

Jialuo Du

Research Associate (Postdoc)
Computer Science and Engineering
Michigan State University, MI, US
Google Scholar

Email: dujluo@gmail.com
<https://daibiaoxuwu.github.io/>
Phone: +86 13681397482
GitHub: [daibiaoxuwu](https://github.com/daibiaoxuwu)

Research Interests

Low-power wide-area IoT, wireless physical layer, and AI for wireless systems. My research builds **physics-informed intelligent signal processing**, which joins white-box physical models with black-box learning: the models provide robustness and the learning provides adaptiveness, so that weak and distorted signals can be recovered on commodity IoT devices.

Professional Appointments

Aug 2025 – Present **Michigan State University**, *Research Associate (Postdoc)*

- Department of Computer Science and Engineering. Supervisor: Prof. Zhichao Cao

Education

Sept 2020 – July 2025 **Tsinghua University**, *Ph.D., School of Software*

- Advisor: Prof. Yunhao Liu

Sept 2016 – June 2020 **Tsinghua University**, *B.Eng., Computer Science and Technology*

Publications

Conference Papers

Self-Supervised Doppler-Guided RF Odometry

Kunzhe Song, **Jialuo Du**, Jingkai Lin, Huacheng Zeng
NeurIPS 2026 (poster), accepted. OpenReview

DeRa: Deep-Range Low-Power Wide Area IoT via Ultra-sensitive Signal Detection

Jialuo Du, Jingkai Lin, Zhichao Cao

ACM MobiCom 2026, pp. 599–619. Acceptance rate: 89/625 (14.2%). DOI

LoRaTrimmer: Optimal Energy Condensation with Chirp Trimming for LoRa Weak Signal Decoding

Jialuo Du, Yunhao Liu, Yidong Ren, Li Liu, Zhichao Cao

ACM MobiCom 2024. Acceptance rate: 103/494. DOI

SRLoRa: Neural-enhanced LoRa Weak Signal Decoding with Multi-gateway Super Resolution

Jialuo Du, Yidong Ren, Zhui Zhu, Chenning Li, Zhichao Cao, Qiang Ma, Yunhao Liu

ACM MobiHoc 2023. Acceptance rate: 30/136. DOI

NELoRa-Bench: A Benchmark for Neural-enhanced LoRa Demodulation

Jialuo Du, Yidong Ren, Mi Zhang, Yunhao Liu, Zhichao Cao

ICLR 2023 Workshop on Machine Learning for IoT. arXiv

SRPeek: Super Resolution Enabled Screen Peeking via COTS Smartphone

Jialuo Du, Chenning Li, Zhenguo Guo, Zhichao Cao

IEEE ICPADS 2021. DOI

Kairos: Soil-Aware Transmission Control for Long-Term Agricultural Cross-Soil LoRa

Jingkai Lin, Yidong Ren, **Jialuo Du**, Yimeng Liu, Yawen Wang, Younsuk Dong, Tianxing Li, Zhichao Cao

IEEE ICNP 2026. Acceptance rate: 67/277 (24.2%). PDF

LoRaSeek: Boosting Denoising Ability in Neural-enhanced LoRa Decoder via Hierarchical Feature Extraction

Khang Nguyen, Yidong Ren, **Jialuo Du**, Jingkai Lin, Maolin Gan, Shigang Chen, Mi Zhang, Chunyi Peng, Zhichao Cao

ACM MobiCom 2025. Acceptance rate: 36/348. DOI

Demeter: Reliable Cross-soil LPWAN with Low-cost Signal Polarization Alignment

Yidong Ren, Wei Sun, **Jialuo Du**, Huaili Zeng, Younsuk Dong, Mi Zhang, Shigang Chen, Yunhao Liu, Tianxing Li, Zhichao Cao

ACM MobiCom 2024. Acceptance rate: 103/494. DOI

Prism: High-throughput LoRa Backscatter with Non-linear Chirps

Yidong Ren, Puyu Cai, Jinyan Jiang, **Jialuo Du**, Zhichao Cao

IEEE INFOCOM 2023. Acceptance rate: 252/1312. DOI

EyeLoc: Smartphone Vision-enabled Plug-n-play Indoor Localization in Large Shopping Malls

Zhichao Cao, **Jialuo Du**, Manni Liu, Qing Zhou

IEEE DySPAN 2019.

