

Shuo Liu

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Dear hiring manager,

I am a PhD student in Computer Science at Georgetown University, and I am highly interested in your Security Researcher – MSR: PhD Graduates position. I am attracted to the potential and opportunities offered by the position and the challenging yet creative environment at Microsoft and MSR. I believe there is a match between the requirements and my qualifications, motivating me to apply for the position. I am interested in education, and how to utilize new technology to help students and teachers improve their learning and teaching experiences.

My current research topic is distributed algorithms, specifically, resilient distributed optimization algorithms, including fault-tolerant and asynchrony in the distributed system. For example, machine learning is usually an optimization problem. Consider a system solving machine learning tasks involving multiple computers working collaboratively – federated learning, for example, and some of the participants might be faulty, due to hardware failures or adversarial attacks. My research focuses on designing resilient algorithms against these faulty participants so that they can still output usable outcomes, and showing how resilient the algorithms can be. As cloud computing becoming increasingly popular these days, this topic is gaining interest and attention from researchers and from industry. The problems we are solving can also be viewed from a security point of view. Research in this line of work involves mathematical analysis of algorithms, as well as simulations of the algorithms with Python, and a list of my publications can be found in my resume and on [Google Scholar](#).

My other research experience is my graduate thesis on social media privacy. I studied a type of privacy breach on social media websites, where an attacker could discover a user's hidden information through public information of the users that he/she is connected to. This research involved data collection, data mining, analysis, and creating a demo website for users to check their possible social media privacy issues. It is a part of a larger project in the lab and we used Python, Java, PHP, and other coding languages in the whole project.

Given my research experiences, I have grown a general interest in privacy and security, from both applicational and theoretical points of view. I believe that with the rapid growth of cloud computing, machine learning, and data-centered computing, privacy and security problems have become significant and fundamental ones that need to be answered. Other than my research, I am also interested in privacy-related theories like differential privacy, with courses and discussions in data privacy and governance, offered by professors including Kobbi Nissim, a faculty member of my department.

In addition, I also have two software engineering internships at Google and Meta, which provided me with exposure to engineering in industrial standards, and experience in handling work in unfamiliar topics and tasks. These experiences complement my PhD research experience which is more theoretical, and would come in handy if any of my research tasks required implementations in the future.

My training and experience during my pursuit of graduate degrees and intern experience allow me to positively contribute to the position. Thank you in advance for your consideration of my application. I look forward to hearing from you soon and I would appreciate an opportunity for an interview.