



Contributions of the Department of **Earth and Ocean Sciences (EOS)** to the Marine Sciences

Faculty and Student Research Highlights

EOS marine science faculty and students are involved in a variety of interdisciplinary and international research projects in collaboration with top-tier research universities and government agencies funded by more than \$20 million in grant funds to UNCW and collaborating institutions. Examples include:

- **Lynn Leonard** operates UNCW's Coastal Ocean Research and Monitoring Program (CORMP). Since 1999, CORMP has received over \$10M from NOAA, General Dynamics, and The U.S. Army Corps of Engineers to provide real time oceanographic/weather data and data products to Federal and State Agencies, private sector stakeholders, and the general public: www.cormp.org.
- **Scott Noon** and students are collaborating with researchers at Columbia University, Vanderbilt University, University of Minnesota, and Dhaka University through multiple NSF and NASA funded grants totaling over \$5-million to investigate flood risk in Bangladesh in response to tectonic activity, monsoon rains, and global climate change and sea-level rise.
- **Scott Noon** and students are collaborating with researchers at Oregon State University, University of Washington, University of California San Diego, and the Monterey Bay Aquarium Research Institute through a series of research grants from NSF and NOAA totaling well over \$5-million investigating volcanic processes and hazards on the Juan de Fuca Ridge, 250 miles offshore from Washington and Oregon.
- **Chad Lane, Doug Gamble**, and students are collaborating with researchers at the University of Tennessee on a \$385,000 project to investigate atmospheric mechanisms responsible for extended periods of drought in the circum-Caribbean region.
- **Shannon Klotsko** and students are collaborating with researchers at San Diego State University, the Natural History Museum of LA County, Oregon State University, and Scripps Institution of Oceanography on submerged paleolandscapes on the Pacific continental shelf and searching for evidence of the peopling of the Americas. Funding received by BOEM (~\$500k) and two NOAA grants (\$370k, \$250k).
- **Narcisa Pricope, Joanne Halls**, and students are working with the North Carolina Department of Transportation on a \$300,000 project to fuse multi-source UAS-derived data to improve project planning and the NCDOT Wetlands Prediction Model.
- **Narcisa Pricope** and students are working with researchers at Stetson University on a \$440,000 NOAA-funded project to assess options for flood resilient transportation upgrades in four southeastern coastal communities.
- **Joe Long, Andrea Hawkes, Lynn Leonard, Eman Ghoneim** and students are evaluating the response and recovery of natural and built coastlines impacted by Hurricane Florence as part of a recent \$50,000 NSF-funded research project.

Research Topics

- Climate Change
- Coastal and Ocean Observing
- Coastal Hazards
- Coastal Management
- Energy & Mineral Resources
- GIS and Remote Sensing
- Groundwater Hydrology
- Ocean Current Dynamics
- Sea Floor Mapping & Coastal Tectonics
- Water Resources & Environmental Assessment



2019 SECOORA Undergraduate Student Data Challenge winners

Deanna Edwing and Kelsea Edwing developed computer algorithms to automatically identify extreme water-levels and dune erosion from web camera footage in the Southeast.



2016 NOAA Hollings Scholars and EOS undergraduates **Jin-Si Over** and **Audrey Taylor** conducted research at the University of Hawaii at Manoa and University of Washington focused on shoreline change in response to sea level rise and the geochemistry of aerosols in Alaska.



Selected Recent Publications in High-Impact Scientific Journals from EOS Faculty and Students

