

YIDONG REN

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RESEARCH INTERESTS

- **Low-power Wireless Networks.** Physical layer encoder decoder design [MobiSys'24, MobiCom'24 C3, MobiHoc'23, ICLR'23 ML4IoT]. Ultra-low power communication [INFOCOM'23]. Channel adapted Wi-Fi [TMC'22].
- **Internet of Things.** Satellite IoT in rural areas [MobiCom'24 C1]. Cross-soil agricultural IoT [MobiCom'24 C2].
- **Mobile computing:** Wearable system [SenSys'24].

EDUCATION

Michigan State University East Lansing, USA
Ph.D. Candidate, Department of Computer Science and Engineering 2021 – Present
Advisor: Zhichao Cao

University of Electronic Science and Technology of China Chengdu, China
B.E., Electronic and Information Engineering 2017 – 2021

CONFERENCE PUBLICATIONS

- MobiCom 2024** [C1] SateRIoT: High-performance Ground-Space Networking for Rural IoT.
Yidong Ren, Amalinda Gamage, Li Liu, Mo Li, Shigang Chen, Younsuk Dong, Zhichao Cao.
The 30th Annual International Conference On Mobile Computing And Networking.
Acceptance ratio: 20.85%
- MobiCom 2024** [C2] 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.
The 30th Annual International Conference On Mobile Computing And Networking.
Acceptance ratio: 20.85%
- MobiCom 2024** [C3] LoRaTrimmer: Optimal Energy Condensation with Chirp Trimming for LoRa Weak Signal Decoding.
Jialuo Du, Yunhao Liu, **Yidong Ren**, Li Liu, Zhichao Cao.
The 30th Annual International Conference On Mobile Computing And Networking.
Acceptance ratio: 20.85%
- MobiSys 2024** [C4] ChirpTransformer: Versatile LoRa Encoding for Low-power Wide-area IoT.
Yidong Ren* (co-primary author), Chenning Li*, Shuai Tong, Shakhrul Iman Siam, Mi Zhang, Jiliang Wang, Yunhao Liu, Zhichao Cao.
The 22nd ACM International Conference on Mobile Systems, Applications, and Services
Acceptance ratio: 16.35%
- SenSys 2024** [C5] PiezoBuds: Piezo-Aided Secure Earbuds with Practical Speaker Authentication.
Gen Li*, Huaili Zeng*, Hanqing Guo, **Yidong Ren**, Aiden Dixon, Zhichao Cao and Tianxing Li.
The 22nd ACM Conference on Embedded Networked Sensor Systems.
Acceptance ratio: 18.53%
- MobiHoc 2023** [C6] SRLoRa: Neural-enhanced LoRa Weak Signal Decoding with Multi-gateway Super Resolution.
Jialuo Du, **Yidong Ren**, Zhuizhu, Chenning Li, Zhichao Cao, Qiang Ma, Yunhao Liu.
The 24th International Symposium on Theory, Algorithmic Foundations, and Protocol Design for Mobile Networks and Mobile Computing
Acceptance ratio: 22.06%
- INFOCOM 2023** [C7] Prism: High-throughput LoRa Backscatter with Non-linear Chirps.
Yidong Ren, Puyu Cai, Jinyan Jiang, Jialuo Du, Zhichao Cao.
IEEE Conference on Computer Communications, 2023
Acceptance ratio: 19.21%
- ICNP 2022** [C8] Is Lorawan Really Wide? Fine-grained LoRa Link-level Measurement in An Urban Environment.
Yidong Ren* (co-primary author), Li Liu*, Chenning Li*, Zhichao Cao and Shigang Chen.
The 30th IEEE International Conference on Network Protocols.
Acceptance ratio: 21.43%

* denotes equal contribution, _ are students I mentor

JOURNAL PUBLICATIONS

ToN	[J1] Morph: ChirpTransformer-based Encoder-decoder Co-design for Reliable LoRa Communication. Yidong Ren , Maolin Gan, Mi Zhang, Shigang Chen, Zhichao Cao. <i>Under review of IEEE/ACM Transactions on Networking</i>
TMC	[J2] Channel Adapted Antenna Augmentation for Improved Wi-Fi Throughput. Yanbo Zhang, Weiping Sun, Yidong Ren , Sung-ju Lee, Mo Li. IEEE Transactions on Mobile Computing, 2022.

