



# Contributions of the Policy, Health, Economics, and Data Science groups (PHEDS) to the Marine Sciences

## Faculty and Student Research Highlights

The PHEDS marine science faculty and students include members from the Department of Public and International Affairs, Department of Mathematics and Statistics, Cameron School of Business, and College of Health and Human Services. Research and grant highlights include:

- **Dr. Peter Schuhmann (CSB):** The Economic Value of Recreational Catch Improvements in the Cape Fear River Basin, Phase II - Linking Improvements in Migratory Fish Passage to Economic Benefits of Fisheries in the Cape Fear River, NOAA National Marine Fisheries Service, \$58,100, 2018-2020.
- **Dr. Mark Lammers and Dr. James Blum (MAS):** Reefs in Space and Time (with co-PIs McNamara and Brown), NOAA CIOERT, \$154,823, 2017-2018.
- **Dr. Mark Lammers (MAS):** Machine Learning for auto-classification of particle types in holographic imagery, NOAA CIOERT, \$18,000 (subaward on \$234,000 Novel Technology to Explore the Mesopelagic Ocean), 2018.
- **Dr. Jennifer McCall (CHHS):** Development of user-friendly fluorescence based assays for marine toxins, NIH NIEHS, \$1,467,906, 2018-2020.
- **Dr. Jennifer McCall (CHHS):** Partnership for Workforce Development in the BioPharmaceutical Industry, NIIMBL, \$449,770, 2018-2019.
- **Masters of Coastal and Ocean Policy (PIA)** graduate students have analyzed a wide range of policy issues from fisheries to offshore energy to public health (led by **Dr. Jessica Weinkle**).
- **Dr. Mark Imperial and Dr. Kirstin Kinzer (PIA):** Comprehensive Planning in North Carolina's Coastal Communities: A Guidance Manual for Local Governments, NC Department of Environmental Quality, Division of Coastal Management, \$50,000, 2017



## Research Topics

Adaptive Capacity & Resilience of Coastal Communities

Bioassay Development for Harmful Algal Toxins

Economic Valuation of Coastal and Marine Ecosystem Services

Facilitating Recovery to Coastal Disasters

Governance of Watersheds, Coastal Areas, and Fisheries

Immunomodulatory Drug Discovery/Development from Marine Algae

Machine Learning for Classification and Forecasting

Mathematical and Statistical Analysis of Marine Science Systems

Modeling and Predicting Human Response to Environmental Change

Julian Prato Valderrama, PhD Candidate, Universidad Nacional de Colombia (Dr. Peter Schuhmann, co-chair)

Awarded Fulbright Colombia for thesis "Relationships between coral reef complexity and ecosystem services at Caribbean oceanic islands, Seaflower Biosphere Reserve, Colombia."

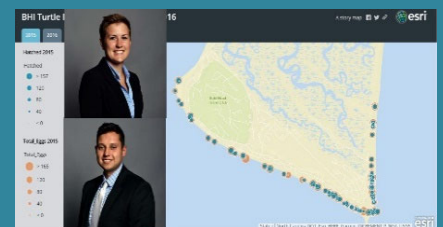


Ashley Bissette, Honors in Clinical Research, (Dr. Jennifer McCall, advisor)

Ashley presented her honors thesis "Antimicrobial Drug Discovery from Marine Algae" multiple times, including at a UNCW Board of Trustees meeting in 2019. She was one of 5 UNCW honors students selected for this honor.

Adam Silva and Olivia Bryson, MS Data Science (Dr. Lammers, chair).

Adam and Olivia have been working with Chris Shank from the Bald Head Island Conservancy mapping nesting habits of sea turtles from data taken over the last 37 years. Check out a map of hatch success based on total eggs and number hatched. <https://arcg.is/1rTe1X>



