Statement of Purpose

I am Abhishek Datta, I am writing this statement for my sincere interest in the joint doctoral position on Microbial cycling of Arsenic in aquifers at IIT Kharagpur and University of Manchester. I have completed my Masters in Biotechnology at the Indian Institute of Technology, Bombay (2020) and I look forward to an opportunity in learning as well as contributing to the field of Geomicrobiology and Environmental Microbiology.

I believe that the set of skills that I have acquired during my master's dissertation will make me a good fit for this position. I have worked under, Dr. Anirban Banerjee (Associate Professor, IIT Bombay) on the project "Construction of various secondary structures of capD mRNA in *Streptococcus pneumoniae* by site-directed mutagenesis" where I had hands-on experience in the evaluation of an RNAThermosensor which is suspected to be responsible for the pathogenic transition of the opportunistic pathogen *S. pneumoniae*. I have performed a comparative analysis of the mRNA transcribed and the protein translated from the gene capD which codes for a putative RNA-Thermosensor in *S. pneumoniae* using qRT-PCR and Western Blot at different temperatures. I have cloned this specific gene in both Escherichia coli and S. pneumoniae background & performed site-directed mutations on the promoter sequence of this gene to identify the nucleotide residues responsible for the thermosensing property.

During my internship at University of Calcutta, I have studied the effect of phytochemicals isolated from Plumbago leaf against Candida biofilm and septicemia. I have also studied the shrinkage of mammalian WBC upon incubation with the same isolates. Apart from this, I have learned to identify and extract bioactive chemical components from plants using thin-layer chromatography and column chromatography.

I have gained intensive research experience as a part of my M.Sc. project and as an intern during my bachelor's. I find myself particularly inclined towards the field of Microbiology and I wish to take this up as my research focus during the further course of my studies. Having studied microbiology, biochemistry, and molecular biology, as a part of my undergraduate as well as postgraduate studies. I have a sound background in the theoretical as well as the practical aspects of these subjects. Microorganisms are omnipresent and are even associated to healthy life. All though they are microscopic but the contribution of microbial communities to the environment is enormous. Understanding a microbe can reveal metabolic secrets that can be manipulated either directly or indirectly for bioremediation purposes. Shortly after my High School I came to know about Dr. Ananda Mohan Chakravarty, who became famous for his genetically engineered oil eating Pseudomonas bacteria. This, along with all the other remarkable aspects of microbiology encouraged me to pursue my higher studies in this subject. Understanding bacterial metabolism has always been a way to search for potential therapeutic targets in pathogens, modulate it for enhanced production of certain chemicals which are difficult to manufacture otherwise, and lastly reengineering them for bioremediation purposes. Out of all these three novel aspects I believe it is very essential for us now to concentrate especially on bioremediation, as the pollution levels are increasing at an exponential level in today's world. The first step of bioremediation is to identify certain microbes that utilize the toxic compound for some purpose and to understand that mechanism at a molecular level. I believe working in this project will provide me an opportunity to learn the techniques and develop knowledge on identifying potential microbes involved in cycling of arsenic and understand the molecular mechanisms involved. It is crucial for us to invest more time, resources, and capital in developing bioremediation strategies for a cleaner and healthier future.

I consider myself as a hardworking and disciplined student, and I am motivated to gain deeper insights in the field of environmental microbiology. I am accustomed to working independently as well as being a part of a team. To conclude I would like to emphasize my keen interest for this project and given the opportunity, I believe, I would be able to implement the skills that I have learned during my masters and bachelors to this project.