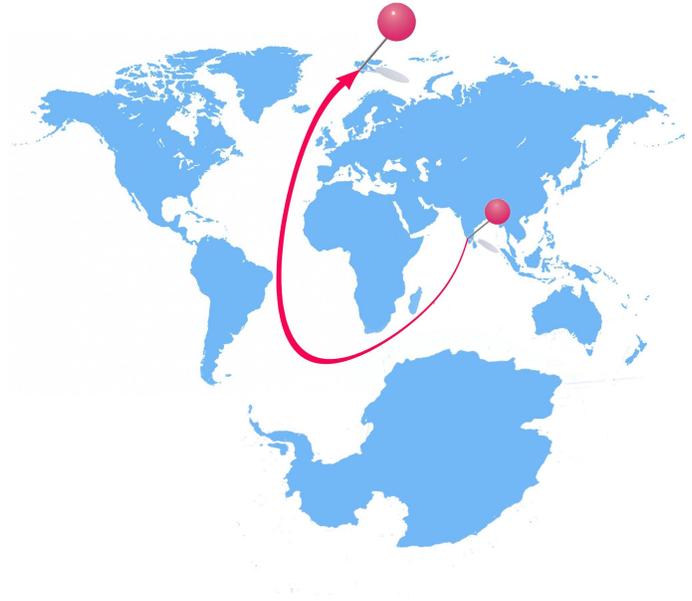




Neelu's story: From India to the land of the midnight sun

Ocean



[Photo caption] Dr Neelu Singh - Marine Toxicologist working in Svalbard

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Photo courtesy of Dr. Neelu Singh

I live in Longyearbyen, the only major settlement on the remote Arctic island of Svalbard, Norway, where I investigate marine Persistent Organic Pollutants (POPs) in the polar ocean. My research team travels by ship to collect sediment samples from the ocean, and I analyse the plastics we find to understand where they come from and the impact they have on living creatures and the environment.

Svalbard is growing in importance as a summer tourist hub. Located above the Arctic Circle, in summer the sun never sets, and in winter we live in 24 hours of darkness. Many polar researchers also work here, but otherwise the island is shared only with polar bears, seals, reindeer and Arctic birds.

I studied Marine Geochemistry at Mangalore University and then at the National Center for Polar and Ocean Research in India. My journey in the field of polar research began in 2008, when I got the opportunity to participate in the Indian Antarctic Expedition. This was the first time I got the chance to be in Antarctica and to feel personally how pristine and divine the Polar Regions are. The immaculate environment gave a gleam to my dream – to work in Polar Regions.

After completing my doctoral degree, I travelled around 7,530 miles from a tropical country to Svalbard, which is a land of midnight sun. I have spent seven years working in the field of environmental chemistry in polar regions. I now have extensive expertise in the study of Trace Metals and Persistent Organic Pollutants (POPs) in the polar regions.

My research experience and expertise has inspired a deep interest in the connections between Persistent Organic Pollutants, plastics and global climate issues related to environmental

pollutants. I am passionate about communicating science and hope that these hands-on activities I have co-developed with educators will help everyone to understand how plastic pollution in their own homeland can end up in the Arctic ocean, due to marine transportation.

Background



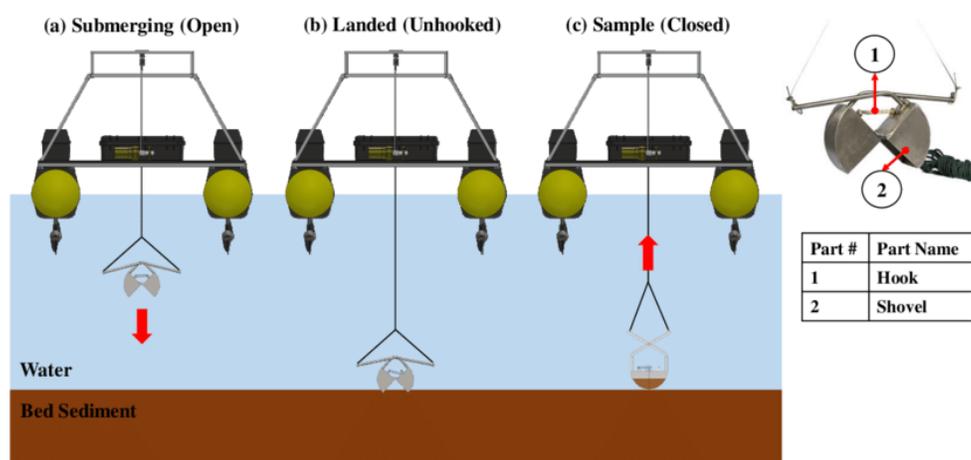
My PhD research project focused on the Assessment of Persistent Organic Pollutants and heavy metals in the Kongsfjorden, Ny-Ålesund in Svalbard. I took part in five Indian Arctic expeditions (between 2012-2015) on board a ship to collect sediment samples from Kongsfjorden.

