

# MY JOURNEY AS AN IASc-INSa-NASI SUMMER RESEARCH FELLOW AT IIT ROORKEE

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This past summer, I had the opportunity to be an IASc-INSa-NASI summer research fellow at the prestigious Indian Institute of Technology Roorkee under the guidance of Dr. Nitin Khandelwal at Department of hydrology. As a Master's student in geology, I wanted to venture beyond ordinary geological subjects, that led me into this research project which addresses environmental remediation.

My research work was focused on a critical environmental issue: the removal of nano-plastics from water bodies. These minute plastic particles pose a great threat to the aquatic ecosystems as well as human health and their removal was very difficult. To address this challenge, my project focused on designing nano-enabled sponges that could capture and remove these contaminants from water.

As a student of geology, moving into the fields of nanoscience and material chemistry proved to be arduous yet thrilling experience as well. My mentor's guidance was invaluable in understanding these new subjects. His patience and expertise provided me with the insight into complex concepts and thus facilitated my understanding of how to merge geology with nanoscience.

The project started with an extensive literature review to understand the existing solutions and the missing links. During the first few weeks, I was mostly occupied by getting familiar with properties of various kinds of materials as well as learning how to use equipment and techniques that are necessary for making and testing nano-enabled sponges. We experimented on and with different materials, trying to improve their structure and properties so that they could attract nanoplastics better. The whole process was intensive through numerous trials as well as errors whereby every trial brought us closer to our goal. The initial results were encouraging, demonstrating that the nano-enabled sponges had an ability to effectively capture nanoplastics from water. Nevertheless, there is still much work to be done, these findings serve as a major breakthrough in terms of resolving the environmental hazard caused by nanoplastics.

Within this fellowship, I have gained more insight into scientific research processes starting from formulating a hypothesis up to interpreting data after analysis has been done. Getting hands-on experience using sophisticated laboratory techniques and instruments has been particularly helpful for my academic as well as professional growth. At the same time, I was engaged in personal interaction with other researchers and students leading to dynamic learning environment which fostered supportive attitudes towards one another. In addition, I used to present my findings to peers during the weekly lab meetings, which helped me to improve my oral presentation skills. This fellowship not only broadened my knowledge and skills but also reaffirmed my interest in environmental geology and inspired me to continue pursuing research that contributes to environmental sustainability.

Living on the IIT campus was an experience itself. The campus is incredibly beautiful, surrounded by greenery and with a blend of modern facilities and historic buildings. Walking around the campus gave me a sense of calmness every morning before heading into the department. Interacting with students and faculty from different backgrounds have given more meaning to my stay at IIT Roorkee. Experiencing the lively Haridwar atmosphere, walking along the ghats, and witnessing the Ganga Aarti added a special dimension to my time in Roorkee.

I am deeply grateful to Dr. Nitin Khandelwal for his mentorship, to IASc-INSa-NASI for providing this huge opportunity and to IIT Roorkee for the excellent facilities and resources. The project of nano-enabled sponges for nanoplastic removal holds promising potential, and I am excited about the future possibilities of this research.