Zachary Cobell Research Engineer - The Water Institute of the Gulf

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Education

B.S. in Civil Engineering, Environmental Engineering

University of Notre Dame, Notre Dame, Indiana

Professional Experience:

Arcadis U.S., Inc Highlands Ranch, Colorado • Project Coastal Engineer

ADCIRC Model Development Group

June 2010 - February 2019

1110 River Road S., Suite 200

Baton Rouge, LA 70825

February 2012 – present

Chapel Hill, North Carolina

• Model Developer and Maintainer

Applicable Skills:

- Hydrodynamic and mass transport model: ADCIRC, SWAN, Delft3D 4 Suite, Flexible Mesh, STWAVE, Flow3D, Aquaveo SMS
- Authored Open Source Software: MetOceanViewer, ADCIRCModules, FigureGen
- Programming Languages: Fortran, C, C++, Qt, Python, LaTeX, Bash, MPI, OpenMP, Matlab, MySQL, Ruby, Autotools, CMake, Perl, R
- Other Tools: Git, SVN, Vim, Microsoft Office Suite, ArcGIS, GDAL, NetCDF, XMDF, Paraview, Fieldview, Linux, Windows, Mac OSX

Publications

- J.H. Atkinson, H.J. Roberts, S. Zou, P. Bacopoulos, S. Mederos, J. Weishampel, and Z. Cobell. Deriving Frictional Parameters and Performing Historical Validation for an ADCIRC Storm Surge Model of the Florida Gulf Coast. Florida Watershed Journal, 4-2:23, 27, 2011
- J. C. Dietrich, J. J. Westerink, A. B. Kennedy, J. M. Smith, R. E. Jensen, M. Zijlema, L. H. Holthuijsen, C. Dawson, R. A. Luettich, M. D. Powell, V. J. Cardone, A. T. Cox, G. W. Stone, H. Pourtaheri, M. E. Hope, S. Tanaka, L. G. Westerink, H. J. Westerink, and Z. Cobell. Hurricane Gustav (2008) Waves and Storm Surge: Hindcast, Synoptic Analysis, and Validation in Southern Louisiana. Monthly Weather Review, 139(8):2488, 2522, August 2011
- 3. Z. Cobell, H. Zhao, H.J. Roberts, F.R. Clark, and S. Zou. Surge and Wave Modeling for the

Louisiana 2012 Coastal Master Plan. Journal of Coastal Research: Special Issue 67 - Louisiana's 2012 Coastal Master Plan Technical Analysis, pages 88, 108, 2013

- 4. **Z. Cobell**. Advancements in Hurricane Storm Surge Modeling Utilizing the ADCIRC Model. State of the Coast 2014. New Orleans, Louisiana, March 2014
- 5. **Z. Cobell**. Impacts to Surge and Waves due to the 2017 Louisiana Coastal Master Plan. State of the Coast 2018. New Orleans, Louisiana, May 2018
- 6. **Z. Cobell**. Modeling Storm Surge Suppression Impacts in Galveston Bay. American Shore and Beach Preservation Association: National Coastal Conference. Galveston, Texas, November 2018

Selected Project Work

Louisiana 2012 and 2017 Master Plan: Storm Surge and Wave Analysis2011-2017Coastal Protection and Restoration Authority of LouisianaBaton Rouge, Louisiana

- Serve as modeling lead for storm surge and wave simulations
- Develop new statewide ADCIRC+SWAN model mesh maximizing efficiency and accuracy
- Implement proposed coastal protection and restoration features in the landscape
- Conduct over 7,000 total hurricane simulations with varying sea level rise and landscape scenarios

NYC Special Initiative for Rebuilding and Resiliency (SIRR)	2012-2013
New York City Mayor's Office	New York, New York

- Lead hydrodynamic modeling efforts to perform rapid hindcast of Hurricane Sandy
- Develop high resolution model based upon the FEMA work recently completed
- In a compressed schedule, use FEMA synthetic storms to evaluate proposed restoration and protection projects using multiple future sea level rise projections with varying hurricane strengths
- Analyze model results to help refine project characteristics
- Received highest award from New York Chapter of the American Society of Landscape Architects which recognizes work done through a collaboration of landscape architects with allied professionals in a spirit of mutual expansion beyond traditional roles
- Received Innovation Excellence Award from Hyperion Research which recognizes outstanding
- scientific, engineering and business computing achievements enabled by high performance computing

Flood Protection Level of Service Hurricane Simulations	2017-2019
South Florida Water Management District (SFWMD)	West Palm Beach, Florida

- Use ADCIRC, SWAN, and D-Flow to simulate storm surge near gates and pumps managed by SFWMD within narrow canals in South Florida adjacent to Biscayne Bay
- Validate model using Hurricane Andrew and Wilma
- Use synthetic hurricanes with varying degrees of sea level rise understand operational impacts
- Train SFWMD staff to deploy the model as required

Galveston Bay Hydrodynamics and Salinity Modeling	2017-2018
Gulf Coast Community Protection and Recovery District	Houston, Texas

• Developed D-Flow Flexible Mesh model geometry of Galveston Bay, Texas and surrounding areas

- Simulate three years of hydrodynamics and salinity using discharge, evaporation, precipitation, astronomic tides, and atmospheric forcing
- Evaluate impacts to water levels due to the construction of various gate designs at Bolivar Roads
- Provide guidance to structural engineers to optimize position of structural elements to minimize environmental impacts

West Shore of Lake Pontchartrain Hurricane Protection Project2011-2013United States Army Corps of EngineersNew Orleans, Louisiana

- Update ADCIRC+STWAVE model geometries for use in study area
- Implement protection features and efficiently simulate hurricanes using Department of Defense resources
- Project vegetation and sea level rise conditions for 20 and 50 years into the future

Living Breakwaters Hydrodynamics and Sediment Transport Analysis2016-2018New York Governor's Office of Storm RecoveryStaten Island, New York

- Develop a Delft3D model using multibeam LIDAR and validate hydrodynamic and wave quantities to deployed ADCP gages at project site
- Support 30, 60, and 95% phases of design for a proposed group of breakwaters near Staten Island, New York using the Delft3D modeling suite
- Simulate impacts to retention time, sediment transport, wave parameters, and currents

Simulations of Dynamic Levee Breaching During Hurricane Katrina2012-2013United States Department of JusticeNew Orleans, Louisiana

- Develop new modules for the ADCIRC+SWAN model to allow simulation of wave overtopping volumes and dynamic levee breaching for simulation of Hurricane Katrina
- Demonstrate that the new modules accurately reproduced water level elevation and time of food arrival throughout the Central Wetlands and Lower 9th Ward
- Support DOJ expert witness through deposition and trial

Support for Flood Mapping at Newark International Airport2014-2015Port Authority of New York and New Jersey (PANYNJ)Newark, New Jersey

- Lead hydrodynamic modeling efforts to develop a Delft3D model of Newark Airport and surrounding areas
- Validate model performance on PANYNJ property
- Use modeling to support revision of FEMA Flood Insurance Rate Maps (FIRMs)