Daniel Buscombe

Research Geologist, United States Geological Survey,
Grand Canyon Monitoring and Research Center, 2255 N Gemini Drive, Flagstaff, AZ 86001
https://profile.usgs.gov/dbuscombe

Contact Information

Tel: 928-556-7216 email: dbuscombe@usgs.gov

Research Statement

I study the complex inter-relations between fluid flows, landforms, sediment transport and sedimentology. My research approach is interdisciplinary in sedimentology, coastal and hydraulic engineering, and geophysics, applying methodologies ranging from field surveys and laboratory analysis to analytical and numerical modeling. Of special interest to me is geostatistical analyses, computational geomorphology and sedimentology, stochastic modeling techniques, community software development, instrument design, and the remote characterization of sedimentary environments, which includes sensing the properties of flows and particles at rest and in motion, in single and multiphase flows, both terrestrial and subaqueous, by developing and applying novel acoustics and optics instrumentation and computational algorithms

Education

Ph.D. (2008), Coastal Geomorphology/Nearshore Oceanography, University of Plymouth, Plymouth, UK. *Morphodynamics, Sediment Dynamics and Sedimentation of a Gravel Beach.* Advisor: Prof. Gerhard Masselink.

BSc (Hons), 1st class (2003), Physical Geography with Minors in Environmental Sciences and Biology, Lancaster University, Lancaster, UK. *Morphodynamics of a Ridge-and-Runnel System on a Macrotidal Beach.* Advisor: Dr Suzanna Ilic.

Employment History

November 2012 – present. *Research Geologist, Grand Canyon Monitoring and Research Center, U.S. Geological Survey, Flagstaff, AZ, USA.*

October 2009 – November 2012. *Post-doctoral Research Fellow, School of Marine Science & Engineering, University of Plymouth, UK.*

September, 2008 – 2011. *Computer Programming Contractor, Marine Biology & Ecology Research Centre, University of Plymouth, UK.*

October, 2008 – October 2009. *Post-doctoral Research Scholar, United States Geological Survey, Santa Cruz, California, USA.*

June, 2008 – September, 2008. *Research Assistant, School of Geography, University of Plymouth, UK.*

December, 2007 – April, 2008. *Research Assistant, School of Earth, Ocean & Environmental Science, University of Plymouth, UK.*

October, 2004 – July 2008. *Associate Lecturer and Demonstrator (part-time), School of Geography, University of Plymouth, UK.*

August 2003 - September, 2004. *Assistant tutor, Field Studies Council, Castle Head, Grange-over-Sands, UK.*

Peer-Reviewed Publications

In review/preparation

42 **Buscombe, D.**, Yard, M., and others, in prep, Mapping submerged aquatic vegetation in Glen Canyon, Arizona using underwater photography and high-frequency acoustics. Intended for *RIVER RESEARCH & APPLICATIONS*.

41 **Buscombe, D.**, Grams, P.E., in prep, Specifying uncertainty in acoustic classifications of riverbed sediment: Colorado River in Marble and Grand Canyons, Arizona. Intended for *JOURNAL OF GEOPHYSICAL RESEARCH - EARTH SURFACE*.

40 **Buscombe, D.**, Conley, D.C., and Nimmo-Smith, W.A.M., in prep, Effect of bubbles on acoustic measurements of suspended sand in the surf zone. *JOURNAL OF GEOPHYSICAL RESEARCH - OCEANS*

39 **Buscombe, D.**, submitted, PyHum: Python toolbox for shallow water physical habitat assessment using recreational-grade sidescan sonar. *ENVIRONMENTAL MODELLING & SOFTWARE*

38 Grams, P.E. **Buscombe, D.**, Kaplinski, M., Hazel, J., Topping, D.J., in review, Patterns of channel and sandbar morphologic response to sediment evacuation in a debris-fan dominated canyon. *EARTH SURFACE PROCESSES & LANDFORMS*.

37 Cuttler, M., Lowe, R., Falter, J., and **Buscombe, D.**, in review, Estimating the settling velocity of bioclastic sediment from common grain-size analysis techniques. *SEDIMENTOLOGY*.

