






DEEPAK A. CHERIAN







Education 2016: Ph.D., MIT-WHOI Joint Program in Oceanography, Physical Oceanography
2010: M.Tech. & B.Tech. (Hons.), Ocean Engineering & Naval Architecture,
Indian Institute of Technology, Kharagpur.

Positions 2023 Sep – Present: Forward Engineer, [Earthmover PBC](#)
2023 Mar – 2024 Sep: Project Scientist, NSF National Center for Atmospheric Research
2019 Mar – 2020 Jan: Postdoctoral Fellow, NSF National Center for Atmospheric Research
2017 Jan – 2019 Mar: Research Associate (Post-Doc), Oregon State University

Open-Science Contributions

Mentoring 2024 : Mentor and Supervisor, Earthmover Developer Relations Internship.
2021, 2022 , 2023: Project Mentor, NSF NCAR CISL [Summer Internships in Parallel Computer Science](#) (SIParCS).

Service 2022–present: Member, NASA Physical Oceanography Distributed Active Archive Center (PO.DAAC) [User Working Group](#)  with particular focus on assisting in PO.DAAC’s transition to the cloud.
2020–2023: Co-lead, NSF NCAR [Earth System Data Science Initiative](#) , founded to accelerate NCAR’s transition to Python and modern open-source scientific practices.
2022: Open-Science Subject Matter Expert, NASA [Earth System Observatory \(ESO\) Independent Review Board](#) . Reviewed data systems and open-science facilitation plans for future NASA science mission.

Teaching, Publications 2025: Tutorial on “Zarr, Icechunk, & Xarray for Cloud-native Geospatial Data-cube Analysis”. Cloud-Native Geospatial Conference.
2023:  Unidata Users Workshop: Invited tutorial on using [Climate and Forecast \(CF\)](#)  convention metadata for expressive analytics.
2020 , 2023  SciPy Conference: Tutorial on python package [xarray](#)
2020, 2022 [OceanHackWeek](#) : Invited tutorial on python package [xarray](#).
[Cherian, D. A.](#), Almansi, M., Bourgault, P. (2021). “cf-xarray: Scale your analysis across datasets with less data wrangling and more metadata handling” Proceedings of the 2021 EarthCube Annual Meeting. [Reproducible Jupyter Notebook](#) .

Led significant overhaul of the Xarray tutorial material with the aim of enabling community members to deliver the material.

Published articles describing scalable data analytics techniques on NCAR's [Earth System Data Science blog](#).


Assistance with parallel scaling of analysis workflows on various public forums; e.g. Xarray Github Discussions, Pangeo Discourse forum, various NCAR internal channels.


Software **2017–present:** Maintainer and community leader for open source scientific Python packages in the Pangeo ecosystem spanning storage, compute, and analysis layers: [xarray](#), [icechunk](#), [flox](#), [zarr](#), [cf_xarray](#), [xgcm](#).

Funding **Co-I** 2024-2026 Chan Zuckerberg Initiative Essential Open Source Software Cycle 6. “Supporting the adoption of Xarray in the biomedical research community.”


Co-PI 2022-2025 NASA Open Source Tools, Frameworks, and Libraries. “Enhancing analysis of NASA remote sensing datasets with Xarray”

Co-I 2020-2021 Chan Zuckerberg Initiative Essential Open Source Software Cycle 2. “Xarray: Multidimensional Labeled Arrays and Datasets in Python”

Talks **2025**  “Zarr for Cloud-native Geospatial. When and Why?”. Cloud-Native Geospatial Conference.


2025  “Earthmover: Accelerating frictionless accessibility for the Earth Sciences” NSF NCAR CISL Seminar.

2024 **[invited]**: “zarr: cloud-native n-dimensional array storage” NSF [Ocean Observatories Initiative Facility Board](#) (OOIFB) and Data Systems Committee (DSC) Meeting.

2024 **[invited]**  “What can a data commons learn from the open science software commons?” [Innovations in Open Science \(IOS\) Planning Workshop: Community Expectations for a Geoscience Data Commons](#). NSF NCAR.

2023 “cf-xarray: Scale your analysis across datasets with less data wrangling and more metadata handling”. AGU Fall Meeting 2023.

2023 “Fast & Furious GroupBy Calculations at Scale with Flox, Dask, and Xarray”. AMS Annual Meeting 2023.

