



## TRAVIS SWANSON, PH.D.

### *Geoscientist*

Travis Swanson, a geoscientist, has years of experience in the development and application of numerical models using modern high-level computer languages and application of pre-existing models to simulate geomorphic, hydrodynamic, and geologic phenomenon.

Prior to joining The Water Institute, Swanson was an assistant professor at Georgia Southern University in the Department of Geology and Geography from 2019 to 2023 where he was a research mentor in fluvial geomorphology, physical sedimentology, and chemical hydrology. Prior to that he was a postdoctoral research fellow at Rice University in the Department of Earth, Environmental and Planetary Sciences.

Some of his recent prior collaborations on simulating coastal change include a project where he mentored the application of an existing shoreline model (ShorelineS, a reduced complexity shoreline model) to investigate a significant engineering challenge: Why delta lobe orientation to wave climate along the Yellow River Deltas is unable to explain why land loss is greater for engineered deltaic avulsions when compared to natural abandoned delta lobe avulsion. In another recent collaboration at Sargent Beach in Texas, a combination of remotely sensed and in-situ erosion measurements were combined to inform a data-driven model that connects rapid post-storm rates of mud cliff erosion to storm-generated changes in cliff shape and sediment cover.

Swanson received his bachelor's degree in hydrogeology, master's in geological sciences, and Ph.D. in geological sciences from The University of Texas at Austin. More information at Swanson's [homepage](#) or at google scholar [here](#).

### PROFESSIONAL EXPERIENCE

2023-Present: Geoscientist, The Water Institute

2019-2023: Assistant Professor, Georgia Southern University, Department of Geology and Geography

2016-2019: Postdoctoral Research Fellow, Rice University, Department of Earth, Environmental and Planetary Sciences.

2015-2016: Research Scientist, Shell Exploration and Production international, Inc.

2014: Research Scientist (intern) Shell Exploration and Production International, Inc.

2010-2015: Graduate Research Assistant, The University of Texas at Austin

2008-2010: Graduate Teaching Assistant, The University of Texas at Austin

### COMPANY ROLE

Geoscientist

### PROJECT ROLE / FOCUS AREAS

Numerical modeling

Exploratory statistics

Data science

Experiment and project  
design

### EDUCATION

Ph.D. Geological  
Sciences, The  
University of Texas at  
Austin, 2015

M.S. Geological  
Sciences, The  
University of Texas at  
Austin, 2010

B.S.  
Hydrogeology/Environ  
mental Geology, the  
University of Texas at  
Austin, 2007



## SELECTED PROJECTS

**Barrier Island System Management (ongoing).** The Barrier Island System Management (BISM) program has been developed by the Louisiana Coastal Protection and Restoration Authority (CPRA) through facilitation by the Water Institute of the Gulf (the Institute). BISM is intended to be a holistic and systemwide approach to manage the entire barrier island and headland chain through restoration and maintenance, replacing a project-based prioritization approach previously adopted as part of the Louisiana Coastal Master Plan.

**Lower Mississippi River Management Program (ongoing).** Development and implementation of a surrogate machine learning model and bed-updating framework to enable fast morphodynamic simulation of the Lower Mississippi River to help account for the uncertainty in river conditions over the next 50 to 75 years

**SmartPort (ongoing).** This project aims to develop tools for ports along the Mississippi River, including a shoaling forecast using crowd sourced data.

**Barrier Island Topographic State: Indicators of Resistance vs Resilience (ongoing)** Support the Monitoring and Adaptive Management Strategy of the Louisiana Trustee Implementation Group relating to barrier islands. There is an identified need for barrier island creation, restoration, and maintenance (resilient/maintained over time) with the goal of reducing land and habitat loss. This project will develop and document an approach for assessing and characterizing barrier island response to natural processes (e.g., changes to dune morphology and island resistance or resilience to overwash and sealevel rise).

## SELECTED PUBLICATIONS

Hughes, C.M., Rice, M.S., Barnhart, C.J., Swanson, T.E., Pfeiffer, A.M., and Goudge, T.A., 2023, Sources of Clay-Rich Sediment in Eberswalde Crater, Mars With Implications for Biopreservation Potential: Journal

of Geophysical Research: Planets, v. 128, p. e2022JE007545, doi:10.1029/2022JE007545.

