**CURRICULUM VITAE**



**Dr. Pandi Sudarsanarao**Project Scientist II | Polar Sciences Group
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# EDUCATIONAL QUALIFICATIONS:

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| 2008-14 | Ph.D., Chemical Oceanography, Andhra UniversityThesis topic: Variability of coloured dissolved organic matter (CDOM) and phytoplankton optical properties in the Bay of Bengal.Under the supervision of *Prof. Nittala S. Sarma* |
| 2005-07 | Master of Sciences with Specialization in Marine Chemistry from Andhra University, Topper with **Distinction** aggregate 73 %. |

**PRIZE/MEDAL:**

Dr. D. Satyanarayana 60th Birthday commemoration prize, Andhra Univeristy, 2007.

# TEACHING EXPERIENCES:

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| 2014-19 | Chemical Oceanography, M.Sc 2nd year, Department of PNCO, Marine Chemistry Laboratory, Andhra University.Topics: Chemical Oceanography, Water quality measurements, Analytical errors, spectroscopy and Instrumentation. |

**RESEARCH EXPERIENCE:**

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| Project Scientist II:April 2022 to dateNCPOR, Goa | Project title: Hydrodynamics and biogeochemistry in the Indian Ocean sector of the Southern Ocean.Research Focus: "Investigating Bio-Optical Characteristics in the Indian Sector of the Southern Ocean: Integrating Hydrodynamics and Biogeochemistry" |
| Project Scientist IMay 2019-March 2022NCPOR, Goa | Project title: Hydrodynamics and biogeochemistry in the Indian Ocean sector of the Southern Ocean. |
| CSIR-RA April 2017-April 2019Andhra University | Bio-Optical characteristics of Phytoplankton functional types in relation to pigment composition and their application to HAB detection. |
| SRFApril 2013 –April 2017Andhra University | Studies on CDOM variability, structure and affecting factors for improving ocean colour algorithms in the Midwestern Bay of Bengal (SATCORE project, INCOIS funded). |
| SRF: March 2010-2013JRF: March 2008–2010Andhra University | Optical and chemical characterization of CDOM and DOC signature of the central East Indian coastal waters of the Bay of Bengal. Analyses of water quality parameters such as Nutrients, salinity, dissolved oxygen, TSM, Chlorophyll a, BOD, Turbidity (SATCORE project, INCOIS funded). |

**ADVANCED TRAINING COURSES ATTENDED:**

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| 1 | International POGO Training program, 5-25, Feb 2012 | The Application of ocean colour remote sensing in Primary Productivity and Ecosystem Modeling at INCOIS, Hyderabad. |
| 2 | International Training Course (ITCO Oceans), 10–14 Nov, 2014 | Ocean colour remote sensing, data processing and applications”November at INCOIS, Hyderabad. |

**TECHNICAL SKILLS/Expertise**

* Bio optical Parameters such as IOPs and AOPs, and Satellite image processing of chlorophyll a and SST by using SeaDAS.
* Particulate absorption Phytoplankton and dissolved organic matter absorption and fluorescence characteristics
* Analysis of various other parameters DOC, Hydrochemical parameters (Nutrients, Dissolved Oxygen, Chlorophyll a, pH, salinity and Turbidity etc..).
* Statistical techniques, Parallel Factor (PARAFAC) analysis, Principal Component Analysis and Regression analysis, Peak fit analysis etc…,
* Knowledge using statistical software like Python, Matlab, Peak Fit, SPSS 17, Origin 8, Surfer 8, Grapher 7 ODV etc.