2016

36 Hamill, D., **Buscombe, D.**, Wheaton, J.M., Melis, T.S., Grams. P.E., 2016, Towards bed texture change detection in large rivers from repeat imaging using recreational grade sidescan sonar *Proceedings of the 8th International Conference on Fluvial Hydraulics*, St. Louis, Missouri, July 2016.

35 **Buscombe, D.**, Grams. P.E., 2016, Stochasticity of riverbed backscattering, with implications for acoustical classification of non-cohesive sediment using multibeam sonar *Proceedings of the 8th International Conference on Fluvial Hydraulics*, St. Louis, Missouri, July 2016.

34 **Buscombe, D.**, 2016, Spatially explicit spectral analysis of point clouds and geospatial data. *COMPUTERS & GEOSCIENCES* 86, 92-108, 10.1016/j.cageo.2015.10.004.

2015

33 **Buscombe, D.**, Grams, P.E., Smith, S.M., 2015, Automated riverbed sediment classification using low-cost sidescan sonar. *JOURNAL OF HYDRAULIC ENGINEERING*, 10.1061/(ASCE)HY.1943-7900.0001079, 06015019.

32 Davies, E.J., **Buscombe, D.**, Graham, G.W., Nimmo-Smith, W.A.M., 2015, Evaluating Unsupervised Methods to Size and Classify Suspended Particles using Digital in-line Holography, *JOURNAL OF ATMOSPHERIC & OCEANOGRAPHIC TECHNOLOGY*, 32, 1241 - 1256. doi: 10.1175/JTECH-D-14-00157.1

31 Grams. P.E., **Buscombe, D.**, Topping, D.J., Hazel, J.E., and Kaplinski, M.A. (2015) Use of Flux and Morphologic Sediment Budgets for Sandbar Monitoring on the Colorado River in Marble Canyon, Arizona. *Proceedings of the 10th Federal Interagency Sedimentation Conference*, Reno, April 2015.

30 **Buscombe, D.**, Grams. P.E., Kaplinski, M.A., Tusso, R.B., and Rubin, D.M. (2015) Hydroacoustic signatures of Colorado riverbed sediments in Marble and Grand Canyons using multibeam sonar. *Proceedings of the 10th Federal Interagency Sedimentation Conference*, Reno, April 2015.

29 **Buscombe, D.**, Grams. P.E., Melis, T.S., Smith, S. (2015) Considerations for unsupervised riverbed sediment characterization using low-cost sidescan sonar: Examples from the Colorado River, AZ and the Penobscot River, ME. *Proceedings of the 10th Federal Interagency Sedimentation Conference*, Reno, April 2015.

28 **Buscombe, D.**, Tusso, R.B., Grams. P.E. (2015) Using oblique digital photography for alluvial sandbar monitoring and low-cost change detection. *Proceedings of the 10th Federal Interagency Sedimentation Conference*, Reno, April 2015.

2014

27 Puleo, J., Blenkinsopp, C., Conley, D., Masselink, G., Turner, I., Russell, P., **Buscombe, D.**, Howe, D., Lanckriet, T., McCall, R., and Poate, T., 2014, A Comprehensive Field Study of Swash-Zone Processes, Part 1: Experimental Design with Examples of Hydrodynamic and Sediment Transport Measurements. *JOURNAL OF WATERWAY, PORT, COASTAL, & OCEAN ENGINEERING*, 140, 2942. 10.1061/(ASCE)WW.1943-5460.0000210.

26 **Buscombe, D.**, Rubin, D.M., Lacy, J.R., Storlazzi, C., Hatcher, G., Chezar, H., Wyland, R. and Sherwood, C., 2014, Autonomous bed-sediment imaging-systems for revealing temporal variability of grain size. *LIMNOLOGY & OCEANOGRAPHY: METHODS*, 12, 390 - 406.

25 **Buscombe, D.**, Grams, P.E., Kaplinski, M.A., 2014, Characterizing riverbed sediment using high-frequency acoustics 1: Spectral properties of scattering. *JOURNAL OF GEOPHYSICAL RESEARCH - EARTH SURFACE, 119, doi:10.1002/2014JF003189.*.

