ZHIHUI GAO

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RESEARCH INTERESTS

Spectrum Sensing, Millimeter Wave Communication, Network Resource Allocation, Joint Communication and Sensing, Cyber-Physical Systems, Internet-of-Things.

EDUCATION

- **Duke University** *Durham, NC*
  Ph.D. in Electrical and Computer Engineering *August 2020 - Present*
  M.S. in Electrical and Computer Engineering *August 2020 - September 2023*
  Advisor: Prof. Tingjun Chen and Prof. Yiran Chen
- **Fudan University** *Shanghai, China*
  B.Eng. in Electrical Engineering *September 2016 - June 2020*
  Advisor: Prof. Yuedong Xu
- **University of Texas at Austin** *Austin, TX*
  Exchange Program in Electrical and Computer Engineering *August 2018 - December 2018*

PUBLICATION

- **Zhihui Gao**, Zhecun Liu, Tingjun Chen. Chameleon: Integrated Sensing and Communication with Sub-Symbol Beam Switching in mmWave Networks. In *arXiv preprint arXiv:2509.14628*, 2025.
- **Zhihui Gao**, Zhecun Liu, Tingjun Chen. BatStation: Toward in-situ Radar Sensing on 5G Base Stations with Zero-Shot Template Generation. In *arXiv preprint arXiv:2509.06898*, 2025.
- Zhenzhou Qi, Chung-Hsuan Tung, **Zhihui Gao**, Tingjun Chen. NEXUS: Efficient and Scalable Multi-Cell mmWave Baseband Processing with Heterogeneous Compute. In *arXiv preprint arXiv:2509.04625*, 2025.
- Ningyuan Yang, Lyu Guanliang, Mingchen Ma, Yiyi Lu, Yiming Li, **Zhihui Gao**, Hancheng Ye, Jianyi Zhang, Tingjun Chen, Yiran Chen. IoT-MCP: Bridging LLMs and IoT Systems through Model Context Protocol. In *Proc. ACM MobiCom'24 Workshop on Wireless Network Testbeds, Experimental Evaluation & CHaracterization (**WiNTECH'25**)*, 2025.
- Yiming Li, Scarlett Francini, **Zhihui Gao**, Tingjun Chen. Demo: ClickDT: Building Scalable and High-Resolution Wireless Digital Twins with a Few Clicks. In *Proc. IEEE Military Communication Conference (**MILCOM'25 Demo**)*, 2025.
- Wei Cheng, **Zhihui Gao**, Jose Guajardo, Hesham Beshary, Ali Niknejad, Tingjun Chen. SPEAR+: Streaming-based Multi-Channel SDR Implementation Using the RFSoC Platform. In *Proc. IEEE Military Communication Conference (**MILCOM'25**)*, 2025.
- Xueying Wu, Baijun Zhou, **Zhihui Gao**, Yuzhe Fu, Qilin Zheng, Yintao He, Hai Li. KLLM: Fast LLM Inference with K-Means Quantization. In *arXiv preprint arXiv:2507.23035*, 2025.
- Sri Krishna Vadlamani, Kfir Sulimany, **Zhihui Gao**, Tingjun Chen, Dirk Englund. Machine Intelligence on Wireless Edge Networks. In *arXiv preprint arXiv:2506.12210*, 2025.
- **Zhihui Gao**, Sri Krishna Vadlamani, Kfir Sulimany, Dirk Englund, Tingjun Chen. Disaggregated Deep Learning via in-physics Computing at Radio Frequency. In *arXiv preprint arXiv:2504.17752*, 2025.