## Selected Recent Publications

- **Weinkle, J.** (2019) Experts, regulatory capture, and the “governor’s dilemma”: The politics of hurricane risk science and insurance. *Regulation and Governance*. doi.org/10.1111/rego.12255.
- **Weinkle, J., Landsea, C., Collins, D., Musulin, R., Crompton, R.P., Klotzbach, P.J., Pielke, Jr. R.** (2018). Normalized hurricane damage in the continental United States 1900–2017. *Nature Sustainability*. doi.org/10.1038/s41893-018-0165-2
- **Baehler, K. J., Biddle, J. C.** (2018). Governance for adaptive capacity and resilience in the U.S. water sector. *Ecology and Society*, 23(4). doi:10.5751/ES-10537-230424
- **Ulibarri, N., Emerson, K., Imperial, M.T., Jager, N., Newig, J., Weber, E.** (2020) How does collaborative governance evolve? Insights from a medium-n case comparison. *Policy & Society*. DOI: 10.1080/14494035.2020.1769288
- **Prins, B., Phayal, A., Daxecker, U.E.** (2019) Fueling rebellion: Maritime piracy and the duration of civil war. *International Area Studies Review*. 22(2):128-47.
- **Schuhmann, P.W., Skeete, R., Waite, R., Bangwayo-Skeete, P., Casey, J.F., Oxenford, H.A., Gill, D.A.** (2019) Coastal and Marine Quality and Tourists' Stated Intention to Return to Barbados, *Water*, 11(6), 1265.
- **Casey, J.F., Schuhmann, P.W.** (2019) Pact or No Pact: Are Tourists Willing to Contribute To The Protected Areas Conservation Trust In Order To Enhance Marine Resource Conservation In Belize?, *Marine Policy*, 101, 8-14.
- **Schuhmann, P., Waite, R., Skeete, R., Lorde, T., Oxenford, H., Moore, W. Spencer, F.** (2019) Visitors' Willingness to Pay Conservation Fees in Barbados, *Tourism Management*, 71, 315-326.
- **Leutou, A.S., McCall, J.R., York, B., Govindapur, R.R., Bourdelais, A.J.** (2020). Anti-inflammatory activity of glycolipids and a polyunsaturated fatty acid methyl ester isolated from the marine dinoflagellate *Karenia mikimotoi*. *Marine Drugs*. 18(3):138. doi: 10.3390/md18030138
- **McCall, J.R., Holland, W.C., Keeler, D.M., Hardison, D.R., Litaker, R.W.** (2019). Improved accuracy of saxitoxin measurement using an optimized enzyme-linked immunosorbent assay. *Toxins*. 11(11):632. doi: 10.3390/toxins11110632
- **Keeler, D.M., Grandal, M.K., McCall, J.R.** (2019). Brevenal, a marine natural product, is anti-inflammatory and an immunomodulator of macrophage and lung epithelial cells. *Marine Drugs*. 17(3):184. doi: 10.3390/md17030184

## Contributions to Marine Science Curriculum

### Masters of Coastal and Ocean Policy (MCOP)

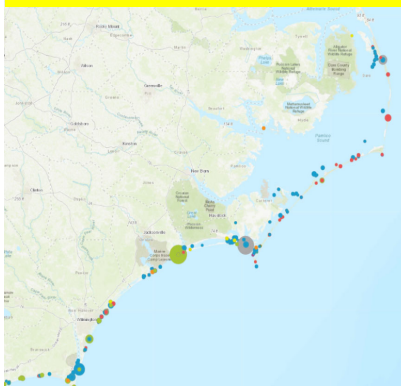
Program Mission: To seek creative, scientifically sound solutions to coastal and ocean governance problems through relevant research, regional engagement, and the education of future leaders committed to advancing the wise stewardship of coastal and ocean resources.

Interdisciplinary courses include:

- **Topics in Biological & Environmental Science of Coastal Issues**
- **Topics in Geology, Geography, & Physics of Coastal Issues**
- **Environmental Economics**
- **Environmental Policy Analysis**
- **Seminar in Coastal and Ocean Policy**



Masters of Coastal & Ocean Policy (MCOP) students constructed an oyster sill to dissipate wave energy at Carolina Beach State Park as part of their service learning assignment for N.C. Coastal Issues & Experiences course.



UNCW Data Science collaboration with Audubon North Carolina and the North Carolina Wildlife Resources Commissions to refine and analyze over 40 years of data regarding nesting sites and abundance of colonial waterbirds. Data were collected from the statewide Colonial Waterbird Census, which was initiated in the 1970s by UNCW professor emeritus Dr. James Parnell, and includes the Brown Pelican, White Ibis, and Least Tern.

## U.S. Industry, Institutional, and Governmental Collaborations

## International Collaborations and Connections

Harbor Branch Oceanographic Institute	The Coastal Society	SeaTox Research Inc
Audubon North Carolina	Bald Head Island Conservancy	NOAA
North Carolina Wildlife Resources Commission	National Estuarine Research Reserves	Alcami Corporation

Institut Louis Malarde, Papeete, French Polynesia	Government of Barbados, Ministry of Maritime Affairs and Blue Economy
Universidad Nacional de Colombia	University of the West Indies-St. Augustine