Dr Daniel David Buscombe

Assistant Research Professor
School of Earth Sciences & Environmental Sustainability,
Northern Arizona University, Flagstaff,
Arizona 86011, USA

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Twitter: @GrainSize
Github: @dbuscombe-usgs
Speakerdeck: speakerdeck.com/dbuscombe

Education

University of Plymouth, UK
Doctor of Philosophy in Coastal Geomorphology / Nearshore Oceanography
Thesis title: Morphodynamics, sediment dynamics and sedimentation of a gravel beach
Graduation date: September 2008
Advised by Prof. Gerhard Masselink and Dr Mark Davidson

Lancaster University, Bowland College, UK
Bachelor of Science (with Honours) Physical Geography, minors in Environmental Sciences and Biological Sciences
Thesis title: Morphodynamics of a Macrotidal Ridge-and-Runnel Beach
Graduation date: September 2003
Advised by Dr Suzana

Professional Experience

Northern Arizona University, USA
Assistant Research Professor, Sch. Earth Sciences & Environmental Sustainability
{Nov. 2016- present}

United States Geological Survey, USA
Research Geologist, Grand Canyon Monitoring & Research Center
{Nov. 2012- Nov. 2016}

University of Plymouth, UK
Postdoctoral Research Fellow, Sch. Marine Science & Engineering
{2009- 2012}

University of California Santa Cruz, USA
Postdoctoral Research Fellow, Dept. Earth & Planetary Sciences, and U.S. Geological Survey
{2008- 2009}

University of Plymouth, UK
Computer Programming Contractor, Marine Biology & Ecology Research Center
{2008- 2011}
Research Assistant, Sch. Marine Science & Engineering
{2007- 2008}
Associate Lecturer and PhD candidate, Sch. Geography
{2004- 2008}

Field Studies Council, UK
Assistant tutor, Castle Head Field Centre
{2003- 2004}

Publications

1. **Buscombe**, **D**., & Masselink, G. (2006) Concepts in Gravel Beach Dynamics. *Earth Science Reviews* 79, 33-52.
2. **Buscombe**, **D**., Austin, M.J. & 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* (Vol 1).
3. Austin, M.J., Masselink, G., Turner, I., **Buscombe, D.**, & Williams, J.J. (2008) Groundwater seepage between a gravel barrier and a freshwater lagoon. *Proceedings of the 31st International Conference on Coastal Engineering (ICCE)*, Hamburg.
4. Ruzi de Alegria, A., Masselink, G., Kingston, K., Williams, J.J., & **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.
5. **Buscombe**, **D**., Masselink, G., & 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.

6. Masselink, G. & **Buscombe**, **D**. (2008) Shifting gravel: A case study of Slapton Sands. *Geography Review* 22, 27-31.
7. **Buscombe**, **D**. (2008) Estimation of grain size distributions and associated parameters from digital images of sediment. *Sedimentary Geology* 210, 1-10.
8. Austin, M.J. & **Buscombe**, **D**. (2008) Morphological change and sediment dynamics of the beach step on a macrotidal gravel beach. *Marine Geology* 249, 167-183.
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.
10. Williams, J.J., Masselink, G., **Buscombe**, **D**., Turner, I., Matias, A., Ferreira, O., Meltje, N., Bradbury, A., Albers, T., & Pan, S. (2009) BARDEX (Barrier Dynamics Experiment): taking the beach into the laboratory. *Journal of Coastal Research* SI 56, 158 – 162.
11. Warrick, J.A., Rubin, D.M., Ruggiero, P., Harney, J., Draut, A.E., & **Buscombe**, **D**. (2009) Grain Size Information from the Statistical Properties of Digital Images of Sediment. *Earth Surface Processes & Landforms* 34, 1811-1821.
12. **Buscombe**, **D**., & Masselink, G. (2009) Grain Size Information from the Statistical Properties of Digital Images of Sediment. *Sedimentology* 56, 421-438.
13. **Buscombe**, **D**., Rubin, D.M. & 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.
14. **Buscombe**, **D**., Rubin, D.M. & Warrick, J.A. (2010) Universal Approximation of Grain Size from Images of Non-Cohesive Sediment. *Journal of Geophysical Research - Earth Surface* 115, F02015.
15. Conley, D.C., **Buscombe**, **D**., & 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.
16. **Buscombe**, **D**., & 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.
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.
18. Lacy, J.R., Rubin, D.M. & **Buscombe**, **D**. (2012) Currents and sediment transport induced by a tsunami far from its source. *Journal of Geophysical Research - Oceans* 117, C09028.
19. **Buscombe**, **D**., & Rubin, D.M. (2012) Advances in the Simulation and Automated Measurement of Granular Material, Part 1: Simulations. *Journal of Geophysical Research - Earth Surface* 117, F02002.
20. **Buscombe**, **D**., & 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.
21. **Buscombe**, **D**., & Conley, D.C. (2012) Effective Shear Stress of Graded Sediment. *Water Resources Research* 48, W05506.
22. Williams, J.J., **Buscombe**, **D**., Masselink, G., Turner, I., & Swinkels, C. (2012) Barrier Dynamics Experiment (BARDEX): Aims, Design and Procedures. *Coastal Engineering* 63, 3 – 12.
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.
24. **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.
25. **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.

