UKRI Future Leaders Fellowship: *Next generation forest dynamics modelling using remote sensing data*
P.I. Emily R. Lines
Co. I: **Stuart W. D. Grieve**
Award: **£1,230,000**

2019 QMUL Strategic Facilities Investment Fund: *A multi-sensor aerial observatory for dynamic characterisation of Earth's landscapes and ecosystems*
P.I.: **Stuart W. D. Grieve** and Emily R. Lines
Award: **£348,839**

2017 British Society for Geomorphology Outreach Grant: *GeoBus: River in a box*
P.I.: **Stuart W. D. Grieve**
Co. I: Charlotte J Pike
Award: **£900**

2014 British Society for Geomorphology Student Travel Grant
Award: **£750**

2014 NERC Cosmogenic Isotope Analysis Facility: *Hillslope-channel coupling in a steady-state landscape.*
P.I.: T.C. Hales
Co. I.: Simon M. Mudd, Robert N. Parker and **Stuart W. D. Grieve**
Award: **£19,320**

2013 Safe Software Grant Program
Award: **Software licence for FME Desktop Edition**

2011 SAAS Postgraduate Students' Allowances Scheme
Award: **£3400**

2011 University of Edinburgh Postgraduate Bursary
Award: **£1300**

Professional Memberships

2020– Fellow of the Higher Education Academy
2019– Society of Research Software Engineering
2016– European Geosciences Union
2014– American Geophysical Union
2014– British Society for Geomorphology

Other Qualifications

2022– UK Civil Aviation Authority A2 UAV Pilot certificate of competence