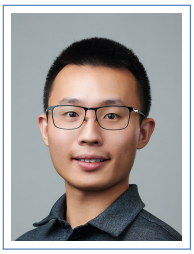
Yue Wu

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Experience

2025–present **Senior Researcher**, *Microsoft Azure Quantum*.
Full-time researcher working on quantum error correction

2024–2025 **Consulting Researcher**, *Microsoft Azure Quantum*.
Part-time researcher, manager: Marcus Silva

2020–2025 **Computer Science Department**, *Yale University*.
Ph.D. student, co-advised by Lin Zhong (primary) and Shruti Puri

2023 summer 6.5-8.25 **Research Intern**, *Microsoft Azure Quantum*.
Summer intern, advisor: Nicolas Delfosse

2018 summer 7.8-9.8 **Efficient Computing Group**, *Rice University*.
Summer intern, advisor: Lin Zhong

2019 summer 6.25-9.7 **Efficient Computing Group**, *Rice University*.
Summer intern, advisor: Lin Zhong

2016–2020 **School of Electronics Engineering and Compter Science**, *Peking University*.
Undergraduate, advisor: Chenren Xu

Research and Awards

2026/6/8 **deq: a Dynamic and Generic QEC Decoding System**.

- The first QEC decoding system that is capable of decoding dynamic logical circuits (feed-forward and arbitrary branching).
- It supports general QEC codes and custom logical instruction sets by providing a new programming language and compiler.
- Open-sourced at `https://github.com/microsoft/qdk-ec/tree/main/deq`

2025/10/2 **Minimum-Weight Parity Factor (MWPF) Decoder for quantum LDPC codes**.

- A more accurate QEC decoder that applies to arbitrary hypergraphs for general quantum LDPC codes.
- The hypergraph MWPF problem is NP-hard, yet we're able to build a mathematical foundation that strictly bound the proximity and use heuristics to reach higher accuracy than MWPM decoders.
- Library preview at `https://pypi.org/project/mwpf/`.

2025/2/20 **Micro Blossom: Accelerated Minimum-Weight Perfect Matching Decoding for Quantum Error Correction**.

- Hardware accelerator for exact MWPM decoding with sub-microsecond latency.

2023/5/15 **Fusion Blossom: Fast MWPM Decoders for Quantum Error Correction (QEC) (Best Paper Award of IEEE QCE'2023)**.

- The first almost-linear-time, parallel MWPM decoder, providing open-sourced implementation.
- Scalable to arbitrarily large code distances while meeting the decoding throughput requirement.
- Combining the strength of the Union-Find decoder (fast) and the MWPM decoder (accurate) for an exact MWPM decoder with almost-linear average time complexity.

2023/1/20 **Scalable Quantum Error Correction for Surface Codes using FPGA**.

- The first distributed Union-Find decoder on FPGA that achieves sub-microsecond decoding time.
- By using massively parallel compute units, it scales to arbitrarily large code distances.

2022/11/7 **An Interpretation of Union-Find Decoder on Weighted Graphs**.

- I found a close relationship between the Union-Find decoder and Minimum-Weight Perfect Matching (MWPM) decoder, also found sufficient conditions of equivalence between UF and MWPM decoders.

2022/8/9 **Erasure conversion for fault-tolerant quantum computing in alkaline earth Rydberg atom arrays**.

- I numerically evaluates the improvement of erasure conversion as proposed by Jeff D Thompson et al.

2020/12/18 **QEC-Playground: A research tool for topological Quantum Error Correction (QEC)**.

- Initially started as a course project for APHY660 (Quantum Information & Computation), this project has evolved to a research tool for QEC that supports circuit simulation, decoding and visualization.
- It supports both Pauli noise and erasure noise simulation.
- It supports various decoders like MWPM decoder, Union-Find decoder, Tailored MWPM decoder, etc.
- It includes a visualization tool that helps beginners learn QEC as well as experts to debug decoders.

2019/10/25 **Turboboosting visible light backscatter communication**.