**EXPEDITIONS/CRUISES PARTICIPATED:**

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| 1 | Indian Scientific Expedition to the Arctic (ISEA)May 2023-June 2023 | Himadhri, Ny-Alesund (Team leader Dr. S.C. Tripathy). |
| 2 | Indian Scientific Expedition to Southern Ocean (ISESO) 05.01.2020 to 11.03.2020 | SA Agulhas, ISESO-11 (Chief Scientist: Dr Anoop S. Mahajan, IITM-Pune). |
| 3 | Arabian seaFebruary 5-25, 2017 | ORV Sagar Sampada-356, Chief Scientist: Dr A. A. Lotlikar, INCOIS, 20 Days |
| 4 | Bay of Bengal | ORV Sagar Manjusha - 19th October to 3rd November 2017 (Chief Scientist: Dr Satyprakash, INCOIS, 15 Days)ORV Sagar Nidi-42: 24th July to 12th August 2010 (Chief Scientist, Dr V.V.S.S Sarma, NIO, 24 Days)ORV Sagar Sampada-272: August 27 to 14 September 2010 (Chief Scientist: Dr Jaya Baskaran, CMLRE, 20 Days)ORV Sagar Kanya-227: 28th July to 28th August 2010 (Chief Scientist, Dr Prasanna Kumar, NIO, 28 Days)CRV Sagar Paschimi and Sagar Purvi: 17 Cruises (2009-2014, different cruises, Chief scientist: myself / Dr NVHK Chari, 85 Days),Trawler vessels (privately owned improvised for scientific cruises): 100 Cruises (2008-17). |
| **INSTRUMENTAL SKILLS:** |  |
| Spectrofluorometer, Horiba Jobin Yvon, Fluoromax-4 |
| Spectrophotometer with ISP, Shimadzu UV-2600 |
| Hyperspectral underwater Radiometer, Satlantic |
| Sun Photometer, Microtopes2 |
| Total Organic Carbon Analyser, Shimadzu |
| Gas Chromatograph, HP |
| High-performance liquid chromatography LC 1200 series, Agilent Technologies, USA |

**SIGNIFICANT ACHIEVEMENTS :**

1. **Southern Ocean Bio-optical Properties:**
* Chlorophyll-a specific phytoplankton absorption (a\*ph(443)) proves to be a more effective indicator for understanding pigment package effect across fronts.
* Optical active substances (OAS) plays a significant role in indicating both the active growth and decay phases of phytoplankton blooms, as well as in the remineralization of organic matter.
* The proposed robust aph(443)-Chl-a model equation stands as a reliable tool for deriving phytoplankton absorption and estimating net primary production.

 **Satellite Data in ISSO:**

* Satellite-derived aph(443) is a better indicator than Chl-a in daily phytoplankton productivity estimation within the ISSO region.
* Empirical algorithms reveal that SeaWiFS OC5 and OC4 are more accurate than MODIS Aqua for chlorophyll-a assessment in the ISSO.

 **Pigment-based phytosize class (PSC) Models:**

* + PSC models facilitate the prediction of organic carbon export to the deep ocean.
1. **SWTIO and EIO Characteristics:**
* Distinct subsurface stratifications in the SWTIO and EIO result in low surface productivity.
* The Deep Chlorophyll Maximum (DCM) is categorized into two groups (DBM and DAM), with DBM indicating higher carbon fixation per phytoplankton cell and a more robust biological pump than DAM.
* Particulate backscattering analysis with phytoplankton size fractions reveals that microplankton exhibits higher carbon fixation compared to nano and picoplankton.
1. **Northeastern Arabian sea :**
* Empirical link established between remote sensing reflectance and Noctiluca scintillans cell density, suggesting inclusion of 510 nm sensor capability in future satellite launches.
* CDOM can also be used to predict estuarine acidification by identifying deviation from the equation of spectral slope ratio (*SR*) with salinity.
* CDOM identified anthropogenic organic pollution in southeast and northwest estuaries.
1. **Northwestern Bay of Bengal:**
* Study on absorption and fluorescence traits of CDOM in monsoonal estuary, revealing seasonal variability and conservative behavior against salinity.
* Fluorescence characteristics of CDOM investigated, identifying sources and variability during eddies.
* Identified the coastal processes using CDOM absorption and fluorescence and nutrients studies
1. **Arctic, Svalbard:**
* Bio-optical data have been collected and used to quantify the chromophoric and fluorophoric components in the Kongsfjord and Krossfjorden regions.

