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## **EDUCATION**

Louisiana State University	Baton Rouge, LA	Civil Engineering	MS, 2008
Inha University	Incheon, Korea	Oceanography	MS, 1998
Inha University	Incheon, Korea	Oceanography	BS, 1996

## **RESEARCH INTERESTS**

Estuarine and coastal hydrodynamics, water quality processes including dispersion of pollution, eutrophication and hypoxia/anoxia, wave attenuation by vegetation, storm surge, numerical modeling.

## **PROFESSIONAL EXPERIENCE**

The Water Institute	Research Scientist	2016–Present
	Research Associate	2012–2016
Center of Excellence, Center for Analysis and Response to Coastal Hazards	Research Associate	2009–2012
Louisiana State University, Department of Civil and Environmental Engineering	Graduate Assistant	2007–2008
University of South Alabama, Department of Marine Sciences	Graduate Assistant	2003–2006

## **PROFESSIONAL SOCIETY MEMBERSHIPS**

- American Geophysical Union, 2013–Present

## **TRAINING COURSES**

- Machine Learning, 2023

**NOTABLE PROJECTS**

**Modeler/Developing a Harmful Algal Bloom Threat Index to Assess Risks to Marine Organisms, Human Health, and Economic Well-Being of Shellfish and Fish Industries.** 2022–2024

*BTNEP*

The model employs machine learning techniques to predict areas susceptible to Harmful Algal Blooms (HABs) and evaluate threats to oysters. It achieves this by analyzing satellite remote sensing reflectance, incorporating customized band ratios for both shallow estuarine systems and open ocean conditions. Through the analysis of these ratios and the integration of available remote sensing reflectance values, the model effectively forecasts HAB and oyster threat indexes at specific locations.

**Model Development/Partnership for our Working Coast: Advancing Coastal Habitat Assessment** 2022–2023

*Chevron*

To improve the accuracy of vegetation models, machine learning (ML) algorithms are being developed that can capture linear and non-linear relationships between abiotic variables and vegetation species and % Coverage. Vegetation and abiotic data (i.e., water level, salinity, temperature, etc.) were analyzed in CRMS. Based on the data analysis, a dataset for ML model training was constructed and the model was trained.

**Method Evaluation/Refining the Analytical Approach that Louisiana Uses to Estimate Coastal Wetland Greenhouse Gas Fluxes** 2022–2023

*Coastal Protection and Restoration Authority*

Reviewed and evaluated assumptions, methodology, and parameters used for blue carbon assessment in RESTORE Council-funded study coastal. Conducted sensitivity tests for assumptions and uncertainties used in the coastal carbon assessment.

**Habitat Suitability Index (HSI) Development/Ecosystem Model Runs for Mid-Breton Scenarios** 2021–2022

*Coastal Protection and Restoration Authority*

Calculated HSIs 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.

**Model Development/Partnership for our Working Coast Phase II, Port Fourchon, Louisiana**

2020–2022

*The Water Institute*

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

**PUBLISHED WORKS**

**Peer-Reviewed Publications**

- Liu, B.; Sevick, T.; Jung, H.; Kiskaddon, E.; Carruthers, T. (2023) Quantifying the Potential Contribution of Submerged Aquatic Vegetation to Coastal Carbon Capture in a Delta System from Field and Landsat 8/9-Operational Land Imager (OLI) Data with Deep Convolutional Neural Network. *Remote Sens.* <https://doi.org/10.3390/rs15153765>
- Jung, H.; Nuttle, W.; Baustian, M.M.; Carruthers, T. (2023). Influence of Increased Freshwater Inflow on Nitrogen and Phosphorus Budgets in a Dynamic Subtropical Estuary, Barataria Basin, Louisiana. *Water*, <https://doi.org/10.3390/w15111974>
- Hemmerling SA, DeMyers C, Parfait J, Piñero E, Baustian MM, Bregman M, Di Leonardo D, Esposito C, Georgiou IY, Grismore A, Jung H, McMann B and Miner MD (2023), A community-informed transdisciplinary approach to coastal restoration planning: Maximizing the social and ecological co-benefits of wetland creation in Port Fourchon, Louisiana, USA. *Front. Environ. Sci.* 11:1105671. doi: 10.3389/fenvs.2023.1105671.
- Baustian, M. M., Jung, H., Bienn, H. C., Barra, M., Hemmerling, S. A., Wang, Y., White, E. D., & Meselhe, E. A. (2020). Engaging coastal community members about natural and nature-based solutions to assess their ecosystem function. *Ecological Engineering*, 143(5–6).
- Meselhe, E. A., Wang, Y., White, E. D., Jung, H., Baustian, M. M., Hemmerling, S. A., Barra, M., & Bienn, H. C. (2020). Knowledge-based predictive tools to assess effectiveness of natural and nature-based solutions for coastal restoration and protection planning. *Journal of Hydraulic Engineering*, 146(2).
- Hemmerling, S. A., Barra, M., Bienn, H. C., Baustian, M. M., Jung, H., Meselhe, E. A., Wang, Y., & White, E. D. (2020). Elevating local knowledge through participatory modeling: Active community engagement in restoration planning in coastal Louisiana. *Journal of Geographical Systems*, 22(2), 241–266.
- Baustian, M. M., Meselhe, E. A., Jung, H., Sadid, K., Duke-Sylvester, S. M., Visser, J. M., Allison, M. A., Moss, L. C., Ramatchandirane, C., Sebastiaan van Maren, D., Jeuken, M., & Bargu, S. (2018). Development of an integrated biophysical model to represent morphological and ecological processes in a changing deltaic and coastal ecosystem. *Environmental Modelling & Software*, 109, 402–419.
- Park, K., Powers, S. P., Bosarge, G. S., & Jung, H.-S. (2014). Plugging the leak: Barrier island restoration following Hurricane Katrina enhances larval retention and improves salinity regime for oysters in Mobile Bay, Alabama. *Marine Environmental Research*, 94, 48–55.
- Himangshu, D., & Jung, H. (2013). An efficient tool to assess risk of storm surge using data mining. *Coastal Hazards*.
- Deng, Z.-Q., & Jung, H. (2010). Effect of channel size on solute residence time distribution in rivers. *Advances in Water Resources*, 33(9), 1118–1127.
- Jung, H.-S., & Deng, Z.-Q. (2010). Modeling of nitrogen retention in Amite River. *Water, Air, & Soil Pollution*, 215(1), 411–425.
- Deng, Z., & Jung, H. (2009). Variable residence time-based model for solute transport in streams. *Water Resources Research*, 45.

