Manish S. Devana, PhD

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Research & Professional Experience

[1] **Marine Chemistry, Instrumentation, and Engineering Lab** **2023-Present**
Postdoctoral Investigator, Woods Hole Oceanographic Institution

- Developed a longterm aquatic eddy covariance system capable of measuring high frequency benthic carbon, oxygen fluxes, and temperature fluxes.
- Engineered embedded systems to control multiple oceanographic sensors in syncronisation for real time high frequency measurements in marine settings using arduino and rasberry pi based controllers (C++ and Python)
- Optimized embedded system control algorithms to maintain realtime communications while improving data recording algorithms to reduce data loss to <0.5% in high frequency eddy covariance measurements.
- Created and maintained backend web infrastructure for real time data monitoring and storage of coastal oceanographic measurements using django web frameworks and multiple database types (Sqlite, MySql, and PostgreSQL)
- Created backend data infrastructure allowing for “plug and play” approach to enable easy integration and interchanging of deployed sensors on centralized embedded platform.
- Led field deployments and testing of instrumentation and troubleshooting of sensors and internal circuits.

[2] **Innovation Advisors, Sustainability Consulting** **2023-Present**
Contractor (part-time), Research Triangle Institute

- Conducted market research and techno-economic analysis on alternative maritime fuels for shipping decarbonization.
- Assessed technology readiness of various maritime fuel alternatives using Dept. of Energy and NASA technology readiness frameworks.
- Investigated adsorbent technology for use in novel direct air capture methods and assess commercial viability of different adsorbents.

[3] **Overturning in the Subpolar North Atlantic Program** **2018-2023**
Graduate Research Assistant, University of Miami

- Investigated mid-depth and deep ocean flows across a range of physical and temporal scales in an effort to understand various components of the flow variability and impacts on larger Atlantic Meridional Overturning Circulation
- Geospatial data analysis with numerous types of datasets including: high resolution time series, unstructured spatial shipboard and ARGO observations, remote sensing observations (ocean altimetry and sea surface temperature), high resolution numerical model “big data”, ocean and atmosphere reanalysis products.
- Implemented numerical simulations to supplement observational campaigns (fluid dynamics simulations and statistical models)
- Assisted in constructing, deploying, and recovering mooring arrays with various instruments during multiple sea campaigns. Tasks involved manual construction of instrument components, calibrating instruments, data quality control and calibration post recovery
- Collaborative work involving partners at institutions in numerous countries

Technical Skills

[1] Python (Strong)

- Experience using geospatial datasets with core earth science python packages (xarray,cartopy, dash, GMT, netcdf, numpy, scipy).
- Developed python programs for oceanographic field work (CTD and mooring data processing, mooring trilateration, instrument calibrations).
- Extensive experience with data visualization techniques including: matplotlib static and animated figures,

interactive visualizations, geospatial visualizations, real-time data visuals, and “big-data” visualization techniques.
    - Familiar with developing machine learning models for research and data analysis using Tensorflow, pyTorch, and Keras.
    - Develop backend infrastructure for real time oceanographic data monitoring using django web frameworks and front end web pages for data visualization.
    - Familiar with high performance computing operations including modifying code for GPU operations and parallelization of algorithms.

[2] C++ (Strong)
    - Developed software for embedded systems control on microcontrollers used for recording and controlling high resolution oceanographic data in real time.
    - Improve real time data processing of high frequency data to reduce memory and power consumption on oceanographic sensor platform
    - Create portable libraries for sensors to allow easy interchanging of sensors on centralized oceanographic system.

[3] Embedded Systems Engineering
    - Aided in the development of embedded systems based on microcontrollers that allow for combining numerous oceanographic sensors on single platform.
    - Built and tested circuits using multiple communication protocols in combination (I2C, UART, CAN, RS232, and SPI) that are currently deployed in coastal marine settings.

