

Statement of Purpose

Sunandan Naha

Project Name: - “Microbial Cycling of Arsenic in Aquifers”

IIT Kharagpur-University of Manchester Joint PhD Program

IIT Kharagpur-Manchester University Joint degree program has made me very curious about one of their proposed projects i.e. “Microbial cycling of Arsenic in aquifers” as this project is relevant to my interdisciplinary study background and research experience as well. I have done my B.Sc. in Microbiology which is the key factor of this project. Physics and Chemistry were my supporting subjects during B.Sc. which helps me to understand and apply Microbiology in a more facilitating way. Then I have done my M.Sc. in Marine Science where I have studied about Geology which is also a crucial part of this project. However, my Master’s dissertation was on effect of physicochemical characters on abundance of coliform bacteria which contaminates the aquatic ecosystem. During the project I have done an extensive field sampling with similar proportion to the lab work. Starting from planning of work to the thesis writing and presentation, all these steps I have done individually and independently. After my M.Sc. I was involved in three different interdisciplinary projects for about 2.5 years which makes me enriched with preparation, planning, application and presentation about research. My first project was on algal taxonomy study of marine water samples, analysis of physical, chemical and biological parameters of water sample and molecular analytical techniques of algal sample purified from marine water. My second project was on aquaculture research about pond and estuarine ecosystem by physicochemical and microbial point of view. Then my third project was on bioremediation where I was working on zooplankton purified from river which could act as biofilter to treat wastewater. Then I have done my M.Tech. in Biotechnology to enrich my knowledge about latest Biotechnology techniques including Genomics, Proteomics, Metabolomics, Bioinformatics, latest software used in Biotechnology and so on. My Master’s Thesis Project was on the wastewater treatment along with bioelectricity generation using microbial fuel cell. I have prepared the whole project plan by myself alone including sampling, data collection, lab experiments, data processing, thesis writing, journal article writing and presentation of project work. During the work I have published two publications in reputed journals; two book chapters and four conference poster presentations during this last one year and two more research articles are under preparation right now.

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Now the question comes why am I so motivated to apply for this project. From my point of view, several answers are there to address this question. First of all, this project is a highly interdisciplinary project which is relevant to my knowledge of interdisciplinary study background, research experience, skills and publications and of course I have the eligibility criteria defined by the authority. Next fact is, the content of the project. This project is basically related to which area where I used to live and thus it is a major concern to me as well being a habitat of this area. Arsenic contamination is like a nightmare to many peoples of Bengal. Water is called as the other name of life but when such water is getting literally poisoned by a molecular villain with atomic no. 33, the whole life might get ruined. Now the responsibility comes to us who can use their knowledge, their expertise, their skills and their all facilities to change the pathetic scenario. If we try hard with all our latest weapons like Genomics, Proteomics, Metabolomics, Next Generation Sequencing and so on for Microbiological and latest atomic level analytical techniques for Geological studies, we can make a change. Arsenate reductase is the enzyme responsible for Arsenate reduction. We need to investigate the marker gene for the Arsenate Reductase through 16s rRNA sequencing. We need to make sampling as a spatiotemporal basis from each and every geomorphological area of West Bengal and associated concerned and we should analyze the samples to as much as we can to determine the potential of microbial catabolic activities, the physical environment concerned and chemical factors including potential organic and inorganic nutrients which will feed the organism. In fact, we can find out a novel microbial species which works efficiently in all physical and chemical conditions. Finally, I always dreamed in my life to be a researcher in such a field where I can do something for the common people following the lines by Albert Einstein “A hundred times every day I remind myself that my inner and outer life are based on the labors of other men, living and dead, and that I must exert myself in order to give in the same measure as I have received and am still receiving”.