

# Nishchitha S Etige

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Data Scientist specializing in spatiotemporal data analysis, statistical modeling, and machine learning. Experienced in developing reproducible datasets and predictive models using simulation, observational, and remote-sensing data to quantify risk and system variability.

## Experience

### **JANUS Research Group | Senior Research Associate I | Nov 2023 – Present**

- Evaluating the impact of assimilating GRACE ocean bottom pressure data into the optimized estimates produced by the project for Estimating the Circulation and Climate of the Ocean (ECCO).
- Quantifying the resolution dependency of ocean bottom pressure using GLORYS reanalysis and VIKING model simulations.
- Developed data pipelines to process and analyze HighResMIP simulations to quantify the resolution dependency and model uncertainty of the U.S. East Coast sea-level.
- Designed and implemented process-oriented diagnostics (PODs) for NOAA's Model Diagnostics Task Force. Automated model skill evaluation and reproducible workflows through GitHub for broader modeling teams.
- Applied low-frequency component analysis (LFCA) to characterize the Pacific Basin's sea level and climate variability patterns.

### **Virtual Research Group | Lead | May 2023 – Present**

- Designed a predictive framework for ocean productivity responses to heat extremes using LSTM and 1D-CNN deep learning models in Python.
- Conducted a comparative review of machine learning methods for marine heatwave prediction, resulting in a peer-reviewed publication.
- Analyzed the influence of the Indian Ocean Dipole on Sri Lankan coastal productivity using spatial data analysis.

### **Boston University | Doctoral Researcher & Teaching Fellow | Aug 2019 – Nov 2023**

- Conducted signal processing of ocean data to isolate scale-dependent ocean variability using low-pass filtering.
- Performed spatiotemporal analysis (EOFs, Granger Causality, Regression) on reanalysis data and CESM simulations to identify and predict links between ocean circulation and North Pacific/North American climate variability and heat extremes.
- Led lectures and discussions in climate and atmospheric science courses; communicated statistics, data visualization, and uncertainty concepts to diverse audiences.

### **National Center for Atmospheric Research (NCAR) | Earth System Science Intern | May 2023 – Aug 2023**

- Utilized NCAR's high-performance computing resources to process and analyze high-resolution climate model simulations (CESM), to project future changes in North Pacific climate variability and marine heatwaves.

### **University of Massachusetts Dartmouth | Graduate Research Assistant | Jan 2018 - Aug 2019**

- Built a 38-year geocoded database of Gulf Stream warm core rings by digitizing historical Gulf Stream charts using QGIS.
- Applied time-series analysis, regime shift analysis, and survival analysis to quantify the interannual variability and the longevity of warm core rings.

### **International Experience | Hydrology/ Water Resources/Marine Conservation | Oct 2015 – Aug 2017**

- Quantified the hydrological impacts on the Tana River Basin (Kenya) under different climate scenarios to support water resource planning.
- Developed policy profiles for reservoir management and irrigation planning in Kazakhstan using the USGS Global Reservoir and Dam Database (GRanD).
- Maintained a geocoded agro-well database for North-Central Sri Lanka to inform irrigation planning decisions.

- Collected geocoded Dugong sighting data to inform a proposed marine protected area in the Indian Ocean as part of a cross-national Dugong and Seagrass Conservation Project.

## Education

<b>PhD in Earth &amp; Environment (GPA 4/4)</b>	May 2024
Boston University	
<b>MS in Marine Science &amp; Technology</b>	Aug 2019
University of Massachusetts Dartmouth	
<b>BS in Aquatic Resources Technology</b>	Oct 2015
Uva Wellassa University of Sri Lanka	

## Technical Skills & Tools

- Programming Languages:** Python (pandas, NumPy, Xarray, matplotlib), R, & MATLAB.
- Statistical & ML methods:** Predictive modeling, regression, feature engineering, anomaly detection, time-series analysis, spatial analysis.
- Datasets:** CMIP6, CESM, ECCO, GLORYS, VIKING, GRACE, ERA5, OISST, ERSST.
- High Performance Computing:** NCAR Derecho, Boston University Shared Computing Cluster
- GIS:** ArcGIS, QGIS.
- Tools:** GitHub, JupyterHub.

## Major Achievements and Services

- U.S. Permanent Residency as an **Individual with Extraordinary Ability (EB-1A)**
- NCAR Earth System Science Internship** – National Center for Atmospheric Research (2023)
- Warren McLeod Summer Fellowship** – Boston University Marine Program (2022)
- Graduate Summer Fellowship** - The Frederick S. Pardee Center, Boston University (2021)
- Reviewer** – JGR Oceans & Atmospheres, NHESS, Heylion, Oceans
- Mentoring** undergraduate students
- Grant Representative** for a grant awarded by Asia Pacific Network for Global Change Research (2015/16)

## Selected Coursework

Supervised Machine Learning: Regression and Classification | Information Structures with Python | Multivariate Analysis for Geographers | Ecosystem Remote Sensing | Spatial Data Analysis Using GIS

## Selected Publications

- Welandawe, S.V. et al., (2025) **Machine Learning Techniques for Marine Heatwave Prediction: A comprehensive Review.** Intell. Mar. Technol. Syst. 3, 28. <https://doi.org/10.1007/s44295-025-00076-1>
- Little, C.M. et al., 2025 **Pan-Pacific low-frequency modes of sea level and climate variability.** Science Advances 11(22). <https://doi.org/10.1126/sciadv.adw3661>
- Silva, E.N.S., Anderson, B.T. **Northeast Pacific marine heatwaves linked to Kuroshio Extension variability.** Commun Earth Environ 4, 367 (2023). <https://doi.org/10.1038/s43247-023-01010-1>
- Silva, E.N.S., A. Gangopadhyay, G. Fay, A., M. Welandawe, G. Gawarkiewicz, A. M. Silver, and J. Clark, 2020: **A survival analysis of the warm core rings of the Gulf Stream** Journal of Geophysical Research: Oceans, 125(10), p.e2020JC016507. <https://doi.org/10.1029/2020JC016507>
- Gangopadhyay, A., Gawarkiewicz, G., Silva, E. N. S., Silver, A. M., Monim, M., & Clark, J. 2020. **A census of the warm-core rings of the Gulf Stream: 1980–2017.** Journal of Geophysical Research: Oceans, 125, e2019JC016033. <https://doi.org/10.1029/2019JC016033>
- Fourteen conference proceedings, including AGU Fall Meeting and Ocean Sciences Meeting**
- Seven invited talks, including one at Woods Hole Oceanographic Institute, MA.**