**PUBLICATIONS:**

1. Padhi S.K, Tripathi S.C., **Pandi, S.R.,** **2024**. Cross-frontal variability of phytoplankton productivity in the Indian Sector of the 2 Southern Ocean during austral summer of 2010-2018. Science of the total environment, 954, 176401. https://doi.org/10.1016/j.scitotenv.2024.176401.
2. **Pandi S.R.,\*** Sarma N.S., Chiranjeevulu G., Chari, N.V.H.K., Lotliker A.A., Bajish, C.C., Tripathy S.C., **2024**. Chromophoric dissolved organic matter traces seasonally changing coastal processes in a river-influenced region of the western Bay of Bengal. Environmental Science and Pollution Research. DOI : 10.1007/s11356-024-34443-y.
3. Tripathy, S.C., Kerkar, A.U., Sabu, P., Padhi, S.K., **Pandi, S.R.,** Sarkar, A., Parli, B. V, **2024**. observations of phytoplankton light-absorption and productivity in Prydz Bay , coastal Antarctica 1–19. https://doi.org/10.3389/fmars.2024.1420179.
4. Sarma, N.S., Chiranjeevulu, G., **Pandi, S.R.,** Bhaskara, D., Sarma, VVSS., 2023. Coupling between chromophoric dissolved organic matter and dissolved inorganic carbon in Indian estuaries. Sci. Total Environ. 905, 167120. https://doi.org/10.1016/j.scitotenv.2023.167120.
5. **Pandi, S.R.,** Sarat C. Tripathy, S. S. Shaju, P. Minu, Anvita U. Kerkar, C. C. Bajish, N. Anilkumar 2023. Interannual variability of surface bio-optical characteristics in the frontal zones of the Indian sector of the Southern Ocean during austral summer. **Polar Sciences**. <https://doi.org/10.1016/j.polar.2023.100944>.
6. **Pandi, S.R.,** Tripathy, S.C., Shaju, S.S., Anilkumar, N., 2023. Cross frontal variability in bio-optical characteristics in the Indian sector of the Southern Ocean during an austral summer. **Reg. Stud. Mar. Sci**. 61, 102892. [https://doi.org/10.1016/j.rsma. 2023.102892](https://doi.org/10.1016/j.rsma.%202023.102892).
7. Sarma, N.S., Bailar, S.K. Lotliker A.A., **Pandi, S.R.,** Samanta, A., Suchismita, S., 2022. Sea surface temperature and phytoplankton abundance as crucial proxies for green Noctiluca bloom monitoring in the northeastern Arabian Sea: A case study. Ocean Sci. J. **58**, 2 (2023). https://doi.org/10.1007/s12601-022-00096-6.
8. **Pandi, S.R.,** Tripathy, S.C., Parida, C., Lotliker, A.A., Chandrasekhar Naik, R., Naik, R.K., Mishra, R.K., Anilkumar, N., 2022. Spatiotemporal variability in bio-optical characteristics of the southwestern tropical Indian Ocean during boreal summer: Biophysical influences. Prog. Oceanogr. 208, 102883. [https://doi.org/10.1016/j. pocean.2022.102883](https://doi.org/10.1016/j.%20pocean.2022.102883).
9. Sarma, N.S., Kumar, **Pandi, S.R.,** Anandrao, A., Samanta, A., 2022. Noctiluca blooms intensify when northwesterly winds complement northeasterlies in the northern Arabian Sea : Possible implications. **Oceanologia.** https://doi.org/10.1016/j.oceano.2022.06.004.
