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Joint PhD Program- IIT Kharagpur and University of Manchester

In Geological Sciences, I find a fascinating field dealing with the fundamental questions on the uniqueness of our planet and its processes in the vastness of space. This area of research has intrigued me since my school days as it lies at the intersection of my interests in geography and the fundamental sciences of chemistry, physics and mathematics. After taking up the subject in my undergraduate level at Jadavpur University, Kolkata, I have worked towards developing my knowledge and acumen required to establish myself as an independent earth science researcher. Thus, after undertaking foundational courseworks and extensive fieldworks in my Bachelor's, I pursued my passion to delve deeper into this field by taking the advanced courses in Geochemistry, Mineralogy and Igneous Petrology as a Master's student at the Indian Institute of Technology Kharagpur. I have also gained the technical knowledge on handling the optical microscope, XRD, EPMA, LA- ICPMS and other geochemical and petrological analytical instruments.

Thus after having studied my Bachelor's and Master's at two premier institutions of India with rich scientific heritage, my interest in pursuing research has grown even more stronger. In the summer of 2021, I pursued a research internship at the Physical Research Laboratory Ahmedabad, India where I worked on the geochemical comparison of Depleted and Enriched Martian Shergottites with the Deccan Basalt along with other terrestrial rocks suites like the N-MORB, E-MORB and OIB. It was done by analyzing the various geochemical plots of the different major oxide and trace element data gathered from the spectroscopic or geochemical analysis of the samples available in various literature sources. This work, under the guidance of Dr. Dwijesh Ray, was done in order to infer the geochemical properties of the Martian crust and the mantle and analyze the possibility of using the Continental Flood Basalts like the Deccan Traps as a potential geochemical and petrological analogue for Martian Basalts. This work has been selected for being presented as an i-poster at the hybrid 53<sup>rd</sup> Lunar and Planetary Science Conference- LPSC 2022 to be held at The Woodlands, Texas, U.S. Additionally, I have gained experience in Planetary Geology due to my work on the Lunar spectroscopy in my Master's Dissertation under the guidance of Dr. Saibal Gupta at IIT Kharagpur along with my participation in the anomalous Lunar impact melt mapping project using LROC data and ArcGIS over the last summer. These projects have allowed me to gain a first-hand experience in framing right questions, handling large datasets, gaining insights, managing deadlines and developing a scientific mind.

Hence, I am highly interested in getting the opportunity to pursue the Joint Doctoral program on understanding the petrology of Deccan Traps and its varied implications on other aspects of Earth system. Deccan Traps is one of the best preserved Large Igneous Provinces on Earth and acts as the archetype of the Continental Flood Basalt. It is one of the most actively studied areas in Geosciences and a widely accepted consensus on its origin, geochronology, emplacement rate and volatile release is yet to be attained. Volatile release during emplacement of Deccan Basalt may also have had severe climatic consequences which could have been one of the reasons contributing to the mass extinction at the K-P boundary. Further, the weathering pattern and secondary mineralogy of the region enables us to use the Deccan Basalt as the geochemical and petrological analogue site for Martian Basalt. Thus, the opportunity to collect core samples from the region coupled with the ability to access the world class facilities at both universities for sample analysis is highly intriguing and would contribute significantly to better understanding of the one of the most fascinating period in the Earth's geological past.

Thus to conclude, I would like to state that I am aware of the trials and tribulations encountered during a Ph.D. program, ranging from spending long days at the laboratory to conducting experiments beyond

## STATEMENT OF PURPOSE

usual work hours, undertaking laborious fieldwork to acquiring soft skills all the while managing extensive coursework. But, I believe my background of undertaking rigorous coursework at my undergraduate and postgraduate levels along with my experience of working in diverse research labs while handling diverse scientific projects throughout my academic career has enhanced me as a person and has boosted my curiosity for research. Further, owing to my prior experience in handling the geochemical data of the region and my familiarity with it, I am confident about my fruitful contribution towards achieving of the research objectives of the project.