



RATNAKSHA LELE

PhD Candidate

ratnaksha.github.io | rlele@ucsd.edu

Doctoral student using machine learning on remote sensing and observational data to study the ocean's role in regulating global climate. Strong background in time series analysis, signal processing, hypothesis testing and statistical modeling. Seeking opportunities to apply data-driven frameworks on real-world engineering, business and logistics challenges.

EDUCATION

UC SAN DIEGO

PhD in Oceanography
Expected 2023

UC SAN DIEGO

Master of Science
Physical Oceanography
Dec 2018

VIT UNIVERSITY

Bachelor of Technology
Mechanical Engineering
June 2016

SKILLS

Programming 5+ yrs:

Python • MATLAB • C

ML frameworks:

Sklearn • PyTorch

Familiar:

R • SQL • ArcGIS

COURSEWORK

Recommender Sys. and Web Mining
Statistical Learning
ML for Physical Applications
Data Analysis Methods I, II & III
Applied Mathematics I, II & III
Probability and Statistics
Applied Numerical Methods
Operations Research

LINKS



www.github.com/ratnaksha



www.linkedin.com/in/ratnakshalele

WORK EXPERIENCE

JUPITER INTELLIGENCE INC. | ML & DATA SCIENCE INTERN

JUN 2022 – SEPT 2022

- Built and tested a pilot ML model to predict extreme coastal flooding in future climate scenarios for various metro areas along the United States coastline.
- Incorporated a deep transfer-learning neural network to prioritize cost and efficiency to train the model over ~10M grid points in the domain. Expected to save company up to 80% of current flood modeling costs.

SCRIPPS INSTITUTION OF OCEANOGRAPHY | PhD CANDIDATE

AUG 2016 – PRESENT

- Quantified uncertainty in the role of turbulence in deep ocean circulation to within a factor of 3 by applying advanced signal processing and statistical algorithms on novel deep-ocean turbulence measurements (χ_{pod}) in MATLAB and Python. Contributed to NSF-funded program to make above data public to improve future climate model predictions and reliability.
- Implementing Embedded Clustering on oceanographic observational data using Non-Negative Matrix Factorization and Gaussian Mixture Models to identify unique dynamical regimes of turbulence-driven mixing in the global ocean.
- Improving inference and predictability of ocean dynamics at high resolution by training deep neural network models on remotely sensed data from NASA's GRACE mission– to advance the understanding of global spatiotemporal variability in deep ocean currents and response to climate change.

WOODS HOLE OCEANOGRAPHIC INSTITUTION | RESEARCH FELLOW

JUNE 2015 – APRIL 2016

- Implemented time-series and spectral methods on in-situ Ice Tethered Profiler (ITP) sea-ice data, field and satellite observations to understand the dynamics and seasonal variation in sea-ice momentum and energy transfer.
- Discovered disparities in outdated ocean model parameterizations of sea-ice compared to new field observation. Recommended updating parameterization to reflect changing sea-ice conditions in the Arctic; now published in *Elementa: Science of the Anthropocene*. [[pdf](#)]

AWARDS

2020 NASA Future Investigator in Earth and Space Science Fellowship Grant
2020 NASA JPL Center for Climate Science Summer School
2017 Departmental Travel Award for Research Excellence
2016 UC San Diego Regents Fellowship
2016 VIT University Special Achiever Award
2015 Woods Hole Oceanographic Institution Summer Student Fellowship
2014 Indian Academy of Sciences Summer Research Fellowship

PUBLICATIONS

- [1] R Lele, S G Purkey and J A MacKinnon, Global Regimes of Turbulent Mixing using Unsupervised Embedded Clustering of Hydrographic Data, Geophysical Research Letters, in prep.
- [2] J D Nash, **R Lele**, J A MacKinnon, S G Purkey, et al. Estimating χ using fast-response thermistors on traditional shipboard CTDs: sources of uncertainty and bias. Journal of Atmospheric and Oceanic Technology, in review.
- [3] **R Lele**, S G Purkey, J D Nash, J A MacKinnon, A M Thurnherr, C B Whalen, et al. Abyssal Heat Budget in the Southwest Pacific Basin. Journal of Physical Oceanography, 2021. [[pdf](#)]
- [4] Sylvia T Cole, John M Toole, **Ratnaksha Lele**, Mary-Louise Timmermans, Shawn G Gallaher, Timothy P Stanton, William J Shaw, Byongjun Hwang, Ted Maksym, Jeremy P Wilkinson, et al. Ice and ocean velocity in the arctic marginal ice zone: Ice roughness and momentum transfer. Elementa Science of the Anthropocene, 5, 2017. [[pdf](#)].
- [5] **R Lele**. An investigation into arctic sea-ice dynamics and energetics. Report submitted in partial fulfillment of the WHOI Summer Student Fellowship, 2015.

INVITED TALKS & PRESENTATIONS

- R Lele, SG Purkey, JA MacKinnon, Unsupervised Learning of Ocean Turbulence, Caltech, Feb 2022, **Talk**.
- R Lele et al, Abyssal Mixing in the South West Pacific Basin. Ocean Sciences Meeting, San Diego CA, Feb 2020, **Talk**.
- R Lele et al, Recipes of Turbulent Mixing from the South Pacific. Gordon Research Conference on Ocean Mixing, Andover NH, June 2018, **Poster**.
- R Lele et al, Decadal Changes in the Properties and Transport of AABW at 32S in the Southwest Pacific Basin. Ocean Sciences Meeting, Portland OR, Feb 2018, **Talk**.
- R Lele and SG Purkey Antarctic Bottom Water Warming in the South West Pacific Basin. Graduate Climate Conference, Woods Hole MA, Nov 2017, **Poster**.
- R Lele et al, An Investigation into Arctic Sea-Ice Dynamics and Energetics. Ocean Sciences Meeting, New Orleans LA, Feb 2016, **Talk**.

TEACHING EXPERIENCE

Introduction to Physical Oceanography SIO-210	Teaching Assistant	Fall 2020
Introduction to Programming in C ITE-101	Teaching Assistant	Fall 2012

OCEANIC FIELDWORK EXPERIENCE

HLY-1803 Experiment in the Beaufort and Chukchi Seas	US Coast Guard Cutter Healy	Oct-Nov 2018
GO-SHIP P06 Leg-1 in the South Pacific	RVIB Nathaniel B. Palmer	Jul-Aug 2017
La Jolla Internal Tide Experiment	RV Sally Ride	Dec 2016