Haofan Lu

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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

- [**Under Submission to ICML'24**] Haofan Lu, Christopher Vattheuer, Baharan Mirzasoleiman, Omid Abari "NeWRF: A Deep Learning Framework for Wireless Radiation Field Reconstruction and Channel Prediction".
- [**HotMobile'24**] Tianxiang Li, Mohammad H. Mazaheri, Kalaivani Kamalakannan, Haofan Lu, Omid Abari "Can IoT Devices be Powered up by Future Indoor Wireless Networks?". [**link**]
- [**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%. [**link**]
- [**IEEE IoTJ**] Ali Abedi, Haofan Lu, Alex Chen, Charlie Liu, Omid Abari, "WiFi Physical Layer Stays Awake and Responds When Should Not". IF: 10.6. [**link**]
- [**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%. [**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× 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

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