26. **Buscombe**, **D**., Rubin, D.M., Lacy, J.R., Storlazzi, C., Hatcher, G., Chezar, H., Wyland, R., & Sherwood, C. (2014) Autonomous bed-sediment imaging-systems for revealing temporal variability of grain size. *Limnology & Oceanography: Methods*, 32, 1241 – 1256.
27. Puleo, J., Blenkinsopp, C., Conley, D., Masselink, G., Turner, I., Russell, P.,A., **Buscombe**, **D**., Howe, D., Lanckriet, T., McCall, R., & Poate, T. (2014) 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, 29 - 42.
28. Tusso, R.B., **Buscombe**, **D**., & 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.
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.
30. **Buscombe**, **D**., Grams. P.E., Kaplinski, M.A., Tusso, R.B., & 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.
31. Grams, P.E., **Buscombe**, **D**., Topping, D.J., Hazel, J.E., & 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.
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.
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.
34. **Buscombe**, **D**. (2016) Spatially explicit spectral analysis of point clouds and geospatial data. *Computers & Geosciences* 86, 92-108.
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.
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.
37. Cuttler, M., Lowe, R., Falter, J., & **Buscombe**, **D**. (2016) Estimating the settling velocity of bioclastic sediment from common grain-size analysis techniques. *Sedimentology* 10.1111/sed.12338.
38. **Buscombe**, **D**. (2017) Shallow water benthic imaging and substrate characterization using recreational-grade sidescan-sonar. *Environmental Modelling & Software* 89:1-18.
39. Kaplinski, M.A., Hazel, J.E., Grams. P.E., Kohl, K., **Buscombe**, **D**., & Tusso, R.B. (2017) Channel mapping river miles 29–62 of the Colorado River in Grand Canyon National Park, Arizona, May 2009. *U.S. Geological Survey Open-File Report 2017–1030*, 35 p., https://doi.org/10.3133/ofr20171030.
40. **Buscombe**, **D**., Grams, P.E., & Kaplinski, M.A. (in review) Compositional signatures in acoustic backscatter over vegetated and unvegetated mixed sand-gravel riverbeds. *Journal of Geophysical Research - Earth Surface*
41. **Buscombe**, **D**., Conley, D.C, & Nimmo-Smith, W.A.M. (in prep) Effect of bubbles on acoustic measurements of suspended sand in the surf zone. *Continental Shelf Research*
42. Grams. P.E., **Buscombe**, **D**., Topping, D.J. Hazel, J.E., Kaplinski, M.A. (in prep) Constructing a closed sediment budget in a noisy river. *Earth Surface Processes & Landforms*

Conference Presentations

{2017}

Grams, P.E., **Buscombe, D.**, Topping, D.J., and Mueller, E.R. (2017) Sand Pulses and Sand Patches on the Colorado River in Grand Canyon. *River, Coastal and Estuarine Morphodynamics*, Padova, Italy, September 2017.

Buscombe, D., Kaplinksi, M., Grams, P.E., Ashley, T., McElroy, B., and Rubin, D.M. (2017) The sand dunes of the Colorado River, Grand Canyon, USA. *River, Coastal and Estuarine Morphodynamics*, Padova, Italy, September 2017.

