Statement of Purpose

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One of the challenging things to do in the world in educational terms is the Ph.D., but the rewards are beneficial to humankind. The self-fulfillment and satisfaction I achieve from it push me to go through all the hard work and toil. A constant urge to learn and explore the life sciences, an ambition to make services for the growing technological world and contribute to its development has led me to study engineering. I feel a driving force of observing the nature and practical utility of research work exciting me towards my goals.

From my schooling times, I have shown a very keen interest in the subjects of mathematics and physics and applying the principles to chemistry, which have enhanced my analytical and quantitative skills. This was when I decided to choose Mechanical Engineering as my primary field of study at the undergraduate level. In my undergraduate years, I have been given comprehensive training in essential sciences and engineering, emphasizing my major professional beginning from the fourth year**. Although loads can be calculated and joints can be reinforced, it is the material used that controls the most at the end of the day.** I learned this lesson during my final year project, i.e., All Terrain Bot. The bot material selection was the most challenging part, which my team and I had spent days preparing for. This event has inspired me to enter the world of material science. The zeal to know deeply about different materials, structures, properties, and thrust to develop better material encouraged me to take the Metallurgy and Materials Engineering field of specialization for my Master's study. Further, while studying the coursework in materials, I realized that Material Characterization has emerged as an indispensable method for scientific research of materials parallel to experiment, computational, and theory. Therefore, I decided to take with a major in Material Characterization as a field of specialization for my doctoral study.

My schooling had helped me in acquiring a good percentage (77.4%) in 10^{th} grade. I passed out my 12^{th} grade with 86.4%, and I got 96% in physics, 96% in chemistry, and 96% in mathematics, culminating in my achieving 1st rank in the school.

After completing my undergraduate program with 75.18%, I performed well in the GATE (Graduate Aptitude Test in Engineering), a national level and extremely competitive exam for entering into the Master of Technology (M.Tech) program. I joined **the Indian Institute of Technology, Jodhpur** (IITJ) for my post-graduation. My objective in pursuing an M.Tech in Materials Engineering is to acquire an in-depth competence and hone my intellectual ability in this engineering stream. Here, I worked in the field of Fatigue and Fracture under the guidance of Prof. Abir Bhattacharyya. I believe my education, good interpersonal bits of intelligence, and working under my professor make me a competitive candidate.

To prepare myself to undertake my future research in this direction, for my M.tech thesis, I choose to work on **Mechanical and Micro Structural Characterization of Rolling Contact Fatigue loaded bearing steels**. My goal was to quantify the fatigue damage within bearing steels as a function of RCF cycles. To characterize the subsurface fatigue damage, I have adopted a micro indentation and micro compression study-based approach and optical and scanning electron microscopy. I have prepared specimens for microstructural characterization using an optical microscope, scanning electron microscope (SEM). Combined experimental and Dislocation cell formation model is developed which based on Dislocation assisted carbon migration theory and Neuber's rule to estimate white etching formation with the continuously evolving cyclic plastic strain amplitudes in plastically deformed subsurface regions of M50 bearing steel subjected to rolling contact fatigue (RCF) over several hundred million.

After I joined Prof. Abir Bhattacharyya as Junior Research Fellow, I worked on designing fixtures for tensile and simple shear mechanical testing of soft polymeric materials. Since January 2021, I am working on developing a finite element sub-model for determining local stress field near alloy carbides in M50 bearing steel subjected to rolling contact fatigue loading.

I request you to consider this mail for admission for Doctoral study. I strongly feel that I can match the high standard of your university. Thank you for allowing me to express myself.