Weiying Hou

houwayne.github.io | @HouWayne | Google Scholar

Profile

Computer Science Ph.D. from The University of Hong Kong specializing in wireless sensing and AIoT. My research combines deep learning, RF and acoustic signal processing, metamaterials, and multimodal fusion for robust sensing. I develop learning methods, open-source frameworks, and embedded prototypes for contactless health monitoring and drone-based sensing.

Skills

Deep Learning: PyTorch, time-series/spectrogram models, physical data augmentation, training and evaluation.
Sensing & systems: RF/acoustic signal processing, localization, Linux drivers, embedded systems, Raspberry Pi.
Programming & tools: Python, C/C++, MATLAB, Linux, Git, COMSOL, 3D prototyping.

Publication

1. **"Take Me Home, Wi-Fi Drone": A Drone-based Wireless System for Wilderness Search and Rescue.**
   First author | ACM MobiCom 2026 **(CCF-A)** | **Best Artifact Award** | Paper | Code | Website | Demo Video
   - Built an **end-to-end Wi-Fi drone system** integrating **discovery, direction finding, and a search loop**, with a 3D-printed Luneburg lens and a **5-NIC, 10-antenna** platform running a patched Intel AX200 Linux driver.
   - Validated auto-reconnection on **11 smartphones**; achieved **18.4° median angular error** on **13,671 packets from drone flights across 4 mountainous sites and 12 placements**, and **5 m error in a field trial**. Featured Video
   - Released **Luneburg Studio**, a browser-based Luneburg lens designer with 3D visualization and STL export.
2. **RFBoost: Understanding and Boosting Deep WiFi Sensing via Physical Data Augmentation.**
   First author | ACM IMWUT / UbiComp 2024 **(CCF-A)** | Paper | Code
   - Developed physical data augmentation for **deep Wi-Fi sensing**; evaluated on **three sensing tasks** and improved accuracy across **nine models by up to 13.4 percentage points**, without collecting new data.
3. **OctoSense: Building a Unified Ecosystem for Open-Source Wireless Sensing.**
   First author | ACM/IEEE SenSys 2027 **(CCF-B)** | Conditionally accepted | Paper | Code | Website
   - Unified **10 Wi-Fi CSI/mmWave/UWB datasets** with shared data, processing, and model APIs; cut user-facing function-call code by **up to 91%**, with no more than 29.1% epoch-time overhead and **no additional peak memory**.
4. **OctoNet: A Large-Scale Multi-Modal Dataset for Human Activity Understanding Grounded in Motion-Captured 3D Pose Labels.**
   Co-author | NeurIPS 2025 – Datasets and Benchmarks Track **(CCF-A)** | Paper | Code | Website
   - Co-developed a multimodal dataset and open-source benchmarks for **activity recognition and 3D pose estimation**, spanning **67.72M synchronized frames, 12 modalities, 41 participants, and 62 activities**.
5. **VeCare: Statistical Acoustic Sensing for Automotive In-Cabin Monitoring.**
   Second author | USENIX NSDI 2023 **(CCF-A)** | Paper
   - Co-developed acoustic in-cabin monitoring; evaluation covers **5 microphones** × **5 speakers**. Child-presence studies with **15 children in 7 vehicle models** achieved **98.8% detection** with **2.1% false alarms**.
6. **Neuro-Wideband WiFi Sensing via Self-Conditioned CSI Extrapolation.**
   Second author | arXiv preprint, 2026 | Paper
   - Co-authored a **Transformer/diffusion** framework that approximates wideband CSI from narrowband measurements for localization and multi-person breathing sensing, without extra channel measurements.

Patents

- **Luneburg-lens-assisted RF direction finding for UAV navigation and localization.**
  First-listed inventor | U.S. provisional filing, June 2026 (pending).
- **Statistical acoustic sensing for in-vehicle child presence detection.**
  Co-inventor | U.S. patent publication US 2024/0329239 A1 (pending).

Education

Ph.D. in Computer Science, The University of Hong Kong | Advisor: Prof. Chenshu Wu 2021.09 - 2026.11
B.E. in Computer Science, Beijing University of Posts and Telecommunications | **Outstanding Graduate** 2017 – 2021

Talk

UbiComp 2026 Tutorial Co-organizer & Speaker 11 Oct 2026, Shanghai, China
Towards Open-Sourced Datasets, Benchmarks, and Platforms for Multi-Modal Sensing

Awards

MobiCom 2026 Best Artifact Award (Take Me Home, Wi-Fi Drone) 2026
Best Student Presentation (1st of 9), Second Low-Altitude Summit 2026