



# RATNAKSHA LELE

PhD Candidate

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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](https://www.github.com/ratnaksha)



[www.linkedin.com/in/ratnakshalele](https://www.linkedin.com/in/ratnakshalele)

## WORK EXPERIENCE

### CORTEVA INC. | MACHINE LEARNING SCIENTIST INTERN

MAR 2023 – PRESENT

- Designing data pipelines and incorporating novel remote sensing and climate data using Bayesian Neural Nets to improve crop yield predictability and forecasts in various agricultural markets in the US.

### JUPITER INTELLIGENCE INC. | ML & DATA SCIENCE INTERN

JUN 2022 – SEPT 2022

- Built, engineered and tested a pilot machine learning model to predict coastal flooding in future climate scenarios along the US 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.

### UC SAN DIEGO – SCRIPPS INSTITUTION OF OCEANOGRAPHY | PhD CANDIDATE

AUG 2016 – PRESENT

- Published research using time series analysis, statistical techniques, bootstrapping methods and advanced signal processing to quantify role of turbulence in the deep ocean from internal waves in global ocean circulation.
- 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. [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  $\chi$  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	R/V Sally Ride	Dec 2016