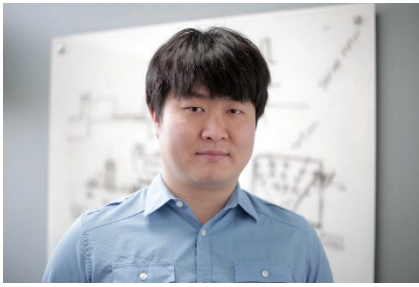


# The Internet of Long-lasting, Trustworthy, and Useful Things



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**University of Wisconsin-Madison**

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## Abstract

The past decade has witnessed the remarkable growth of the Internet of Things (IoT) fueled by the advancement of sensing and communication technologies and the emergence of artificial intelligence (AI). As “things” get more connected and intelligent, however, they hit the wall of various resource constraints. Energy constraint hinders the adoption of power-hungry AI technology in low-cost, low-power edge devices. It also limits design options for usable and effective security to safeguard data generated by ubiquitous sensors. As a result, despite the rapidly growing number of IoT devices, their applications are limited to certain domains, such as home automation, where energy and security constraints are relatively less stringent. To permeate broader application domains, such as precision agriculture and personal healthcare, these challenges must be thoroughly addressed from all angles, from physical device design to IoT application design.

My research has focused on addressing energy and security challenges toward long-lasting and trustworthy IoT, and solving societal problems using networked embedded systems technology. In this talk, I will first discuss design challenges in resource-constrained networked embedded systems focusing on energy and security. I will present novel design methods and techniques to establish secure connectivity and enable intelligence for low-power IoT devices. I will also present how low-power IoT can contribute to the economic, environmental, and ethical sustainability of modern agriculture. Finally, I will provide an overview of my future research plans for accomplishing the vision of IoT in the real world.

## Bio

Younghyun Kim is an Assistant Professor in the Department of Electrical and Computer Engineering and an ECE Grainger Faculty Scholar at the University of Wisconsin-Madison. He received his B.S. degree with the highest honor in computer science and engineering and a 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 research interests include energy-efficient computing and the security and privacy of the Internet of Things. His research has been recognized with various awards, including the NSF CAREER Award, Meta Research Award, IEEE Micro Top Pick, EDAA Outstanding Dissertation Award, and multiple design contest and demo awards at Design Automation Conference (DAC) and International Symposium on Low Power Electronics and Design (ISLPED). He served on the Technical Program Committees and Organizing Committees of various conferences on design automation and embedded systems, including 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). Website: <https://wisest.ece.wisc.edu/>

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