Martijn C. Bregman, MS
Research Scientist
The Water Institute
1110 River Road S., Suite 200
Baton Rouge, LA 70802
Tel. No. (225) 227 – 2724
Email: mbregman@thewaterinstitute.org

EDUCATION

| Delft University of Technology | Delft, The Netherlands | Civil Engineering (Hydraulic Engineering Track) | MS, 2018 |
| Delft University of Technology | Delft, The Netherlands | Civil Engineering | BS, 2014 |

RESEARCH INTERESTS

Coastal and riverine systems, sediment management, flood risk and impacts, numerical modeling.

PROFESSIONAL EXPERIENCE

The Water Institute	Research Scientist	2021–Present
	Research Associate	2018–2021
Deltares (The Netherlands)	Graduate Intern	2017–2018
Rijkswaterstaat (The Netherlands)	Intern	2017
eThekwini Metropolitan Municipality (Greater Durban area, South Africa)	Graduate Research Project	2016

TECHNICAL PROFICIENCIES

- Numerical Modeling
    - Delft3D 4 (advanced knowledge)
    - Delft3D FM (advanced knowledge)
    - SFINCS (advanced knowledge)
    - HEC-RAS
    - HEC-HMS
    - PCSWMM
    - Flow3D
- GIS
    - ArcMap
    - ArcGIS Pro (advanced knowledge)
- Programming, Scripting & Computing
    - MATLAB (advanced knowledge)
    - Python (advanced knowledge)
    - Bash/Shell scripting
    - HPC computing

TRAINING COURSES

- SFINCS Course (Deltares, 2023)
- A/E/C Project Management Bootcamp (PSMJ, 2022)
- Flow-3D Hydro CFD Workshop (Flow Science, Inc., 2022)
- HEC-RAS and HEC-HMS Training (Water Institute, 2022)
- Delft3D FM Coastal Morphodynamic Modeling Course (Deltares, 2019)

NOTABLE PROJECTS

Research Scientist/Mid-Breton and Mid-Barataria Sediment Diversions - Environmental Impact Statement (EIS)   Current
Coastal Protection and Restoration Authority
Conducted large numerical modeling projects for the Mid-Breton and Mid-Barataria Sediment Diversions in southeast Louisiana, utilizing over 2 million CPU hours to assess impacts on geomorphology, salinity, flooding, and water quality in the receiving areas and the Mississippi River. Made significant improvements to the modeling frameworks, including the automation of various processes such as quality assurance and quality control (QAQC) and post-processing, to facilitate high-performance computing operations with minimal human intervention. Led multiple analyses, including hydraulic conveyance assessments in the Mid-Breton receiving area and studies on diversion-related impacts on navigation and dredging in the Mississippi River, as well as water level impacts near communities in the Barataria Basin.

Research Scientist/Louisiana Sediment Management Plan   2021–2023
The Water Institute
Conducted numerical modeling studies as part of the Borrow Area Management and Monitoring (BAMM) program. The first study assessed the effects of in-bay sediment mining in Barataria Bay, Louisiana, where a Delft3D FM model was developed to simulate hydrodynamics (currents and waves), sediment transport, and morphology. Analyzed model results to investigate the impacts of borrow pits on tidal prism, their ability to capture sediment that would otherwise be lost, and the influence of pit orientation on local and regional sediment dynamics. Findings were presented in a paper for the 2023 Coastal Sediments Conference. The second study focused on infilling rates and downstream impacts of borrow pits in lateral bars of the Lowermost Mississippi River, improving and extending two Delft3D 4 hydro-morphodynamic models to enhance understanding of borrow pit infilling processes and their implications for regional river management, including diversion operations and navigation channel dredging.

Research Scientist/A Citywide Probabilistic Compound Flood Model & Real-Time Forecasting System	Current

City of Jacksonville, FL
Project where the Water Institute and partners support development of Jacksonville's first resilience strategy. Led the development, testing, and analysis of a SFINCS model for Jacksonville to improve understanding of compound flooding, perform a series of sensitivity tests, and inform and support the development of a more detailed 2D HEC-RAS model.