10. Kerkar, A.U., Tripathy, S.C., **Pandi, S.R.,** 2022. Bio-optical depiction of a polar ocean under global change: Exploring the regional absorption traits. **Glob. Planet. Change** 213, 103818. https://doi.org/10.1016/j.gloplacha.2022.103818.
11. **Pandi, S.R.**,\* Chari, N.V.H.K., Lotliker, A.A, Sarma, N.S., Tripathy, S.C., Bajish, C.C., 2021. Spatiotemporal variability in the optical characteristics of dissolved organic matter in the coastal Bay of Bengal. **Int J Environ Sci Technol.** https://doi.org/10.1007/s13762-021-03605-7.
12. **Pandi, S.R.,\*** Chari N.V.H.K., Sarma N.S., Tripathy S.C., Chiranjeevulu G., Das S. 2021. A Review of Estuarine CDOM Dynamics of East Coast of India Influenced by Hydrographical Forcing. In: Das S., Ghosh T. (eds) **Estuarine Biogeochemical Dynamics of the East Coast of India.** Springer, Cham. <https://doi.org/10.1007/978-3-030-68980-3_14>.
13. Anvita U. Kerkar, S.C. Tripathy, David J. Hughes, P. Sabu, **Pandi, S.R.**, A. Sarkar, M. Tiwari, 2021. Characterization of Phytoplankton Productivity and Bio-Optical Variability in a Polar Marine Ecosystem, **Progress in Oceanography**, 102573 0079-6611. <https://doi.org/10.1016/j.pocean.2021.102573>.
14. **Pandi, S.R.,\*** N.V.H.K. Chari, Nittala S. Sarma, G. Chiranjeevulu, R. Kiran, K.N. Murthy, P. Venkatesh, Aneesh A Lotliker, Sarat C. Tripathy 2021. Characteristics of conservative and non-conservative CDOM of a tropical monsoonal estuary in relation to changing biogeochemistry. **Regional Studies in Marine Science**, 44, 101721. <https://doi.org/10.1016/j.rsma.2021.101721>.
15. **Pandi, S.R.**, S.K, Baliarsingh, Aneesh Anandrao Lotliker, Nittala S. Sarma, Sarat Chandra Tripathy, 2021. Empirical relationships for remote sensing reflectance and Noctiluca scintillans cell density in the northeastern Arabian Sea. **Marine Pollution Bulletin** 161, B, 111770. <https://doi.org/10.1016/j.marpolbul.2020.111770>.
16. Tripathy SC, Sabu P, Patra S, Naik RK, Sarkar A, Venkataramana V, Kerkar AU and **Pandi, S.R.**, 2020. Biophysical control on variability in Phytoplankton production and composition in the South-Western Tropical Indian Ocean during monsoon 2014. **Frontiers in marine science** 7:515. http://doi: 10.3389/fmars.2020.00515.
17. N.V.H.K. Chari, **Pandi, S.R.**, V.V. Kanuri, C. K. Basuri 2019. Structural variation of coloured dissolved organic matter during summer and winter seasons in a tropical estuary: A case study. **Marine Pollution Bulletin** 149, 110563. <https://doi.org/10.1016/j.marpolbul.2019.110563>.
