Aditya Narayanan

Postdoctoral Research Fellow,
School of Ocean and Earth Sciences,
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Areas of specialization

• Southern Ocean dynamics • Shelf sea processes • Open ocean polynyas • Subpolar gyres • Circumpolar Deep Water mixing pathways • Dense Shelf Water formation • Sea ice formation processes • Observational hydrography of subpolar oceans

Education

2013-2020 **Ph.D.**, Physical Oceanography, Indian Institute of Technology Madras, India.
2013-2020 **MS.**, Ocean Engineering, Indian Institute of Technology Madras, India.
2006-2010 **BTech** in Civil Engineering, National Institute of Technology, Jalandhar, India.

Appointments Held

2023-2026 Postdoctoral Researcher, School of Ocean and Earth Science, University of Southampton, UK
2023-2026 Visiting Research Fellow, Center for Marine Bio-Innovation, University of New South Wales, Sydney
2021-2023 Postdoctoral Researcher, Department of Marine Sciences, Gothenburg University, Sweden.
2019-2020 Senior Project Scientist, IC&SR, Indian Institute of Technology, Madras, India.
2013-2019 Half time teaching assistant, Indian Institute of Technology, Madras, India.
2010-2013 Project Engineer and Project Manager, Flowline Systems Pvt Ltd., Mumbai, India.

Publications

Journals

2024 Narayanan, A., Roquet, F., Gille, S. T., Gülk, B., Mazloff, M. R., Silvano, A., & Naveira Garabato, A. C. (2024). Ekman-driven salt transport as a key mechanism for open-ocean polynya formation at Maud Rise. Science Advances, 10(18), eadj0777. https://doi.org/10.1126/sciadv.adj0777

2023 Birte Gülk, Fabien Roquet, Alberto C. Naveira Garabato, Aditya Narayanan, Clément Rousset, and Gurvan Madec, (2023). "Variability and Remote Controls of the Warm-Water Halo and Taylor Cap at Maud Rise." Journal of Geophysical Research: Oceans; https://doi.org/10.1029/2022JC019517.

2023 Aditya Narayanan, Sarah Gille, Matthew Mazloff, Fabien Roquet, Marcel D. du Plessis, K. Murali, (2023). "Zonal Distribution of Circumpolar Deep Water Transformation Rates and its Relation to Heat Content on Antarctic Shelves", *Journal of Geophysical Research: Oceans*, doi:https://doi.org/10.1029/2022JC019310

2023 Sallée, J. B., Abrahamsen, E. P., Allaigre, C., Auger, M., Ayres, H., Badhe, R., ... Narayanan, A. ... et al. (2023). "Southern ocean carbon and heat impact on climate." Philosophical transactions of the royal society A 381.2249 (2023): 20220056.

2020 Queste, B. Y., E. P. Abrahamsen, M. D. du Plessis, S. T. Gille, L. Gregor, M. R. Mazloff, A. Narayanan, F. Roquet, and S. Swart, (2020), "Southern Ocean" [in "State of the Climate in 2019"], *Bull. Amer. Meteor. Soc.*, 101, S307-S309, doi: https://doi.org/10.1175/BAMS-D-20-0090.1

2019 Aditya Narayanan, Sarah Gille, Matthew Mazloff, Murali K, (2019). "Water mass characteristics of the Antarctic margins and the production and seasonality of Dense Shelf Water", *Journal of Geophysical Research: Oceans*, doi: https://doi.org/10.1029/2018JC014907

Under review (drafts available on request)

2024 Aditya Narayanan, Fabien Roquet, Oana Dragomir, Sarah T. Gille, Birte Gülk, Margaret Lindeman, Matthew R. Mazloff, Alessandro Silvano, Alberto C. Naveira Garabato. "Eastern Weddell Gyre Variability Impacts Maud Rise Stratification"

PhD Thesis

2020 Narayanan, A. (2020). Characteristics of antarctic marginal seas that influence shelfwater formation and circumpolar deep water intrusion. Indian Institute of Technology Madras. PhD Thesis. http://hdl.handle.net/10603/408207

