

STATEMENT OF PURPOSE

Upon coming across the advertisement for a joint studentship opportunity for doctoral research at IIT Kharagpur and the University of Manchester Institute that aligned perfectly with my research interests, I was filled with excitement at the possibility of working with Prof A.R Mohanty and Prof Sergey Utyuzhnikov in their respective labs. The research outcome of this project has the potential to make significant contributions to the industrial sector, which motivated me to apply for this opportunity. With an undergraduate and Master's degree in Mechanical Engineering, I was on the lookout for an environment that would encourage and facilitate my growth in the field of research and development.

My MTech research project under the guidance of Professor Amiya Ranjan Mohanty at IIT Kharagpur involved detecting leakages in condenser pipes. The project was executed by building a prototype model using flexible and PVC pipes that included holes, cracks, and no defects inside an acoustic room with an air compressor outside. To record the sound pressure level, a microphone and battery-powered CCLD Signal Conditioners were used in LabVIEW. Furthermore, a vacuum system was produced that allowed creating a vacuum inside the entire prototype model such that air goes inside the pipe through the defects. To create more data and validate them with experimental data, a Computational Fluid Dynamics (CFD) model was created. The recorded data obtained from different pipes in both conditions were analyzed to predict the presence of leakage by applying machine learning techniques. This project allowed me to develop skills in experimental techniques, data analysis, and computational modelling, and I gained insights into the practical challenges associated with research in the field of mechanical engineering. The experience has motivated me to pursue further research in this field, and I am eager to apply the knowledge and skills gained in this project to further research.

In addition to my academic studies, I have a track record of excellence in sports and leadership. I was awarded the title of Best Sports Person of the Year during my undergraduate studies in 2018. As the President of Sports at my university, I successfully organized a sports fest that showcased my sportsmanship and leadership skills. I am proud to have represented the Pune University football team at the National level All-India University Football Championship in 2019, where we secured 13th place out of all the teams in India. Furthermore, in 2022, I was selected to play for the IIT Kharagpur Inter IIT Football team, which was a great honor for me. My leadership qualities have also allowed me to develop additional skills, such as managing financial budgets, logistics, and inventory. I had the opportunity to hold the position of General Secretary of Sports and Games for one of the residences at IIT Kharagpur during the 2021-2022 academic year, which provided me with valuable experience in managing events and resources. These positions are

a display of my leadership skills and my ability to coordinate and work as a team player in any circumstance I am placed in.

I believe that this opportunity will be instrumental in shaping my research career and will help me overcome the challenges that I may face in the future. By participating in this doctoral program, I hope to acquire advanced skills and techniques that will help me solve complex research problems. I am confident that this experience will not only enhance my professional growth as a full-time research scientist but also as a team player and a strategic thinker. I am excited to contribute to the research community by bringing in fresh ideas and a new perspective gained through this program.