24 **Buscombe, D.**, Grams, P.E., Kaplinski, M.A., 2014, Characterizing riverbed sediment using high-frequency acoustics 2: Scattering signatures of Colorado River bed sediment in Marble and Grand Canyons. *JOURNAL OF GEOPHYSICAL RESEARCH - EARTH SURFACE, 119, doi:10.1002/2014JF003191*.

2013

23 **Buscombe, D.**, 2013, Transferable Wavelet Method for Grain Size-Distribution from Images of Sediment Surfaces and Thin Sections, and Other Natural Granular Patterns. *SEDIMENTOLOGY* 60, 1709–1732.

2012

22 Williams, J.J., **Buscombe, D.**, Masselink, G., Turner, I., and Swinkels, C., 2012, Barrier Dynamics Experiment (BARDEX): Aims, Design and Procedures. *COASTAL ENGINEERING* 63, 3-12.

21 **Buscombe, D.**, and Conley, D.C., 2012, Effective Shear Stress of Graded Sediment. *WATER RESOURCES RESEARCH* 48, W05506.

20 **Buscombe, D.**, and Rubin, D.M., 2012, Advances in the Simulation and Automated Measurement of Granular Material, Part 1: Simulations. *JOURNAL OF GEOPHYSICAL RESEARCH - EARTH SURFACE* 117, F02001.

19 **Buscombe, D.**, and Rubin, D.M., 2012, Advances in the Simulation and Automated Measurement of Granular Material, Part 2: Direct Measures of Particle Properties. *JOURNAL OF GEOPHYSICAL RESEARCH - EARTH SURFACE* 117, F02002.

18 Lacy, J.R., Rubin, D.M. and **Buscombe, D.**, 2012, Currents and sediment transport induced by a tsunami far from its source. *JOURNAL OF GEOPHYSICAL RESEARCH - OCEANS* 117, C09028.

17 Puleo, J.A., Conley, D.C., Masselink, G., Russell, P., Turner, I.L., Blenkinsopp, C., **Buscombe, D.**, Lanckriet, T., McCall, R., and Poate, T. (2012) Comprehensive study of swash-zone hydrodynamics and sediment transport. *Proceedings of the 33rd International Conference on Coastal Engineering*, Santander, July 2012.

16 **Buscombe, D.**, and Conley, D.C. (2012) Schmidt number of sand suspensions under oscillating-grid turbulence. *Proceedings of the 33rd International Conference on Coastal Engineering*, Santander, July 2012.

15 Conley, D.C., **Buscombe, D.**, and Nimmo-Smith, A. (2012) Use of digital holographic cameras to examine the measurement and understanding of sediment suspension in the nearshore. *Proceedings of the 33rd International Conference on Coastal Engineering*, Santander, July 2012.

2010

14 **Buscombe, D.**, Rubin, D.M., and Warrick, J.A., 2010, Universal Approximation of Grain Size from Images of Non-Cohesive Sediment. *JOURNAL OF GEOPHYSICAL RESEARCH - EARTH SURFACE* 115, F02015.

13 **Buscombe, D.**, Rubin, D. M., and Warrick, J. A. (2010) An automated and 'universal' method for measuring mean grain size from a digital image of sediment. *Proceedings of the 9th Federal Interagency Sedimentation Conference*, Las Vegas June 2010.

2009

12 **Buscombe, D.**, and Masselink, G., 2009, Grain Size Information from the Statistical Properties of Digital Images of Sediment. *SEDIMENTOLOGY* 56, 421-438

11 Warrick, J.A., Rubin, D.M., Ruggiero, P., Harney, J., Draut, A.E., and **Buscombe, D.**, 2009, Cobble Cam: Grain-size measurements of sand to boulder from digital photographs and autocorrelation analyses. *EARTH SURFACE PROCESSES & LANDFORMS* 34, 1811-1821.

10 Williams, J., Masselink, G., **Buscombe, D.**, Turner, I., Matias, A., Ferreira, O., Meltje, N., Bradbury, A., Albers, T., and Pan, S., 2009, BARDEX (Barrier Dynamics Experiment): taking the beach into the laboratory. *JOURNAL OF COASTAL RESEARCH* SI 56, 158-162.