Van Stan, J. T., Swanson, T. E., & Sasse, R. K., 2022, Carbonate dissolution cones are unlikely to originate from stemflow funneling. *Geomorphology*, 108215. <https://doi.org/10.1016/j.geomorph.2022.108215>

\* Palermo, R.V., Piliouras, A., Swanson, T.E., Ashton, A.D., and Mohrig, D., 2021, The effects of storms and a transient sandy veneer on the interannual planform evolution of a low-relief coastal cliff and shore platform at Sargent Beach, Texas, USA: *Earth Surface Dynamics*, v. 9, p. 1111–1123, doi:10.5194/esurf-9-1111-2021.

Carlson, B.N., Nittrouer, J.A., Swanson, T.E., Moodie, A.J., Dong, T.Y., Ma, H., Kineke, G.C., Pan, M., and Wang, Y., 2021, Impacts of Engineered Diversions and Natural Avulsions on Delta-Lobe Stability: *Geophysical Research Letters*, v. 48, p. e2021GL092438, doi:10.1029/2021GL092438.

Van Stan, J.T., Ponette-González, A.G., Swanson, T., and Weathers, K.C., 2021, Throughfall and stemflow are major hydrologic highways for particulate traffic through tree canopies: *Frontiers in Ecology and the Environment*, v. 19, p. 404–410, doi:10.1002/fee.2360.

Odezulu, C.I., Swanson, T., and Anderson, J.B., 2021, Holocene progradation and retrogradation of the Central Texas Coast regulated by alongshore and cross-shore sediment flux variability: *The Depositional Record*, v. 7, p. 77–92, doi:https://doi.org/10.1002/dep2.130.

Fernandes, A.M., Abeyta, A., Mahon, R.C., Martindale, R., Bergmann, K.D., Jackson, C.A., Present, T.M., Reano, D., Swanson, T., Butler, K., Brisson, S., Mohrig, D., and Johnson, C., 2020, Enriching Lives within Sedimentary Geology: Evaluating SEPM's Role in Diversity, Equity, and Inclusion, *The Sedimentary Record*, v. 18, p. 4-12.

Wu, C., Nittrouer, J.A., Swanson, T., Ma, H., Barefoot, E., Best, J., and Allison, M., 2020, Dune-scale cross-strata across the fluvial-deltaic backwater regime: Preservation potential of an autogenic stratigraphic signature: *Geology*, v. 48, p. 1144–1148, doi:10.1130/G47601.1.

Cardenas, B.T., Mohrig, D., Goudge, T.A., Hughes, C.M., Levy, J.S., Swanson, T., Mason, J., and Zhao, F., 2020, The anatomy of exhumed river-channel belts: Bedform to belt-scale river kinematics of the Ruby Ranch Member, Cretaceous Cedar Mountain



Formation, Utah, USA: *Sedimentology*, v. 67, p. 3655–3682, doi:10.1111/sed.12765.

Van Stan, J.T., Allen, S.T., Swanson, T., Skinner, M., and Gordon, D.A., 2020, Wrack and ruin: Legacy hydrologic effects of hurricane-deposited wrack on hardwood-hammock coastal islands: *Environmental Research Communications*, v. 2, p. 061001, doi:10.1088/2515-7620/ab9527.

Cardenas, B.T., Swanson, T., Goudge, T.A., Wagner, R.W., and Mohrig, D., 2019, The Effect of Remote Sensing Resolution Limits on Aeolian Sandstone Measurements and the Reconstruction of Ancient Dune Fields on Mars: Numerical Experiment Using the Page Sandstone, Earth: *Journal of Geophysical Research: Planets*, v. 124, p. 3244–3256, doi:10.1029/2019JE006191.

Cardenas, B.T., Kocurek, G., Mohrig, D., Swanson, T., Hughes, C.M., and Brothers, S.C., 2019, Preservation of Autogenic Processes and Allogenic Forcings in Set-Scale Aeolian Architecture II: The Scour-and-Fill Dominated Jurassic Page Sandstone, Arizona, U.S.A.: *Journal of Sedimentary Research*, v. 89, p. 741–760, doi:10.2110/jsr.2019.41.

Swanson, T., Mohrig, D., Kocurek, G., Cardenas, B.T., and Wolinsky, M.A., 2019, Preservation of Autogenic Processes and Allogenic Forcings in Set-Scale Aeolian Architecture I: Numerical Experiments: *Journal of Sedimentary Research*, v. 89, p. 728–740, doi:10.2110/jsr.2019.42.