Research Scientist/Bayou Greenbelt Feasibility: Hydraulic and Salinity Modeling to Evaluate the Bayou Greenbelt Greenway	2023–2024

National Park Service
Led the development of a three-dimensional Delft3D model to evaluate salinity impacts due to Bayou Greenbelt, a proposed connection of waterways in Lake Charles, Louisiana. Supported and co-developed a 2D HEC-RAS model to assess changes in rainfall-induced flooding.

Master's Thesis/A New Modelling Method for Representing the Effect of Spiral Flow on the Bed Shear Stress	2017–2018

Deltares, The Netherlands
Exploratory research to develop a new parameterization method for spiral flow in river bends, carried out using the Delft3D modeling suite. Investigated the shortcomings of three-dimensional and depth-averaged models in representing spiral flow and developed a new method to calculate the bed shear stress direction in rivers.

PUBLISHED WORKS

Peer-Reviewed Publications

Georgiou, I. Y., Messina, F., Sakib, M. M., Zou, S., Foster-Martinez, M., Bregman, M., Hein, C. J., Fenster, M. S., Shawler, J. L., McPherran, K., & Trembanis, A. C. (2023). Hydrodynamics and sediment-transport pathways along a mixed-energy spit-inlet system: A modeling study at Chincoteague Inlet (Virginia, USA). Journal of Marine Science and Engineering, 11(5), 1075.

Hemmerling, S. A., DeMyers, C., Parfait, J., Piñero, E., Baustian, M. M., Bregman, M., Di Leonardo, D., Esposito, C., Georgiou, I. Y., Grismore, A., Jung, H., McMann, B., & Miner, M. D. (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. Frontiers in Environmental Science, 11.

Technical Reports

Georgiou, I.Y., Bregman, M., Hemmerling, S.A., Partida, L., Pittman, G., Saharia, A., Wang, Y., (2024). Bayou Greenbelt Feasibility Study: Hydraulic and Salinity Modeling to Evaluate the Bayou Greenbelt Greenway. The Water Institute. Prepared for the National Park Service and funded by the Federal Emergency Management Agency. Baton Rouge, LA.

Bregman, M. C., Georgiou, I. Y., Miner, M., Khalil, S., Swartz, J. M., Raynie, R. (2023). *Assessing the Impact of In-Bay Borrow Pits on Estuarine Sediment Dynamics, Barataria Bay, Louisiana*. Prepared by The Water Institute for the Coastal Protection and Restoration Authority. Baton Rouge, LA.

Bregman, M., Hanegan, K., LeBlanc Hatfield, M., Lindquist, D., Foster-Martinez, M., Patton, B., Reed, D. J., Visser, J., Wang, Y., Zhanxian, W., & White, E. D. (2023). *2023 Coastal Master Plan: Attachment C4:*

Extended Project Narratives – ICM. Version 4. (p. 302). Baton Rouge, Louisiana: Coastal Protection and Restoration Authority.

White, E. D., Bregman, M., Dalyander, S., Foster-Martinez, M. R., Georgiou, I., Hanegan, K., Lindquist, D., Miner, M., Reed, D. J., Visser, J. M., Wang, & Y., & Wang, Z. (2023). *2023 Coastal Master Plan: Attachment C2: 50-Year FWOA Model Output, Regional Summaries - ICM. Version 3.* (p. 194). Baton Rouge, Louisiana: Coastal Protection and Restoration Authority.

Georgiou, I. Y., Bregman, M., Messina, F., Di Leonardo, D., Wang, Y., Zou, S., Khalil, S., Raynie, R., Swartz, J., & Miner, M. (2023). *Sediment infilling rate of Lowermost Mississippi River borrow pits and impacts on downstream dredging.* Baton Rouge, LA: The Water Institute of the Gulf, Prepared for the Coastal Protection and Restoration Authority (CPRA) under Task Order 72.2.

Bregman, M., Messina, F., Miner, M., Georgiou, I. Y., & Wilson, C. S. (2023). *Inter-model comparisons between physical and numerical models: Comparisons of future projections between the numerical Basin Wide Model Version 4 and the Lower Mississippi River Physical Model* (No. P-00407-01). Baton Rouge, LA: Prepared for the Louisiana Coastal Protection and Restoration Authority by The Water Institute and Louisiana State University under Task Order 69.

