Climate & Global Dynamics Laboratory
Mesa Lab 400, National Center for Atmospheric Research
1850 Table Mesa Drive, Boulder, CO, USA 80305.
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+1 303-497-1713
deepak@cherian.net
www.cherian.net
http://orcid.org/0000-0002-6861-8734

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

2020 Jan – present: Project Scientist I, National Center for Atmospheric Research

2019 Mar – 2020 Jan: Postdoctoral Fellow, National Center for Atmospheric Research

2017 Jan – 2019 Mar: Research Associate (Post-Doc), Oregon State University

2016 Sep – 2017 Jan: Postdoctoral Investigator, Woods Hole Oceanographic Institution

2010–2016: Graduate research assistant, Massachusetts Institute of Technology & Woods Hole Oceanographic Institution

Articles

Moum, J.N., et. al. (2022) "Deep Cycle Turbulence in Atlantic and Pacific Cold Tongues.". Geophysical Research Letters (49).

Whitt, D.B., Cherian, D.A. et. al. (2022) "Simulation and scaling of the turbulent vertical heat transport and deep-cycle turbulence across the equatorial Pacific cold tongue.". Journal of Physical Oceanography.

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.

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

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

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

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.

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.

Funding

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.
"Xarray: Multidimensional Labeled Arrays and Datasets in Python"

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

Invited Talks

"*Open-Sesame: open your science with Pangeo*"
2022: (talk) Ocean Sciences Meeting.

"*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.

Talks & Posters

"*Observed and simulated pathways of temperature variance in the NATRE region.*"
— presented at
2022: Eddy Mixing CPT Meeting
Ocean Sciences Meeting

"*flox: fast and furious GroupBy reductions with Dask at Pangeo scale.*" — presented at
2022: SciPy Conference
2021: Pangeo Showcase

"*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 Insitute of Technology, Sack Lunch Seminar

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

Software

Extensive experience with parallel analysis of large datasets using scientific Python packages on HPC and cloud computing systems e.g. `Dask`, `NumPy`, `Pandas`, `xarray`; extensive experience with MATLAB

Service

Co-lead, NCAR Earth System Data Science Intiative, 2020–present

External reviewer for the NSF Physical Oceangraphy panel; 2021, 2022.

Core developer for open source Python packages in the Pangeo ecosystem: `xarray`, `xgcm`, `cf_xarray`

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

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

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

Teaching, Mentoring, Outreach

2021, 2022: Project Mentor, NCAR CISL Summer Internships in Parallel Computer Science (SIParCS).

2022: Mentor, NSF Promoting Geoscience Research, Education, and Success (PROGRESS) program

2022: Mentor, AGU Geosciences Education & Mentorship Support (GEMS) program

2020: Coiled Science Thursday Livestream Series: Demo on "Scalable computing in oceanography." (Youtube).

2020 SciPy Conference: Tutorial on python package `xarray`

2020 Ocean Hack Week: Invited tutorial on python package `xarray` for analysis of geoscience datasets.

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

Additional Training

2020 Diversity leadership training summit organised by UCAR Human Resources and the Office for Diversity, Equity and Inclusion.

2014 Coastal and Estuarine Field Methods Summer School, Woods Hole Oceanographic Institution

2013 Teaching Certificate Program, Massachusetts Institute of Technology

2012 Estuarine and Coastal Fluid Dynamics Summer School, University of Washington Friday Harbor Laboratories

Fieldwork

2018 Sep: *R/V Thomas G. Thompson*, Western Pacific. PI: Jim Moum (OSU)

2017 Feb: *R/V Roger Revelle*, South China Sea. PI: Lou St-Laurent (WHOI)

2014 July: *R/V Tioga*, off Martha's Vineyard. (student-run cruise for summer school) PI: Deepak Cherian, Jonathan Fincke, Cara Manning (WHOI).

2013 Nov: *R/V Roger Revelle*, Bay of Bengal. PI: Emily Shroyer (OSU)

2011 July: *SSV Corwith Cramer*, Middle Atlantic Bight. PI: Donglai Gong (WHOI)