

Statement of purpose

With an aim to be a specialist in the optical communication field, I have been enthusiastically seeking knowledge in this area since my undergraduate studies. An ever-growing aspiration for the research and development of this diverse field inspired me to find the **Optical Communication Research Group** led by **Professor Ioannis Roudas** at your university. I have found great compatibility between our research interests and therefore, I am eager to start my PhD under the supervision of **Professor Ioannis Roudas** in the fall 2017 semester at your university. I am greatly motivated by the goal of the ongoing project of the Optical Communication research group, which aims to resolve data traffic issue in the fiber optic internet backbone network. I want to contribute greatly to this project through my future PhD research works at your university.

I have completed my B.Sc. in Electrical and Electronic Engineering from Independent University, Bangladesh. During the final year senior project of my undergrad, I found it very interesting to learn about Universal Software Defined Radio. My undergraduate senior project-“An experiment based study on Software Defined Radio (SDR) using MATLAB,” has enabled me to do research in the Telecommunication Laboratory at Independent University, Bangladesh (IUB). Through this project, I gained hands-on experience of working with real time Software Defined Radio by experimenting with real time wireless transmission and reception of FM radio signals, self generated voice signals, Walkie Talkie transmitters and receivers, QPSK transmitters and receivers, and Chirp signals using MATLAB, USRP and Universal Hardware Drivers. Furthermore, I was able to develop MATLAB based simulation models for several modulation and demodulation techniques to be implemented in the USRP project. Through working in this project, I developed a keen interest to gain further knowledge in the optical and telecommunication field and set my long term goal of pursuing a PhD in this field.

My interest to do research in the optical communication field was further invoked by my master's studies. I have completed my master's in Computer Engineering as a Korean Government Scholarship student and worked as a research assistant in the 3D Image Processing Laboratory of Chosun University, South Korea. As a research assistant of the 3D image processing laboratory, I worked with the optical domain based image encryption techniques for secure authentication of image data and developed optical domain based image hash models. In my master's thesis work, I have evaluated the cryptographic properties of double random phase encryption technique in the gyrator domain. The final outcome of my master's research work has been submitted to one of the most prestigious Applied Optics journals, which I have included in my application package as a writing sample. I have enjoyed my work so far and that motivates me greatly to contribute to the research and development of the optical communication field more. My previous research works has given me a greater understanding of practical research problems and made me able to offer solutions by integrating mathematical and engineering concepts into my work. Besides, I have developed a keen interest to extend my knowledge in the optical communication field. I want to use my acquired knowledge and research experiences of my previous undergraduate and master's studies in my future PhD studies at Montana State University.

In my PhD research, I want to develop cost efficient optical communication systems which would solve problems related to data congestion by maximizing the capacity of the optical fibers. To start my PhD in this domain, I have been actively studying the recent publications of the Optical Communication Research Group of your university and hope to contribute to the project with some novel idea soon. In addition to developing necessary background knowledge on other mandatory courses of Electrical and Computer Engineering, I have always emphasized in developing strong background knowledge on Optical Communication, Telecommunication, modeling and simulation of different types of optical encryption techniques, Digital Signal Processing, Engineering Mathematics and Cryptography courses of my undergraduate and master's studies to prepare myself for a PhD in this field. Furthermore, I was also able to advance my programming skills in MATLAB through working in the lab projects. During my master's studies, I have worked in several research projects and presented thesis, poster and paper in the conferences in Korea and developed presentation skills necessary for my future PhD studies. I believe, all these experiences makes me a perfect candidate for the PhD in Electrical and Computer Engineering program at your research oriented graduate school.

My devotion to study was greatly inspired upon receiving the 100% tuition waiver at IUB as Merit Scholar for my previous academic excellence in the secondary and higher secondary school certificate examinations in which I obtained GPA 5.00 on the scale of 5.00. During studying in the Independent University, I had been placed in Vice Chancellor's honor list for achieving a CGPA above 3.85 on the scale of 4.00 and also had been placed as Magna Cum Laude during my convocation. I have included the copies of these certificates in my application package for the selection committee to evaluate my qualification as a future PhD student at your school. I was greatly encouraged by these accomplishments to endeavor for research based higher studies after my undergraduate degree. As a consequence, I applied to the Korean Government Scholarship program (KGSP) and achieved an invaluable opportunity to study research based masters at Chosun University, South Korea for three years as a KGSP student. After successful completion of my master's studies and research works at Chosun University, I have reached one step ahead in accomplishing my long cherished desire of pursuing my PhD in Electrical and Computer Engineering at your university.

After completion of my PhD, I have a long term goal of pursuing a teaching and research oriented career. To accomplish my long term goal of a research oriented career, I have come to this far and now I'm striving to contribute to the science through my future PhD research. A doctoral program in a highly research-oriented environment like yours will give me valuable research experience and enable me to contribute greatly in the research and development of my intended field. Therefore, I am looking forward to join your esteemed program with a suitable financial aid. Although women are considered as minority groups in the fields of science and engineering, I want to act as an agent of positive change to this stereotype through my intelligence, diligence and devotion and want to contribute greatly to the science and research through my future research works.