

Himanshu Saxena

Postdoctoral Fellow

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Education and Experience

2024–Present: **Postdoctoral Fellow**. Alma Mater Studiorum, University of Bologna, Ravenna, Italy

2022–2024: **Postdoctoral Fellow**. Physical Research Laboratory, Ahmedabad, India

2017–2022: **PhD (Earth Sciences)**. Physical Research Laboratory, Ahmedabad, India

Title: *Biological fixation of nitrogen and carbon in the northern Indian Ocean*

Supervisor: [Dr. Arvind Singh](#), Associate Professor, Physical Research Laboratory

2016 : **MSc (Chemistry)**. CCS University, Meerut, India

2014 : **BSc (Chemistry Hons)**. University of Delhi, Delhi, India

Research Interests

- Primary production and nitrogen fixation
- Marine based carbon dioxide removal (CDR)
- Marine biogeochemical cycles
- Stable isotopes and nutrient biogeochemistry

Research Cruise Experiences

- ORV *Sagar Kanya* (SK–374), Arabian Sea, 23 Oct – 25 Nov 2021
- ORV *Sagar Kanya* (SK–373), Bay of Bengal, 23 Sep – 16 Oct 2021
- ORV *Sagar Kanya* (SK–364), Arabian Sea, 16 Dec 2019 – 6 Jan 2020
- ORV *Sindhu Sankalp* (SSK–127), Bay of Bengal, 5–15 Apr 2019
- ORV *Sagar Nidhi* (SN–132), Bay of Bengal, 12 Jul – 2 Aug 2018

Instrumentation Skills

- 'Elemental analyser–isotopic ratio mass spectrometer (EA–IRMS)' for POC, PON, $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ measurements
- 'Skalar Autoanalyzer' for seawater nitrate, nitrite, phosphate and silicate measurements
- 'Shimadzu TOC–TN' autoanalyzer for total organic C and total N measurements
- 'BD FACSAria III Flow Cytometer' for phytoplankton analysis and sorting
- 'Gas chromatograph' for dissolved CO_2 , CH_4 and N_2O gas measurements
- 'HPLC' for pigment analysis in seawater

Publications

8. **Saxena, H.**, Sahoo, D., Nazirahmed, S., Sharma, N., Rai, D.K., Kumar, S., Singh, A. (2024). Winter convective mixing mediating coupling of N-gain and -loss in the Arabian Sea. *Journal of Geophysical Research: Oceans*, 129, e2023JC020839. <https://doi.org/10.1029/2023JC020839>
7. **Saxena, H.**, Sahoo, D., Nazirahmed, S., Chaudhari, D., Rahi, P., Kumar, S., Benavides, M., Krishna, A.V., Sudheer, A.K., Singh, A. (2023). The Bay of Bengal: An enigmatic diazotrophic niche. *Journal of Geophysical Research: Biogeosciences*, 128, e2023JG007687. <https://doi.org/10.1029/2023JG007687>
6. Shao, Z., Xu, Y., **Saxena, H.** et al. (2023). Global oceanic diazotroph database version 2 and elevated estimate of global oceanic N_2 fixation. *Earth System Science Data*, 15, 3673–3709. <https://doi.org/10.5194/essd-15-3673-2023>
5. **Saxena, H.**, Sahoo, D., Nazirahmed, S., Rai, D. K., Khan, M. A., Sharma, N., Kumar, S., Singh, A. (2022). Contribution of carbon fixation toward carbon sink in the ocean twilight zone. *Geophysical Research Letters*, 49, e2022GL099044. <https://doi.org/10.1029/2022GL099044>

4. Khan, M.A., Rahman, A., Sahoo, D., **Saxena, H.**, Singh, A., Kumar, S. (2022). Nitrous oxide in the central Bay of Bengal during the summer monsoon. *Regional Studies in Marine Science*, 52, 102314. <https://doi.org/10.1016/j.rsma.2022.102314>
3. Sahoo, D., **Saxena, H.**, Nazirahmed, S., Kumar, S., Sudheer, A.K., Bhushan, R., Sahay, A., Singh, A. (2021). Role of eddies and N₂ fixation in regulating C:N:P proportions in the Bay of Bengal. *Biogeochemistry*, 155, 413–429. <https://doi.org/10.1007/s10533-021-00833-4>
2. Sahoo, D., **Saxena, H.**, Tripathi, N., Khan, M.A., Rahman, A., Kumar, S., Sudheer, A.K., Singh, A. (2020). Non-Redfieldian C:N:P ratio in the inorganic and organic pools of the Bay of Bengal during the summer monsoon. *Marine Ecology Progress Series*, 653, 41–55. <https://doi.org/10.3354/meps13498>
1. **Saxena, H.**, Sahoo, D., Khan, M.A., Kumar, S., Sudheer, A.K., Singh, A. (2020). Dinitrogen fixation rates in the Bay of Bengal during summer monsoon. *Environmental Research Communications*, 2, 051007. <https://doi.org/10.1088/2515-7620/ab89fa>

Under Review

- Sahoo, D., **Saxena, H.**, Nazirahmed, S., Khan, M. A., Rai, D. K., Sharma, N., Kumar, S., Sudheer, A. K., Bhushan, R., Singh, A. (2023). Winter convective mixing regulates the C:N:P ratios in the ocean. *Limnology and Oceanography*