2008

9 Masselink, G., **Buscombe, D.**, Austin, M.J, O'Hare, T., Russell, P., 2008, Sediment Trend Models Fail to Reproduce Small Scale Sediment Transport Patterns on an Intertidal Beach. *SEDIMENTOLOGY* 55, 667-687.

8 Austin, M.J., and **Buscombe, D.**, 2008, Morphological Change and Sediment Dynamics of the Beach Step on a Macrotidal Gravel Beach. *MARINE GEOLOGY* 249, 167-183.

7 **Buscombe, D.**, 2008, Estimation of Grain Size Distributions and Associated Parameters from Digital Images of Sediment. *SEDIMENTARY GEOLOGY* 210, 1-10.

6 Masselink, G., and **Buscombe, D.**, 2008, Shifting gravel: A case study of Slapton Sands. *GEOGRAPHY REVIEW* 22 (1), 27-31.

5 **Buscombe, D.**, Masselink, G., and Rubin, D.M. (2008) Granular Properties from Digital Images of Sediment: Implications for Coastal Sediment Transport Modelling. *Proceedings of the 31st International Conference on Coastal Engineering (ICCE)*, Hamburg, 2008.

4 Ruiz de Alegria, A., Masselink, G., Kingston, K., Williams, J., and **Buscombe, D.** (2008) Storm Impacts on a Gravel Beach Using the ARGUS video system. *Proceedings of the 31st International Conference on Coastal Engineering (ICCE)*, Hamburg, 2008.

3 Austin, M.J., Masselink, G., Turner, I., **Buscombe, D.**, and Williams, J. (2008) Groundwater seepage between a gravel barrier beach and a freshwater lagoon. *Proceedings of the 31st International Conference on Coastal Engineering (ICCE)*, Hamburg, 2008.

2007

2 **Buscombe, D.**, Austin, M.J., and Masselink, G. (2007) Field observations of step dynamics on a macrotidal gravel beach. In Kraus, N., and Rosati, J., (Eds) *Proceedings of Coastal Sediments 2007 (Volume 1)*, ASCE, USA.

2006

1 **Buscombe, D.**, and Masselink, G., 2006, Concepts in Gravel Beach Dynamics. *EARTH SCIENCE REVIEWS* 79, 33-52.

Conference Publications

2016

37 Hamill, D., **Buscombe, D.**, Wheaton, J., and Wilcock, P. (2016) Recreational-Grade Sidescan Sonar: Transforming a Low-Cost Leisure Gadget into a High Resolution Riverbed Remote Sensing Tool. *American Geophysical Union Fall Meeting*, San Francisco, Dec 2016.

36 Grams, P.E., Schmeeckle, M., Mueller, E., **Buscombe, D.**, Kasprak, A., and Leary, K. (2016) Experimental Demonstration of 3-Dimensional Flow Structures and Depositional Features in a Lateral Recirculation Zone. *American Geophysical Union Fall Meeting*, San Francisco, Dec 2016.

35 Kasprak, A., **Buscombe, D.**, Caster, J., Grams, P.E., and Sankey, J.B. (2016) The individual and additive effects of vegetation encroachment and hydrologic alteration on sediment connectivity in Grand Canyon. *American Geophysical Union Fall Meeting*, San Francisco, Dec 2016.

34 Rossi, R., **Buscombe, D.**, Grams, P.E., Wheaton, J.M., and Schmidt, J. (2016) From Hype to an Operational Tool: Efforts to Establish a Long-Term Monitoring Protocol of Alluvial Sandbars using 'Structure-from-Motion' Photogrammetry. *American Geophysical Union Fall Meeting*, San Francisco, Dec 2016.

33 Ashley, T., McElroy, B., **Buscombe, D.**, Grams. P.E., Kaplinski, M.A., (2016) Estimating bedload from gage data to improve flux-based sediment budgets *Geological Society of America Meeting*, Denver, Sept 2016.

