



Cyber-Physical Systems (CPS) Seminar Series

Title: All Your GPS Are Belong To Us: Towards Stealthy Manipulation of Road Navigation Systems

Speaker: Dr. Yuanchao Shu, Microsoft Research

Abstract: Mobile navigation services are used by billions of users around globe today. While GPS spoofing is a known threat, it is not yet clear if spoofing attacks can truly manipulate road navigation systems. In this work, we explore the feasibility of a stealthy manipulation attack against road navigation systems. The goal is to trigger the fake turn-by-turn navigation to guide the victim to a wrong destination without being noticed. Our key idea is to slightly shift the GPS location so that the fake navigation route matches the shape of the actual roads and trigger physically possible instructions. To demonstrate the feasibility, we perform controlled measurements by implementing a portable GPS spoofer and testing on real cars. The complete attack is validated by extensive trace-driven simulation and real-world driving tests. Deceptive user studies using a driving simulator also show that 95% of the participants follow the navigation to the wrong destination without recognizing the attack.

Biography: Yuanchao Shu is currently a Researcher with Mobility and Networking Research Group at Microsoft Research. His research interests lie broadly in mobile and networked systems. His previous research results have been published at top-tier venues including MobiCom, MobiSys, Ubicomp, SenSys, USENIX Security etc. He won IEEE WCNC Best Paper Award, IEEE INFOCOM Best Demo Award, and was the recipient of ACM China Doctoral Dissertation Award and IBM PhD Fellowship. Dr. Shu received Ph.D. from Zhejiang University in 2015, and was also a joint Ph.D. student in the EECS Department at the University of Michigan, Ann Arbor.



Date: Friday, Aug. 31, 2018

Time: 12:00-13:00PM

Location: MAC Lab, LW Suite 800