[4] Javascript (Proficient)

[5] Proficient in Linux operating systems (experience with CentOs, Debian, and Ubuntu)

[6] HTML & CSS (Proficient) - Experience responsive designing web pages and markdown documentation

[7] Microsoft Word, Excel, Publisher (Strong)

[8] Adobe Creative Cloud tools (Photoshop, Illustrator, Premiere) (Proficient)

Fieldwork Experience

[1] RAPID-MOCHA Mooring Recovery and Hydrographic Survey Cruise *2018 November*
    - Assisted with mooring deployments and recovery during 22 day cruise on the R/V Atlantic Explorer

[2] OSNAP Mooring Recovery and Hydrographic Survey Cruise *2019 September*
    - Assisted with mooring build, deployments, and recovery, CTD operations, salinity/temperature/velocity instrument calibrations, and realtime data analysis during 34 day cruise on the R/V Armstrong

[3] RAPID-MOCHA Mooring Recovery and Hydrographic Survey Cruise *2021 September*
    - Assisted with mooring build, deployments, and recovery, CTD operations, salinity/temperature/velocity instrument calibrations, and realtime data analysis during 24 day cruise on the R/V Endeavor

[4] OSNAP Mooring Recovery and Hydrographic Survey Cruise *2022 August (planned)*

Publications

[1] M. Devana, W.E. Johns (2021): Rapid Freshening of Iceland Scotland Overflow Water Driven by Entrainment of a Major Upper Ocean Salinity Anomaly, *Geophysical Research Letters*

[2] W.E.Johns, M.Devana, A.Houk, S.Zou (2021): Moored Observations of the Iceland-Scotland Overflow Plume Along the Eastern Flank of the Reykjanes Ridge, *Journal of Geophysical Research: Oceans*

Seminars and Conference Presentations

[1] Geophysical Fluid Dynamics Summer School Student Seminar **2019**

[2] American Geophysical Union Fall Meeting 2019: **Rapid Freshening of the Iceland Scotland Overflow Driven by Entrainment** **2019**

[3] Ocean Sciences Fall Meeting 2020: **Rapid Freshening of the Iceland Scotland Overflow Driven By Entrainment 2019**

[4] Ocean Sciences Fall Meeting 2022: **Variability of the Iceland Scotland Overflow** **2022**

[5] U.S. Atlantic Meridional Overturning Circulation Science Team Meeting: **Rapid Freshening of the Iceland Scotland Overflow Driven By Entrainment** **2022**

[6] American Meteorological Society Atmospheric and Oceanic Fluid Dynamics 2022: **Boundary Layer Dynamics in Bottom Intensified Flow along the Reykjanes Ridge** **2022**

Education

[1] Rosenstiel School of Marine and Atmospheric Science, University of Miami: *Meteorology and Physical Oceanography - PhD* **2018-2023**

[2] 2015-2018 University of Southamption, UK, *Physical Oceanography* ***First Class Honours*** *- MSCi (integrated BSC & MSC)* **2015-2018**

[3] New York University: *Biochemistry* **2013-2015**

Professional Development

[1] Graduate Undergraduate Mentoring (GUM) *Co-Founder and Mentor* **2019-Present**

- Co-founded mentoring program for earth science graduate students to mentor undergraduate students with the aim of enhancing the experience and retention of under-represented groups of students in earth science research

[1] COMPASS Student Seminar Series Speaker **2019, 2020, 2021**

[2] University of Miami Teaching Assistant: *Intro to Marine Science Lab* **Fall 2019**

[3] University of Miami Teaching Assistant: *Python Programming for Marine Science* **Fall 2021**

Awards and Honors

[1] Top of Class University of Southampton Oceanography **2018**

[2] 2019 Outstanding Student Presentation Award - AGU Fall Meeting **2019**

[3] COMPASS Student Seminar Series Best Graphics **2019-20**

[4] COMPASS Student Seminar Series 3rd Place Overall **2021-22**

Teaching Experience

[1] University of Miami Teaching Assistant **Introduction to Marine Science Laboratory** **Fall 2019**

[2] University of Miami Teaching Assistant **Python Programming for Marine Science** **Fall 2021**

[3] University of Southampton Student Teaching Assistant **Marine Geochemistry** **Fall 2017**

Other Work Experience

[1] Wetlab Bar (*Bartender*) **2019-2023**

[2] University of Southampton Student Union (*Event Staff and Bartender*) **2016-2018**

[3] Cal Adventures Summer Camp *Windsurfing/Sailing Instructor and Boating Programs Manager* **2014-2017**