COMPANY ROLE

Research Scientist

PROJECT ROLE / FOCUS AREAS

Numerical Modeling

Coastal and Riverine Systems

Sediment Management

Flood Risk and Impacts

EDUCATION

MS Civil Engineering (hydraulic engineering track), Delft University of Technology, 2018

BS Civil Engineering, Geology, Delft University of Technology, 2014

TRAINING

Delft3D FM - Coastal Morphodynamic Modeling Course (Deltares, Nov. 2019)

A/E/C Project Management Bootcamp (PSMJ, Dec. 2022)

FLOW-3D HYDRO CFD Workshop (Flow Science, May 2022)

MARTIJN BREGMAN

Research Scientist

Martijn Bregman has more than six years of continuous experience in numerical modeling of hydrodynamics, sediment transport, and morphology in coastal and riverine systems. Bregman has worked on numerous studies to evaluate coastal protection and restoration projects. This includes studies into landscape evolution, sediment management, flood risk and impacts, and environmental impacts. Additionally, he developed and automated several cross-disciplinary modeling frameworks at the Water Institute that operate within high performance computing environments. Bregman has experience with various numerical modeling software packages and has become a subject matter expert in the Delft3D 4 (structured grid) and Delft3D FM (unstructured grid) modeling suites.

PROFESSIONAL EXPERIENCE

2021-Present:	Research Scientist, The Water Institute
2018-2020:	Research Associate, The Water Institute
2017-2018:	Graduate Research Intern, Deltares (The Netherlands)
2017:	Graduate Intern, Rijkswaterstaat (The Netherlands)

SELECTED PROJECTS (CONTINUED ON PAGE 2)

Louisiana Sediment Management Plan (Barataria Bay), CPRA (2021-present): Numerical modeling study as part of the Borrow Area Management and Monitoring (BAMM) program to assess the effect of in-bay sediment mining in Barataria Bay, Louisiana. Developed a Delft3D FM model that simulates hydrodynamics (currents and waves), sediment transport, and morphology. Analyzed and interpreted model results to investigate the impact of borrow pits on the tidal prism, the capability of borrow pits to capture sediment that would otherwise be lost from the system, and the influence of pit orientation on local and regional sediment dynamics.

Louisiana Sediment Management Plan (Lowermost Mississippi River), CPRA (2021-present): Numerical modeling study to assess infilling rates and downstream impacts of borrow pits in lateral bars of the Lowermost Mississippi River. Improved and extended two Delft3D 4 hydro-morphodynamic models to better understand processes that govern borrow pit infilling. This study also investigated the impact of borrow pits on regional river management (e.g. diversion operation, dredging of the navigation channel).

SELECTED PROJECTS (CONTINUED)

2023 Coastal Master Plan – Integrated Compartment Model, Hydro Modeling (Louisiana), CPRA (2018-present): The Integrated Compartment Model (ICM) is used to predict future landscape changes and evaluate projects that are part of the Coastal Masterplan. Supported model set-up and QAQC; analyzed and documented model results and project impacts.

Mid-Breton Sediment Diversion – Environmental Impact Statement (EIS) support and evaluation of diversion operation, CPRA (2019-present): Large numerical modeling project (~1 million CPU hours) to assess impacts of the planned Mid-Breton Sediment Diversion in southeast Louisiana on geomorphology, salinity, flooding, and water quality in the receiving area as well as the Mississippi River. Made improvements to the model and implemented an automated production system to perform the simulations in a high-performance computing environment with minimized need for human action or intervention. Led several analyses, including an assessment of hydraulic conveyance in the Mid-Breton receiving area, and a study into diversion-related impacts on navigation and dredging in the Mississippi River.

Mid-Barataria Sediment Diversion – Environmental Impact Statement (EIS) support and evaluation of diversion operation, CPRA (2018-2022): Large numerical modeling project (>1 million CPU hours) to assess impacts of the planned Mid-Barataria Sediment Diversion in southeast Louisiana on geomorphology, salinity, flooding, and water quality in the receiving area as well as the Mississippi River. Supported the modeling activities by automating several parts of the modeling framework, including QAQC and post-processing. Performed numerous assessments of diversion impacts, including a study into impacts on water levels near several communities in the Barataria Basin.

Partnership for Our Working Coast (2020-2022): Public-private partnership between The Water Institute and energy industry partners (Chevron, Shell, and Danos) along with the Greater Lafourche Port Commission (GLPC). The partnership took a science-based approach to find ways to maximize coastal restoration benefits from sediment that will be generated by a large-scale dredging project to deepen the Port's entrance channel. Led development of the Delft3D FM hydrodynamic and morphology models that formed the backbone of the modeling framework used to assess different marsh creation projects. Led the effort to set up, couple, and automate the modeling framework and coordinated with developers of other model subcomponents.

Hurricane Sedimentation on Salt Marshes: Extent, Provenance, and Processes (2022, ongoing): Collaborative study with external partners (Boston University, Virginia Institute of Marine Science) to understand delivery of mineral to salt marshes. Led development of a Delft3D FM model to simulate hydrodynamics (currents and waves), sediment transport, and morphology in the area around Sapelo Island in Georgia under regular and hurricane conditions.

A new modelling method for representing the effect of spiral flow on the bed shear stress (Master's thesis), Deltares, The Netherlands (2017-2018): 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.

Morphological data transformation and analyses of coastal maintenance projects in the North Sea Region (Internship), Rijkswaterstaat, The Netherlands (2017): Interned within an international collaboration program of several countries along the North Sea in Europe that aim to exchange coastal maintenance knowledge and experiences. Investigated coastal surveying and maintenance practices of each of the member countries. Developed a method for standardization of data analysis to enhance cross-border data-based coastal research.

Flood Safety Durban (Graduate research project), eThekwini Metropolitan Municipality, South Africa (2016): Research project at the municipality's Engineering Unit to assess flooding resilience of the low-lying central business district of Durban. Main responsibility entailed stormwater modeling with SWMM software (PCSWMM).