Research Agenda

Scaling LoRa to Massive IoT: A Physical Layer Approach

Jialuo Du

ACM MobiSys 2026 Rising Stars Forum (MobiSys Companion '26), pp. 150–151. DOI

Journal Articles

Umami-MRNN: Deep Learning-based Prediction of Umami Peptide Using RNN and MLP

Lulu Qi, **Jialuo Du**, Yue Sun, Yongzhao Xiong, Xinyao Zhao, Daodong Pan, Yueru Zhi, Yali Dang, Xinchang Gao

Food Chemistry, 2023. DOI

EyeLoc: Smartphone Vision-enabled Plug-n-play Indoor Localization in Large Shopping Malls

Manni Liu, **Jialuo Du**, Qing Zhou, Zhichao Cao, Yunhao Liu

IEEE Internet of Things Journal, 2020. DOI

Preprints

AIoT-based Continuous, Contextualized, and Explainable Driving Assessment for Older Adults

Yimeng Liu, Fangwei Zhang, Maolin Gan, **Jialuo Du**, Jingkai Lin, Yawen Wang, Fei Sun, Honglei Chen, Linda Hill, Ruofeng Liu, Tianxing Li, Zhichao Cao

arXiv:2603.00691, 2026. arXiv

NELoRa-Bench: A Benchmark for Neural-enhanced LoRa Demodulation

Jialuo Du, Yidong Ren, Mi Zhang, Yunhao Liu, Zhichao Cao

arXiv:2305.01573, 2023. arXiv

Research Highlights

Ultra-sensitive packet detection (DeRa, MobiCom 2026, first author)

- Showed that weak LoRa packets are lost at *detection*, before decoding starts: carrier frequency offset rotates the phase of every preamble chirp, so existing detectors can only add magnitudes.
- Modeled the phase evolution, compensated CFO-induced timing, frequency and leakage distortions (up to 40 kHz), and accumulated the preamble coherently, lowering the detection threshold by 4.3–4.8 dB and the decoding threshold by 3.3–3.9 dB on COTS devices across SF 7–12.

Optimal weak-signal demodulation (LoRaTrimmer, MobiCom 2024, first author)

- Found an overlooked frequency and phase jump inside every real LoRa symbol that standard dechirp-and-FFT demodulation ignores, and derived the optimal decoder under a probabilistic channel model.

- Computed all trimmed FFTs at once in $\mathcal{O}(n^{1.5})$ time by splitting the DFT matrix along its anti-diagonal. Gains 1.70–2.49 dB SNR over the state of the art, including the neural decoder NELoRa, at a fraction of its computation.

Neural and multi-gateway decoding (SRLoRa, MobiHoc 2023; NELoRa-Bench, ICLR-W 2023; first author)

- Designed a neural architecture with max-min-merge layers that fuses weak copies of one packet from multiple gateways.
- Released NELoRa-Bench, an open dataset of 27,329 real LoRa symbols and an evaluation methodology adopted by later neural decoders, including LoRaSeek (MobiCom 2025).

Open-Source Software and Datasets

- LoRaTrimmer decoder: github.com/LoRaTrimmer/LoRaTrimmer, with a reproducible workflow on Kaggle
- NELoRa-Bench dataset: github.com/daibiaoxuwu/NeLoRa_Dataset and Kaggle
- Browser-based interactive LoRa receiver demos: daibiaoxuwu.github.io

Teaching Experience

- Assisted in teaching CSE 410 Operating Systems (undergraduate), Michigan State University, Spring 2026

Mentoring

- Jingkai Lin, Ph.D. student, Michigan State University. Outcomes: first author of Kairos (IEEE ICNP 2026); second author of DeRa (ACM MobiCom 2026)

Professional Service

- Technical Program Committee member, IEEE International Conference on Mobility, Sensing and Networking (MSN), 2026
- Distinguished Reviewer Board, ACM Transactions on Internet of Things (TIOT), 2026