Jan. 13, 2016

Dear Faculty Search Committee,

It is my great pleasure to write this letter of recommendation to give my strongest support for Mr. Si Chen's application of a tenure-track assistant professor in your department.

Si Chen is my first PhD student after my joining UB. Since I admitted him in 2012, I have been continuously impressed by his excellent research ability as well as his self-motivated attitude. My long time working with him makes me very familiar with his academic strengths and great personality.

He first impressed me with his self-motivated quick learning and intelligent programming skills. He obtained the master degree from Electrical Engineering department at University at Buffalo before joining my UbiSeC Lab. With his previous study, Si laid a broad and solid foundation in both electrical engineering and computer science. As soon as he joined my lab, I assigned him to lead a secure acoustic communication project. He was challenged to build a purely software-based system solution for securing short-range smartphone communications without relying on a key agreement phase. He self-learnt how to program on android platform, studied state-of-the-art audio coding scheme, grasped the usage of Django framework, and mastered the technique of friendly-jamming for acoustic communications. Finally, he was able to integrated all the components into a very successful prototype system. In fact, his mobile application was among the first to demonstrate an alternative NFC technique for off-the-shelf smartphone devices, enabling a much stronger security guarantee without imposing any additional hardware dependency. This prototype system was selected in the finalist (top 10 projects) of ACM MobiCom' 2013 Mobile App competition.

Si then showed his critical thinking and quantitative ability in his research of a mobile sensing project. Si's first major research result was in designing and implementing a crowdsourcing system utilizing sensor-rich video data from mobile users for indoor floor plan reconstruction. This is a difficult problem as it needs strong ability in both system architecture and algorithm design. Si first analyzed the problem and then exploited the sequential relationship between each consecutive frame abstracted from the video to improve system performance. He then built a real system with both mobile front-end and cloud back-end and conducted comprehensive experiments in a real-world scenario. The experiments results demonstrated that his techniques achieved a significant improvement of accuracy compared with other state-of-the-art crowdsourcing floor plan reconstruction systems. Going beyond 2D, he further proposed IndoorCrowd2D, a smartphone-empowered crowdsourcing system for indoor scene reconstruction. He came up with a divide-and-conquer method for solving the problem. Then, he designed trackable models to represent indoor space, implemented them independently and

demonstrated its advantages by comparing with other systems. Especially, Si's work was the first to propose, design and implement a smartphone-based crowdsourcing system that explores the power of untrained individuals to generate building interior views at scale. It broke away from established approaches to reconstruct indoor scenes, and explored an advanced architecture based on crowdsourcing and mobile-sensing. Moreover, the system achieved a significant improvement of accuracy compared with other indoor scene reconstruction systems, according to a long-term real-world experiment on 30 volunteers. More importantly, the system he built was readily deployable in real-world scenarios. It is also expected to extend existing online map services to the indoor environments at an unprecedented scale, which is currently cost prohibitive. In a long view, this system can serve as an important stepping-stone towards economically viable massive indoor 3D model reconstruction. The results of the two research projects have been published on IEEE International Conference on Distributed Computing Systems (ICDCS'15) and ACM conference on Embedded Networked Sensor Systems (SenSys'15), which are highly selective research venues on systems issues of broadly-defined sensors and sensor-enabled smart systems.

Si has continually impressed me with his brilliant problem-solving ability, solid programming ability, independent thinking and strong mathematics background. Si also participated in a location-based social networks (LBSNs) project. In this project, he has collaborated with another research group remotely and developed an automated user location tracking system, which can accurately geo-locate any target in LBSN. The outcome of this project serves as a critical security reminder of the current LBSNs pertaining to a vast number of users. This work has been published on The ACM International Symposium on Mobile Ad Hoc Networking and Computing. (MobiHoc'14).

Si in fact spoke pretty good English when he came to the US, as he understands that English is a general obstacle for an international to pursue an academic career in the US. Si has made great effort in perfecting his English constantly. He takes every chance to improve and perfect his English in his daily life. He has given presentations in a number of international conferences. Every time he would rehearse his presentation again and again until he is fully satisfied with himself. All his hard work has paid off. His English has improved significantly and his presentation skill is excellent. He was among the few of graduate students that were invited as a guest lecturer to give talks in our graduate level courses for which the speakers are usually professors or established researchers from other universities or companies. The feedback I heard from the students are very positive. Besides his teaching ability, Si also has the talent in mentoring fresh or junior level students. He told me that it is amazing to let the knowledge be passed from one to many by good communication skill, and thereby, he enjoys sharing what he knows with more students. He is able to explain complicated knowledge by simple language, which is the premise to obtain good teaching results. I am sure he will develop into a good teacher since he does possess excellent presentation and mentoring skills.

Additionally, Si has a strong desire and great enthusiasm to pursue new knowledge. He constantly keeps track of the latest trends in academia. He keeps exploring untapped challenges brought by emerging technologies and investigating novel ideas and techniques to tackle practical problems for today's and tomorrow's cyber physical systems. He also analyzes the contributions of new papers carefully, writes programs to verify how good they are, and

discusses with me his new ideas. He believes that researchers in computer science field must be continuous to learn, grow and experience things in life to adapt the rapid changing technology. As his academic advisor, I work closely with him on making his study plans, improving his academic performance, and shaping his career goals, and thereby, I clearly understand that his career goal is becoming a faculty in the field of cyber security. I believe his self-motivated personality will be very beneficial to his future career and research.

Another capability Si has been purposefully trained is the proposal writing and grant seeking. I have had him deeply involved in the Microsoft Research Azure Research Grant proposal to support our indoor crowdsourcing project. He has contributed significantly by helping identify the key issues and proposed original and innovative ideas. This proposal was funded last year, and I highly appreciate Si's contribution. Si has been also involved in a few NSF proposals that I have been writing, and two of them have been successfully funded. As a fast learner, Si has already known every step that takes to win a research grant. With his proved problem identification and solving ability, I am sure that he is ready to develop his own proposal and will be successful in attracting research funding.

Last but not least, Si has a very pleasant personality. His classmates and lab mates also considered Si warm-hearted and considerate of others. Si believes that strong teamwork is as significant as the ability of individuals. Besides being a researcher, he is also a great leader and a helpful partner in our lab. People who have collaborated with him regard him as having a stable personality and high sense of responsibility.

Overall, I am very excited with Si's accomplishments and abilities. Compared with my other talented young students I have had the fortune to mentor, Si is among the most outstanding ones. He is mature and energetic with strong career ambition. I am pleased that he will continue his pursuit for high-quality research in academia, and I expect great research achievements from him long into the future. Should you have any further questions, please don't hesitate to contact me.

Sincerely Yours,

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