

*** Title : Usable Security and Privacy for the Internet-of-Things**

*** Abstract :**

The explosive proliferation of the Internet-of-Things (IoT) ecosystems has enabled new applications and services based on its ubiquitous presence. Equipped with a rich set of sensors, IoT devices collect a vast amount of data from the user and the environment in homes, buildings, and communities, often without the user's awareness. As they collect more sensitive data than ever, ensuring security and privacy has become a more daunting task. However, because the devices are large in number, heterogeneous, and resource-limited, traditional security and privacy schemes are facing new challenges in usability.

In this talk, I will discuss IoT security and privacy focusing on the usability aspect. First, I will present two context-based device authentication schemes that verify mutual proximity using unique signatures in the physical measurement. These schemes can be used to establish secure connectivity among a large number of IoT devices without user intervention. Second, a novel biometric challenge-response authentication technique will be introduced. Unlike traditional biometric modalities that are unique and cannot be revoked, this technique generates multiple challenge-response pairs of biometric signatures so that each signature is used only once. Finally, a real-time privacy control for eye-tracking data will be presented. Eye-tracking is a key input modality in virtual and augmented reality but also can be used to secretly identify the user by a third party. The proposed control framework can preserve both privacy and utility.

*** Bio :**

Prof. Younghyun Kim is an Assistant Professor of electrical and computer engineering and a Grainger Faculty Scholar at the University of Wisconsin-Madison, where he leads the Wisconsin Embedded Systems and Computing (WISEST) Laboratory. Prof. Kim received his B.S. degree in computer science and engineering and the Ph.D. degree in electrical engineering and computer science from Seoul National University in 2007 and 2013, respectively. He was a Postdoctoral Research Assistant at Purdue University and a visiting scholar at the University of Southern California. His current research interests include energy-efficient computing and security and privacy of the Internet-of-Things. He was a recipient of the NSF Faculty Early Career Development Program (CAREER) Award in 2019, the EDAA Outstanding Dissertation Award in 2013, the Design Contest Award at the ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED) in 2007, 2012, 2017, and 2018, the IEEE SSCS Seoul Chapter Award at the International SoC Design Conference in 2009, and the Best Paper Award Nomination at the ACM/IEEE ISLPED in 2016. He served on the Technical Program Committees of various

conferences including the Design Automation Conference (DAC), ISLPED, Asia and South Pacific Design Automation Conference (ASP-DAC), International Conference on VLSI Design (VLSID), and Symposium on Applied Computing (SAC). He served as a Guest Editor for a Special Issue of VLSI Integration Journal (Elsevier).