

Mead A. Allison
Professor and Chair

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School of Science and Engineering

EDUCATION

B.S., College of William & Mary (1985), M.S., East Carolina University (1988), Ph.D., State University of New York at Stony Brook (1993)

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BIOGRAPHY

My research group examines modern and Holocene environments associated with river basins, deltas, coastal environments and the continental shelf. In the past, our work has taken us to every continent except Africa, with a specialization in the study of large river dispersal systems from source to sink (e.g., Amazon, Ganges-Brahmaputra, Yangtze, Mekong, Fraser, Colville). We have a particular focus on the Mississippi system because of its experimental value to a lab group based on top of the Mississippi Delta. We collaborate with a large network researchers from around the world on an even larger range of topics. Many recent projects have been closely linked to applied issues associated with the protection and restoration of the Mississippi Delta including (1) examining the utility and methodology of large river diversions for rebuilding coastal wetlands harnessing the crevasse splay methodology of natural river evolution, (2) examining river bar evolution and its links to the utilization of sand resources via long-distance pipeline conveyance to build wetlands and restore barrier islands, (3) testing the efficacy of various restoration strategies including the use of green infrastructure to alter morphology of the coastal realm for protecting human and natural resources, and (4) examining the impact of episodic events such as large floods and hurricanes on system evolution and health.

We utilize a wide range of tools to address these issues. On the uptown campus, we operate a radiochemical geochronology laboratory featuring a variety of alpha and gamma spectrometers (well and planar configuration) that allow us to measure key radiotracers in the natural environment (e.g., ^{210}Pb , ^{137}Cs , ^{234}Th , ^7Be , etc.). These tracers can be used to measure rates of sediment accumulation at a site or give insight into the pathways of sediment transport and origins of sediment particles moving through river-coastal-marine systems. In addition, we operate out of a larger laboratory complex on the Mississippi River at the Tulane River and Coastal Center (TRCC). Here we have laboratories to do a variety of sediment analyses (e.g., grain size, organic content, bulk properties, etc.) and open space for processing core material and building and programming field instrumentation. We also house our boats for field operations out of this complex.

SELECTED PUBLICATIONS

MISSISSIPPI RIVER AND DELTA

- Baustian, M.M., Meselhe, E., Jung, H., Sadid, K., Duke-Sylvester, S., Visser, J.M., Allison, M.A., Moss, L.C., Ramatchandirane, C.G., van Maren, D.S., Jeuken, M. and Bargu, S., 2018. Development of an integrated biophysical model to represent morphological and ecological processes in a changing deltaic and coastal ecosystem. *Environmental Modeling and Software*.
<https://doi.org/10.1016/j.envsoft.2018.05.019>.
- Allison, M.A. and Pratt, T.C., 2017. Discharge controls on the sediment and dissolved nutrient transport flux of the lowermost Mississippi River: implications for export to the ocean and for delta restoration. *Journal of Hydrology* 555:1-14. <https://doi.org/10.1016/j.jhydrol.2017.10.002>.
- Allison, M.A., Yuill, B.T., Meselhe, E.A., Marsh, J.K., Kolker, A.S., and Ameen, A.D., 2017. Observational and numerical particle tracking to examine sediment dynamics in a Mississippi River delta diversion. *Estuarine, Coastal and Shelf Science* 194:97-108.
<https://doi.org/10.1016/j.ecss.2017.06.004>.
- Allison, M.A., Ramirez, M.T., and Meselhe, E.A., 2014. Diversion of Mississippi River water and sediment to ameliorate coastal land loss in Louisiana, USA. *Water Resources Management* 28:4113–4126. [10.1007/s11269-014-0731-y](https://doi.org/10.1007/s11269-014-0731-y).
- Allison, M.A., Vosburg, B.M., Ramirez, M.T., and Meselhe, E.A., 2013. Mississippi River channel response to the Bonnet Carre Spillway opening in the 2011 flood and its implications for the design and operation of river diversions. *Journal of Hydrology* 477:104-118.
<https://doi.org/10.1016/j.jhydrol.2012.11.011>.

OTHER SYSTEMS

- Venditti, J.G., Nittrouer, J.A., Allison, M.A., Humphries, R.P., and Church, M., 2019. Supply-limited bedform patterns and scaling downstream of a gravel-sand transition. *Sedimentology* doi: 10.1111/sed.12604. <https://doi.org/10.1111/sed.12604>.
- Ogston, A., Allison, M., J. Mullarney, J., and Nittrouer, C. (eds.), 2017. *Sediment- and hydro-dynamics of the Mekong Delta: from tidal river to continental shelf*. *Continental Shelf Research Special Issue* 147:1-246. <https://www.sciencedirect.com/journal/continental-shelf-research/vol/147/suppl/C>.
- Allison, M.A., Yuill, B.T., Tornqvist, T., Amelung, F., Dixon, T., Erkens, G., Stuurman, R., Jones, C., Milne, G., Steckler, M., Syvitski, J., and Teatini, P., 2016. Coastal subsidence: global risks and mitigation. 2016. *EOS—Transactions of the American Geophysical Union*. 97: 22-27.
<https://eos.org/features/global-risks-and-research-priorities-for-coastal-subsidence>.
- Berg, M., Marcantonio, F., Allison, M.A., McAlister, J., Wilcox, B., and Fox, W., 2016. Contrasting watershed-scale trends in runoff and sediment yield complicate rangeland water resources planning. *Hydrol. Earth Syst. Sci.* 20:2295-2307.
<https://www.hydrol-earth-syst-sci.net/20/2295/2016/>
- Fricke, A.T., Sheets, B.A., Nittrouer, C.A., Allison, M.A., and Ogston, A.S., 2015. An examination of Froude-supercritical flows and cyclic steps on a subaqueous lacustrine delta, Lake Chelan, WA, USA. *Journal of Sedimentary Research*. DOI:10.2110/jsr.2015.48
<https://pubs.geoscienceworld.org/sepm/jsedres/article-abstract/85/7/754/145484/an-examination-of-froude-supercritical-flows-and?redirectedFrom=fulltext>
- Smith, R.W., Bianchi, T.S., Allison, M.A., Savage, C. and Galy, V., 2015. High rates of organic carbon burial in fjord sediments globally. *Nature Geosciences*. DOI:10.1038/ngeo2421
<https://www.nature.com/articles/ngeo2421>.

