

Christopher R. Esposito

Research Scientist: Water Resources, The Water Institute of the Gulf

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Education

Ph.D. in Earth and Environmental Sciences, 2016 (expected)

Tulane University, New Orleans, Louisiana

M.S. in Earth and Environmental Sciences, 2011

University of New Orleans, New Orleans, Louisiana

B.S. in Mathematics/Physical Oceanography, 2003

Rutgers, The State University of New Jersey, New Brunswick, New Jersey

Research Interests:

Sediment transport in bifurcating channel networks; Vegetation interactions on sediment dynamics; Floodplain development; Coastal zone land use and infrastructure policy; Records of earth surface process information in stratigraphy;

Professional Experience:

The Water Institute of the Gulf	2016-Present
<ul style="list-style-type: none">• <i>Research Associate</i>	
Tulane University	2011-2016
<ul style="list-style-type: none">• <i>Research/Teaching Assistant</i>	
ConocoPhillips	2012-2013
<ul style="list-style-type: none">• <i>Intern, Geomodeling and SedStrat Groups</i>	
University of New Orleans	2009-2011
<ul style="list-style-type: none">• <i>Research Assistant</i>	
High Schools in Louisiana and New Jersey	2004-2009
<ul style="list-style-type: none">• <i>Math Teacher, Environmental Education Teacher</i>	

Selected Projects

Transport Thresholds for Fine Sediment in Vegetation. Sea-level rise poses a serious challenge to natural resource managers as they work to retain and restore coastal marshes. Sediment transported to a marsh by a river or tides can play an important role in mitigating the effects of sea-level rise by increasing land surface elevation. At present there are no standardized data collection techniques that can be used to monitor sediment transport into and within vegetated regions, limiting abilities to measure and predict the influence of restoration efforts. This project, developed in close collaboration with coastal restoration practitioners, aims to establish a standardized data collection methodology for monitoring sediment transport within coastal wetland vegetation. Restoration practitioners will be able to use this methodology to improve predictions of marsh sustainability and better assess the effectiveness of restoration efforts.

Mid Barataria and Mid Breton Outfall Management Study. A Delft3D investigation into the dynamics of sediment diversion evolution, focusing in particular on the factors that maintain or diminish diversion performance over decadal timescales.

Gradually Varied Flow in Complex Channel Networks. This investigation into the hydraulics and sediment transport of complex, bifurcating deltaic channel networks is designed to test the hypothesis that channel geometry substantially mediates the backwater response of terminal distributary channels. Dissertation Research

Structure, Texture, and Sediment Retention Rates of Crevasse Splay. This study investigates crevasse splays in the context of floodplain sediment budgets, to which they are major contributors. Special attention is paid to the factors that determine how efficiently a crevasse splay sequesters sediment, with an eye on designing and managing river diversions. Dissertation Research.

The Statistical Signature of Morphological Processes in Stratigraphy. This study uses physical experiments to investigate when and how the signs of surface morphological processes are transferred into the stratigraphic record. Dissertation Research.

Depositional History of a Large Subdelta: A study investigating sediment retention in a Mississippi River subdelta, focusing particularly on transport of sand from the trunk channel into the subdelta. Independent Research.

Sedimentation Rates and Patterns in River Dominated Wetlands: A Field and Numerical Study. A field and numerical (Delft3D) study of accretion rates in mouth bars in the Mississippi River Delta over a single flood cycle. Master's Research.

Forward Stratigraphic Modeling and Reservoir Prediction. A numerical (Delft3D, SWAN) study of wave dominated delta deposits, sedimentary architecture, and reservoir properties. Internship project.

Community and Synergistic Activities

- CoPe (Coastlines and People) Scoping Workshop. NSF effort to define coastal research needs. 2018
- Session Convener: AGU 2017 EP43, GSA South Central 2016 T7 (co-chair)
- Coastal Advisory Commission, Southeast Levee Flood Protection Authority. 2015 – 2016
- Collaborator with artists through A Studio In The Woods. Frequent panelist on coastal resilience.
- Reviewer: *J. Geophys. Res. Earth Surf.*, *Geophys. Res. Lett.*, *Geomorphology*, *Mar. Geol.*, *Estuar. Coast. Shelf Sci.*, *Earth Surf. Process. Landf.*, *Earth Surf. Dyn.*, *Catena*

Peer Reviewed Publications

Esposito, C. R., Meselhe, Ehab A., & Liang, M. (submitted). Comparing Models of Sand Transport Into Diversions and Crevasses. *Geophysical Research Letters*.

Esposito, C. R., Georgiou, I. Y., & Straub, K. M. (in revision). Flow Loss in Deltaic Distributaries: Impacts on Channel Morphology and Network Stability. *Journal of Geophysical Research: Earth Surface*.

