Stuart William David Grieve

Research Software Developer

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Stuart W D Grieve
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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 **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 sediment transport processes are reflected in landscape morphology, and in particular how sediment is transported from hillslopes into channels. The mechanisms of this transport range from the motion of individual particles through to large scale slope failures and debris flows. In particular, I aim to bridge the gap between models and reality and identify topographic signatures of local scale sediment transport processes, which converge to shape landforms at scales beyond their initial region of influence. I am also working to link forest growth models to shallow landslide hazard, to better understand slope stability in locations where forests are rapidly changing, in many cases due to human impacts.

I conduct such research through the development of open source software which facilitates reproducible topographic 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 Martian landscapes, at a range of scales spanning individual hillslopes to continental scale features. I am also interested in the 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.

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, Visual Basic, Perl)** 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)**. 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.**, *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

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 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

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)

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)

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)

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*
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.: Tristam 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**

Professional Memberships

2014– American Geophysical Union
2014– British Society for Geomorphology