*Student co-authors

- *Taylor, A.K., **M.M. Benedetti**, J.A. Haws, and C.S. Lane. 2019. Hydrogen isotopic compositions of sedimentary n-alkanes record ecological change at a Portuguese paleowetland. *Quaternary International* 532, 23–33.
- Taylor, Z.P., **C.S. Lane**, and S.P. Horn. *In Press*. A 3,000-year record of drought in southern Pacific Costa Rica. *Quaternary Research*.
- Moore, C.R., M.J. Brooks, A.C. Goodyear, T.A. Ferguson, A.G. Perrotti, S. Mitra, A. Listekci, B. King, D.J. Mallinson, **C.S. Lane**, B. Shapiro, J. Knapp, A. West, D.L. Carlson, W. Wolbach, T.R. Them, S.M. Harris, and S. Pyne-O'Donnell. 2019. Sediment Cores from White Pond, South Carolina, contain a platinum anomaly, pyrogenic carbon peak, and coprophilous spore decline at 12.8 ka. *Scientific Reports*
- **Nooner, S. L.** and Chadwick Jr., W. W., 2016. Inflation-predictable behavior and co-eruption deformation at Axial Seamount, *Science*, 354(6318), 1399-1403.
- *Vignier, J., Volety, A.K., Soudant, P., Chu, F.-L., **Loh, A.N.**, Boulais, M., Robert, R., Morris, J.M., Lay, C.R., Krasnec, M.O. 2019. Evaluation of the toxicity of the Deepwater Horizon oil and associated dispersant on early life stages of the Eastern oyster, *Crassostrea virginica*. *Separation Science and Technology* 11
- *Mapes, K.L. and **Pricope, N.G.** 2020. Evaluating SWAT model performance for runoff, percolation, and sediment loss estimation in low-gradient watersheds of the Atlantic Coastal Plain. *Hydrology* 7,21.
- **Pricope, N.G.**, Mapes, K.L. and Woodward, K.D. 2019. Remote sensing of human-environment interactions in global change research: a review of advances, challenges and future directions. *Remote Sensing* 2019, 11, 2783.
- Nelson, A.R., **Hawkes, A.D.**, Sawai, Y., Engelhart, S.E., Witter, R., Grant-Walter, W.C., Bradley, L-A., Dura, T., Cahill, N., Horton, B.P., 2020. Identifying the greatest earthquakes of the past 2000 years at the Nehalem River estuary, northern Oregon coast, USA. *Open Quaternary*, v. 6, 1-30. <http://doi.org/10.5334/oq.70>.
- **Klotsko, S.**, Driscoll, N., and Keigwin, L., 2019. Multiple meltwater discharge and ice rafting events recorded in the deglacial sediments along the Beaufort Margin, Arctic Ocean. *Quaternary Science Reviews* 203, 185-208.
- L.D. Keigwin, **S. Klotsko**, N. Zhao, B. Reily, L.Giosan, and N. W. Driscoll, 2018. Deglacial Floods in the Beaufort Sea. *Nature Geoscience* 11, 599-604.
- *Santos, V. M., Wahl, T., **Long, J. W.**, Passeri, D. L., & Plant, N. G. (2019). Combining Numerical and Statistical Models to Predict Storm-Induced Dune Erosion. *Journal of Geophysical Research: Earth Surface*, 124(7), 1817-1834. (2019) 9:15121
- Passeri, D. L., Bilskie, M. V., Plant, N. G., **Long, J. W.**, & Hagen, S. C. (2018). Dynamic modeling of barrier island response to hurricane storm surge under future sea level rise. *Climatic change*, 149(3-4), 413-425.

Contributions to Marine Science Curriculum

Degree Programs:
 Oceanography (B.S.), Geology (B.S.), Geography (B.A.),
 Geoscience (B.S. and M.S.), and
 GIScience graduate certificate

- Coastal Management
- Coasts and Society
- Field Methods
- Geographic Information Science
- Geohydrology
- Geological Oceanography
- Geophysics
- Global Climate Change
- Marine Biogeochemistry
- Nearshore Processes
- Oceanographic Cruise Techniques
- Oceanography
- Ocean Observing
- Paleooceanography
- Paleoclimatology
- Relative Sea Level Rise
- Remote Sensing
- Seafloor Mapping
- Sedimentology and Stratigraphy
- Stable Isotope Geochemistry
- Underwater Technologies
- Unmanned Aerial Vehicles
- Weather Analysis and Forecasting
- Weather and Climate



Students in the Department of Earth and Ocean Sciences spend much of their time studying and exploring the coast of North Carolina through a curriculum focused around hands-on course experiences.



U.S. Institutional and Governmental Collaborations

International Collaborations and Connections

N.C. Department of Environmental Quality	NOAA National Weather Service	University of Alaska Fairbanks	Ajman University (UAE)	Nanyang Technological University (Singapore)
Department of the Interior	Rutgers University	N.C. Department of Transportation	Al-Azhan University (Egypt)	Universite de Bretagne Occidentale (France)
NASA	Scripps Institution of Oceanography (UCSD)	University of the Virgin Islands	College Dublin	National Oil Corporation (Libya)
Lahmont Doherty Earth Observatory	Tufts University	U.S. Army Corps of Engineers	College of the Bahamas	University of the West Indies (Jamaica)
National Park Service	Woods Hole Oceanographic Institute	USGS	Dhaka University (Bangladesh)	University of Algarve (Portugal)