2015

32 Grams. P.E., **Buscombe, D.**, Hazel, J.E., Kaplinski, M.A., Topping, D.J. (2015) Patterns of Channel and Sandbar Morphologic Response to Sediment Evacuation on the Colorado River in Marble Canyon, Arizona *American Geophysical Union Fall Meeting*, San Francisco, Dec 2015. (poster)

31 Ashley, T., McElroy, B., **Buscombe, D.**, Grams. P.E., Kaplinski, M.A., (2015) Examining the relationship between suspended sand load and bedload on the Colorado River, using concurrent measurements of suspended sand and observations of sand dune migration *American Geophysical Union Fall Meeting*, San Francisco, Dec 2015. (poster)

30 Rubin, D.M., Topping, D.J., Schmidt, J.C., Grams. P.E., **Buscombe, D.**, East, A.E., Wright, S.A., (2015) Interpreting hydraulic conditions from morphology, sedimentology, and grain size of sand bars in the Colorado River in Grand Canyon *American Geophysical Union Fall Meeting*, San Francisco, Dec 2015. (oral)

29 Kaplinski, M.A., **Buscombe, D.**, Ashley, T., Tusso, R.B., Grams. P.E., McElroy, B., Mueller, E., Hamill, D., and Townsend, J. (2015) Observations of sand dune migration on the Colorado River in Grand Canyon using high-resolution multibeam bathymetry *American Geophysical Union Fall Meeting*, San Francisco, Dec 2015. (oral)

28 Hensleigh, J., **Buscombe, D.**, Wheaton, J.M., and Brasington, J. (2015) TopCAT and PySESA: Open-source software tools for point cloud decimation, roughness analyses, and quantitative description of terrestrial surfaces. *American Geophysical Union Fall Meeting*, San Francisco, Dec 2015. (poster)

27 **Buscombe, D.**, Wheaton, J.M., Hensleigh, J., Grams, P.E., Welcker, C., Anderson, K., and Kaplinski, M. (2015) Addressing scale dependence in roughness and morphometric statistics derived from point cloud data. *American Geophysical Union Fall Meeting*, San Francisco, Dec 2015. (poster)

26 **Buscombe, D.** (2015) Acoustic and topographic sediment classification in Lower Marble Canyon *2nd MBES in Rivers Workshop*, USGS Flagstaff, AZ, March 2015. (oral)

25 **Buscombe, D.** and Kaplinski, M.A. (2015) Characterizing sand dune migration on the Colorado River in Western Grand Canyon using repeat multibeam mapping *2nd MBES in Rivers Workshop*, USGS Flagstaff, AZ, March 2015. (oral)

24 **Buscombe, D.** (2015) Towards automated substrate mapping with low-cost sidescan sonar *2nd MBES in Rivers Workshop*, USGS Flagstaff, AZ, March 2015. (oral)

2014

23 Rubin, D., Topping, D., Grams, P., Tusso, R., Schmidt, J., **Buscombe, D.**, Melis, T., Wright, S. (2014) What sediment grain size reveals about suspended-sediment transport in the Colorado River in Grand Canyon. *International Conference on the Status and Future of the World's Large Rivers*, Brazil (oral).

22 **Buscombe, D.**, Grams. P.E., and Kaplinski, M.A. (2014) Bed sediment classification using acoustic backscatter *1st MBES in Rivers Workshop*, Utah State University, Feb 2014. (oral)

21 **Buscombe, D.**, Grams. P.E. (2014) Topographic and acoustic estimates of grain-scale roughness from high-resolution multibeam echo-sounder: examples from the Colorado River in Marble and Grand Canyons. *American Geophysical Union Fall Meeting*, San Francisco, Dec 2014. (oral)

2013

20 Kaplinski, M.A., Hazel, J.E., Grams. P.E., **Buscombe, D.**, Hadley, D., and Kohl. K. (2013) Constructing a morphologic sediment budget, with uncertainties, for a 50-km segment of the Colorado River in Grand Canyon. *American Geophysical Union Fall Meeting*, San Francisco, Dec 2013 (poster).

19 Grams. P.E., **Buscombe, D.**, Hazel, J.E., Kaplinski, M.A., and Topping, D.J. (2013) Reconciliation of Flux-based and Morphologic-based Sediment Budgets. *American Geophysical Union Fall Meeting*, San Francisco, Dec 2013 (oral).

