OVEL DÍAZ GARCÍA, PH.D.

Research Scientist

ORGANIZATION ROLE

Research Scientist

PROJECT ROLE / FOCUS AREAS

Technical delivery
Numerical modeling
Storm surge
Hydrodynamics

EDUCATION

Ph.D., Earth Sciences, National Autonomous University of Mexico, 2020

MS, Applied Mathematics, University of Cienfuegos, 2008

BS, Nuclear Engineer, Higher Institute of Technology and Applied Sciences, 2003

CERTIFICATIONS

ADCIRC
MARS3D
FVCOM
Delft3D and Delft3D Flexible Mesh
FUNWAVE

Ovel Díaz García is a Numerical Modeling Research Scientist at The Water Institute's Coastal and Deltaic Systems Modeling group.

Ovel graduated as a Nuclear Engineer at the Higher Institute of Technology and Applied Sciences, Havana, Cuba, and has applied his programming and numerical models experience to study environmental processes since his early research career. During his research years in Cuba and Mexico, he participated in national and international projects related mainly to numerical models. Ovel created the first three operational forecasting numerical systems of storm surge for Mexican coasts using ADCIRC for Mexican institutions like the National Meteorological Services (SMN), the National Center for Disaster Prevention (CENAPRED), and the Center for Atmospheric Sciences (CCA).

His research includes using numerical models for atmospherics (WRF), hydrodynamics (MARS3D), storm surges (ADCIRC, FVCOM), waves (FUNWAVE, SWAN), and oil spills (GNOME) processes. His skills include applying numerical models, programming in MATLAB, Python, Pascal, FORTRAN, PHP, and using visualization and data processing tools like ArcGIS, QGIS, MapInfo, NCL, and Ferret. He is an expert Linux and HPC user with experience in scripting and automation processes.

PROFESSIONAL EXPERIENCE

2021–Present: Research Scientist, The Water Institute

2020–2021: Numerical Modeling Expert, Coastal Processes and Engineer Laboratory, National Autonomous University of Mexico

2017–2020: Professor, National Autonomous University of Mexico

2021–Present: External Advisor, Interdisciplinary Center of Marine Sciences postgraduate program, La Paz, National Polytechnic Institute, Mexico

2019–2023: External Advisor, Marine Sciences postgraduate program, National Autonomous University of Mexico

2020: Postdoc, Center for Atmospheric Sciences, National Autonomous University of Mexico

2017–2020: Numerical Modeling Expert, Center for Atmospheric Sciences, National Autonomous University of Mexico

2003–2012: Researcher, Center for Environmental Studies of Cienfuegos

SELECTED PROJECTS

Citywide Probabilistic and Compound Flood Model and Real-Time Forecasting System, *City of Jacksonville. (2024)*. Research Scientist. SFINCS model outputs post-processing support, Real-Time Forecasting system simulations execution, and monitoring.

Eden Isles Risk and Consequence Modeling, *Coastal Protection and restoration Authority (CPRA). (2024)*. Research Scientist. Storm surge and wave simulations. Mesh modifications, running and post-processing hundreds of simulations on HPC.

Social Responses to Climate Change Attributed Flooding in South Louisiana, *National Center for Atmospheric Research (NCAR). (2023–Present)*. Research Scientist. Storm surge and wave simulations. Historical impact of Hurricane Ida (2021) and changes in past and future climate conditions.

Coastwide No Investment Risk Reduction Implementation Hindcast, *CPRA. (2024)*. Research Scientist. Storm surge and wave simulations. GIS data manipulation, mesh modifications, running and post-processing hundreds of simulations on HPC, compare results with the Louisiana CMP 2023 project results.

Louisiana Coastal Master Plan 2023, *CPRA. (2021–2023)*. Research Scientist. Storm surge and wave simulations. GIS data manipulation, bash and python scripting, unstructured mesh edition, running and post-processing thousands of simulations on HPC.

Louisiana Watershed Initiative, *CPRA. (2022–2023)*. Research Scientist. Worked on storm surge modeling for hydrological and hydraulic modeling of tropical and non-tropical storms in a state-wide implementation. Run historical events, compare with station data, download and preprocess wind data for HEC models.

SELECTED PUBLICATIONS

1. Rodríguez-Pérez, J., Córdova-López L.F., & Díaz-García, O. (2020). Coastal hydrodynamics during Hurricane Wilma (2005) in Artemisa, Mayabeque and Havana. Hydraulic and Environmental Engineering 41(2), p.3-17

2. Díaz-García, O, Zavala-Hidalgo, J., Douillet, P., Contreras Ruiz-Esparza, A., Fichez, R., Grenz, C., & Denis, L. (2020). Changes in the flooding area due to storm surge under climate change in an extensive wetland area in the southern Gulf of Mexico. Atmosphere 33(2), p. 105-121.

3. Muñoz-Caravaca, A., Douillet, P., Díaz-Garcia, O., Renaud, F., Herrera-Marrero, R.H., & Alcantara-Carrio, J. (2012). Flushing time in the Cienfuegos Bay, Cuba. Natural Resource Modeling 25(3), p. 434-455.

4. Muñoz-Caravaca A., Díaz-García O., Douillet P., Fichez R., Herrera-Marrero R.H., AlcántaraCarrió J., & García-Rodríguez A. (2011). The distribution of residence time in the Bay of Cienfuegos. Oceanological Series (9), p. 15-29

5. Muñoz-Caravaca A., García-Rodríguez, A., Douillet, P., Díaz-García, O., Fichez, R., Herrera-Marrero, R.H., & Alcántara-Carrió, J. (2011). Analysis of the processes of renewal of the waters of the Bay of Cienfuegos, CENIC Biological Sciences, 42(3), p. 125-130

6. Muñoz-Caravaca, A., Herrera-Marrero, R.H., Fichez, R., Douillet, P., Díaz-García, O., & Fernández, J.M. (2010). Influence of hydrodynamic and morphometric characteristics on the distribution of 210Pb in the surface sediments of Cienfuegos Bay, Cuba, Rev. Marine Research, 31(1), 11-21

7. Muñoz-Caravaca, A., Douillet, P., Díaz-García, O., Ouillon, S., & Fichez, R. (2008). Influence of tide, wind and fluvial input in the circulation of the waters in the Cienfuegos Bay, Cuba. Marine Research, 29(2), 101-112

8. Barros, R.C., Garcia, C.R., Dominguez, D.S., Díaz-García, O., & Tame, V.M. (2004). Recent advances in spectral nodal methods for numerically solving neutron-diffusion eigenvalue problems. Transport Theory and Statistical Physics, 33(3 & 4)