2022 **[invited]**  “Open-Sesame: open your science with Pangeo” Ocean Sciences Meeting.

Academic Contributions


Articles

Cherian, D. A. (2025). “Property testing for Ocean Models: Can we specify it?”  Invited submission to Electronic Proceedings in Theoretical Computer Science.

Cherian, D. A., Guo, Y., Bryan, F. O. (2024). “Assessing Modeled Mesoscale Stirring Using Microscale Observations.” *Journal of Physical Oceanography*, 54(5): 1183–1194.





Morris, D., **Cherian, D.A.**, Castruccio, F., Kleypas, J., Krumhardt, K., Moulton, M., Williamson, R. D., Zohdy, S., Dunning, K., Davidson, C. (2024).


“How changes projected by climate models can inform climate adaptation and marine sanctuary management: A collaborative prototype methodology.” *Journal of Environmental Management*, 368, 121953. 


Moum, J. N., Smyth, W. D., Hughes, K. G., **Cherian, D. A.**, Warner, S. J., Bourlès, B., Brandt, P., Dengler, M. (2023). “Wind Dependencies of Deep Cycle Turbulence in the Equatorial Cold Tongues.” *Journal of Physical Oceanography*, 53(8): 1979–1995.





Moum, J. N., Hughes, K. G., Shroyer, E. L., Smyth, W. D., **Cherian, D.A.**, Warner, S. J., Bourlès, B., Brandt, P., Dengler, M. (2022). “Deep Cycle Turbulence in Atlantic and Pacific Cold Tongues.” *Geophysical Research Letters*, 49(8). 

Whitt, D. B., **Cherian, D. A.**, Holmes, R. M., Bachman, S. D., Lien, R.-C., Large, W. G., Moum, J. N. (2022). “Simulation and Scaling of the Turbulent Vertical Heat Transport and Deep-Cycle Turbulence across the Equatorial Pacific Cold Tongue.” *Journal of Physical Oceanography*, 52(5), 981–1014. 

Philipps, H.E., et. al. (2021) “Progress in understanding of Indian Ocean circulation, variability, air-sea exchange and impacts on biogeochemistry”. *Ocean Science Discussions* (17) : 1677–1751. 


Shroyer, E.L., et. al. (2021) “Bay of Bengal Intraseasonal Oscillations and the 2018 Monsoon Onset”. *Bull. Amer. Meteor. Soc.* 102 (10): E1936-E1951. 


Cherian, D.A., Whitt D.B., Holmes, R.M., Lien, R.-C., Bachman, S.D., Large, W.L. (2021). “Off-equatorial deep cycle turbulence forced by Tropical Instability Waves in the equatorial Pacific”. *Journal of Physical Oceanography*. 51 (5): 1575–1593.  


Rypina, I.I., Pratt, L.J., Entner, S., Anderson, A., **Cherian, D.A.** (2020).

“The Influence of an Eddy in the Success Rates and Distributions of Passively


Advected or Actively Swimming Biological Organisms Crossing the Continental Slope”. Journal of Physical Oceanography 50 (7): 1839–1852. [doi](#)

Cherian, D.A., Shroyer, E.L., Wijesekera, H.W. and Moum, J.N. (2020).
“The seasonal cycle of upper-ocean mixing at 8°N in the Bay of Bengal”.
Journal of Physical Oceanography 50: 323–342 [doi](#) 

Cherian, D.A. and Brink, K.H. (2018). “Shelf flows forced by deep-ocean anticyclonic eddies at the shelfbreak”. Journal of Physical Oceanography. 48 (5): 1117–1138 [doi](#) 

Cherian, D.A. and Brink, K.H. (2016) “Offshore Transport of Shelf Water by Deep-Ocean Eddies.”, Journal of Physical Oceanography 46 (12): 3599–3621 [doi](#) 

Brink, K.H. and **Cherian, D.A.** (2013) “Instability of an idealized tidal mixing front: Symmetric instabilities and frictional effects.”
Journal of Marine Research 71 (6): 425–450. [doi](#)

Haine, T.W.N. and **Cherian, D.A.** (2013) “Analogies of Ocean/Atmosphere Rotating Fluid Dynamics with Gyroscopes: Teaching Opportunities.”
Bull. Amer. Meteor. Soc. 94: 673–684. [doi](#) 