{2016}

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.

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.

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.

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.

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.

Buscombe, D., and Grams. P.E. (2016) Stochasticity of riverbed backscattering, with implications for acoustical classification of non-cohesive sediment using multibeam sonar. *8th International Conference on Fluvial Hydraulics*, St. Louis, MO.

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. *8th International Conference on Fluvial Hydraulics*, St. Louis, MO.

{2015}

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.

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.

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.

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.

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.

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.

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

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.

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

{2014}
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*

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.

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.

{2013}
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

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

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

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

{2012}
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

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

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

{2011}
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

Buscombe, D., and Rubin, D.M. (2011) How do you tell how big something is without

direct measurement? Estimating grain size using an image's spectrum. *American Geophysical Union Fall Meeting*, San Francisco, Dec 2011

{2010}
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

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

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

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

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

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.

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.

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. *Hydralab III Joint User Meeting*, Hannover

{2009}
Williams, J.J., Masselink, G., **Buscombe, D.**, and 7 others (2009). BARDEX (Barrier Dynamics Experiment): taking the beach into the laboratory. *10th International Coastal Symposium (ICS),* Lisbon, Portugal 2009

{2008}
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

{2007}
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. *American Geophysical Union Fall Meeting*, San Francisco, Dec 2007

Teaching

EES 680, Spring 2017. *Earth & Environmental Data Analysis*
Course leader – University of Northern Arizona

EES 698-1, Fall 2015. *Topics in Fluvial Geomorphology*
Guest lecturer – University of Northern Arizona

EES 529, Fall 2014–2016. *Applied Remote Sensing*
Guest lecturer – University of Northern Arizona

OS204, 2010 – 2012. *Waves, Tides and Coastal Dynamics*
Guest lecturer – University of Plymouth

OS311 2010 – 2012, *Modelling Ocean Processes*
Guest lecturer – University of Plymouth

Geography, 2004–2008. *Introductory statistics, Glacial Geomorphology, Coastal Geomorphology*
Teaching assistant – University of Plymouth

FSC, 2003 – 2004
Field- and classroom-based ecology, geology, environmental sciences
Teaching assistant – Field Studies Council Castle Head

Graduate Student Mentoring

Andrew Platt. *Estimates of total in-channel sand storage in Grand Canyon*. MS, Northern Arizona University, 2016-Present. School of Earth Sciences & Environmental Sustainability. Co-supervised with Dr Ryan Porter.

Ryan Lima. *Remote sensing of sandbar dynamics*. PhD, Northern Arizona University, 2016-Present. School of Earth Sciences & Environmental Sustainability. Co-supervised with Dr Temuulen Sankey.

Rebecca Rossi. *Structure-from-Motion surveying of sandbars in Grand Canyon*. MS, Utah State University, Department of Watershed Sciences, 2014-Present. Co-supervised with Dr Joseph Wheaton.

Thomas Ashley. *Sediment transport and the evolution of dune topography at the grain scale*. PhD, 2014-Present. School of Geology and Geophysics, University of Wyoming. Co-supervised with Dr Brandon McElroy.

Daniel Hamill. *Transforming a Low-Cost Leisure Gadget into a High Resolution Riverbed Remote Sensing Tool*. MS, Utah State University Department of Watershed Sciences, 2015-2017. Co-supervised with Dr Joseph Wheaton.

Martin Meoli. *Gravel transport under waves*. MSc Applied Marine Science, School of Marine Science & Engineering, University of Plymouth, 2011–2012. Co-supervised with Dr Alex Nimmo-Smith.

James Sawyer. *Holographic imaging of near-bed sand suspensions*. MSc Applied Marine Science, School of Marine Science & Engineering, University of Plymouth, 2011–2012. Co-supervised with Dr Daniel Conley

Awards and Honors

ASCE-EWRI Best Technical Note Award
Awarded by the Environmental & Water Resources Institute, American Society of Civil Engineers, February 2017. For Buscombe et al. (2016) Automated riverbed sediment classification using low-cost sidescan sonar, Journal of Hydraulic Engineering.

