# Stuart William David Grieve
Lecturer in Physical Geography

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## Appointments

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| 2018– | **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

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

2019 **QMUL Education Awards**
Innovative Teaching Award *nominee*
Technology Enhanced Learning Award *nominee*
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

## 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.

## Technical Skills

Accomplished programmer comfortable with object orientated concepts and a range of languages **(C++, Python, Java)** and the use of version control **(git, subversion)** to manage large projects. Extensive experience in desktop **(ArcGIS, FME, Whitebox, QGIS)** and web based **(MapBox, Mapguide)** GIS to solve complex spatial problems. Managing large spatial and non-spatial datasets using SQL databases **(Oracle, PostgreSQL, MySQL, SQLite)**. Development of novel geospatial analyses to answer scientific questions. Processing raw LiDAR point clouds to produce bare earth DEMs.

## Other Employment

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

## Publications

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| 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, doi:10.1016/B978-0-444-64177-9.00012-6 |
| 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, doi:10.1130/G46939.1 |
| 2019 | Chen, S-a, Michaelides, K., **Grieve, S.W.D.**, Singer, M.B., *Aridity is expressed in river topography globally.* Nature, doi:10.1038/s41586-019-1558-8 |

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., doi:10.1016/j.epsl.2019.06.018

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., doi:10.1029/2017JF004453

2017    **Grieve, S.W.D.**, *spatial-efd: A spatial-aware implementation of elliptical Fourier analysis.* JOSS, doi:10.21105/joss.00189

2016    **Grieve, S.W.D.**, Mudd, S.M., Hurst, M.D., *How long is a hillslope?* Earth Surf. Process. Landforms. doi:10.1002/esp.3884

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., doi:10.5194/esurf-4-309-2016

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., doi:10.5194/esurf-4-627-2016

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., doi:10.1038/srep34438

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., doi:10.5194/esurf-4-655-2016

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., doi:10.1002/2015JF003747

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., doi:10.1002/2013JF002981

## 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

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

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.* EGU2020: Sharing Geoscience Online.

2020     Wheatland, J., Spencer, K., **Grieve, S.W.D.**, Gu, C., Carr, S., Manning, A., Bushby, A., Botto, L. *A New 3D Descriptor for Irregularly Shaped Suspended Sediment Aggregates.* 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    **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., *LSD-TopoToolBox: 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)

2020–    Research Design, Convener (2nd year)

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| 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 (2nd year) |
| 2018– | Geography in the World, Lecturer (1st 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)

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| 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

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| 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– | **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**: 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

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

2019–    Society of Research Software Engineering
2016–    European Geosciences Union
2014–    American Geophysical Union
2014–    British Society for Geomorphology