18. N. S. Sarma,**Pandi, S.R.**,Chari N.V.H.K., Gundala Chiranjeevulu, Rayaprolu Kiran, K. Shiva Krishna,D. Bhaskara Rao, P. Venkatesh, B. Charan Kumar, A.V. Raman (2017). Spectral Modeling of Estuarine Colored Dissolved Organic Matter. **Current science.** doi: 10.18520/cs/v114/i08/1762-1767.
19. K.N. Murty, Nittala S. Sarma, **Pandi, S.R.,** G. Chiranjeevulu, R. Kiran, R. Muralikrishna. Hydrodynamic control of microphytoplankton bloom in a coastal sea. **Journal of Earth System Sciences**, 126:82, 1-14. DOI 10.1007/s12040-017-0867-2.
20. N.V.H.K. Chari & **Pandi, S.R.,** (2017). Characterization of humic substances and their distribution of XAD fractions by absorption spectroscopy in the Godavari estuary, India. **Current Science,** 113(2), 299-303.
21. **Pandi, S.R.,** G. Chiranjeevulu, R. Kiran, N.V.H.K. Chari, R. Muralikrishna, B. Srinivasarao, A.A. Lotliker, Nittala S. Sarma (2016). Contrasting bio-optical characteristics of coastal water prior to and in the aftermath of a tropical super cyclone. **International Journal of Remote Sensing:** 38 (12), 3519–3530.
22. N.V.H.K. Chari, Nittala S Sarma, **Pandi, S.R.**, G. Chiranjeevulu, R. Kiran, K.N. Murthy, P. Venkatesh (2016). Fluorescent dissolved organic matter dynamics in the coastal waters off the Central East Indian Coast (Bay of Bengal). **Environment and Ecological Research** 4(1), 13 – 20**.**
23. **Pandi, S.R.,** Rayaprolu Kiran, Nittala S. Sarma, A.S. Srikanth, V.V.S.S. Sarma, M. S. Krishna,D. Bandyopadhyay,V.R. Prasad, T. Acharyya,K. G. Reddy (2014). Contrasting phytoplankton community structure and associated light absorption characteristics of the western Bay of Bengal. **Ocean Dynamics: 64 (1): 89-101.**
24. G. Chiranjeevulu, K. N. Murty, Nittala S. Sarma, R. Kiran, N.V.H.K. Chari, **Pandi, S.R.,** Pragada Venkatesh, C. Annapurna, K. Nageswara Rao (2014). Coloured dissolved organic matter signature and phytoplankton response in a coastal ecosystem during mesoscale cyclonic (cold core) eddy. **Marine Environmental Research** 98, 49-59.
25. Chari, N. V. H. K., K. Suman, N. S. Sarma, Pandi, S.R., G. Chiranjeevulu, R. Kiran, and U. Koduru (2013). Fluorescence and absorption characteristics of Dissolved Organic Matter excreted by phytoplankton species of western Bay of Bengal under axenic laboratory conditions. Journal of Experimental Marine Biology and Ecology 445, 148-155.
26. N.V.H.K. Chari, Pandi, S.R., Nittala S. Sarma (2013). Fluorescent Dissolved Organic Matter in the Continental shelf waters of western Bay of Bengal. Journal of Earth System Science 122, 1325-1334. https://doi.org/10.1007/s12040-013-0349-0
27. N.V.H.K. Chari, N. S. Sarma, **Pandi, S.R.,** and K. N. Murthy (2012), Seasonal and spatial constraints of fluorophores in the midwestern Bay of Bengal by PARAFAC analysis of excitation-emission matrix spectra, **Estuarine, and Coastal and Shelf Sciences** 100, 162-171.

