Idalia A. Machuca

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Experience

Principle Power **Emeryville, California**

Principle Power is a technology and service provider for the offshore wind energy market. Principle Power's proven technology, the WindFloat®, is a semi-submersible platform compatible with standard wind turbines and suitable for deepwater deployment.

- **Physical Scientist (Metocean)** **Nov 2019 – Present**
  - Performed metocean (meteorological-oceanographic) analyses for 10 multi-MW commercial offshore wind energy projects and 2 federally-funded R&D studies as Principle Power's only in-house metocean specialist and contact for all customers.
  - Defined statistical and analytical metrics and developed software tools to analyze environmental data and develop design criteria for multiple engineering disciplines (aerodynamic and hydrodynamic design of the WindFloat® platform, mooring, and cable systems) throughout the various stages of project execution (feasibility, design, certification, installation).
  - Led the site selection assessment of R&D studies funded by the U.S. DOE and NYSERDA by characterizing wind, wave, and current conditions, bathymetry and soil conditions, and potential hazards in areas of interest.
  - Authored 16 technical reports associated with financial milestones of commercial offshore wind projects and R&D studies in accordance with wind energy industry techniques and standards and internal QA/QC procedures.
  - Managed metocean needs of departments across multiple geographies, domains of expertise, and levels of organization.

University of British Columbia **Vancouver, Canada**

The Mesoscale Ocean and Atmospheric Dynamics Group at the University of British Columbia conducts oceanographic research and coastal risk assessment using hindcast, nowcast, and forecast numerical modelling and field techniques.

- **Graduate Researcher** **Sep 2015 – May 2019**
  - Developed a high-resolution numerical ocean model to investigate complex flow dynamics in the Canadian Arctic Ocean.
  - Quantified the impact of environmental forcing and topography on currents along coastlines and submarine canyons.
  - Performed data processing, analysis, and visualization on multi-dimensional, spatiotemporal data from ocean and atmospheric models and instrumentation, including wind, current, temperature, salinity, and nitrate data.
  - Performed model evaluation using published results of lab experiments, theoretical models, and field measurements.
- **Research Assistant** **Jul 2014 – Apr 2015**
  - Investigated oceanographic processes causing storm surge along the Salish Sea coast using hindcast numerical modelling.
  - Demonstrated the regional effects of tides and river outflow using statistical methods and trajectory computations.
  - Assessed and revised research priorities by conducting workshops with community, government, and industry stakeholders.

Education

M.Sc. in Physical Oceanography **2015 – 2019**
University of British Columbia Vancouver, Canada

B.Sc. in Geophysics, Minor in Oceanography **2010 – 2014**
University of British Columbia Vancouver, Canada

Skills

- Programming: Python (NumPy, SciPy, Pandas, Matplotlib, Seaborn, Bokeh, Jupyter Notebook), MATLAB, command line.
- Tools: NEMO, AGRIF, HPC, Git, QGIS, NREL ReX, Windographer, Open Data on AWS, LaTeX, Microsoft Office Suite.
- Environmental datasets: ERA5, WRF, Vortex, Oceanweather GROW, GHCN, GOFS (HYCOM + NCODA Global Analysis and Reanalysis), WAVEWATCH III, SWAN, MIKE 21, GEBCO, usSEABED, field measurements (lidar, CTD, ADCP).

Publications

- Machuca, Idalia A. "Circulation and Upwelling in Mackenzie Canyon, a Dynamically Wide Submarine Canyon in the Beaufort Sea." MSc Thesis. University of British Columbia. 2019.
- Soontiens, N., Allen, S., Latornell, D., Le Souef, K., Machuca, I., Paquin, J.-P., Lu, Y., Thompson, K., Korabel, V. "Storm Surges in the Strait of Georgia Simulated with a Regional Model." Atmosphere-Ocean 54 1-21. 2016.