U.S Geological Survey "What's the Big Idea?"
Research featured in the video "What's the Big Idea? —Using Sound to Remotely Sense the Riverbed" on the YouTube channel of the U.S. Geological Survey, March 2016

American Geophysical Research Union Research Spotlight
Research featured in the article "Using Sound Waves to Study Grand Canyon Sediment", EOS Earth and Space Science News, July 2015. https://eos.org/research-spotlights/using-sound-waves-to-study-grand-canyon-sediment

Elsevier "Excellence in Peer Review" Award
for the Elsevier journal, Sedimentary Geology, 2013

Journal of Geophysical Research-Oceans Editor's Highlight
Research featured in the article "Novel observations of currents and drag generated by a tsunami" published in the Journal of Geophysical Research – Oceans. September 2012

Service

Journal Reviewer, 2007 – present
Arctic; Continental Shelf Research; Earth Surface Processes & 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.

NEON Aquatic Technical Working Group, 2017 - present
Member of the NSF-funded National Ecological Observatory Network Aquatic Technical Working Group, advising on bathymetry, substrate characterization, and hydroacoustic instrumentation and analyses.

Workshops and Conferences Organized

{2016}
Software Carpentry. Lead organizer for this 3 day-long, 30-person workshop at U.S. Geological Survey.

{2015}
MBES in Rivers. Lead organizer for 2nd Multibeam in Rivers Workshop, a 3 day-long, 30-person workshop at U.S. Geological Survey.

{2013}
AGU. Co-convener of the session, EP010. Fluvial sediment budgets: Can we do better? American Geophysical Union Fall Meeting, December 2013

{2007}
AGU. Co-convener of the session, H60: Linking sediment supply, bed-sediment particle size, sediment transport, and bed morphology in fluvial, marine, and aeolian settings. American Geophysical Union Fall Meeting, December 2007

YCSEC 2007. On the organizing committee for the Young Coastal Scientist and Engineers Conference, 2007, hosted by the School of Geography at the University of Plymouth 19-21 April 2007.

{2005}
QRA. On the organizing committee for the Quaternary Research Association's 4th International Postgraduate Symposium, hosted by the School of Geography at the University of Plymouth 31st August - 2nd September 2005.

Invited Talks

{2017}
Particle Size 'by Proxy': Decoding the Textural Information in Scattered Sound & Light. Utah Water Research Laboratory, Utah State University, Logan, UT.

{2016}
Large-scale SfM: Grand Canyon Style. Pacific Coastal & Marine Science Center, USGS, Santa Cruz, CA.

Particle Size 'by Proxy': Decoding the Textural Information in Remotely Sensed Landforms. School of Earth Sciences & Environmental Sustainability, Northern Arizona University, Flagstaff, AZ.

The Digital Grain Size Web Computing Application. USGS Center for Data Integration, Denver, CO

Observations of sand dune migration on the Colorado River in Grand Canyon. Glen Canyon Dam Adaptive Management Program Adaptive Management Work Group Meeting, Phoenix, AZ

{2015}
The Digital Grain Size Project: Past, Present and Future. USGS Coastal and Marine Geology, Woods Hole, MA

{2014}
Measuring bed sediments for improved sediment budgets and physical habitat assessment. Glen Canyon Dam Adaptive Management Program Adaptive Management Work Group Meeting, Flagstaff, AZ

Bed Sediment Classification Using High-Frequency Acoustic Backscatter. Multibeam in Rivers Summit, Utah State University, Logan, UT

{2012}
Digital Grain Size. British Geological Survey, Marine Geosciences Division, Edinburgh, UK

Nearshore Sediment Transport Through the Looking Glass. Grand Canyon Monitoring and Research Center, Flagstaff, AZ

{2010}
Turbulence, Sediment Stratification and Altered Resuspension under Waves. Centre for Coastal Science and Engineering, University of Plymouth, UK

{2009}
Morphodynamics and sediment dynamics of a macrotidal gravel beach. Coastal and Marine Geology, United States Geological Survey, Santa Cruz, CA

{2008}
Optical sensing of gravel sediment transport and characteristics: recent advances and future challenges. Lancaster University Environmental Imaging Network, Lancaster University, UK

