Haofan Lu

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Research Interests

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

Education

University of California, Los Angeles Sept. 2021 – June 2026 (Expected)

PhD student in Computer Science Department

- Advisor: Professor Omid Abari
- **Research focus areas:** Internet of Things, Machine Learning

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

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 [**link**]

Zhejiang University Sept. 2017 – June 2021

B. Eng. in Electrical Engineering and Automation from Zhejiang University GPA: 3.94

- Capstone Project: A crowd-sourcing urban air quality monitoring system on bike (**Best Social Impact Award**)

Selected Publications

- [**SIGCOMM'23**] Haofan Lu, Mohammad Hossein Mazaheri, Omid Abari, "A Millimeter Wave Backscatter Network for Joint Communication and Localization". Acceptance rate: 71/323 = 22.0%.
- [**IEEE Internet of Things Journal**] Ali Abedi, Haofan Lu, Alex Chen, Charlie Liu, Omid Abari, "WiFi Physical Layer Stays Awake and Responds When Should Not". IF: 10.6
- [**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**] Haofan Lu, Tianxiang Li, Reza Rezvani, Mohammad Hossein Mazaheri, Omid Abari. "Enhancing WiFi Protocols via Smarter Antenna Design".

Industry Experience

Samsung Research America - Standard and Mobility Innovation Lab June. 2023 – Spet 2023

Research Intern

- **Project:** WiFi-based velocity estimation and tracking for Ambient Intelligence
- Developed a indoor device-free tracking system based on WiFi sensing and filed a patent for the code and artifacts.

Selected Research Projects

Wireless Channel Predication using Machine Learning Feb. 2023 – Present

- Simulate WiFi Channel State Information (CSI) using ray-tracing simulation in Wireless Insite and MATLAB.
- Designed a Deep Learning pipeline based on Neural Radiance Field (NeRF) to learn the radiation of WiFi signal.

Millimeter Wave Backscatter Integrated Sensing and Communication Jun. 2022 – Feb. 2023

- Designed and implemented a low-power millimeter wave backscatter system for IoT applications.
- Designed a novel modulation scheme that utilize the frequency scanning antenna to enable two-way communication.
- System achieves cm-level localization and up to 40 Mbps two-way communication with power consumption of 32 mW and 18 mW

Enhancing WiFi Communication and Sensing using Smart Antenna March 2022 – Sep. 2023

- Design and Fabricated a Frequency Scanning Antenna (FSA) at WiFi band (5.8GHz)
- Integrate the antenna with the latest WiFi standard (802.11ax) to enhance communication range and datarate
- Enable device localization with submeter-level accuracy using a single transceiver chain.

Programming Languages & Skills

- Languages: Python, MATLAB, C/C++, JAVA, JavaScript, Verilog, SystemVerilog, HTML, CSS, Bootstrap.
- Frameworks & Platforms: **PyTorch**, ESP-IDF, GNU Radio, Django, Weights & Biases, MySQL, InfluxDB, Docker
- Softwares: Unity, FreeCAD, Blender, Wireless Insite, WaveFarer