Personal Statement

I'm fascinated by **systems**, especially **networked system**. I'm interested in the throughput, stability and scalability in system design. I'm thrilled when working on machine, especially for those people do not interact in daily life (Laptop is not as exciting as a server!). Compared to what application is running on the system, I'd like to pay more attention to the design of lower system itself. I'm also interested in the changes that today's datacenter network can bring to **data systems**.

I joined **Prof. Xinbing Wang**'s lab and started my first research in the field of scholarly big data. I found the search result in our paper search system Acemap sometimes unsatisfactory. The reason behind was that innovative papers with insightful ideas were needed, instead of old papers already gaining lots of citations. To model the abstract concept of innovativeness, I designed a new topic model leveraging citation information, assuming that ideas flow in the form of "topic" through citations. This resulted in a quantitative metric J-index, which represented the academic influence of a paper. This work was accepted by AAAI 2016 workshop and J-index was used to select INFOCOM 2016 Test of Time Paper Award together with google scholar. Next I further looked into the ranking algorithm for newly published papers, which lack citation information such that the classic ranking algorithm like PageRank cannot be applied. I proposed an algorithm which uses random walk as a feature extractor, leveraging author, venue and affiliation information. In addition, I used learning to rank algorithm to combine these features. This work was submitted to CIKM 2016.

I found myself more interested in system fields connected with machines, therefore I went to another group co-supervised by Prof. Xinbing Wang and **Prof. Xiaohua Tian**. There I worked on a smart glass aiming to help millions of paralysis patients back to normal life, making their faces symmetric again. Monitoring the healthy half side of face, electric circuit could generate impulse stimulating the nerve in the ill half side. Accuracy and energy were the main concern. Finally, I chose the low-cost NanoPi2 and mitigated Caffe onto the board which I used to implement a robust CNN model. The accuracy increased to 99% and the device could work 48 hours without charging. This work was submitted to INFOCOM 2017. Besides, attracted by wireless application, I implemented a RSS-based localization system under the supervision of Prof. Xiaohua Tian for fast drone. Given the fast movement of drone, to push the limit to the best accuracy and least cost, I proposed a lot of techniques such as 4-D RSS interpolation, path estimation, fitting and prediction. These methods reduced RSS training workload by over 80% and the average location error by 50%. This work is under review by TMC. From these two projects I learned much about system design, and I made my decision to continue working on wired/wireless system project.

Attracted by wireless work Ubicarse, I interned at **Prof. Swarun Kumar's group at CMU**. Instead of what RF-IDraw and Tagoram did, I thought from the advantage of RFID -- being able to read multiple tags at the same time. Leveraging such low-cost tags as much as possible was what I wanted to do. I aimed to design a localization algorithm inferring the relative location of a group of tags with the least number of antennas and highest accuracy, which could be applied on HCI input or gesture recognition. At first, I started from the simplest case where there was no multipath. But after trying several times I was still unable to mitigate the number of antennas to one. What surprising me was, when I first put this aside and started to think how to deal with multipath, which is traditionally considered as a major challenge for indoor localization, multipath becomes supportive instead. It acts as equivalent "mirror antennas", enabling us to reduce the number of antenna to one with the help of array of reference tags. Currently the system achieves subcentimeter-accuracy and are working on the 3D case localization.

Now I'm interning at **Prof. Kyle Jamieson's lab at Princeton**. I'm working on enabling Wi-Fi routers seamlessly switching, which reveals the future that watching HD films in a fast moving car using Wi-Fi. Many previous works concentrated on the fast handover between Wi-Fi routers. However, we claim that the most efficient way is no handover, but using central controller scheme to achieve smart switching instead . The main concern here is how to design a system without any modification on the client side. I achieved this by a lot of modifications on Wi-Fi routers from mac80211 Linux stack (link layer), NAT (IP layer) and packets deduplication (transportation layer). I also designed switching mechanism based on CSI information. We plan to submit this work to SIGCOMM 2017. During the internship I had a further understanding of wireless sensing and TCP/IP stack, and also got trained for quality research.

I'm eager to participate in the fundamental system work, which requires a fully understanding of each level of systems. For example, to make OpenWrt saturated the maximum performance potential, I have to look inside the Linux kernel. To make the wireless part of kernel in good functionality, I need to check mac80211 stack. To utilize mac80211, I need to dig into the lower ath9k driver. A best detailed understanding requires a best detailed degree!

XXX school attracts me a lot for its active open academic environment and top-tier CS department. I admire Prof. XXX for his work on project "XXX". I'm also interested in the work of Prof. XXX and Prof. XXX's group. I think XXX's graduate program fits me very well and will help me take a steady step to be a leader in system field.