Esposito, C. R., Di Leonardo, D., Harlan, M., & Straub, K. M. (2018). Sediment Storage Partitioning in Alluvial Stratigraphy: The Influence of Discharge Variability. *Journal of Sedimentary Research*, 88(6), 717–726. <https://doi.org/10.2110/jsr.2018.36>

Nienhuis, J. H., Törnqvist, T. E., & **Esposito, C. R.** (2018). Crevasse Splays Versus Avulsions: A Recipe for Land Building With Levee Breaches. *Geophysical Research Letters*, 45(9), 4058–4067. <https://doi.org/10.1029/2018GL077933>

Esposito, C. R., Shen, Z., Törnqvist, T. E., Marshak, J., & White, C. (2017). Efficient retention of mud drives land building on the Mississippi Delta plain. *Earth Surface Dynamics*, 5(3), 387–397. <https://doi.org/10.5194/esurf-5-387-2017>

Esposito, C. R., Georgiou, I. Y., & Kolker, A. S. (2013). Hydrodynamic and geomorphic controls on mouth bar evolution. *Geophysical Research Letters*, 40(8), 1540–1545. <https://doi.org/10.1002/grl.50333>

Straub, K. M., & **Esposito, C. R.** (2013). Influence of water and sediment supply on the stratigraphic record of alluvial fans and deltas: Process controls on stratigraphic completeness. *Journal of Geophysical Research: Earth Surface*, 1–14. <https://doi.org/10.1002/jgrf.20061>

Invited Presentations:

Esposito, C.R., Törnqvist, T.E., Shen, Z., Marshak, J., White, C. (2015) “Building The Mississippi River Delta With Silt and Clay: Texture and Sediment Retention Efficiency of Crevasse Splays”, Mississippi River Delta Coalition’s Diversion Workshop, New Orleans, LA.

Esposito, C.R., Straub, K.M. (2014) “Observing Morphology Becoming Stratigraphy: The Statistical Imprint of Coastal Processes In Deltaic Stratigraphy”, International Deltas Meeting, Istomino, Russia.

Esposito, C.R., Boyd, R. (2012) “Representing Stratigraphic Time with Delft3D: First Steps”, Second Deltares Workshop on Forward Stratigraphic Modeling, Delft, The Netherlands.

Conference Presentations:

Esposito, C.R., Shen, Z., Tornqvist, T.E., Marshak, J., White, C., 2016: “Efficient Retention of Mud for Land Building on the Mississippi Delta Plain”, American Geophysical Union Ocean Sciences Meeting, Baton Rouge, Louisiana .

Esposito, C.R., Straub, K.M., Georgiou, I.Y., 2015: “Gradually Varied Flow in Complex Channel Networks”, American Geophysical Union Fall Meeting (poster)

Straub, K.M., and **Esposito**, C.R., 2015: “High Fidelity? Temporal and spatial scales of stratigraphic incompleteness and how they compare to environmental forcings”, American Geophysical Union Fall Meeting, San Francisco, California.

Esposito, C.R. and Straub, K.M., 2014: “Observing morphology becoming stratigraphy: The statistical imprint of coastal processes in deltaic stratigraphy”, SEPM Meeting on Autogenic Dynamics of Sedimentary Systems, Grand Junction, Colorado. (talk)

Esposito, C.R. and Straub, K.M., 2013: “The statistical signal of morphological process in stratigraphy”, Fall Meeting of the American Geophysical Union, San Francisco, California. (talk)

Straub, K.M. and **Esposito**, C.R., 2013: “Influence of water and sediment supply on the completeness of the stratigraphic record and the construction of stratigraphic surfaces in alluvial fans and deltas”, Annual Meeting of the American Association of Petroleum Geologist, Pittsburgh, Pennsylvania.

Esposito, C.R., R. Boyd, K.M. Straub, 2013: “Forward stratigraphic modeling of deltaic deposits using Delft3D”, Annual Meeting of the American Association of Petroleum Geologist, Pittsburgh, Pennsylvania. (poster)

Straub, K.M., Y. Wang, C.R. **Esposito**, 2012: “Relating the creation and preservation of stratigraphic surfaces to geomorphic surfaces in continental margin environments”, Fall Meeting of the American Geophysical Union, San Francisco, California.

Straub, K.M., Y. Wang, C.R. **Esposito**, 2012: “Relating the creation and preservation of stratigraphic surfaces to geomorphic surfaces in deltaic environments”, William Smith Meeting – Strata and Time, London, United Kingdom.

Straub, K.M., C.R. **Esposito**, J.I. Kuykendall, 2011: “Morphodynamic models for the construction of submarine channel levees and implications for the hydraulic geometry of submarine channels”, Annual meeting of the Geological Society of America, Charlotte, North Carolina.

Esposito, C.R., Georgiou, I.Y., Kolker, A.S., 2010: “Patterns of Sediment Transport and Deposition During a Flood Event in a Mississippi River Crevasse Splay”, Fall Meeting of the American Geophysical Union, San Francisco, California (poster)

Esposito, C.R., Georgiou, I.Y., Kolker, A.S., 2010: “Delta Evolution During a Single Flood Event in a River Dominated Wetland.”, Annual meeting of the Geological Society of America, Denver, Colorado. (talk)

Honors and Awards:

- Vokes Fellowship (2015)
- Geological Society of America (2014) Research Grant-in-Aid, \$900
- Tulane University, 2014
Outstanding Earth and Environmental Sciences Graduate Student Research Award
- Tulane University, 2014
Outstanding Earth and Environmental Sciences Graduate Student Teaching Award
- Department of Earth and Environmental Sciences, Tulane University (2011), McWilliams Scholarship
- Southeastern Geological Society (2010), Graduate Student Scholarship
- New Orleans Geological Society (2010), University Earth Science Award

Technical Skills

Matlab, Python, Delft3D, HEC-RAS, SWAN, Petrel, GIS tools, Arduino, SketchUp, Illustrator, C++, Hydroacoustic Instruments, Laser Particle Size Analyzer, Camsizer, flume design, ADCP, LISST, CTD arrays, YSI samplers, deployment rig construction, small boat operator, various suspended and bed load sediment samplers