Statement of Research Interest

My name is Kuanghua Qiao. I graduated from York University in June 2019, Major Electrical Engineering. I am writing to express my interest in pursuing the MASc at the Department of Electrical Engineering & Computer Science at York University. My main research interest is Embedded Hardware/Software and Low power mixed-signal Integrated Circuit Design. The main reason for me to pursue a graduate degree is to gain an advantage in the job market and further specializing in a professional field of interest. I am excited by the prospect of performing research and broadening my knowledge of Integrated Circuit Design, and I believe I would make an excellent Master candidate.

I took Professor Ghafar-Zadeh’s class EECS4641 Introduction to Medical Devices in 2015 and deem it a worthy cause to devote to. Later on, in the course EECS3612 Sensors and Measurement Instruments, I was introduced with the idea of lab-on-chip, which is fascinating for it uses VLSI technology to improve I have discussed the available Master position in BioSA Research Group. As he found me a qualified candidate for this position, supporting my application, he has agreed to be my Master supervisor should I be accepted.

I am passionate about embedded systems and Integrated circuit design. During my time as an undergraduate student, I have been working in the BioSA laboratory under professor Ghafar-Zadeh’s supervision for two semesters. During this time, he gave me a lot of guidance on electronics as well as a research practice. He had shown great support and patience toward my projects.

For my first project, I participated in the Age-Related Macular Degeneration Diagnostic Tool: Hardware and Software Development. The project aims to develop a system for visual assessment of patients suffering from macular diseases. In this project, I developed a wireless gesture capture glove that serves as an optional input device of the whole system. The resulting device can recognize two distinct hand gestures made in real-time with an accuracy of 82%.

The second project is A Non-Invasive Wireless Respiratory Monitoring System for Animals. In this project, I Designed a biomedical device to noninvasively monitor a dog’s breath rate with 99.7% accuracy using a piece of conductive fabric and wireless technology to remotely monitor breath rate in an undisturbed environment. The research was showcased in Lassonde Undergraduate Research Conference 2018.

Finally, I participated in the Core-CBCM CMOS Capacitive Sensors for Life Science Applications project. In this project, I built a test platform for the capacitive sensor designed by another Ph.D. student Omid Farhanieh. The test platform includes a PCB interface, a microcontroller that generates the test signals and a python test script that has a GUI. With my effort, we were able to conduct the electrical test of the circuit chip successfully with convenience.

Through the series of projects, I’ve done in the BioSA laboratory I have gained a well understanding of all aspects of embedded system design including microcontrollers, serial communications, power supply modules, and PCB design.

I have also passed most of the related electronics courses with good grades such as EECS3611 Analog Integrated Circuit Design, EECS3612 Sensors and Measurement Instruments in which I got an A. However, I do not meet the requirement for admission, for the grade in my last 2 years were too low; That is because of two major reasons: 1) I was suffering depression caused by my social relationship and family issues during the last few years of my undergraduate studies; 2) The course curriculum for the first-generation electrical engineering students was not well organized. These problems are no longer troubling me now. I have recovered and learn to handle my problems. I am ready for furthering my academic achievement.

Should I get accepted, I would like to improve on the projects I did by applying new techniques such as VLSI and building a more complex yet reliable and easy to use a circuit board. I have gathered numerous ideas and skills over my spare time and eager to try them out, and with the access of EDA software, and various test instruments on campus, I can surely achieve success in my graduate studies.

Thus, after careful consideration, I decided to pursue a graduate degree in electrical engineering at York University. I believe I have the skills, discipline and perseverance to be successful in my graduate studies, and I could greatly benefit from Professor Ghafar-Zadeh’s teaching and guidance in applying my new ideas to my project.