**Papers Under review:**

1. **Pandi, S.R.,** Sarma, N.S., Tripathi S.C., 2024**.** Bio-optical depictions in the coastal waters of India: A brief Review (review)**. Book chapter Springer nature.**

**Presented papers in Seminar/Workshops/Talks:**

1. **Pandi, S.R**, (2024)**.** Assessing the Southern Ocean Carbon pathways by deciphering the Bio-Optical signature” Academic talk, NCPOR on 14th February 22, 2024.
2. **Pandi, S.R.,\* S.C. Tripathy, S.S. Shaju, R.C.S. Naik, A.A. Lotliker.** Three component absorption model for phytoplankton size classes in the Indian Sector of Southern Ocean. OSICON 23 conference, 23-25th August 2023at the Indian National Centre for Ocean Information Service (INCOIS), Telangana. **Flash presentation+Poster**.
3. **Pandi, S.R.,** S. C. Tripathy, S. S. Shaju, P. Minu, Anvita U. Kerkar, Deepti V. G., Dessai, C.C. Bajish, Anilkumar, N., 2023. Interannual and spatial variability of bio-optical characteristics in the Indian sector of the Southern Ocean during austral summer. Oral presentation, National conference on polar sciences, May 16-19, 2023, at NCPOR, Goa.
4. **S.R. Pandi\*,** S.C. Tripathy, S. S. Shaju, P. Minu, N. Anilkumar. Identification of Phytoplankton size classes using *in situ* phytoplankton absorption in the Indian sector of the Southern Ocean. SCAR open science conference, poster, 1-10 August 2022, NCPOR. **Oral presentation.**
5. **Pandi, S.R.,\***  Sarat C. Tripathy, S. S. Shaju, P. Minu, Anvita U. Kerkar, Deepti V. G. Dessai, N. Anilkumar. Interannual and spatial variability of bio-optical characteristics in the Indian sector of Southern Ocean during austral summer. **Oral Presentation**, OSICON-21, Aug 12-14, 2021, National Centre for Polar and Ocean Research, Goa.
6. **S.R. Pandi.,\*** Sarat C. Tripathy, S. S. Shaju, P. Minu, Anvita U. Kerkar, Deepti V. G. Dessai, N. Anilkumar. Interannual variability of bio-optical characteristics in the Indian sector of Southern Ocean. MARICON conference held on 16-20 December 2019 at Kochi (Poster presentation).
7. **Pandi, S.R.,\*** N.V.H.K. Chari, G. Chiranjeevulu, Sarat C. Tripathy, Aneesh A.Lotlikar3, N. Anil Kumar2, Nittala S. Sarma1. In situ remote sensing reflectance band ratios-based FDOM quantification in the northwestern Bay of Bengal. International Indian Ocean Science Conference (IIOSC) held on 16-20 March 2020, Goa, India (Oral presentation, conference postponed).
8. **Pandi, S.R.,\*** A.A. Lotlikar,B.S. Kumar, R. M. Krishna, P. Shyamala and Nittala S. Sarma. Optical characteristics distinguishing the phytoplankton bloom (*noctiluca*) and non-bloom domains of the northern Arabian Sea. World Ocean Science Congress 25-27 February 2019, Andhra University, India (**Oral presentation**)
9. **Pandi, S.R.,\*** G. Chiranjeevulu, Nittala S. Sarma\*, N.V.H.K. Chari, R. Kiran (2015). Humicfluorescence ratio as a proxy for Remote sensing reflectance band ratio Rrs(412)/Rrs(443) for CDOM estimation and application of particle backscattering for pollution monitoring in the western Bay of Bengal. International Indian Ocean Expedition (IIOE), Symposium on November 30 to December 3rd 2015 (**Poster presentation)**.
10. **Pandi, S.R.,\*** Inter-comparison of *in situ* and retrieved chlorophyll *a* using OC4V4, OC3M and OC4, presented at **International POGO Training program on “**Application of ocean colour remote sensing in Primary Productivity and Ecosystem Modeling” INCOIS, Hyderabad, 25th Feb 2012 (**Oral presentation**).
11. **Pandi, S.R.,\*** Nittala S Sarma N.V.H.K. Chari, K. Narasimha Murthy. Absorption coefficient models for two contrasting adjacent regions in the mid-western Bay of Bengal. Workshop on **“Coastal Ocean Color: - A perspective for Satellite applications in the Indian Context” from** 19th to 20th March 2012 at International Centre, Goa (**Oral presentation)**.
12. **Pandi, S.R.,\*** Nittala S Sarma, N.V.H.K. Chari, K. Narasimha Murthy. Estimation of chlorophyll concentration using second order derivative spectroscopy in marine coastal. National conference on “Frontier Research areas in Organic Synthesis” at the department of organic chemistry, Andhra University, Visakhapatnam. 29-30th Nov. 2011 (**Poster presentation**)
13. **Pandi, S.R.,\*** Nittala S Sarma N.V.H.K. Chari, K. Narasimha Murthy. Specific absorption of chlorophyll in different algae. Recent developments in cultured Algae, April 4-5, 2009. OASTC, Andhra University (**Poster presentation)**.
14. **Pandi, S.R.,\*** N.V.H.K. Chari, Nittala S Sarma,\* Rayaprolu Kiran, Gundala Chiranjeevulu, K. Narasimha Murthy. Phytoplankton spectral absorption in the near shore regions of western Bay of Bengal during pre-monsoon season. ICMZ-2, National conference on Integrated Coastal Zone Management “ICMZ-12”, 24-25 Feb 2012, Berhampur University, Odisha (**Poster presentation)**.

**Areas of Research Interest:**

Biogeochemistry, Bio optics - Ocean Colour remote sensing, and water quality assessment.