- Deng, Z., & Jung, H. (2009). Scaling dispersion model for pollutant transport in river. *Environmental Modeling & Software*, 24, 627–631.
- Deng, Z., Lima, J., & Jung, H. (2008). Sediment transport rate-based model for rainfall-induced soil erosion. *Catena*, 76, 54–62.
- Park, K., Jung, H.-S., Kim, H.-S., & Ahn, S.-M. (2005). Three-dimensional hydrodynamic-eutrophication model (HEM-3D): Application to Kwang-Yang Bay, Korea. *Marine Environmental Research*, 60(2), 171–193.

### Conference Proceedings and Presentations

- Jung, H., Doyle, S., Kiskaddon, E., Howe, N., Liu, B., Sevick, T., Carruthers, T., & Pittman, G. (2023). *Development of a wetland vegetation distribution model for coastal Louisiana using machine learning*. State of the Coast, New Orleans, LA.
- Jung, H., Liu, B., Baustian, M., & Kiskaddon, E. (2022). *Estimates of coastal blue carbon sequestration in marsh-mangrove dominated habitats in Port Fourchon, LA, USA, in response to future sea level rise*. American Geophysical Union, Chicago, IL.
- Jung, H., Baustian, M., Carruthers, T., & Nuttle, W. (2021). *Modeling the changes in nutrients and phytoplankton dynamics from large-scale coastal restoration in Louisiana, USA*. Coastal & Estuarine Research Federation (CERF) Biennial Conference.
- Jung, H., Baustian, M., & Carruthers, T. (2021). *Evaluation of potential impacts of nutrients and primary production in the Barataria Basin in response to the proposed Mid-Barataria Sediment Diversion*. State of the Coast.
- Jung, H., Moss, L., Di Leonardo, D., Carruthers, T., DeMarco, K., Mathews, M., & Barsher, M. (2019). *Modeling potential benefits of fragmented terrace restoration in Terrebonne Bay, Louisiana: Wave attenuation, sediment process, and potential SAV habitat*. American Geophysical Union, San Francisco, CA.
- Jung, H., Baustian, M., Meselhe, E., & Carruthers, T. (2018). *Developing nitrogen budgets using an integrated biophysical model to investigate current and future phytoplankton dynamics in a rapidly changing subtropical estuary, Barataria Basin*. American Geophysical Union, Washington, D.C.
- Jung, H., Carruthers, T., Allison, M., Weathers, D., Moss, L., & Timmermans, H. (2017). *Maximizing effectiveness of adaptation action in Pacific Island communities using coastal wave attenuation models*. American Geophysical Union, New Orleans, LA.
- Jung, H., Meselhe, E., & Baustian, M. (2016). *Potential changes in the spatial and temporal patterns of nutrients and phytoplankton taxa in Lower Mississippi River Basins in response to proposed large sediment diversions*. American Geophysical Union, San Francisco, CA.
- Meselhe, E., Pereira, J., Jung, H., Gaweesh, A., & Allison, M. (2013). *Investigation of sediment diversions in the Lower Mississippi River*. American Geophysical Union, San Francisco, CA.
- Jung, H., Das, H., Skelton, G., & Whalin, R. (2011). *Rapid estimation of high resolution local storm and interactive operation with a disaster response intelligent system*. The 3rd Annual Conference on Hurricanes, Major Disasters, Coastal Protection and Rapid Recovery in Texas and Gulf Coast Region, Houston, TX.
- Das, H., Jung, H., Smith, J., & Wamsley, T. (2011). *A high resolution unstructured model to study storm surge in the Pacific Island of Guam*. 22–29.
- Das, H., Jung, H., Ebersole, B., Wamsley, T., & Whalin, R. (2011). *An efficient storm surge forecasting tool for coastal Mississippi. 1*.
- Herring, B., Das, H., Jung, H., & Whalin, R. (2010). *An efficient storm surge forecasting tool for coastal Mississippi using data mining*. The Fourth Annual DHS University Network Summit, Washington, D.C.
- Deng, Z., Jung, H., & Ghimire, B. (2010). *Hyporheic exchange-induced long-tailed residence time distributions of solute in rivers*. The 33rd Congress of the International Association of Hydraulic Engineering and Research, Vancouver, Canada.
- Deng, Z., & Jung, H. (2007). *Scale-dependent dispersion in rivers*. The 32nd Congress of the International Association of Hydraulic Engineering and Research, Venice, Italy.
- Park, K., Jung, H., Kim, H., & Ahn, S. (2003). Estuarine and coastal water quality modeling: Concept and a case study in Korea. *Determining Environmental Carrying Capacity of Coastal and Marine Areas: Progress, Constraints, and Future Options*, 98–114.