JOHN SWARTZ, Ph.D.

Company Role
Research Scientist

Project Role / Focus Areas
- Coastal, Marine, and Fluvial Geology
- Regional Sediment Management
- Large Scale Landscape Evolution
- Applied Sedimentology
- Marine Geophysics
- Lidar and high-resolution topography analysis

Education
- Ph.D. – Geological Science, The University of Texas at Austin, 2019
- M.S. – Geological Sciences, University of Texas at Austin, 2014
- B.S. – Geology, University of
- Pittsburgh, 2012

Professional Membership
- American Geophysical Union, Earth and Planetary Surface Processes Section
- Geological Society of America
- International Association of Sedimentologists
- American Association of Petroleum Geologists

Experience Profile

John Swartz, Ph.D., research scientist, joined the Institute from University of Texas at Austin where he was a postdoctoral fellow with expertise in applied sedimentology, geomorphology, and water resources. Dr. Swartz works on understanding of the topography of rivers, floodplains, and coasts and has done extensive work characterizing the dynamics of these systems using combined field, remote sensing, and historical data. In addition, Dr. Swartz's work includes projects identifying potential sand resources along the Texas coast and the use of applied sedimentology to connect research to policy makers and communities for better coastal restoration.

As a visiting scholar with University of Colorado's Community Surface Dynamics Modeling System, Dr. Swartz continues to work with a community of scientists focused on developing and improving models of earth surface processes. Before joining the Institute, Dr. Swartz's experience included working as a geologist at ConocoPhillips, the U.S. Geological Survey, and the Woods Hole Oceanographic Institution.

Professional Experience

The Water Institute of the Gulf
- *Research Scientist* — *Jan. 2021-present*
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University of Colorado-Boulder
- *Visiting scholar* — *Jan. 2020-present*

University of Texas at Austin
- *Postdoctoral fellow* — *Jan. 2020-Dec. 2021*

Boise State University
- *Postdoctoral fellow* — *Jan. 2020-Dec. 2021*

University of Texas Austin
- *Graduate research fellow* — *Aug. 2015-Dec. 2019*

Equinor US
- *Geology intern* — *May 2018-Aug. 2018*

ConocoPhillips Company
- *Sedimentologist* — *Aug. 2014-Aug. 2015*

ConocoPhillips Company
- *Geoscience Intern* — *May 2013-Sept. 2013*

University of Texas Austin
- *Graduate research fellow* — *Aug. 2012-Aug. 2014*

United States Geological Survey
- *Geologist* — *May 2012-Aug. 2012*

Woods Hole Oceanographic Institution
- *Research assistant* — *May 2011-May 2012*

Woods Hole Oceanographic Institution
- *Summer fellow* — *May 2010-Sept. 2010*

Selected Projects

Natural and Anthopogenic Drivers of Lower Rio Grande River Morphodynamics (2016-2019). The lower Rio Grande project was developed to assess the sediment transport and hydrologic dynamics of the lower river along the US-Mexico border over the last ~130 years. The river and delta have been subject to anthropogenic stresses due to a combination of dam and levee construction, water use, and sand mining. A comprehensive data suite was assembled including historical border surveys, aerial imagery, airborne lidar, and direct field measurements to understand how river morphology and water availability has changed since the 19th century. Rigorous geomorphic and statistical analysis provided evidence for significant change in fluvial dynamics over the last 100 years that has led to the river no longer providing significant sediment supply to the delta. This work provides a foundation to inform future efforts to restore natural sediment and ecosystem functions to the Rio Grande delta. Funded by the University of Texas at Austin.

