

# **Statement of Purpose**

The enclosed statement of purpose is meant to put forth my aspiration for admission and financial aid to the Ph.D. program on the topic of “Cavitation bubble dynamics experimentation and numerical modelling using smooth particle hydrodynamics (SPH)” at your esteemed universities, as well as description of my plans subsequent to my graduation.

I am currently working in Eaton Corporation for more than four (4) years in Aerospace domain as Product Design and Development Engineer. I have completed a two (2) year's Master's Program leading to the degree Masters of Technology (M. tech) under the Aerospace Engineering department specialized in Aerodynamics from the Indian Institute of Technology, Kanpur, India, one of the prestigious universities in India and recognized worldwide (QS ranking 277) with CPI 9 out of 10.

I was introduced to mathematics, physical sciences, social sciences etc. in school but it was mathematics and physical sciences that really intrigued me and captured my mind and imagination. I always wanted to have a career in which I could understand real life problems around me and see mathematical and physical aspects. As time passed, I realized that it was the field of engineering and technology that provided unfolding challenges and opportunities to solve real-world problems. Hence, the ultimate dream took the shape of becoming an aerospace engineer. I was inspired for aerospace engineering solely by understanding the working principle of aircraft. My undergraduate education in aeronautical engineering has provided me a sound background in aircraft and aerospace technologies that has kept me abreast of latest developments. After joining the masters' program in Aerospace engineering, I learned fluid dynamics, thermodynamics and computational fluid dynamics (CFD) and these subjects really caught onto me.

With the growing interest in the field of fluid dynamics, I went on to do Master of Technology in Aerospace Engineering with Aerodynamics specialization from Indian Institute of Technology Kanpur. As I was determined to work in the field of basic fluid dynamics and explore it in depth, I chose a project on ‘Finite element simulation of flow in a Y-intake of a supersonic aircraft’ under Professor S. Mittal. The aim of the project was to conduct three-dimensional numerical study of supersonic flow field inside a bifurcated Y-duct. I contributed in the development of in house CFD code (FORTRAN coding) which is based on Finite Element SUPG method. At the same time, I attended the courses ‘Heat and Mass Transfer’, ‘Fluid dynamics’, ‘Turbulence’, ‘Aerodynamics’ and ‘Acoustics’ which enhanced my interest in fundamentals of fluid dynamics. The two years in IIT Kanpur were fascinating for me. Based on my skills, I got placed in the Eaton India Innovation Center as a research and development engineer. There, I worked on several R&D projects like design and development of non-metallic couplers for the use in fuel line, Air-taxi thermal management system, Optimizing the old designs of aerospace products. Mold flow analysis, structural and vibrational analysis, FEA, numerical calculations, experiments are part of my research job in Eaton Corporation. Also, Provisional Patent is granted on designing the electrical path for a non-conductive fuel line.

My decision to pursue a Doctor of Philosophy (Ph.D.) on the proposed topic roots from my personal experiences right through my academics and professional journey. For my doctorate studies, I want to work further in the field of fluid dynamics, experimental and computational methods to resolve real life problems. The choice of a good university with a faculty dedicated to teaching and research and an atmosphere conducive to learning, thus becomes extremely necessary. Being a prospective student, I believe that the provided research opportunity by very

reputed and recognized organizations Indian Institute of Technology Kharagpur and University of Manchester will prove an arsenal to constitute a solid background for research, which has captivated my desire. The doctoral program will bring out the best in me. After obtaining a Doctor of Philosophy (Ph.D.), I intend to continue my studies to get a Postdoctoral degree. After completing my education, I will like to pursue my career in academics and make break-through researches in the field of my interest which is fluid dynamics.

I wish to aver that I will make maximum use of all the opportunities bestowed upon me and shall pursue my goals with whole hearted dedication and can live to the high standards set by the university. I sincerely hope that my application for admission is favorably received.

Sincerely,  
Ayantika Das