Haofan Lu

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Research Interests

- Internet of things, Wireless sensing and communication systems, Signal processing, Machine learning

Education

University of California, Los Angeles Sept. 2021 – Present

PhD student in Computer Science Department

- Advisor: Professor Omid Abari
- **Research focus areas:** wireless sensing systems, machine learning
- Major area: Computer Network Systems
- Minor area: Artificial Intelligence, Human-Computer Interaction
- Relevant courses: Operating System (A), Embedded Systems (A), Network Protocol and Systems Software Design for Wireless and Mobile (A), IoT Connectivity and Sensing (A+), Intelligent IoT Systems (A), Fundamentals of Artificial Intelligence (A)

Zhejiang University-University of Illinois at Urbana-Champaign Institute Sept. 2017 – June 2021

B. Eng. in Electrical Engineering and Automation from Zhejiang University

B. S. in Electrical Engineering from University of Illinois at Urbana-Champaign

- Thesis Advisor: Professor Romit Roy Choudhury
- Thesis Project: Indoor Localization with the Assistance of Ultrasonic Beacons
- Relevant courses: Signal and Systems, Digital Signal Processing, Communication Networks, Wireless Networks, Mobile Computing Algorithms and Applications, Multi-media Signal Processing, Machine Learning

Publications

- [**International Journal of Heat and Mass Transfer 2022**] Haofan Lu, Yi Yu, Ankit Jain, Yee Sin Ang, Wee-Liat Ong, "Deep learning techniques elucidate and modify the shape factor to extend the effective medium theory beyond its original formulation", IF:5.584
- [**To appear in HotNets'22**] Haofan Lu, Tianxiang Li, Reza Rezvani, Ali Abedi, Omid Abari, "Bringing WiFi Localization to Any WiFi Devices", Acceptance rate: 32/104 = 30.8%.
- [**Under submission**] Alex Chen, Haofan Lu, Ali Abedi, Omid Abari, "WiFi Physical Layer Stays Awake and Responds When Should Not".
- [**Under submission**] Tianxiang Li, Mohammad Hossein Mazaheri, Kalaivani Kamalakannan, Haofan Lu, Omid Abari, "Can 5G Networks Transfer Power to IoT Devices?".

Selected Research Projects

WiFi Physical Layer security loopholes and their implications Sept. 2021 – Present

- Reveal that WiFi Physical layer replies ACK to any packet, even those coming out of the network.
- Reveal that WiFi Physical layer power-saving mechanism can be manipulated by fake beacon packets.
- Investigate the possible security implications of these loopholes, including the disclosure of sensitive information, such as breathing rate; battery drainage of important IoT devices, such as security cameras.

WiFi Localization for IoT devices with a single RF chain March 2022 – Present

- Investigate the WiFi Probing Mechanism and combine it with the Frequency Scanning Antenna (FSA) technique for Angle-of-Arrival (AoA) measurement.
- Develop Time-of-Flight (ToF) based ranging techniques that achieve sub-meter level accuracy on ESP32 platform.
- Combine ToF and AoA information to enable localization for devices with a single RF chain.

Honors & Awards

Graduation with Highest Honor of University of Illinois at Urbana-Champaign 2021

Dean's List of University of Illinois at Urbana-Champaign 2020

Second-class Scholarship for Academic Excellence of Zhejiang University 2020