- Yiming Li, **Zhihui Gao**, Joshua Palathinkal, Monisha Ghosh, Tingjun Chen. A Generalized Deep Learning Model for Signal Coverage Prediction in the CBRS Band. In *Proc. IEEE International Symposium on Dynamic Spectrum Access Networks (**DySPAN'25**)*, 2025.
- Wei Cheng, **Zhihui Gao**, and Tingjun Chen. SPEAR: Software-defined Python-Enhanced RFSoC for wideband radio applications. In *Proc. ACM MobiCom'24 Workshop on Wireless Network Testbeds, Experimental Evaluation & CHaracterization (**WiNTECH'24**)*, 2024.
- Wei Cheng, **Zhihui Gao**, and Tingjun Chen. Demo: Real-time Wideband Software-defined Radio with Python Programmability based on RFSoC. In *Proc. ACM International Conference on Mobile Computing and Networking (**MobiCom'24 Demo**)*, 2024.
- **Zhihui Gao***, Yunjia Zhang*, and Tingjun Chen. DeepMon: Wi-Fi monitoring using sub-Nyquist sampling rate receivers with deep learning. In *Proc. ACM MobiCom24 Workshop on Machine Learning for NextG Networks (**MLNextG'24**)*, 2024.
- **Zhihui Gao**, Zhenzhou Qi, Tingjun Chen. Mambas: Maneuvering Analog Multi-User Beamforming using an Array of Subarrays in mmWave Networks. In *Proc. ACM International Conference on Mobile Computing and Networking (**MobiCom'24**)*, 2024.
- Yiming Li, Zeyu Li, **Zhihui Gao**, Tingjun Chen. Geo2SigMap: High-Fidelity RF Signal Mapping Using Geographic Databases. In *Proc. IEEE International Symposium on Dynamic Spectrum Access Networks (**DySPAN'24**)*, 2024.
- **Zhihui Gao**, Yiran Chen, Tingjun Chen. Swirls: Sniffing Wi-Fi using radios with low sampling rates. In *Proc. ACM International Symposium on Theory, Algorithmic Foundations, and Protocol Design for Mobile Networks and Mobile Computing (**MobiHoc'23**)*, 2023.
- Zhenzhou Qi, **Zhihui Gao**, Chung-Hsuan Tung, and Tingjun Chen. Programmable millimeter-wave MIMO radios with real-time baseband processing. In *Proc. ACM MobiCom23 Workshop on Wireless Network Testbeds, Experimental Evaluation & CHaracterization (**WiNTECH'23**)*, 2023.
- Tingjun Chen, Prasanthi Maddala, Panagiotis Skrimponis, Jakub Kolodziejski, Abhishek Adhikari, Hang Hu, **Zhihui Gao**, Arun Paidimarri, Alberto Valdes-Garcia, Myung Lee, Sundeep Rangan, Gil Zussman, Ivan Seskar. (INVITED) Open-access millimeter-wave software-defined radios in the PAWR COSMOS testbed: Design, deployment, and experimentation. In *Elsevier Computer Networks (**COMNET**)*, 2023.
- Jianyi Zhang, Zhixu Du, Jingwei Sun, Ang Li, Minxue Tang, Yuhao Wu, **Zhihui Gao**, Martin Kuo, Hai-Helen Li, Yiran Chen. Next Generation Federated Learning for Edge Devices: An Overview. (INVITED) In *Proc. IEEE International Conference on Collaboration and Internet Computing (**CIC'22**)*, 2022.
- **Zhihui Gao**, Ang Li, Dong Li, Jialin Liu, Jie Xiong, Yu Wang, Bing Li, Yiran Chen. MOM: Microphone based 3D Orientation Measurement. In *Proc. ACM/IEEE International Conference on Information Processing in Sensor Networks (**IPSN'22**)*, 2022.
- **Zhihui Gao**, Minxue Tang, Ang Li, Yiran Chen. An Audio Frequency Unfolding Framework for Ultra-Low Sampling Rate Sensors. (INVITED) In *Proc. IEEE International Symposium on Quality Electronic Design (**ISQED'22**)*, 2022.
- **Zhihui Gao**, Ang Li, Yunfan Gao, Bing Li, Yu Wang, Yiran Chen. FedSwap: A Federated Learning based 5G Decentralized Dynamic Spectrum Access System. (INVITED) In *Proc. IEEE/ACM International Conference On Computer Aided Design (**ICCAD'21**)*, 2021.
- **Zhihui Gao**, Ang Li, Yunfan Gao, Yu Wang, Yiran Chen. Hermes: Decentralized Dynamic Spectrum Access System for Massive Devices Deployment in 5G. In *Proc. International Conference*

*on Embedded Wireless Systems and Networks (**EWSN'21**)*, 2021.

- **Zhihui Gao***, Yunfan Gao*, Sulei Wang, Dan Li, Yuedong Xu. CRISLoc: Reconstructable CSI Fingerprinting for Indoor Smartphone Localization. *IEEE Internet of Things Journal (**IoT Journal**)*, 2020.

TEACHING AND EDUCATION

- **Teaching Assistant** — *Durham, NC*
  High school outreach with Inspiring Minds — *April 2025 - May 2025*
  Cary Academy
- **Teaching Assistant** — *Durham, NC*
  ECE590 Full-stack IoT Systems — *January 2024 - May 2024*
  Instructor: Prof. Tingjun Chen
- **Teaching Assistant** — *Durham, NC*
  ECE495/CS390 Full-stack IoT Systems — *August 2023 - December 2023*
  Instructor: Prof. Tingjun Chen
- **Teaching Assistant** — *Durham, NC*
  High school outreach with Inspiring Minds — *October 2023 - December 2023*
  Hillside High School
- **Teaching Assistant** — *Durham, NC*
  High school outreach with Inspiring Minds — *March 2023 - April 2023*
  Hillside High School

MENTORING

- Xiangru Chen, Master student at Duke University
- Yiming Li, Master student at Duke University
- Zeyu Li, Undergraduate student at Duke University
- Yixin Liang, Undergraduate student at Zhejiang University
- Yunjia Zhang, Undergraduate student at Carnegie Mellon University

REVIEW SERVICE

- ACM International Conference On Mobile Computing And Networking (MobiCom) 2023, 2024
- IEEE International Conference on Computer Communications (INFOCOM) 2023, 2024
- ACM International Symposium on Theory, Algorithmic Foundations, and Protocol Design for Mobile Networks and Mobile Computing (MobiHoc) 2023
- ACM International Conference on Mobile Systems, Applications, and Services (MobiSys) 2023
- ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN) 2023
- ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (BuildSys) 2023
- ACM/IEEE Symposium on Edge Computing (SEC) 2022
- IEEE Internet of Things Journal