

STATEMENT OF PURPOSE

Applicant's name: Vipul Singh Rathaur

Applying for the PhD position in the IIT KGP-UoM Joint Degree Program

I opted for science in higher secondary school and I was rewarded the “*Innovation in Science Pursuit for Inspired Research*” (INSPIRE) scholarship by the *Department of Science and Technology*, for being in the top 1% of students in the board exams, to pursue study in science. After that, I got admission to one of the premier universities in the country- Allahabad University. Where I developed a keen interest in Geology. I was attracted towards geochemistry and palaeontology because of my fascination with fossils. I later received admission to the esteemed Indian Institute of Technology Kharagpur, where I crafted my interest in paleoceanography, paleoclimatology, and micropaleontology.

Last summer, I was selected for carrying out a summer internship at **Physical Research Laboratory**, India, under Dr Ravi Bhushan. The project was on interpreting paleoceanographic conditions using the core sediments from the Indian Ocean. I developed the age-depth model and quantified the paleoproductivity, got hands-on training with the instruments, and learned the identification of foraminifera. The best thing I learned during the internship was the pre-treatment of the samples and subsequent analysis for radiocarbon dating in a 1MV Accelerator Mass Spectrometer (AMS). I also got experience in sample preparation for stable isotope analysis. The opportunity gave me immense satisfaction, and strongly catalysed my urge for research.

Additionally, I took a course last semester named "Marine Geosciences" as part of my curriculum. This course allowed me to better understand the various oceanographic and atmospheric processes that have impacted the Earth in the past and in the current stage.

I am working on a ten-month project at IIT KGP, as part of my masters' dissertation, under Prof. Anil Kumar Gupta. The project involves a study based on the pteropod assemblage to decipher the surface water palaeoceanographic changes in the south-eastern Arabian Sea during the Holocene. I'm utilizing the Limacina Dissolution Index (LDX) to determine aragonite preservation history as well as analyzing the shell size of *Heliconoides inflatus* to understand palaeoproductivity and in-life dissolution of pteropod shells. During this endeavour, I learned about the identification of Pteropods. They are essential food for everything from juvenile fish to herring, mackerel, rays, seabirds, and whales. The loss or decline of pteropods and similar organisms can disrupt the entire food chain, like cutting a link in a chain. Even minor changes in their environment have a significant impact on these tiny pelagic snails.

Since the project includes the examination of the response of fauna and sediment properties in both the Indian Ocean and Red Sea to monsoonal changes. This project may offer crucial hints regarding the changes occurring today. The methodology that is going to be used in the project overlaps with my current research area. **The joint degree programme IIT KGP and UoM offer is ideal for me, and the project aligns well with my interests.** In the era of climate change, working on a project that will correlate past conditions with the changes that are

happening at an accelerating rate at present, will be essential towards understanding future climate change. The outcomes of the study could lead to significant findings and help me to launch a successful academic career.

I will be benefitted from the world-class academic supervision of two renowned scientists who have immensely contributed to this field. It perfectly combines eminent faculty, excellent research facilities, pleasant university ambiences and a balanced academic program. Also, I will embrace the challenge of living abroad in a brand-new country. The ongoing interdisciplinary research activities along with an excellent research team at IIT KGP & UoM will provide me with a proper work environment congenial to the research field.

My future goals would be to choose a post-doctoral position after this doctoral study and eventually to engage in teaching and research as a career option. I would love to see myself being a professor nurturing and educating young minds. I believe that choosing this project will satiate my research interest and provide an opportunity to scale the ladder of success and establish myself as a scientist.

I sincerely thank the Joint Programme Board, IIT KGP-UoM for giving their precious time for going through my statement of purpose.