18 **Buscombe, D.**, Grams. P.E., Kaplinski, M.A. (2013) Acoustic Scattering by an Heterogeneous River Bed: Relationship to Bathymetry and Implications for Sediment Classification using Multibeam Echosounder Data. *American Geophysical Union Fall Meeting*, San Francisco, Dec 2013 (oral).

17 Davies, E.J., **Buscombe, D.**, Graham, G., Nimmo Smith, W.A.M. (2013) Evaluating Unsupervised Methods to Size and Classify Suspended Particles Using Digital Holography *American Geophysical Union Fall Meeting*, San Francisco, Dec 2013 (poster).

2012

16 Conley, D.C., **Buscombe, D.**, and Nimmo-Smith, A. (2012) New understandings of sediment suspension in the nearshore from cross-comparisons of diverse sensors. *Ocean Sciences 2012*, Salt Lake City (poster).

15 **Buscombe, D.**, Conley, D.C., and Rubin, D.M. (2012) Co-variation of intertidal morphology, bedforms and grain size on a macrotidal sand beach: Praa Sands, UK. *Ocean Sciences 2012*, Salt Lake City (oral).

14 Nimmo-Smith, A., **Buscombe, D.**, and Conley, D.C. (2012) Use of digital holographic cameras to examine the measurement and understanding of sediment suspension in the nearshore. *Particles in Europe*, Barcelona, October 2012 (oral).

2011

13 **Buscombe, D.**, and Conley, D.C. (2011) Formula for Motion Threshold per Grain Size for Graded Sediments in Steady Flows. *European Geosciences Union General Assembly 2011*, Vienna (poster).

12 **Buscombe, D.**, and Rubin, D.M. (2011) How do you tell how big something is without direct measurement? Estimating grain size using an images spectrum. *American Geophysical Union Fall Meeting*, San Francisco, Dec 2011 (oral).

2010

11 **Buscombe, D.** Lacy, J.R., and Rubin, D.M. (2010) Fractional resuspension and sediment flux on a wave-dominated, non-cohesive, inner continental shelf. *Ocean Sciences 2010*, Portland (poster)

10 Rubin, D.M., **Buscombe, D.**, Lacy, J.R., Chezar, H., Hatcher, G., and Wyland, R. (2010) Seafloor sediment observatory on a cable and a shoestring. *Ocean Sciences 2010*, Portland (oral)

9 **Buscombe, D.**, and Conley, D.C. (2010) Modeling sand resuspension and stratification in turbulent nearshore flows: sensitivity to grain size distribution. *Ocean Sciences 2010*, Portland (oral)

8 Lacy, J.R., **Buscombe, D.**, and Rubin, D.M. (2010) Tsunami-enhanced sediment resuspension on the inner shelf in northern Monterey Bay, California. *Ocean Sciences 2010*, Portland (oral)

7 Conley, D.C., and **Buscombe, D.** (2010) Effects of Grain Size Distributions on Fluid-Sediment Feedback. *European Geosciences Union General Assembly 2010*, Vienna (oral)

6 Rubin, D.M., Chezar, H., **Buscombe, D.**, Warrick, J.A., Barnard, P.L., Lacy, J.R., Hatcher, G., Wyland, R., Storlazzi, C., Conaway, C.H., Topping, D.J., Melis, T.S., and Grams, P.E. (2010) New technology for in-situ grain-size analysis from digital images of sediment, and resulting insights regarding sediment transport. *9th Federal Interagency Sedimentation Conference*, Las Vegas June 2010 (oral).

5 **Buscombe, D.**, Rubin, D.M., and Lacy, J.R. (2010) Hourly Measurements of Grain-Size from the Inner Continental Shelf Seabed Using a Fully-Automated, Hydraulically-Controlled Underwater Video Microscope. *Particles in Europe 2010*, Villefranche-Sur-Mer, France. (oral)

4 Williams, J.J., Masselink, G., **Buscombe, D.**, and 10 others (2010) BARDEX (Barrier Dynamics Experiments): a laboratory study of gravel barrier response to waves and tides. *Proceedings of Hydralab III Joint User Meeting*, Hannover, p. 4 (oral)

2009

3 Williams, J.J., Masselink, G., **Buscombe, D.**, and 7 others (2009). BARDEX (Barrier Dynamics Experiment): taking the beach into the laboratory. Abstract submitted for oral presentation at the *10th International Coastal Symposium (ICS)*, Lisbon, Portugal 2009 (oral).

