Haofan Lu

Email: haofan@cs.ucla.edu | Phone: (310) 622-2943 | Homepage: luhaofan.github.io

404 Westwood Plaza, ENG VI Room 497, Los Angeles, CA 90095

RESEARCH INTERESTS

- Signal processing, Machine learning, Internet of Things, and Integrated Sensing and Communication

EDUCATION

University of California, Los Angeles
Sep 2021 – Jun 2026 (Expected)

PhD student in Computer Science Department
- Advisor: Professor Omid Abari — Intelligent Connectivity (ICON) Group
- **Dissertation Project:** Integrated Sensing and Communication for Internet of Things

University of Illinois at Urbana-Champaign
Sep 2017 – Jun 2021

B. S. in Electrical Engineering

GPA: 3.88
- Thesis Advisor: Professor Romit Roy Choudhury
- Thesis Project: Indoor Localization with the Assistance of Ultrasonic Beacons [**link**]

Zhejiang University
Sep 2017 – Jun 2021

B. Eng. in Electrical Engineering and Automation

GPA: 3.94
- Capstone: A on-bike crowd-sourcing urban air-quality monitoring system (**Dean's Best Social Impact Award**)

SELECTED PUBLICATIONS

- [**SIGCOMM'23**] <u>Haofan Lu</u>, Mohammad Hossein Mazaheri, Omid Abari, "A Millimeter Wave Backscatter Network for Joint Communication and Localization". Acceptance rate: 71/323 = 22.0%. [**link**]

- [**IEEE Internet of Things Journal**] Ali Abedi, <u>Haofan Lu</u>, Alex Chen, Charlie Liu, Omid Abari, "WiFi Physical Layer Stays Awake and Responds When Should Not". IF: 10.6. [**link**]

- [**HotNets'22**] <u>Haofan Lu</u>, Tianxiang Li, Reza Rezvani, Ali Abedi, Omid Abari, "Bringing WiFi Localization to Any WiFi Devices". Acceptance rate: 32/104 = 30.8%. [**link**]

INDUSTRY EXPERIENCE

Samsung Research America - Standard and Mobility Innovation Lab
Jun 2023 – Sep 2023

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

SELECTED RESEARCH PROJECTS

Neural Wireless Radiation Fields Reconstruction and Channel Prediction
Feb 2023 – Feb 2024

- Designed a Neural Radiance Fields (NeRF)-based framework to predict the wireless channel at any location in the environment using sparse channel measurements
- Integrated wireless propagation properties into the learning framework of NeRF to characterize wireless fields
- Discovered the nature of wireless radiation scenes and enabled the learning of wireless fields in room-scale space
- **Results:** model achieves 1% relative squared error using $800\times$ lower channel measurement density than prior art

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 utilizes the frequency scanning antenna to enable two-way communication, and Frequency-Modulated Continuous-Wave (FMCW) radar for localization
- **Resulting System Performance:** cm-level localization accuracy, and up to 40 Mbps two-way communication with a power consumption of at most 32 mW

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

- Designed and Fabricated a Frequency Scanning Antenna (FSA) at WiFi band (5.8GHz)
- Integrated 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