- Williams, E., Rosenheim, B.E., Allison, M.A., McNichol, A.P., Xu, L. 2015. Quantification of refractory organic material in Amazon mudbanks of the French Guiana Coast. *Marine Geology*. DOI:10.1016/j.margeo.2015.02.009 <https://doi.org/10.1016/j.margeo.2015.02.009>.
- Xu, B., Bianchi, T.S., Allison, M.A., Dimova, N.T., Wang, H., Zhang, L., Diao, S., Jiang, X., Zhen, Y., Yao, P., Chen, H., Yao, Q., Dong, W., Sui, J., and Yu, Z., 2015. Using multi-radiotracer techniques to better understand sedimentary dynamics of reworked muds in the Changjiang River estuary and inner shelf of East China Sea. *Marine Geology*. 370: 76-86. <https://doi.org/10.1016/j.margeo.2015.10.006>.
- Bianchi, T.S., Allison, M.A., and Cai, W.-J. (eds.) 2014. *Biogeochemical Dynamics at Major River-Coastal Interfaces: Linkages with Global Change*. Cambridge University Press, 658 p. <https://www.cambridge.org/core/books/biogeochemical-dynamics-at-major-river-coastal-interfaces/BBEDF628588F4B781450D69089B53368>.
- Baltzer, F., Allison, M., and Fromard, F. (eds.). 2004. *Material Exchange Between the Upper Continental Shelf and Mangrove Fringed Coasts with Special Reference to the N. Amazon-Guianas Coast*. *Marine Geology Special Issue* 208:113-225. <https://www.sciencedirect.com/journal/marine-geology/vol/208/issue/2>
- Allison, M.A., Khan, S.R., Goodbred, S.L., and Kuehl, S.A., 2003. Stratigraphic evolution of the late Holocene Ganges-Brahmaputra lower delta plain. *Sedimentary Geology* 155:317-342. [https://doi.org/10.1016/S0037-0738\(02\)00185-9](https://doi.org/10.1016/S0037-0738(02)00185-9)

STUDENT FIRST AUTHORED

- Hanna, A.S., Shanahan, T.S., Allison, M.A., Bianchi, T.S., Schreiner, K.M., 2018. A multi-proxy investigation of Late Holocene temperature change and climate-driven fluctuations in sediment sourcing: Simpson Lagoon, Alaska. *The Holocene*. <https://doi.org/10.1177/0959683617752845>.
- Stephens, J.D., Allison, M.A., DiLeonardo, D.R., Weathers, H.D., III., Ogston, A.S., McLachlan, R.L., Xing, F., and Meselhe, E.A., 2017. Sand dynamics in the Mekong River channel and export to the coastal ocean. *Continental Shelf Research*. <http://dx.doi.org/10.1016/j.csr.2017.08.004>.
- Ramirez, M.R., Allison, M.A., Cui, X., Bianchi, T.S., Smith, R.W., Schuller, S.E., and Savage, C., 2016. Modern deposition rates and patterns of organic carbon burial in Fiordland, New Zealand. *Geophysical Research Letters* 43:11,768-11,776. <https://doi.org/10.1002/2016GL070021>.
- Wilson, C.A. and Allison, M.A., 2008. Sediment dynamics and geomorphology of eroding marsh shorelines in southeastern Louisiana. *Estuarine, Shelf and Coastal Science* 80:483-494. <https://doi.org/10.1016/j.ecss.2008.09.004>.
- Nittrouer, J.A., Allison, M.A., and Campanella, R., 2008. Evaluation of bedload transport in the lower Mississippi River: implications for sand transport to the Gulf of Mexico. *J. Geophysical Research-Earth Surface Processes* 113, F03004, doi:10.1029/2007JF000795. <https://doi.org/10.1029/2007JF000795>.
- Galler, J.J. and Allison, M.A., 2008. Estuarine controls on fine-grained sediment storage in the lower Mississippi and Atchafalaya Rivers. *Geological Society of America Bulletin* 120:386-398. <https://doi.org/10.1130/B26060.1>.

CLASSES TAUGHT

EENS 3650	Marine Environmental Geology
EENS 4040/6040	Coastal Marine Geology
RCSE 6800	Introduction to River Science and Engineering (Co-Instructor)
RCSE 6840	Methods in River Sampling (Co-Instructor)

LAB GROUP

Marie Mathews (M.S., EENS)
Autumn Murray (M.S., EENS)
Michael Ramirez (Ph.D., EENS)
Katrina Ginsburg (M.S., EENS starting Fall 2019)
Ryder Myers (M.S., EENS starting Fall 2019)

RESEARCH INTERESTS

Sedimentary processes of continental margin environments, acoustic and optical riverine and seafloor mapping, particle-reactive radiotracers for geochronology, processes of strata formation, high-concentration suspended sediment/cohesive seabed interactions, sediment transport in river channels, microfabric of modern sediments, use of GIS/remote sensing analysis for examining coastal geological processes