Bregman, M., Jung, H., Liu, B., Baustian, M. M., Messina, F., & Georgiou, I. Y. (2022). *Basin Wide Model Version 4 Sensitivity Analysis* [Technical Memorandum]. The Water Institute. Produced for the Louisiana Coastal Protection and Restoration Authority under Task Order 77.

Messina, F., Bregman, M., Zou, S., Georgiou, I. Y., Dalyander, S., & Miner, M. (2022). *Lake Borgne Gulf Sturgeon monitoring and habitat characterization.* The Water Institute of the Gulf. Produced for and funded by Coastal Protection and Restoration Authority under Task Order 81.

Messina, F., Georgiou, I. Y., Bregman, M., Holm, G. O., & Marino, R. (2021). *Analysis of existing and predicted coastal water surface elevation trends in Breton Sound Basin: In support of the Mid-Breton Sediment Diversion Environmental Impact Statement.* The Water Institute. Prepared for and Funded by the Coastal Protection and Restoration Authority under Task Order 77.

Messina, F., Georgiou, I. Y., Bregman, M., Jung, H., Yuill, B. T., Liu, B., Cobell, Z., & Baustian, M. M. (2021). *Mid-Breton Sediment Diversion Engineering Modeling Support: Production Runs with the Basin Wide model Version 4* [Revised March 2022]. The Water Institute. Funded by the Coastal Protection and Restoration Authority under Task Order 77.

Georgiou, I. Y., Messina, F., Bregman, M., Jung, H., & Liu, B. (2021). *Approach to limit crevassing in the Basin Wide model Mid-Breton Production Runs using existing and additional simulations.* Baton Rouge, LA: The Water Institute of the Gulf.

Messina, F., Georgiou, I. Y., Bregman, M., Holm, G. O., & Marino, R. (2021). *Analysis of existing and predicted coastal water surface elevation trends in Breton Sound Basin: In support of the Mid-Breton Sediment Diversion Environmental Impact Statement.* Baton Rouge, LA.: The Water Institute of the Gulf. Prepared for and Funded by the Coastal Protection and Restoration Authority under Task Order 77.

Bregman, M., Messina, F., Jung, H., Yuill, B. T., Baustian, M. M., & Georgiou, I. Y. (2020). *Basin Wide Model Version 4: Basin Wide Model for Mid-Breton Sediment Diversion Modeling* (Task Order 51.3. Final Report). Baton Rouge, LA: The Water Institute of the Gulf. Funded by the Coastal Protection and Restoration Authority.

Bregman, M., Messina, F., Yuill, B., & Jung, H. (2019). *QA/QC Procedures for Mid-Barataria Sediment Diversion Alternatives Modeling* [Technical Memorandum under Task Orders 48 and 51]. The Water Institute, produced for the Coastal Protection and Restoration Authority.

Messina, F., Bregman, M., Jung, H., Yuill, B., & Roberts, H. (2019). *Mid-Barataria Sediment Diversion Engineering Modeling Support: Production Runs with the Basin Wide model Version 3* (Technical Memorandum). Baton Rouge, LA: The Water Institute of the Gulf. Prepared for and funded by the Coastal Protection and Restoration Authority.

Conference Proceedings and Presentations

Bregman, M. C., Swartz, J. M., Khalil, S., Raynie, R., Haywood, E., Miner, M. D., & Georgiou, I. Y. (2023). Local and Regional Effects of Sediment Mining Within a Deteriorating Estuary: Barataria Bay, Louisiana. In Coastal Sediments 2023 (pp. 2763–2776). WORLD SCIENTIFIC.

Sakib, M., Messina, F., Zou, S., Bregman, M., Georgiou, I. Y., Hein, C. J., & Fenster, M. S. (2023). Spit elongation and re-orientation controls downdrift sediment fluxes and inlet morphology. In The proceedings of the coastal sediments 2023 (Vols. 1-5, Vol. 1, pp. 90–102). World Scientific.

Graduate Reports

Bregman, M. (2018). A new modelling method for representing the effect of spiral flow on the bed shear stress. (MSc thesis)

Aelfers, S. G. L., **Bregman**, M. C., Gulden, F. J. H., Hoek, J., & Maan, C. A. (2016). Flood Safety Durban (Graduate Research Project)