Conferences

2024 Aditya Narayanan, Fabien Roquet, Oana Dragomir, Sarah T Gille, Birte Gülk, Margaret Ruth Lindeman, Matthew R Mazloff, Alessandro Silvano, Alberto Naveira Garabato, "Variability of the Weddell Gyre and Ekman Processes near Maud Rise: Implications for Polynya Formation", *Ocean Science Meeting, New Orleans*

2022 Aditya Narayanan, Birte Gülk, Fabien Roquet, and Alberto Naveira Garabato, (2022), "The oceanic drivers of the 2017 Maud Rise polynya", *EGU General Assembly, Vienna*

2019 Aditya Narayanan, Sarah T. Gille, Matthew Mazloff, Murali K, (2019), "Antarctic Shelf Break Processes and Circumpolar Deep Water Intrusion", *AGU Fall Meeting, San Fransisco*

2019 Aditya Narayanan, Sarah T. Gille, Matthew Mazloff, Murali K, (2019), "Antarctic shelf break processes and their role in determining the bottom temperature regime of the shelf seas", *National Conference on Polar Sciences, National Centre for Polar and Ocean Research, Goa, India.*

2018 Aditya Narayanan, Murali K, (2018), "Analysis of Turbulence in the Weddell Sea: Observations and Modeling", *Ocean Sciences Meeting, Portland.*

2016 Aditya, Narayanan (2016), "Mathematical and numerical modeling of the physics of cold water downslope flows", *CLIVAR Open Science Conference, Qingdao.*

Grants

2019–2021 Co-wrote and defended a grant received from Pacer Outreach Program (POP) under The Polar Science And Cryosphere (PACER) Programme initiative granted by ESSO-NCPOR (MoES) for the project titled, *"Shelf sea and shelf break processes of the Antarctic margins and the production of Dense Shelf Water"*, for the period July 2019 to July 2021, sanctioned for an amount of Rs. 24,03,000/-.

2019–2020 Co-wrote and defended successfully a project proposal – *"Antarctic Slope Front dynamics and cross slope exchanges of heat in the Prydz Bay"* – to sail with the Indian Southern Ocean Expedition, 2020 to be conducted by ESSO-NCPOR, Goa.

Academic achievements & awards

2024 Excellence in teaching award, National Centre for Polar and Ocean Research, Goa, India.

2021 Selected on the "alternate panel" for the Fulbright-Nehru Postdoctoral Fellowship.

2020 Student participant in the Indian Southern Ocean Expedition, January to March 2020.

2019 AGU Student Travel Grant to attend the Fall Meeting in San Fransisco.

2019 1st runner up for best poster award during Young Polar Scientist Meeting held at the National Conference on Polar Sciences, National Center for Polar and Ocean Research, Goa, 2019.

2018 Erik Berkner travel grant to attend Ocean Sciences Meeting, Portland, 2018 (joint conference of AGU, TOS, and ASLO).

2016 WCRP CLIVAR Open Science Conference, Qingdao, 2016, travel assistance award.

Supervision

2020-2021 Co-supervised Hasna Kunjumon, M.Sc. dissertation on the dynamics of the Antarctic Circumpolar Current.

2020-2021 Informal mentoring of Sivakrishnan K.K, M.Sc. dissertation on the watermasses of the Antarctic marginal seas.

2023- Co-supervising Soumyadeep Datta, PhD Student, on Antarctic coastal watermass formation.

Teaching

2023 Ocean data analysis, National Center for Polar and Ocean Research, Goa, India.

2022 Co-taught MAR440: course on ocean data analysis at the Department of Marine Sciences, Gothenburg University, Sweden.[course material]

2021 Co-taught MAR440 and MAV110: courses on numerical computing and ocean data analysis at the Department of Marine Sciences, Gothenburg University, Sweden.[course material]

Feb 2020 Lectured onboard research vessel during NCPOR's Southern Ocean Expedition 2020: on the basics of oceanographic, atmospheric, and climate data analysis and conducted practical workshops on using Python data analysis packages.

