Academic Statement of Purpose

I am applying to the Master of Engineering in Electrical and Computer Engineering program with a focus area of Integrated Circuits and Systems at the University of Illinois Urbana-Champaign. My academic training and research experience prepare me well to pursue this ME degree at UIUC.

Currently I am pursuing a Bachelor of Engineering degree in Electronic Information Science and Technology at the Sun Yat-sen University, China. I have taken dozens of core courses in electrical and computing engineering, such as Analogue Electronics, High Frequency Circuits, Digital Circuits, Electromagnetic Fields and Waves, Signals and Systems, Analog and Digital Integrated Circuit Design, Microwave Technology and Antenna, Programming with Practice, Data Structures and Algorithms, Microcomputer and Embedded System, Pattern Recognition.

In addition to course work, I have participated in multiple research projects and competitions. Most recently, I attended the National Student Computer System Capability Challenge (Loongson Cup). At the very beginning, I had not taken courses in computer organization/architecture and did not know hardware design using hardware description languages. Without a clue at all, I decided to start from the basics. I took an elective course in Fall 2020 to learn the basic concepts of computer organization and processor architecture. In the following winter break, I self-studied Verilog hardware description language. By solving the practice problems from the website HDLBits, I acquired the primary circuit design skills in Verilog. The first attempt to compete for the Loongson Cup in summer 2021 was exciting with some regret. Because the processing core I designed lacked the logic to communicate with memory and I/O devices, the processor could not fetch instructions and data. Therefore, the design was incomplete. I felt a bit sad but was not intimidated. I started the process to integrate the AXI bus and UART module with the processing core so that it could access memory and peripherals on the FPGA platform. Eventually, I completed a processor that ran at 50 MHz frequency and fully supported the MIPS-C3 instruction set. I earned a third-tier national prize in the Loongson Cup 2022.

Besides the Loongson Cup, I attended both the 7th and 8th editions of China International College Students' 'Internet+' Innovation and Entrepreneurship Competition in 2021 and 2022, respectively. In these two events, I applied deep learning models for the recognition of modulated signals and facial expressions, and the detection of dry eyes. In addition to individual effort for overcoming difficulties, I have developed my leadership skills when leading groups of fellow students to complete research projects. I have led teams of classmates to design embedded systems such as electronic key and remote-controlled vehicle. I assigned tasks to team members based on their strengths and dynamically adjusted their loads to coordinate the progress. While focusing on my own task, I also communicated with team members frequently to make sure that no one was lagging behind.

My career objective is to join multinational companies such as Apple and Google to develop electronic circuits and systems on which artificial intelligence applications are deployed to improve the quality of human life. I am extremely amazed by the Apple products such as iPhone and AirPods. They achieve both the superior quality and elegancy at the same time. I always dream of becoming a part of the design team of such products. Although I have taken dozens of courses in this area and conducted multiple projects to apply the learned knowledge, I need comprehensive training in both the background knowledge and practical skills in circuit and system design. The ME program in Electrical and Computer Engineering with a focus area of

Integrated Circuits and Systems at the University of Illinois Urbana-Champaign perfectly matches what I need.

Should I be accepted into this ME program, I will consult with my advisor to construct my course plan. For instance, courses such as ECE 425 Introduction to VLSI System Design, ECE 482 Digital IC Design, and ECE 582 Physical VLSI Design will lay a solid foundation for me on VLSI design. Courses such as ECE 411 Computer Organization and Design, ECE 527 System-On-Chip Design, and ECE 541 Computer Systems Analysis will provide me with the opportunity to acquire state-of-the-art skills in computer system design. Besides course work, I am equally excited to conduct projects under the supervision of the renowned faculty of the ECE Department. I am especially interested in the research areas of the following professors: Prof. Deming Chen's research on system-level and high-level design automation, and hardware/software co-design, Prof. Naresh R Shanbhag's research on deep in-memory architectures and integrated circuits for inference at the Edge, and Prof. Andrew Singer's research on machine learning algorithms and systems. I believe that the solid training from the ME program will pave the way for my future career success.

Overall, the Master of Engineering in Electrical and Computer Engineering program with a focus area of Integrated Circuits and Systems at the University of Illinois Urbana-Champaign serves as a critical step to realize my career objective of becoming a seasoned and innovative designer for electronic circuits and systems. My undergraduate education along with my rich experience in research projects lay a solid foundation to be successful at UIUC. Thank you very much for your time and your consideration of my application.