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 – June 2026 (Expected)

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 GPA: 3.94

B. S. in Electrical Engineering from University of Illinois at Urbana-Champaign GPA: 3.88

- 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

- [**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?".
- [**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

Selected Research Projects

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

- Studied the WiFi Physical layer DATA-ACK mechanism and Power-saving mechanism.
- Investigated the security implications of PHY Layer loopholes, such as the disclosure of sensitive information.
- Developed robust signal processing algorithms to estimate breathing rate from WiFi CSI traces through wall.

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

- Investigated the WiFi Probing Mechanism and developed fake beacon injection scheme to enable Angle-of-Arrival (AoA) measurement with a Frequency Scanning Antenna (FSA).
- Developed Time-of-Flight (ToF) based ranging techniques that achieve sub-meter accuracy on ESP32 platform.

Indoor Localization with the Assistance of Ultrasonic Beacons June 2020 – May 2021

- Based on the hardware non-linearity, designed inaudible acoustic signals that are detectable by mobile phones.
- Designed signal detection scheme based on Pulse Compression and Dual-Tone Multi-Frequency (DTMF) techniques
- Achieved in-time location calibration with the designed beacon signal, which improves the IMU dead reckoning localization accuracy.

Programming Languages & Skills

- Languages: Python, C/C++, JAVA, JavaScript, MATLAB
- Frameworks & Platforms: PyTorch, ESP-IDF (w/ ESP32), GNU Radio (w/ SDR), Unity (w/ Oculus VR), Django

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