

## Statement of Purpose

Research and innovation is a field that deals with solutions to real-life problems and can bring about a change in our standard of living. Being a part of such a dynamic field enables us to keep evolving along with the field. Pursuing a path in research is to completely dedicate yourself to changing people's lives for the better. During my early days, I had read chapters about scientists who changed the world. Since then, this desire to contribute to change in the world always remained. This desire to contribute led me to develop a deep interest in science in school. Soon after, I decided to walk on the path of science and I joined the science stream after passing out from school.

In 2017 during my bachelors' degree, I did a research internship in my institute. This internship served as my first encounter with research and the experiences, lessons and skills acquired from that first internship shaped my view of research today. One particular experience I had was that I had to approach the synthesis of a compound by using one particular route which was reported. We synthesized the compound using the reported route, but the compound's yield was poor. So we started to find the reason behind that and ended up approaching the synthesis of the same compound with an alternate route with a much better yield. This experience gave me an idea of how research worked, if one approach failed simply reason out the failure and try another approach or make changes in your original approach. In 2019 during my final year in B.Tech, I got an opportunity to do a research project. During this project, I came across a nanofiller known as nanoclay and gained knowledge about a new and highly interesting class of materials known as nanocomposites. I read articles detailing nanocomposites' superior properties and their potential use in high-end applications like energy storage, high-impact strength applications, water treatment, etc. These potential applications served as motivation for me to pursue this domain as it could potentially change people's lives for the better. After graduation, I pursued a masters' degree in polymers to further learn about polymers for pursuing my research goal. I did a masters' project that dealt with the incorporation of nanoclay in adhesives. This project was a collaboration between IIT Delhi and Pidilite Industries Limited, which is one of the most well-known adhesive companies in the country. This was a really big deal for me since it was the first time I was doing an industrial collaboration project. This project gave me a platform to experience the superiority of nanocomposites and this was the type of project I had always wanted to work on since first coming across the concept of nanocomposites. These experiences sparked in me a desire to learn in-depth about nanocomposites and their potential applications, which is the reason I want to pursue a PhD. I wish to pursue a career in research and development in the future and a PhD degree is essential for the same. A PhD degree is the highest academic degree awarded and this degree will allow me to further explore the already vast domain of nanocomposites and their potential applications in critical areas which are less explored.

IIT Kharagpur and the University of Manchester are two of the most renowned institutions in the world. These universities are well-known for impactful research. A joint doctoral program with these two universities will give me a lot of exposure to the cutting-edge research going on in the respective universities. The project I am interested to pursue is related to the use of graphene and both universities are equipped with top-class research facilities and people who are extremely knowledgeable about their respective fields. This makes my motivation to pursue a doctoral program from these universities even stronger.

My goal is to join the research and development division in the industry and develop nanocomposite materials for high-end applications. I realize that my current knowledge is limited and that a PhD degree will greatly help me in acquiring more knowledge and expertise in this particular field. Through this PhD, I will continue to hone my research and creativity skills. I look forward to working on research projects both independently as well as as part of a team that can benefit my community and the world. The problem-solving skills that I will hone during my PhD will help me in tackling more complex and challenging problems in the future.