YIDONG REN

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428 S. Shaw Lane, East Lansing, MI - 48824, USA

Research Interests

- **Internet of Things:** Satellite IoT in rural areas [MobiCom'24 C1]. Cross-soil agricultural IoT [MobiCom'24 C2].
- **Low-power Wireless Networks:** Physical layer encoder decoder design [MobiSys'24, MobiCom'24 C6, MobiHoc'23, ICLR'23 ML4IoT]. Ultra-low power (backscatter) communication [INFOCOM'23].
- **Mobile Computing:** Wearable system [SenSys'24]. Channel adapted Wi-Fi [TMC'22].

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

* denotes equal contribution, _ are students I mentor

First-author papers:

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%

MobiSys 2024 **[C3]** 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%

INFOCOM 2023 **[C4]** 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 **[C5]** 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%

Other papers:

MobiCom 2024 **[C6]** 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%

SenSys 2024 **[C7]** PiezoBud: A Piezo-Aided Secure Earbud 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 **[C8]** 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%

JOURNAL PUBLICATIONS

TMC **[J1]** Morph: ChirpTransformer-based Encoder-decoder Co-design for Reliable LoRa Communication.
Yidong Ren, Maolin Gan, Mi Zhang, Shigang Chen, Zhichao Cao.
Under review of IEEE Transactions on Mobile Computing

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.

BENCKMARK

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**

DEMO

MobiCom 2024 Demeter-Demo: Demonstrating Cross-soil LPWAN with Low-cost Signal Polarization Alignment.
Yidong Ren, Yawen Wang, Younsuk Dong, Shigang Chen, Mi Zhang, Jiliang Tang, Zhichao Cao.
The 30th Annual International Conference On Mobile Computing And Networking (**Demo**)

INTERNSHIP EXPERIENCE

Qualcomm, WLAN System Team. Santa Clara, CA, USA 06/2024 – 09/2024
Research on *DNN-assisted Wi-Fi CSI localization* and *Deep reinforcement learning for Wi-Fi roaming*.

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 06/2024
Conference Presentation
"ChirpTransformer: Versatile LoRa Encoding for Low-power Wide-area IoT"

Tsinghua University, Beijing, China 06/2024
Invited Talk
"Reliable Cross-soil LPWAN for agricultural IoT"

IEEE INFOCOM 2023, New York City, USA 05/2023
Conference Presentation
"Prism: High-throughput LoRa Backscatter with Non-linear Chirps"

References

1. **Zhichao Cao** (Advisor) Michigan State University
   Assistant Professor Department of Computer Science and Engineering
   NSF CAREER AWARDEE
   Email: caozc@msu.edu
   Phone: +1-517-353-3148

2. **Shigang Chen** University of Florida
   Professor Department of Computer & Information of Science & Engineering
   IEEE Fellow, ACM Distinguished Member
   Email: sgchen@cise.ufl.edu
   Phone: +1-352-214-9215

3. **Mo Li** The Hong Kong University of Science and Technology
   Professor Department of Computer Science and Engineering,
   IEEE Fellow, ACM Distinguished Member
   Email: lim@cse.ust.hk
   Phone: +852 2358 7107

4. **Yunhao Liu** Tsinghua University
   Professor, Dean Global Innovation Exchange
   ACM Fellow, IEEE Fellow
   Email: yunhao@tsinghua.edu.cn
   Phone: +1-517-2495-850