{2007}
A year in the life of Slapton Sands - but was it a typical year? Slapton Research Seminar, Field Studies Council, Slapton Ley, UK

{2006}
Field observations of morphological change and sediment dynamics from the nearshore of a gravel beach. Centre for Coastal Dynamics and Engineering (C-CoDE), University of Plymouth

A view from the beach. Slapton Research Seminar, Field Studies Council, Slapton Ley, UK

{2004}
A tale of two storms. Slapton Research Seminar, Field Studies Council, Slapton Ley, UK

Grants awarded

{2017}
USGS Coastal and Marine Geology Program. $350,000
Co-Investigator (multiple PIs, J. Warrick and others), (2017 - 2018) *Remote Sensing Coastal Change*.

National Park Service. **$450,000**
Co-Investigator (multiple PIs, P.E. Grams and others), (2017 - 2020) Geomorphology and Sediment Transport on the Green and Colorado Rivers in Canyonlands National Park.

{2015}
USGS Mendenhall post-doctoral fellowship. $200,000
Co-investigator: T. Sankey (PI), P. Grams, A. East, D. Buscombe., T. Sankey, (2015 – 2017). The fluvial-aeolian- hillslope continuum: measurement and modeling of topography and vegetation to inform landscape-scale connectivity for sediment in river valley ecosystems

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

USGS Innovation Fund. $48,994
Principal-Investigator (2015 - 2016). LOBOS (Limnological and Oceanographic Benthic Observation System): The next generation dual-scale submersible benthic imaging system. Jointly 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)

Glen Canyon Dam Adaptive Management Work Group. $4,253,400
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

{2014}

National Park Service. $232,016
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

{2013}
Glen Canyon Dam Adaptive Management Work Group. $2,911,400
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

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

{2008}
Plymouth Marine Science Education Fund.
Principal-Investigator (2008). Travel grant to attend and present at ICCE Hamburg 2008

Challenger Society for Marine Science
Principal-Investigator (2008). Travel grant to attend and present at ICCE Hamburg 2008

Society for Sedimentary Geology Grant
Principal-Investigator (2008). President's Fund to investigate nearshore bedload transport and bedforms with stereo underwater video cameras

International Association for Mathematical Geology
Principal-Investigator (2008). Grant to develop and trial algorithms for quantification of granular properties and coarse-grain sediment transport from images of the sea bed

International Association of Sedimentologists
Principal-Investigator (2008). Grant to investigate nearshore bedload transport and bedforms with stereo underwater video cameras

{2007}
American Geophysical Union
Principal-Investigator (2007). Travel Grant, to attend the AGU 2007 Fall Meeting in San Francisco, CA

British Geomorphological Society
Principal-Investigator (2007). Postgraduate award, to attend and present at Coastal Sediments 2007, in New Orleans, LA

Software

DGS
Software for automated analyses of grain size from images of sediment. Source code currently available in Matlab and Python.

PyHum
Software for reading, processing and analysis of Humminbird sidescan data. Source code available in Python/Cython.

pysesa
Python program for spatially explicit spectral analysis. Software for spatially explicit analysis of point clouds and spatially distributed data. Source code available in Python.

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.

MATSCAT
Software for analysis of multiple-frequency acoustic backscatter for suspended

sediment concentration and particle size. Source code available in Matlab.

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.

Skills

Experienced open source developer, with a specialization in scientific computing, including visualization, geospatial statistics, signal processing, image processing and machine learning.

Expert in the Python Language and extensions such as Cython; expert in the MATLAB language, experience writing R, C, C++, and Fortran code.

Experience with a variety of tools and languages, including bash, csh, L A TEX, HTML, Git, Linux, virtual machines, virtual environments, auto-deployment of software packages (PyPI, SWIG, Distutils, conda), distributed, parallel, out-of-core and cloud computing.

Experience with Hydrodynamic modelling software, including the General Ocean Turbulence Model; Simulating Waves Nearshore (SWAN); Simulating Waves ’til Shore (SWASH).

Experience with Hydrographic surveying and mapping software, including Generic Mapping Tools, MB-System and HYPACK, GIS, and geospatial libaries such as GDAL, and Proj-4.

References

Available on request