Texas Offshore Sediment Resources Inventory: Development and Application of Geophysical Processing Workflows for Sand Resource Evaluation (2016-2019). The offshore sediment resources project provided new estimations of offshore sand/sediment resources near the Texas coast and create new workflows and approaches to offshore sediment prospecting. The project was designed to test the utility of new processing workflows for marine geophysical data agu enhance imaging and delineation of potential sediment resources on the continental shelf, to create a new assessment of potential resources within the Trinity River paleo-valley offshore Galveston, TX, and to digitize and archive legacy geologic and geophysical datasets across the Texas continental shelf. New offshore data collection combined with reprocessing of 2D and 3D geophysical datasets provided unprecedented imaging of the offshore Trinity River paleovalley and helped create new estimates of potential sediment resource availability for coastal resiliency projects. These efforts were conducted in close communication with local and national stakeholders and management agencies including the US Army Corps of Engineers and the Texas General Land Office. Funded by the Bureau of Ocean Energy Management.

Identification and Characterization of Floodplain Channel Networks on the Gulf Coastal Plain (2017-2019). Lowland coastal plains are vulnerable to significant fluvial, pluvial, and compound flooding. To better characterize the detailed topography of these floodplains and help improve predictions of flood inundation and extent a novel compilation of over 125,000km^2 of lidar data was assembled and analyzed to delineate small-scale channel networks that exist in between the larger river systems. These small channel systems were found to be a wholly new class of drainage basin that arises in depositional landscapes, and whose properties was never previously explored. The results of this work are being incorporated into flood models to improve prediction of surface hydrologic connectivity across low-relief landscapes. Funded by the University of Texas at Austin.

Selected Publications

1. Swartz, JM, Goudge, TA, and Mohrig, DC., Quantifying Coastal Fluvial Morphodynamics over the Last 100 Years on the Lower Rio Grande, USA and Mexico, Journal of Geophysical Research- Earth Surface. 2020.
2. Goff, JA, Swartz, JM, Gulick, SPS, Dawson, CN, and Alegria-Arzaburu, R., An outflow event on the left side of Hurricane Harvey: Erosion of barrier sand and seaward transport through Aransas Pass, Texas, Geomorphology. 2019.
3. Kohut, JT., Kustka, AB., Hiscock, MR, Lam, PJ, Measures, C, Milligan, A, White, A, Carvalho, F, Hatta, M, Jones, BM, Ohnemus, DC, and Swartz, JM., Mesoscale variability of the summer bloom over the northern Ross Sea shelf: A tale of two bank, Journal of Marine Systems. 2016.
4. Gulick, SPS, Jaeger, JM, Mix, AC, Expedition 341 Science Team… and Swartz, JM., Mid Pleistocene climate transition drives net mass loss from rapidly uplifting St. Elias Mountains, Alaska, Proceedings of the National Academy of Sciences. 2015.
5. Swartz, JM, Gulick, SPS, and Goff, JA., Gulf of Alaska continental slope morphology: Evidence for recent trough mouth fan formation, Geochemistry, Geophysics, Geosystems. 2015.

Selected Conference Proceedings and Presentations

1. Swartz, JM., Goff, JA., Gulick, SPS., Standring, P., and Lowery, C. Coastal River Morphodynamic Response to Sea Level Rise Recorded in Offshore Stratigraphy: A New Look at the Trinity Incised Valley. AGU 2019
2. Standring, P., Lowery, C., Gulick, S.P.S., Swartz, J.M., and Goff, J.A. Holocene Sea Level Rise and Paleo-Environmental Change Within Trinity River Offshore Galveston Bay, Gulf of Mexico. GSA 2019
3. Cardenas, B., Swartz, J.M., and Mohrig, D., The Length of Fluvial Sinuous Ridges on Mars. Lunar and Planetary Science Conference 2019
4. Swartz, JM, Mohrig, DC, and Goudge, TA., Coastal River Dynamics and Morphology on the Rio Grande Delta: Implications for Fluvio-Deltaic Stratigraphy and Channel Belt Architecture. IAS Rome 2019
5. Swartz, J.M., Mohrig, D.C., Passalacqua, P. From Distributary to Tributary: Formation and Morphometry of Coastal Stream Networks Governed by Depositional Processes. CSDMS 2019