



BINGQING LIU, Ph.D.

THE WATER INSTITUTE
OF THE GULF



Company Role

Research Scientist / Deputy Director of RESTORE Act Center of Excellence for Louisiana

Project Role / Focus Areas

- Water Quality
- Land Ocean Interactions
- Remote Sensing
- Ocean modeling

Education

- Postdoc – Coastal Ecology, The Water Institute of the Gulf, 2021
- Ph.D. – Oceanography & Coastal Sciences, Louisiana State University, 2020
- M.S. – Oceanography, Shanghai Ocean University, 2015
- B.S. – Oceanography, Shanghai Ocean University, 2003

Professional Membership

- Coastal & Estuarine Research Federation (CERF)
- American Geophysical Union (AGU)
- Institute of Electrical and Electronics Engineers (IEEE)

Experience Profile

Bingqing Liu, Ph.D. brings her experience in oceanography and coastal science to The Water Institute with her research focusing on wetland-estuary biogeochemistry and ocean color remote sensing. She has extensive research experience in monitoring and characterizing river-coastal dynamics including land-ocean interactions, carbon cycling, phytoplankton community dynamics, and water qualities in the Gulf of Mexico.

Dr. Liu's current research focuses on water quality modeling and remote sensing monitoring to examine the responses of aquatic ecosystem to meteorological/climatic changes and anthropogenic activities from restoration efforts in Louisiana's coastal zone. Her research activities include model improvements and validations, developments of satellite algorithms, field work and laboratory experiments of phytoplankton community dynamics in the estuarine-coastal zones of Louisiana.

In addition to being a research scientist at the Institute, Dr. Liu is the Deputy Director for the RESTORE Act Center of Excellence for Louisiana (LA-COE) where she helps the administration of a competitive coastal research grants program.

Prior to joining the Institute, Dr. Liu earned her Ph.D. in Oceanography and Coastal Sciences at Louisiana State University. In addition, Dr. Liu participated in a NASA Fellowship to attend the "Ocean Optics 2017" training program and an internship at the Applied Physics Laboratory at the University of Washington in Seattle.

Professional Experience

The Water Institute of the Gulf	2022-Present
• <i>Research Scientist</i>	
The Water Institute of the Gulf	2020-2021
• <i>Postdoctoral Researcher</i>	
RESTORE Act Center of Excellence for Louisiana	
• <i>Deputy Director</i>	2020-Present
Louisiana State University	
• <i>Graduate Research Associate (Ph.D.)</i>	2015-2020
University of Washington	
• <i>Internship</i>	2014
Shanghai Ocean University	
• <i>Graduate Research Associate (M.S.)</i>	2013-2015

Selected Projects

Coastal Carbon Capture (CPRA TO83) (2021)

Role: engaged in conducting state of science literature review of coastal carbon research in Louisiana and Gulf-wide, analyzing model results from 2017 Coastal Master Plan, developing scripts to extract habitat changes and calculating net flux of GHG emissions of Louisiana's coastal habitats.

Selected Projects (cont.)

An analytical framework with areal flux rates and habitat areas to estimate the net flux of greenhouse gas emissions from coastal habitats was developed based on reviewing available scientific data in repositories, peer-reviewed literature, carbon sequestration methodologies, extracting landscape model output, and hosting a series of technical meetings. The net flux of greenhouse gas emissions based on carbon dioxide equivalency with and without 2017 Coastal Master Plan of the Louisiana coastal area were estimated at years 2005, 2020, 2025, 2030, and 2050 to align with State of Louisiana's Governors' goals.

Ecosystem Model Runs for Mid-Breton Scenarios (EIS) (Nov. 2021-current)

Role: developed Habitat Suitability Index (HSI) automation script to prepare HSI input parameters and calculate HSI, analyzed the model results.

The HSI for 10 aquatic species (blue crab, brown shrimp, white shrimp, Gulf menhaden, spotted seatrout, largemouth bass, bay anchovy, Atlantic croaker, southern flounder, and eastern oyster) and 4 terrestrial species (green wing teal, mottled duck, America alligator, and gadwall) using model outputs under different diversion operations from Basin-wide Model Version 4, which is developed under the Mississippi River Hydro and Delta Management (MRHDM) and other related projects.

Partnership of our Working Coast Phase II, Port Fourchon, Louisiana (2020-current)

Role: tested and calibrated LAVegMod.PF and analyzed the model results.

