**Statement of Purpose**

As an eager mind who wants to explore the natural phenomenon of the simple yet complex intricacies of bio-physical orders of the universe, I have always grabbed every opportunity that came across to get involved in research works pertaining to Bio-Engineering. My profound interest in this field has given me the impetus to pursue a PhD in this field, that would not only broaden my horizon this field, but would also give me the legs to steer my career towards a goal that I have aimed for in this field. I believe graduate education in the Bioengineering department of University of Illinois Chicago can provide an everlasting experience that will be significant enough to sustain my passion as an academic.

My formal introduction to Electrical and Electronic Engineering began at Islamic University of Technology (IUT), Bangladesh. Under its excellent faculty, I got acquainted with the entire spectrum of Electrical Engineering. In an environment that is intensely competitive, and where research goes hand-in-hand with learning, I had the opportunity to engage myself in both theoretical research work and implementation, thus laying a sound foundation for graduate study. I was ranked second in my undergraduate study with a CGPA of 3.98 out of 4.00.

I got the motivation and interest in Biomedical Engineering initially from a seminar conducted by Dr. SK Alam, a researcher in Biomedical-Imaging field from Riverside-Research-Institute, NJ. During my undergraduate study, I always had keen interest in Signal & Systems, Random Signal & Processes, and Digital Signal processing which ignited my interest and laid the foundation for me to probe into the fine details of Biomedical-Imaging. The first step towards this was when I decided to do my final year thesis, *“Breast ultrasound image analysis and automatic segmentation of cancer lesions”,* under the supervision of Dr. Alam. . My thesis was conducted in collaboration with National Institute of Cancer Research and Hospital (NICRH), Bangladesh. They provided us access to their patient data and ultrasound machines. Our vision was to develop such a computer-aided-diagnosis module that could detect breast cancer lesions and determine if the lesions were malignant or benign essentially providing overworked Radiologists diagnosis support.

As an undergraduate research assistant, I worked on optical character recognition (OCR) for Bengali scripts. We constructed a hypothesis on the efficacy of chain code feature for the recognition of Bengali script and showcased logical grounds to this hypothesis in this project. The output of this project was published in an International Conference and indexed by IEEE Xplore. In this project, I had experience with several methods like feature extraction, pattern & character recognition etc. which would be beneficial to my research work in the biomedical imaging field. I also worked on project relating to Elastography. We developed a software tool that allows researchers to use MATLAB parallel resources on a regular computer with no special hardware and without having any prior knowledge of parallelization. This ultimately reduces the computation time which is a significant issue in this kind of research. We have submitted an article based on this project to an IEEE conference and it is currently under review for publication.

Besides academic and research work, I have also been involved in several co-curricular activities. I led a team of four engineers to a national level business case competition called “Battle of Minds” organized by corporate giant British American Tobacco. Our team chemistry and strategy under my leadership won us the 2nd Runner-up prize competing with teams from other business schools. These leadership skills would help me gel well in a group and work in a coordinated way during my graduate studies.

Upon my graduation I got an offer to join in the Supply Chain department of the British American Tobacco (BAT). The offer being my first one as a fresh graduate I accepted and joined BAT Bangladesh but soon realized how much I miss academic and research environment. On that very month I got an offer letter to join the department of EEE of my alma mater IUT as a faculty member. I grabbed that offer and ended my short corporate life to pursue my passion for academia. I have been working in IUT from December 2013. As part of my teaching responsibilities, I have conducted some basic courses and labs on Electrical Circuits, Electronics, Signal processing, etc. In addition to that, I have been assisting different undergraduate thesis groups on their projects. I am also working as the Moderator of IUT Debating Society which has given me a wonderful platform to socialize with some of the brightest minds of IUT as well as Bangladesh. As a moderator, I have organized both national and international events and judged numerous competitions. I believe these experiences have given me exposure to professional networking with personnel from various backgrounds which will surely help me participate in collaborations with researchers or professionals from other backgrounds.

My academic and career objectives are focused on making significant contribution in the area of Biomedical Signal & Image processing. Throughout the graduate degree, I plan to explore advanced technological issues of biomedical imaging, in addition to gathering valuable research experience and expertise by taking part in various clinical collaborations and projects.

The department of Bioengineering of UIC truly offers wonderful opportunities to researchers interested in Biomedical-Imaging field. I am particularly interested in working with Dr. Xincheng Yao in his **Biomedical Optics and Functional Imaging Laboratory** whereadvanced opto-electronic instruments are developed and applied for functional imaging of retinal neurons, neural tissues, and endocrine cells. Current projects on various research areas like “**Functional imaging of retinal neurons**” and “**Functional imaging of beta cells**” coincide well with my research interest. During my B.Sc. thesis, I developed a segmentation algorithm that could detect lesions of cancerous tumors in breast ultrasound images using textural analysis and active contour modeling. I believe for the accurate identification of localized retinal neural dysfunctions associated with age-related macular degeneration (AMD), diabetic retinopathy (DR), glaucoma, and other eye diseases I could essentially contribute in the functional imaging and processing of the IOS images. I believe that opportunity to participate in such research works will be the perfect platform for me to pursue a research oriented career and at the same time, develop myself into a competent academician.

My goal after completing my PhD is to come back to my country and pursue my academic career as well as continue my research. I would like to initiate clinical collaborations especially with government institutions so that I could use my knowledge and expertise for research work that could essentially contribute to the health sector of Bangladesh. The different research works in bioengineering department are done in collaboration with many clinics and national institutions and if I get a chance to work there, it will definitely be a learning experience for me, working side by side with medical and healthcare professionals. As I have research experience in medical image analysis (segmentation of ultrasound images, feature extraction etc.) and pattern recognition, different applications of medical imaging modalities are some of my strong forte which I believe would be essential for engendering spontaneous creative ideas in this field.

“*The mind is not a vessel to be filled, but a fire to be kindled”*. I believe, with the extensive and detailed course work, conglomeration of highly capable professors and avant-garde research facilities, UIC gives me the perfect platform to exercise and excel in my research endeavors as well as equip me with knowledge and expertise to pursue a career in academia and research.