BENCHMARK

ICLR ML4IoT	NELoRa-Bench: A Benchmark for Neural-enhanced LoRa Demodulation. Jialuo Du, Yidong Ren , Mi Zhang, Yunhao Liu and Zhichao Cao. International Conference on Learning Representations Workshop on Machine Learning for IoT, 2023. Oral
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DEMO

MobiCom 2024	Demeter-Demo: Demonstrating 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. The 30th Annual International Conference On Mobile Computing And Networking (Demo)
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INTERNSHIP EXPERIENCE

Qualcomm, WLAN System Team. Santa Clara, CA, USA	06/2024 – 09/2024
Research on <i>AI-assisted Wi-Fi CSI localization</i> and <i>Deep reinforcement learning for Wi-Fi roaming</i> .	
Nanyang Technological University, WADNS Group, Singapore	07/2019 – 10/2019
Channel adaptive Wi-Fi intelligent antenna selection system. Advisor: Mo Li	

TEACHING EXPERIENCE

Michigan State University, Department of Computer Science and Engineering	
Teaching Assistant	
• CSE 220 — Programming in C	Spring 2022, Spring 2023, Spring 2024
• CSE 891 — AIoT: Artificial Intelligence in the Edge	Fall 2022
Guest Lecturer	
• CSE 891 — AIoT: Artificial Intelligence in the Edge	Fall 2023

ACADEMIC SERVICE

Programm Committee of	
• ACM MobiCom Artifact Evaluation	2024
• ACM MobiSys Artifact Evaluation	2024
• ACM SenSys Artifact Evaluation	2024
• IEEE International Conference on Parallel and Distributed Systems (ICPADS)	2024
Invited Journal Reviewer of	
• IEEE/ACM Transactions on Networking	2023-2024
• IEEE Transactions on Mobile Computing	2024
• ACM Transactions on Sensor Network	2022-2024
Conference Reviewer of	
• IEEE International Symposium on Dynamic Spectrum Access Networks (DySpan)	2022-2023
• EAI MobiQuitous	2022

MENTORSHIP

Puyu Cai	02/2022-12/2022
Now: Master student at Computer Science Department, New York University	
Khang Nguyen and Nam Nguyen	03/2023 - Present
Now: Honor College, Michigan State University	

AWARDS

Student Travel Grant, ACM MobiCom	2024
Student Travel Grant, ACM MobiSys	2024
Student Travel Grant, ACM MobiHoc	2023
Student Travel Grant, IEEE ICNP	2022

GRANTS EXPERIENCE

I assisted in the preparation of proposals for the following research grants:

NSF: LoRa Enabled Space-air-ground Integrated Networks for Next-Generation Agricultural IoT.
Award number 2338976.

NSF: Towards High-Performing LoRa with Embedded Intelligence on the Edge.
Award number 2312674.

TALKS

ACM MobiSys 2024 , Tokyo, Japan Conference Presentation "ChirpTransformer: Versatile LoRa Encoding for Low-power Wide-area IoT"	06/2024
Tsinghua University , Beijing, China Invited Talk "Reliable Cross-soil LPWAN for agricultural IoT"	06/2024
IEEE INFOCOM 2023 , New York City, USA Conference Presentation "Prism: High-throughput LoRa Backscatter with Non-linear Chirps"	05/2023

REFERENCES

- Zhichao Cao** (Advisor) Michigan State University
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- Shigang Chen** University of Florida
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- Mo Li** The Hong Kong University of Science and Technology
Professor Department of Computer Science and Engineering,
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- Yunhao Liu** Tsinghua University
Professor, Dean Global Innovation Exchange
ACM Fellow, IEEE Fellow
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