In order to evaluate the co-benefits of the placement of dredged material for created wetlands, including carbon capture in wetland soils and water quality improvements, an integrated model framework is being developed using the Delft3D-Flexible Mesh suite that takes into account the interaction among hydro-, morpho-, water quality, and vegetation dynamics. In particular, vegetation dynamics model is being developed in collaboration with Deltares to assess water quality and carbon sequestration in wetlands built with dredged material.

Selected Peer-reviewed Publications

1. Liang JH., Liu J., Benfield. M., Justic D., Holstein. D., **Liu B.** 2021. Including the effects of subsurface currents on buoyant particles in Lagrangian particle tracking models: Model development and its application to the study of riverborne plastics over the Louisiana/Texas shelf, *Ocean modeling*, 167, 101879, <https://doi.org/10.1016/j.ocemod.2021.101879>
2. **Liu, B.**, D'Sa, E. J., Maiti, K., Rivera-Monroy, V. H., and Xue, Z. G. 2021. Biogeographical trends in phytoplankton community size structure using adaptive sentinel 3-OLCI chlorophyll a and spectral empirical orthogonal functions in the estuarine-shelf waters of the northern Gulf of Mexico, *Remote Sensing of Environment*, 252, 112-154, doi.org/10.1016/j.rse.2020.112154
3. Clementson, L.A., Richardson, A. J., Rochester, W.A., Oubelkheir, K., **Liu, B.**, D'Sa, E.J., Luiz, F., Ajani, A.P., Schroeder, T., Ford, P. W., Burford, M., Saeck, E., Andrew D.L. Steven, D.L. 2021. 100-year flood on a subtropical coastal phytoplankton community, *Frontiers in Marine Science* (accepted)
4. **Liu, B.**, D'Sa, E. J., and Joshi, I. 2019. Multi-decadal trends and influences on dissolved organic carbon distribution in the Barataria Basin, Louisiana from in-situ and Landsat/MODIS observations, *Remote Sensing of Environment*, 228, 183-202, [doi:10.1016/j.rse.2019.04.023](https://doi.org/10.1016/j.rse.2019.04.023)
5. **Liu, B.**, D'Sa, E. J., and Joshi, I. 2019. Floodwater impact on Galveston Bay phytoplankton taxonomy, pigment composition and photo-physiological state following Hurricane Harvey from field and ocean color (Sentinel-3A OLCI) observations, *Biogeosciences*, 16, 1975–2001, [doi:10.5194/bg-16-1975-2019](https://doi.org/10.5194/bg-16-1975-2019)

Selected Other Documents

1. Baustian, M.M., **Liu, B.**, Moss, L., and Wang, Y. 2022. Estimating Changes of Net Greenhouse Gas Sinks and Sources in Louisiana's Coastal Area from Implementation of the State's 2017 Coastal Master Plan. The Water Institute of the Gulf. Prepared for Coastal Protection and Restoration Authority and Governor's Office of Coastal Activities and funded by the Coastal Protection and Restoration Authority via Task Order 83 through the Gulf Coast Ecosystem Restoration Council. Baton Rouge, LA.
2. **Liu B.**, Jung H., Kiskaddon E., and Carruthers T. 2021. Aquatic Habitat Suitability Index Calculations for Mid- Breton Sediment Diversion Environmental Impact Statement, The Water Institute of the Gulf. Prepared for Coastal Protection and Restoration Authority.
3. **The Water Institute of the Gulf.** 2020. RESTORE Act Center of Excellence for Louisiana. Tracking the Success Metrics of RESTORE Act Center of Excellence for Louisiana – RFP1 Cycle. Baton Rouge, LA.

Presentations and Awards

1. **Liu, B.**, LICOPRI Seminar of "Assessing the Current and Future Natural Carbon Sequestration Capacity of Louisiana's Coastal Habitats". Louisiana Coasts, Oceans Ports and Rivers Institute, Baton Rouge, LA, USA, October 28, 2021
2. **Liu B.**, Baustian M. M., Moss L.C., Dausman A., Pahl J., Vorhoff H., Sutcliffe C., Oral presentation of "Developing an Analytical Framework for Quantifying Potential Coastal Carbon Sinks of Louisiana's Habitats". Coastal & Estuarine Research Federation (CERF) 2021, in virtual, November 9, 2021
3. **Liu, B.**, Seminar of "Assessing the Current and Future Natural Carbon Sequestration Capacity of Louisiana's Coastal Habitats". University of Louisiana at Lafayette, Lafayette, LA, USA, November 19, 2021