

Stuart William David Grieve

Research Software Developer

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Appointments

2017– **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

2017 **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 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

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

Publications

2017	Grieve, S.W.D. , <i>spatial-efd: A spatial-aware implementation of elliptical Fourier analysis</i> . JOSS, doi:10.21105/joss.00189
2016	Grieve, S.W.D. , Mudd, S.M., Hurst, M.D., <i>How long is a hillslope?</i> Earth Surf. Process. Landforms. doi:10.1002/esp.3884
2016	Grieve, S.W.D. , Mudd, S.M., Hurst, M.D., Milodowski, D.T., <i>A nondimensional framework for exploring the relief structure of landscapes</i> . 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., <i>How does grid-resolution modulate the topographic expression of geomorphic processes?</i> 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., <i>Colluvium supply in humid regions limits the frequency of storm-triggered landslides</i> . 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

- 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

- 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 greater 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

- 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.
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Classroom Teaching Experience (Course Level)

- 2017– 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 Oriented 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)
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Field Teaching Experience (Course Level)

- 2017 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)
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Service

- 2017– **Reviewer:** The Journal of Open Source Software
2017– **Reviewer:** Earth Surface Dynamics
2016– **Reviewer:** Entropy
2016– **Reviewer:** Earth Surface Processes and Landforms.
2015 **Currency Reviewer:** Reference Module in Earth Systems and Environmental Sciences, Elsevier.
2014–2015 **Session Chair** M.Sc. GIS postgraduate conference, University of Edinburgh.

Funding Received

- 2017 British Society for Geomorphology Outreach Grant: *GeoBus: River in a box*
PI.: 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*.
PI.: Tristram Hales (Cardiff University)
Co. I.: Simon M. Mudd, Robert Parker (Cardiff University) 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**
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Professional Memberships

- 2014– American Geophysical Union
2014– British Society for Geomorphology