Guozhen Zhu, Ph.D.

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Education

Ph.D. in Electrical Engineering, University of Maryland, College Park	Aug 2023

Thesis: Wireless Sensing and Analytics for Motion Monitoring and Mapping | Advisor: Dr. K. J. Ray Liu

M.S. in Electrical Engineering, University of Maryland, College Park	Aug 2022

Research Interests

Multimodal machine learning for sensing and context understanding (Contextual AI), with applications in wireless sensing, ambient intelligence, and IoT systems.

Experience

Principal Scientist, Origin Wireless, Inc. — Sept 2023 – Present

- Led the research and development of a general-purpose WiFi sensing foundation model and benchmark dataset, enabling robust cross-task generalization across diverse IoT devices and environments.
- Invented TruShield Security, the first privacy-preserving through-the-wall human presence detection system; won **CES 2025 TWICE Picks Award**.
- Led the design of an AI-powered wireless sensing technology, which has been deployed across more than **25 million** devices worldwide through partnerships with leading operators, including Deutsche Telekom, Verizon, and Verisure; earned **Product of the Year in France** (2024).
- Led the research of an interpretable and trustworthy wireless sensing technology for health, including fall, proximity and presence/localization detection, which has been deployed on over **100 millions** of smart devices, including Signify smart bulbs, and Nami plugs .
- Developed a next-generation indoor localization system combining wearable and edge IMU for accurate, infrastructure-free tracking.
- Collaborated with cross-functional research and product teams to translate advanced research prototypes into commercial products deployed at million-scale.

Graduate Research/Teaching Assistant, University of Maryland, College Park — Sept 2019 – May 2021

- Developed ML-based signal processing pipelines of motion analytics for wireless sensing and SLAM.
- Designed a mapping system with high-precision robotics tracking through multimodal signals, cutting the data needs by 88%.
- Reviewer for IEEE TMC, IEEE IoTJ, ACM TIOT, and ACM IMWUT.

Selected Publications

- **Guozhen Zhu**, Yuqian Hu, Weihang Gao, Wei-Hsiang Wang, Beibei Wang, K. J. Ray Liu. *CSI-Bench: A Large-Scale In-the-Wild Dataset for Multi-task WiFi Sensing.* 2025 39th Annual Conference on Neural Information Processing Systems (**NeurIPS**).
- **Guozhen Zhu**, Yuqian Hu, Wei-Hsiang Wang, Beibei Wang, K. J. Ray Liu. *Experience Paper: Scaling WiFi Sensing to Millions of Commodity Devices for Ubiquitous Home Monitoring.* ArXiv preprint arXiv:2506.04322, 2025.
- **Guozhen Zhu**, Beibei Wang, Weihang Gao, Yuqian Hu, Chenshu Wu, K. J. Ray Liu. *SrcSense: Robust WiFi-based Motion Source Recognition via Signal-Informed Deep Learning.* IEEE Journal of Selected Areas in Sensors, 2024.
- Sai Deepika Regani, Beibei Wang, Yuqian Hu, **Guozhen Zhu**, K. J. Ray Liu. *FallAware: An Explainable Learning Approach to Robust Fall Detection With WiFi.* IEEE Journal of Selected Areas in Sensors, 2024.
- Yuqian Hu, **Guozhen Zhu**, Wenhao Wang, Beibei Wang, K. J. Ray Liu. *What you need is a good CSI.* Proceedings of the 30th Annual International Conference on Mobile Computing, 2024.
- WeiHsiang Wang, Beibei Wang, Yuqian Hu, **Guozhen Zhu**, K. J. Ray Liu. *Device-Free Room-Level Localization With WiFi Utilizing Spatial-Frequency-Time Diversity.* IEEE Internet of Things Journal, 2024.
- **Guozhen Zhu**, Yuqian Hu, Beibei Wang, Chenshu Wu, Wei Gao, K. J. Ray Liu. *Practical WiFi Sensing for Human and Non-human Motion Identification on the Edge.* Proceedings of the 22nd Annual International Conference on Mobile Systems, 2024.
- **Guozhen Zhu**, Beibei Wang, Yuqian Hu, K. J. Ray Liu. *WiFi-Based Robust Human and Non-human Motion Recognition With Deep Learning.* 2024 IEEE International Conference on Pervasive Computing and Communications.
- Yuqian Hu, **Guozhen Zhu**, Wenhao Wang, Beibei Wang, K. J. Ray Liu. *Robust Proximity Detection Using On-Device Gait Monitoring.* 2023 IEEE 9th World Forum on Internet of Things (WF-IoT).

- **Guozhen Zhu**, Beibei Wang, Yuqian Hu, Chenshu Wu, Xiaolu Zeng, K. J. Ray Liu. *Wi-MoID: Human and Nonhuman Motion Discrimination Using WiFi With Edge Computing.* IEEE Internet of Things Journal, 2023.
- **Guozhen Zhu**, Chenshu Wu, Beibei Wang, K. J. Ray Liu. *EZMap: Boosting Automatic Floor Plan Construction With High-Precision Robotic Tracking.* IEEE Internet of Things Journal, 2022.
- **Guozhen Zhu**, Chenshu Wu, Xiaolu Zeng, Beibei Wang, K. J. Ray Liu. *Who Moved My Cheese? Human and Non-human Motion Recognition with WiFi.* 2022 IEEE 19th International Conference on Mobile Ad Hoc and Smart Systems.
- **Guozhen Zhu**, Chenshu Wu, Beibei Wang, K. J. Ray Liu. *Floor Plan Reconstruction with High-Precision Rf-Based Tracking.* 2022 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP).
- **Guozhen Zhu**, Bin Yan, Mengting Xing, Chunna Tian. *Automated Counting of Bacterial Colonies on Agar Plates Based on Images Captured at Near-Infrared Light.* Journal of Microbiological Methods, 2018, 153:66-73.
- **Guozhen Zhu**, Chunna Tian. *Determining Sugar Content and Firmness of 'Fuji' Apples by Using Portable Near-Infrared Spectrometer and Diffuse Transmittance Spectroscopy.* Journal of Food Process Engineering, 2018, 41(6): e12810.

