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Xiao Zhang is a postdoctoral associate at Duke University and NSF Athena. Dr. Zhang received his Ph.D. degree of Computer Science from Michigan State University in August of 2023. Dr. Zhang's research interests are next-generation wireless networks (optical, mmWave), AI-assisted sensing/localization, mobile computing, AIoT, Cyber Physical Systems, and HCI. His work was published at top-tier venues of mobile computing and IoT community including MobiCom, MobiSys, Ubicomp, SenSys, SECON, IWQoS, CoNEXT, ICNP, IoTJ, WoWMoM, MASS, CSUR, GLOBECOM, ToSN, etc.
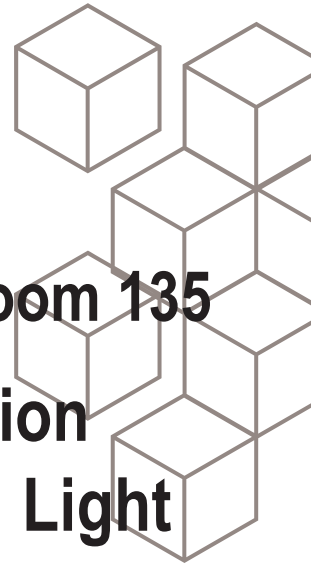
CSE Research Talk
Thursday, February 8th
11:00am - 12:00pm
Location: Dodge Hall Room 135

Towards Next-Generation Wireless Networks: Light Perspective

Xiao Zhang, Duke University, NSF Athena

Wireless networks are now an essential and integral part of modern life, seamlessly woven into the fabric of people's daily routines. The traditional radio based wireless approach suffers from three major drawbacks: (1) RF communication relies on limited spectrum resources, leading to congestion and interference. (2) Traditional RF devices often consume significant energy, especially on mobile devices. (3) RF communication has security risks like eavesdropping and interference. In recent years, there has been a proliferation of low-cost and energy-efficient LEDs and cameras deployed ubiquitously. This trend opens up the exciting possibility of leveraging light for next-generation wireless networks.

In this talk, I will share three key findings from my research in optical wireless communication, highlighting its potential applications in localization and sensing through machine learning. Firstly, I will introduce a novel framework LiFOD that leverages side-channels to enhance indoor LiFi with smooth dimming. Secondly, I will showcase U-Star, a cost-effective self-served underwater navigation system featuring self-illuminating 3D tags. Lastly, I will demonstrate RoFin, an optical camera communication-based digital health approach for human-computer interaction for individuals with Parkinson's disorder. These findings contribute to the development of next-generation wireless networks, emphasizing human-centered, environmentally friendly and secure communication coupled with accurate location awareness. I will conclude by outlining my long-term vision for next-generation wireless networks, incorporating a multidimensional approach that integrates communication, cognition/control, and computation.

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