Statement of Purpose
Chih-ho Hsu

I aspire to pursue a PhD degree in the area of Wireless Communication and Networking. My long-term goal is to become a researcher in the laboratory of a high-tech company with an aspiration to completely reform the way we connect with the world. I believe I can reach this goal with the opportunity and resources provided at the ECEE department of Arizona State University.

As a research assistant, I have completed 3 research projects and co-authored 7 papers in top journals/conferences, including *IEEE Transactions on Multimedia*, *IEEE Access*, *IEEE GLOBECOM*, *IEEE ICC* and *IEEE VTC*. My motivation for wireless research comes from a major life event. I had undergone lung surgery in my junior year. During my hospitalization, whenever my mobile phone ran out of battery, I had a hard time untangling the charging cords due to the drainage tube on my chest. This sparked my interest in developing more convenient wireless technologies.

To delve deeper into wireless research, I joined Prof. Hung-Yu Wei's **Wireless Mobile Network Lab**. My first independent research focused on cache-enabled adaptive video streaming. Through studying the literature, I found the social impact of online users has huge potential to enhance the hit ratio of video caching, thus enhancing Quality of Experience (QoE). I also found that due to different playback request patterns and downlink capacity of mobile users, a video can be partially cached at edge nodes and be transcoded in real-time to improve resource utilization and adapt to the fast-changing channel condition. By integrating the above findings, I developed a social-aware QoE-driven joint video caching and adaptation framework to improve existing video streaming schemes.

My second study aimed to address the UAV-assisted task offloading problem in vehicular networks. By taking advantage of both Deep Neural Network (DNN) and Particle Swarm Optimization (PSO), I developed a hybrid learning framework that can jointly optimize UAV positions, computation offloading and spectrum allocation in Radio Access Network (RAN) with low-complexity while dynamically tuning the DNN in order to adapt to the time-varying wireless environment. From this series of research, I had not only strengthened my programming skills but also acquired sufficient knowledge required to pursue research in deep learning and its applications to wireless networks.

As an undergraduate member in the collaborative project "**B5G smart cross-layer multi-access edge computing**", I have worked on a survey paper on the topic of service orchestration and resource management for edge computing. After analyzing over 350 related papers from various aspects, I have identified the limitations of existing techniques and outlined potential research directions. These experiences have laid the rigor foundation for my research methodology and provided me with profound insights into wireless technologies.

Highly attracted by the research of your esteemed faculties, I would like to apply for your prestigious PhD program. Specifically, **Prof. Junshan Zhang**'s recent studies on edge computing and its applications to the 5G wireless network match my research interest perfectly. **Prof. Martin Reisslein**'s expertise on SDN and multimedia streaming unveils the essence of communication networks that I'm pursuing. I also found **Prof. Yanchao Zhang**'s research on social networks and mobile security appealing as they serve as promising solutions to address emerging challenges in future wireless networks. I believe working with them can equip me with the latest knowledge required to achieve my aspiration. I also believe that both my strong academic ability and research passion will make me a suitable candidate for admission.