2008

2 **Buscombe, D.**, Ruiz de Alegria, A., and Masselink, G. (2008). The relative importance of cross- and along-shore sediment transport in planform and profile adjustments of a gravel barrier beach: Slapton, Devon, UK. *American Geophysical Union Fall Meeting*, San Francisco, Dec 2008 (poster).

2007

1 **Buscombe, D.**, and Masselink, G. (2007) The relationship between sediment properties and sedimentation patterns on a macrotidal gravel beach over a semi lunar tidal cycle. *Eos Transactions American Geophysical Union Fall Meeting*, Abstract H53L-02 (oral).

Reports

1 **Buscombe, D.**, and Scott, T.M. (2008) *Coastal Geomorphology of North Cornwall: St Ives to Trevose Head*. Internal report for Wave Hub Impacts on Seabed and Shoreline Processes, University of Plymouth. 170pp.

2 **Buscombe, D.**, Williams, J. J., and Masselink, G. (2008) *BARDEX (Barrier Dynamics Experiment): experimental procedure, technical information and data report*. Technical report for the European Union Hydralab III, 219pp.

Published
Software

1 **Digital Grain Size.** Software for automated analyses of grain size from images of sediment. Source code currently

available in Matlab and Python. Webpage `http://dbuscombe-usgs.github.com`

2 **PyHum.** Software for reading, processing and analysis of Humminbird sidescan data. Source code available in Python/Cython. Webpage `http://dbuscombe-usgs.github.com`

3 **Benthic Analysis Tool.** Software for the semi-automation of species identification and measurement in deep-sea ROV/drop frame images. Source code available in Matlab.

4 **Sand Simulation Toolbox.** Software for generating 3D discrete particle models consisting of realistic particles (with a size- and shape-distribution) with user-defined properties. Source code available in Matlab. Webpage `http://dbuscombe-usgs.github.com`

5 **MATSCAT.** Software for analysis of multiple-frequency acoustic backscatter for suspended sediment concentration and particle size. Source code available in Matlab.

6 Generic software for serial data acquisition and real-time display. Source code available in Python.

7 Software for interfacing with machine-vision ethernet video cameras. Source code available in C.

8 **PySESA: Python program for spatially explicit spectral analysis** Software for spatially explicit analyis of point clouds and spatially distributed data. Source code available in Python. Webpage `http://dbuscombe-usgs.github.com`

Funded Proposals

1 Principal-Investigator, *British Geomorphological Society Postgraduate award* (£300) to attend and present at Coastal Sediments 2007, in New Orleans, USA

2 Principal-Investigator, *American Geophysical Union Student travel grant* ($600) to attend the AGU 2007 Fall Meeting in San Francisco, USA

3 Principal-Investigator, *International Association of Sedimentologists Grant* (700 euros) to investigate nearshore bedload transport and bedforms with stereo underwater video cameras.

4 Principal-Investigator, *International Association for Mathematical Geology research grant* ($2000) to develop and trial algorithms for quantification of granular properties and coarse-grain sediment transport from images of the sea bed

5 Principal-Investigator, *Society for Sedimentary Geology Grant* ($500, President's Fund) to investigate nearshore bedload transport and bedforms with stereo underwater video cameras.

6 Principal-Investigator, *Challenger Society for Marine Science travel grant* (£150) to attend and present at ICCE Hamburg 2008

7 Principal-Investigator, *Plymouth Marine Science Education Fund* (£250) to attend and present at ICCE Hamburg 2008

8 Co-Investigator; G. Masselink (PI), D.C. Conley, D. Buscombe., (2012 - 2014) *Proto-type Experiment and Numerical Modelling of Energetic Sediment Transport under Waves (PESTS)*. Engineering and Physical Sciences Research Council, UK. EPSRC EP/K000306/1 (£240,000)

9 Co-Investigator (multiple PIs J. Schmidt and others), (2013 - 2014) *Sandbars and sediment storage dynamics: long-term monitoring and research at the site, research and ecosystem scales*, Grand Canyon Monitoring and Research Center Biennial Work Plan. Glen Canyon Dam Adaptive Management Work Group ($2,911,400)

