

## STATEMENT OF INTENT

### MASTER OF APPLIED SCIENCE IN BIOMEDICAL ENGINEERING

### INSTITUTE OF BIOMATERIALS AND BIOMEDICAL ENGINEERING

### UNIVERSITY OF TORONTO

APPLICANT NAME: ARUSHRI SWARUP

INTENDED START DATE: SEPTEMBER, 2016

My name is Arushri Swarup and I am a Biomedical Systems Engineering Science student in my final year at the University of Toronto. I have developed biomedical engineering solutions through my professional experience year and undergraduate course work. I am a driven, optimistic engineer, eager to apply and enhance my skills in exciting, new biomedical engineering challenges. I am passionate about learning new technologies and how to apply them to prototype biomedical engineering solutions.

During my internship at Baylis Medical I took on many roles including documentation, project management, verification and validation testing, and design of manufacturing processes and fixtures. I built up skills in Solidworks, 3D printing, and basic machining to develop fixture prototypes that were tested and further improved through team collaboration. I managed a RoHS compliance project where I communicated with component suppliers and the quality department, took meeting minutes, managed documentation and a project plan. I also designed, conducted, and implemented verification and validation testing of devices according to IEC 60601-2-2 standards for electrical cables. Additionally, I worked with an engineer to perform technical investigations for problems in production, using mechanical force and geometric analysis, and implemented the solution. This experience enhanced my engineering problem solving, communication and project management skills.

Upon completing my internship, I applied the skills I learned to projects during my final year of undergraduate biomedical engineering training. For my thesis project, I am developing a computer model to simulate enhanced transcutaneous nerve stimulation as a future treatment of overactive bladder. Before embarking on this project, I surveyed the literature to learn about electrical nerve stimulation and overactive bladder. Next, I developed a computer model of a simplified human leg with surface electrodes stimulating the nerve. Analysis of the resulting nerve stimulation shows nerve excitability, which I am measuring to determine optimal

positioning of the electrodes. This project will be finally communicated via a thesis report and presentation. I have worked alongside graduate students and my supervising professor to determine the goals of the project. As a result, this project has given me an experience similar to that of a Master's student.

Furthermore, I worked on the design of a modified surgical tool for Endoscopic Ear Surgery. In a team of five engineering students, and under the guidance of an ENT Surgeon at SickKids Hospital, our team used Solidworks, 3D printing and Mill machining to develop a functional prototype that was tested in a cadaver ear canal. Moreover, I intend to transform this into a Master's project at IBBME under the supervision of the ENT surgeon at U of T. I aim to refine this tool so that it can be successfully utilized in the operating room. I also intend to survey the current tools used for endoscopic ear surgery and conduct a surgical time flow study. I will use these studies to test the efficacy of newly developed tools. Through the Master's degree, I also intend to enhance my technical and analytical skills to overcome the day-to-day challenges. This project has the potential to advance endoscopic ear surgery by a great deal. The development of new tools directly impacts surgeons, operating room staff and patients. Observing this impact first-hand motivates me to develop better, safer designs as an engineer. After completing my Master's degree, I look forward to commencing a career in engineering medical devices.