[Photo caption] Ny-Ålesund is one of the four permanent settlements on the island of Spitsbergen in the Svalbard archipelago. It is one of the world's northernmost settlements at 78°55'N 11°56'E and is inhabited by a permanent population of around 30–35 scientists and support staff.

Credit: Harvey Barrison - Flickr: Ny-Ålesund_2013_06_07_3603

Source: https://en.wikipedia.org/wiki/Ny-Ålesund#/media/File:Ny-Ålesund_2013_06_07_3603.jpg

On these expeditions, I developed skills in sample preparation (for example, sorting and grinding samples to produce much smaller particles) and analytical techniques. I collected sediment samples using a Van Veen grab sampler (with the help of a colleague from the logistics team!).



[Photo caption] How do you sample sediment with a Van Veen grab sampler?

Credit: Bae, J. H. et al (2019) conference paper

DOI: [10.23919/OCEANS40490.2019.8962837](https://doi.org/10.23919/OCEANS40490.2019.8962837)

Source:

https://www.researchgate.net/publication/338734264_Development_of_an_Unmanned_Surface_Vehicle_for_Remote_Sediment_Sampling_with_a_Van_Veen_Grab_Sampler

To measure and analyse Persistent Organic Pollutants and heavy metals in sediment, we use a variety of scientific instruments:

- Inductively coupled plasma mass spectrometry (measuring the plastic particles by ionising them and dividing them according mass)
- Cold vapour atomic fluorescence spectroscopy (shining ultraviolet light on the sediment particles can reveal mercury)
- Gas Chromatography-Mass Spectrometry (a combination of methods).



The outcome of this study, which informed my doctoral dissertation in 2019, revealed spatial and temporal variations in the distribution of these pollutants in the Kongsfjorden system. At this time the impact of toxic metals on the fjord sediments from local industry (such as mercury from the fishing industry) was negligible. However, in the case of Persistent Organic Pollutants, the local sources were making a more significant contribution and cannot be overlooked.

[Photo caption] An Arctic skua flies in front of Kronebreen Glacier looking out over Kongsfjord, in this photo taken from the team's drone. Ny Ålesund, Svalbard, Norway.

Credit: Photo by Mark Golder, PolarTrec 2021 'Kongsfjorden' - ARCUS Polar Media Archive
 Source: <https://media.arcus.org/category/arctic?page=1#cbp=31712>

Current Role

I have been chosen as an International Arctic Science Committee (IASC) fellow (2021-2022) from Norway for the Marine Working Group (MWG). As an IASC fellow, I contribute both scientifically and administratively to the working group's activities. Recently I participated in a workshop on a strategic research plan for Arctic marine research aligned with the [United Nations Decade of Ocean Science for Sustainable Development \(UNDOS\) Arctic Action Plan](#).

Along with other members, I have developed a strategic document that outlined a new working group strategic plan and formulated the group's contribution to the fourth International Conference on Arctic Research Planning (ICARP IV). The IASC fellowship is helping me to develop good collaboration and networking skills.

Pristine Arctic or PlasticArctic? by Neelu Singh, 2021 IASC Marine WG Fellow, 17 November 2021

<https://iasc.info/news/iasc-news/891-pristine-arctic-or-plastarctic-by-neelu-singh-2021marine-wg-fellow>