10 Co-Investigator (multiple PIs P.E. Grams and others), (2014 - 2017) *Geomorphic Processes and Relations Among Flow Regime, Sediment Flux and Resource Conditions on the Green River in Canyonlands National Park*. National Park Service ($232,016)

11 Co-Investigator (multiple PIs J. Schmidt and others), (2015 - 2017) *Sandbars and sediment storage dynamics: long-term monitoring and research at the site, research and ecosystem scales*, Grand Canyon Monitoring and Research Center Triennial Work Plan. Glen Canyon Dam Adaptive Management Work Group ($4,253,400).

12 Principal-Investigator (2015 - 2016) *LOBOS (Limnological and Oceanographic Benthic Observation System): The next generation dual-scale submersible benthic imaging system*, jointed funded by the USGS Innovation Fund ($16,497), the Innovation Center for Earth Science Director's Fund ($17,497) and the USGS Southwest Biological Science Center ($15,000) ($48,994 total).

13 Principal-Investigator (2015 - 2016) *The digital grain size web and mobile computing application*, funded by the USGS Center for Data Integration ($46,417).

14 Co-investigator: T. Sankey (PI), P. Grams, A. East, D. Buscombe., T. Sankey, (2015 2017) USGS Mendenhall post-doctoral fellowship, *The fluvial-aeolian- hillslope continuum: measurement and modeling of topography and*

vegetation to inform landscape-scale connectivity for sediment in river valley ecosystems ($200,000).

Graduate Student Supervision

1 Martin Meoli, MSc Applied Marine Science, University of Plymouth, graduated 2011 "Gravel transport under waves" (committee member)

2 James Sawyer, MSc Applied Marine Science, University of Plymouth, graduated 2012 "Holographic imaging of suspended particles" (committee member)

3 Rebecca Rossi, MSc Watershed Sciences, Utah State University, expected graduation 2016, "Pole-mounted SfM Platform for Monitoring Geomorphic Change in a Fluvial Environment: A Case Study of Sandbar Dynamics in Marble and Grand Canyons" (committee member)

4 Daniel Hamill, MSc Watershed Sciences, Utah State University, expected graduation 2017, "Quantifying Riverbed Textures Using Recreational Grade Sidescan Sonar" (committee member)

5 Thomas Ashley, PhD Geology and Geophysics, University of Wyoming, expected graduation 2019, "Bedload transport in sand-bedded rivers" (committee member)

6 Ryan Lima, PhD Earth and Environmental Sciences, Northern Arizona University, expected graduation 2020, "Remotely Sensing the Dynamics of Alluvial Sandbars in Grand Canyon" (committee member)

Professional Activities

Membership

American Geophysical Union (AGU, since 2007); Coastal Zone Network (COZONE, since 2005); Association for the Sciences of Limnology and Oceanography (ASLO, since 2016); The Challenger Society for Marine Science; British Society for Geomorphology; International Association of Sedimentologists (IAS);

Journal Review

Arctic; Continental Shelf Research; Earth Surface Processes and Landforms; Geo-Marine Letters; Geophysical Research Letters; Journal of Hydraulic Engineering; Journal of Marine Science & Engineering; Journal of Mountain Science; Journal of Sedimentary Research; Marine Geology; Sedimentology; Sedimentary Geology; Water Resources Research.

Skills

1 Community models: General Ocean Turbulence Model (GOTM, `http://www.gotm.net/index.php`); Simulating Waves Nearshore (SWAN; `http://www.swan.tudelft.nl/`); Simulating Waves 'til Shore (SWASH; `http://swash.sourceforge.net/features/features.htm`).

2 Proficient with Linux operating systems, high performance computing and distributed computing.

3 Programming/Scripting: Python, BASH, Matlab (proficient); Cython, Kivy, Fortran (experienced); C, C++, R (beginner).

4 Full UK driving licence. Arizona State driving licence.

5 Certficate in Mathematical Methods for Coastal Engineering, June 2005.

6 LANTRA sit-astride ATV qualification, Jan 2011.

7 Motorboat Operator Certification Course (MOCC) completed, April 2016.