Book Chapter

- **Saxena, H.**, Singh, A. (2023). Primary production and its governing factors in the northern Indian Ocean. In Dynamics of planktonic primary productivity in the Indian Ocean. *Springer*. https://doi.org/10.1007/978-3-031-34467-1_7

Workshops/Schools

- *Satellite-based tools for investigating aquatic ecosystems* organized by the Trevor Platt Science Foundation (TPSF) at the Plymouth Marine Laboratory, United Kingdom, on 07 and 08 August 2023
- *Instrumenting our oceans for better observation: a training course on a suite of biogeochemical sensors* organized by the International Ocean Carbon Coordination Project (IOCCP) and the Integrated Carbon Observation System (ICOS) Ocean Thematic Centre (OTC) at the Kristineberg Centre for Marine Research and Innovation, Kristineberg, Sweden, 5–17 Jun 2023
- *International training course on Mesopelagic Respiration* organized by the SCOR WG 161 ReMO at the University of Las Palmas de Gran Canaria, Spain, 21–27 May 2023
- *SOLAS Virtual Summer School 2022*, online, 13–17 Jun 2022
- *21st INDO-US Flow Cytometry Workshops* organized by Live Education Task Force (LETF), International Society for Advancement of Cytometry (ISAC), and Trust for Education and Training in Cytometry (TETC) at the National Institute of Oceanography, Goa, India, on 27 and 28 Jan 2020
- *National Workshop on Assembly and Application of Foldscope* organized by Department of Biogas Research and Microbiology, Gujarat Vidyapith at Gujarat Vidyapith, Gujarat, India, on 5 and 6 Mar 2019

Awards

- PML's European Space Agency-Bicep project (ESA-B) travel support to attend the TPSF training course and symposium
- SCOR travel support to attend the IOCCP ICOS OTC training course
- SCOR travel support to attend the ReMO training course
- Physical Research Laboratory research fellowship award, 2017, for PhD funded by the Department of Space, Government of India

Achievements

- Best poster award for presenting research [work](#) in Hindi language in the Hindi Technical Seminar – 2023 at the Physical Research Laboratory, Ahmedabad, India, 16 Aug 2023
- Selected for the GOOD-OARS-CLAP-COPAS Summer School 2023 in CEAZA & Universidad Católica del Norte, Campus Guayacán Coquimbo, La Serena, Chile, 6–12 Nov 2023
- Selected for the SOLAS Summer School 2023 at the Ocean Science Centre Mindelo in Cape Verde, 5–16 Jun 2023

- Invited to present my published [work](#) at [JETZON](#) – Joint Exploration of the Twilight Zone Ocean Network, online, 18 Oct 2022
- Curator in Open Research Knowledge Graph (ORKG), an initiative of Technische Informationsbibliothek (TIB) – German National Library of Science and Technology, Jul–Dec 2021.
- Selected for the IsoCamp Summer Short-course 2020 and 2021 at the University of New Mexico Center for Stable Isotopes in Albuquerque, NM
- Qualified Graduate Aptitude Test Engineering (GATE), 2017 conducted by the Indian Institute of Technology, Roorkee, on behalf of National Coordination Board (NCB)-GATE, Department of Higher Education, Ministry of Education (MoE), Government of India

Membership

- Core-committee member of Early Career Scientist Network (ECSN), 2nd International Indian Ocean Expedition ([IIOE-2](#))

Abstracts in Conferences/Schools

- **Saxena, H.**, Sahoo, D., Nazirahmed, S., Rai, D.K., Khan, M.A., Sharma, N., Kumar, S., Singh, A. Winter convective mixing couples primary production and N₂ fixation with nutrient supply in the Arabian Sea. *Trevor Platt Science Foundation (TPSF) Symposium “Trends, Reflections, Evolution, and Visions in Ocean Research - A celebration of the scientific life of Trevor Platt”*, Plymouth Marine Laboratory, United Kingdom, 09–11 Aug 2023
- **Saxena, H.**, Sahoo, D., Nazirahmed, S., Rai, D.K., Kumar, S., Singh, A. Nitrogen fixation across the contrasting physicochemical conditions in the Arabian Sea. *FGRC 2023*, Physical Research Laboratory, Ahmedabad, India, 1–3 Feb 2023
- **Saxena, H.**, Sahoo, D., Khan, M.A., Kumar, S., Sudheer, A.K., Singh, A. N₂ and C fixation in the euphotic zone of the Bay of Bengal. *SOLAS Virtual Summer School 2022*, online, 13–17 Jun 2022
- **Saxena, H.**, Sahoo, D., Nazirahmed, S., Krishna, A.V., Sudheer, A.K., Kumar, S., Singh, A. Diazotrophy in the euphotic and oxygen minimum zone of the Bay of Bengal during spring inter-monsoon. *ASLO 2021 Aquatic Sciences Meeting*, online, 23 Jun 2021
- **Saxena, H.**, Sahoo, D., Nazirahmed, S., Rai, D.K., Khan, M.A., Sharma, N., Kumar, S., Singh, A. Key role of overlooked twilight zone towards climate buffering. *EGU General Assembly 2021*, online, 19–30 Apr 2021, EGU21-10643. <https://doi.org/10.5194/egusphere-egu21-10643>