Selected Patents

- **Guozhen Zhu**, Beibei Wang, Weihang Gao, Yuqian Hu, Chenshu Wu, Xiaolu Zeng, K. J. Ray Liu, Oscar C. L. Au. *Method, apparatus, and system for wireless sensing based on deep learning.* U.S. Patent No. US12352889B2. ***(Granted 2025)***
- **Guozhen Zhu**, Chenshu Wu, Beibei Wang, K. J. Ray Liu, Oscar C. L. Au. *Method, apparatus, and system for map reconstruction based on wireless tracking.* U.S. Patent No. US12078510B2. ***(Granted 2024)***
- Yuqian Hu, **Guozhen Zhu**, Beibei Wang, K. J. Ray Liu, Oscar C. L. Au. *Method, apparatus, and system for wireless proximity detection.* U.S. Patent No. US12256360B2. ***(Granted 2025)***
- Sakila S. Jayaweera, Beibei Wang, **Guozhen Zhu**, Weihang Gao, Chenshu Wu, K. J. Ray Liu, Oscar C. L. Au. *Wireless sensing for in-vehicle child presence detection.* U.S. Patent No. US12352844B2. ***(Granted 2025)***
- Beibei Wang, Muhammed Zahid Ozturk, Chenshu Wu, Xiaolu Zeng, Sai Deepika Regani, Yuqian Hu, K. J. Ray Liu, Oscar C. L. Au, Yi Han, Hung-Quoc Duc Lai, David Claffey, Chun-I Chen, Dan Bugos, Peng Zan, **Guozhen Zhu**. *System and method for radio-assisted sound sensing.* EU Patent EP4102247B1. ***(Granted 2024)***
- Beibei Wang, Chenshu Wu, **Guozhen Zhu**, Muhammed Zahid Ozturk, Fengyu Wang, K. J. Ray Liu, Hung-Quoc Duc Lai, Sakila Sandeepani Jayaweera Samaranayake Arachchige Dona, Sai Deepika Regani, Xiaolu Zeng, Wei-Hsiang Wang, Oscar C. L. Au, Min Wu. *System and method for radio-based sleep monitoring.* EU Patent App. No. 22200097.8.
- **Guozhen Zhu**, Beibei Wang, Chenshu Wu, Xiaolu Zeng, K. J. Ray Liu, Oscar C. L. Au. *Method, apparatus, and system for wireless human and non-human motion detection.* U.S. Patent App. No. 18/391,529.
- **Guozhen Zhu**, Beibei Wang, Yuqian Hu, Xiaolu Zeng, K. J. Ray Liu, Weihang Gao, Oscar C. L. Au, Chenshu Wu. *System and method for wireless human-nonhuman motion classification.* EU Patent App. No. 24150597.3.
- **Guozhen Zhu**, Beibei Wang, Yuqian Hu, Chenshu Wu, Xiaolu Zeng, K. J. Ray Liu, Weihang Gao, Oscar C. L. Au. *Methods, apparatus, and systems for wireless detection, sensing, and learning.* JP Patent App. No. 2025-066624.
- Wei-Hsiang Wang, Beibei Wang, **Guozhen Zhu**, K. J. Ray Liu, Oscar C. L. Au, et al. *Wireless sensing using measurement enhancement.* U.S. Patent App. No. US20250141715A1.
- Sakila S. Jayaweera, Sai Deepika Regani, **Guozhen Zhu**, Wei-Hsiang Wang, Beibei Wang, K. J. Ray Liu, Oscar C. L. Au, et al. *High resolution human imaging using neural network.* U.S. Patent App. No. 19/004,301.
- **Guozhen Zhu**, Wenqing Zhang, Shanghua Gao, et al. *An intelligent wearable device for communication between deaf mute and normal person.* Patent ZL201720311729.X.

Industry Impact

Technology deployed worldwide across multiple sectors:
- **Verizon Home Awareness:** WiFi sensing deployed on **more than 10 millions** Fios routers nationwide *(based on US Patent No. US12256360B2 and App. No. 18/391,529)*.
- **Signify (Philips) & Nami Sensing:** Proximity detection and motion sensing deployed on **more than 100 million** smart lights and plugs *(based on US Patent No. US12256360B2, and App. No. 18/391,529)*.
- **TruShield Security:** Award-winning privacy-preserving security system *(CES 2025 TWICE Picks Award, based on US Patent No. US12352889B2 and App. No. 18/391,529)*.
- **Verisure WiFi Vision & Deutsche Telekom:** EU security deployment with Internet Service Providers *(based on EU Patent App. No. 24150597.3 and US Patent App. No. 18/391,529)*.
- **Arlo Technologies:** Exclusive partnership for Verified Human Presence detection *(based on US Patent No. US12352889B2 and App. No. 18/391,529)*.