Funding

Co-PI 2023-2028 NSF Cyberinfrastructure for Sustained Scientific Innovation.
“Frameworks: A community platform for accelerating observationally-constrained regional oceanographic modeling”

Co-I 2023-2028 ONR Arabian Sea Transition Layer Departmental Research Initiative.
“High resolution coupled modeling and data assimilation for improved understanding of transition layer processes in the Arabian Sea Warm Pool”


Co-I 2022-2025 NOAA Climate Variability and Predictability.
“Developing a framework for a field campaign in the cold tongue: Analysis of Pacific Upwelling and Mixing Physics from models and observations.”

lead-PI, 2019-2022 NASA Physical Oceanography.
“Relating SSHA-derived Eddy Diffusivity to In-situ Estimates from Microstructure and ECCO.”

Invited Talks “Property testing for ocean models: Can we specify it?”

2025: VSS 2025: International Workshop on Verification of Scientific Software.

“Seasonal cycle of mixing in the Bay of Bengal”

2022:  (talk) Prediction and Variability of Air-Sea Interactions: the South Asian Monsoon, ICERM Workshop.

Talks &
Posters


“Off-equatorial deep-cycle turbulence forced by Tropical Instability Waves in the equatorial Pacific”

2020: Department of Marine & Coastal Sciences Seminar Series, Rutgers University.
Physical Oceanography Seminar, University of Washington

“When a deep-ocean eddy meets shelf-slope topography.”

2019 : Gordon Research Conference, Coastal Ocean Dynamics.

“Property Testing for ocean models”

2024:  NSF NCAR CGD Oceanography Section Day of Celebration.


“Looking for mesoscale stirring in microstructure.” — presented at

2022: Gordon Research Conference, Ocean Mixing, 2022
(talk) Eddy Mixing Climate Processes Team Meeting
Ocean Sciences Meeting, 2022

“flox: fast and furious GroupBy reductions with Dask at Pangeo scale.” — presented at

2021:  Pangeo Showcase
Dask Distributed Summit

“Off-equatorial deep cycle turbulence forced by Tropical Instability Waves in the equatorial Pacific” — presented at

2021:  Climate & Global Dynamics Laboratory Seminar, NCAR.
2020: (talk) AGU General Meeting, 2020
University of British Columbia, Physical Oceanography Seminar
(talk) Ocean Sciences Meeting, 2020 - San Diego

“The seasonal cycle of upper-ocean mixing in the Bay of Bengal” — presented at

2019: Massachusetts Institute of Technology, Sack Lunch Seminar
Woods Hole Oceanographic Institution, Physical Oceanography Seminar
National Center for Atmospheric Research, CGD seminar
Oregon State University, CEOAS seminar
2018: (poster) Gordon Research Conference, Ocean Mixing
(talk) Ocean Sciences Meeting, 2018 – Portland

“Shelf flows forced by mesoscale eddies at the shelfbreak” — presented at

2017 : (poster) Gordon Research Conference – Coastal Ocean Dynamics

“Offshore export of shelf water by deep-ocean eddies” — presented at

2017: National Taiwan University

Oregon State University, CEOAS seminar

2016: Indian Institute of Science, College of Ocean and Atmospheric Sciences
(talk) Ocean Sciences Meeting, 2016 – New Orleans

“Arresting an eddy’s cross-isobath translation” — presented at

2016: Oregon State University, CEOAS seminar


Massachusetts Institute of Technology, Sack Lunch Seminar

2015: (talk, poster) Gordon Research Conference – Coastal Ocean Modeling

Teaching,
Mentoring,
Outreach

2022: Mentor, [Promoting Geoscience, Research, Education and Success](#) Program (PROGRESS).

2022: Mentor, AGU [Geosciences Education & Mentorship Support](#) Program (GEMS).

2020:  Coiled Science Thursday Livestream Series: Demo on
“Scalable computing in oceanography.”.

2019 Project Mentor, Monsoon Air-Sea Interactions Winter School.

International Center for Theoretical Studies, Bangalore, India

2017 Winter Term: Guest Lecture for “Geophysical Waves” ,
(graduate level course), Oregon State University

Other
Service

2021, 2022, 2024: External reviewer for the NSF Physical Oceanography panel.

Reviewer for Ocean Science, Geophysical Research Letters, Journal of Geophysical Research - Oceans, Journal of Marine Research, and Journal of Physical Oceanography.