Nov 2017 Lectured in a workshop on numerical and scientific computing using Python, Department of Ocean Engineering, IIT Madras.

Research Seminars

2023

"Weddell Gyre Maud Rise interaction: A summary of the chain of events that culminated in the Maud Rise Polynya of 2017.", CMSI, UNSW, Australia.

2023 "Weddell Gyre Maud Rise interaction: A summary of the chain of events that culminated in the Maud Rise Polynya of 2017.", Research School of Earth Science, Australia National University.

2022 "The role played by subpolar gyres in modulating heat content in the Circumpolar Deep Water layer.", University of Southampton, UK.

2022 "Circumpolar Deep Water heat ventilation pathways and the links with continental shelf bottom temperatures of Antarctica.", University of East Anglia, UK.

2021 "Circumpolar Deep Water diapycnal mixing rates in the subpolar Southern Ocean.", University of Gothenburg, Sweden.

Sep 2019 "The bottom temperature regime of the marginal seas of Antarctica", Department of Ocean Engineering, IIT Madras.

Oct 2018 Talk on "Climate Systems" as part of the Open Seminar Series, Department of Physics, IIT Madras.

May 2018 "Downslope Flows in the marginal seas of the Southern Ocean", Department of Ocean Engineering, IIT Madras.

Outreach

- Kadal: academic blog
- IAPSO ECS newsletter
- Webinar on the EU funded project: Southern Ocean Carbon and Heat Impacts on Climate (SOCHIC)
- Webinar on the Weddell Sea polynyas
- Github repositories
- Open Science Foundation repositories

Workshops Attended

2024 DEFIANT porject workshop, British Antarctic Survey, UK.

2023 Ocean mixing in the bottom boundary layer, University of Southampton, UK

2019 Air Sea Interactions in the Bay of Bengal, organised by TIFR-ICTS, Bengaluru

2016 International Summer School on Earth System Modeling, jointly organised by ICTP, Trieste, Italy, and Indian Institute of Tropical Meteorology, Pune

2015 Numerical modeling of free surface flows in coastal and ocean engineering, hands on experience, jointly organised by IITM and NTNU

2015 Internation Symposium on Antarctic Earth Sciences, Goa

2014 High Performance Computing Workshop, jointly organised by IIT Madras, IIT

Bombay, C-DAC Pune, and NVIDIA Corporation

Skills and tools

- Descriptive and dynamical physical oceanography.
- Ship based measurements: CTD, underway CTD, LADCP etc.
- Climate and ocean data analysis.
- Scientific computing and computational fluid dynamics.

Service

2023- Organiser of monthly Southern Ocean seminar series at the National Oceanography Center, Southampton.

2023 Chaired a session during the Challenger Society for Marine Science Ocean Modelling Group Meeting 2023.

2023 Member of early career network of IAPSO and contributing editor of the network newsletter.

2021-2024 Co-organizer of a monthly seminar series on the ocean–sea ice interaction and polynyas in the Weddell Sea.

2018 Assisted university committee on improving diversity and representation in graduate student selection processes.

2014 Organised a graduate students' research conference.

I follow an open data and open science framework where I make my lecture notes and material and software code and workflow openly available on public repositories along with the scientific manuscripts that I publish. See https://github.com/adityarn for more details.

Referees

- Sarah T. Gille, Scripps Institution of Oceanography, University of California San Diego. sgille@ucsd.edu
- Matthew R. Mazloff, Scripps Institution of Oceanography, University of California San Diego. mmazloff@ucsd.edu
- Fabien Roquet, Department of Marine Science, University of Gothenburg, Sweden. f.roquet@gu.se
- Alberto Naveira Garabato, School of Ocean and Earth Sciences, University of Southampton, UK. acng@soton.ac.uk