- By exploring the physical model of TN-LCD in VLBC (Visible Light Backscatter Communication), I designed a new modulation scheme called DSM (Delayed Superimposition Modulation) based on its intrinsically asymmetric transition, boosting the data rate by 8x. Together with PQAM, our system boosts the data rate by 32x in real experiments.

2019/10/25 **ACM MobiCom 2019 Student Research Competition 1st Place**.

Poster: Polarization-based QAM for Visible Light Backscatter Communication

- I built an SDR (Software-defined Radio) system using microcontrollers and developed joint demodulation algorithm for PQAM (proposed by Puri Wang) and DSM (propsed by Yue Wu) that reaches 12x more communication throughput than state-of-the-art.

2018/11/3 **Demo: Long Range Retroreflective V2X Communication with Polarization-based Differential Reception (Best Demo Award of SenSys'18)**.

- A polarization-based differential reception scheme to suppress ambient noise and realize long range retroreflective V2X communications

2018/7/24 **2018 Intel Cup Undergraduate Electronics Design Contest —— Embedded System Design Invitational Contest (First Prize). Project Title: Put and Use IoT Table**.

- A scalable software defined charging network on a surface, which enables wireless charging and communication. Inspired by SDR, this work proposed software-defined coils, which dynamically generates coils and routes to charging drivers for energy transmission as well as NFC communication.

2017/10/16 **ACM MobiCom 2017 Student Research Competition 2nd Place**.

Poster: Smart RF Table Enables IoT on a Desk

- A table which enables wide-range wireless charging and communication through magnetic coupling. It's able to power up small gadgets like desk lamp and detect objects with NFC tags on it.

2015 **32th Chinese Physics Olympiad (CPhO) Gold Medal**.

Publications

2025 **Minimum-Weight Parity Factor Decoder for Quantum Error Correction**, *Yue Wu, Binghong Li, Kathleen Chang, Shruti Puri, Lin Zhong*, https://arxiv.org/abs/2508.04969.

2025 **Micro Blossom: Accelerated Minimum-Weight Perfect Matching Decoding for Quantum Error Correction**, *Yue Wu, Namitha Liyanage, Lin Zhong*, ASPLOS (2025).

2024 **Mitigating Temporal Fragility in the XY Surface Code**, *Pei-Kai Tsai, Yue Wu, Shruti Puri*, Physical Review X (2024).

2023 **Fusion Blossom: Fast MWPM Decoders for QEC**, *Yue Wu, Lin Zhong*, IEEE International Conference on Quantum Computing and Engineering (QCE) 2023, **Best Paper Award**.

2023 **Scalable Quantum Error Correction for Surface Codes using FPGA**, *Namitha Liyanage, Yue Wu, Alexander Deters, Lin Zhong*, IEEE International Conference on Quantum Computing and Engineering (QCE), 2023.

2022 **An Interpretation of Union-Find Decoder on Weighted Graphs**, *Yue Wu, Namitha Liyanage, Lin Zhong*, `https://arxiv.org/abs/2211.03288`.

2022 **Erasure conversion for fault-tolerant quantum computing in alkaline earth Rydberg atom arrays**, *Yue Wu, Shimon Kolkowitz, Shruti Puri, Jeff D. Thompson*, Nature Communications.

2020 **Turboboosting Visible Light Backscatter Communication**, *Yue Wu, Purui Wang, Kenuo Xu, Lilei Feng, Chenren Xu*, ACM SigComm, 2020.

2020 **Renovating road signs for infrastructure-to-vehicle networking: a visible light backscatter communication and networking approach**, *Purui Wang, Lilei Feng, Guojun Chen, Chenren Xu, Yue Wu, Kenuo Xu, Guobin Shen, Kuntai Du, Gang Huang, Xuanzhe Liu*, ACM MobiCom, 2020.

2019 **Improving Visible Light Backscatter Communication with Delayed Superimposition Modulation**, *Yue Wu, Purui Wang, Chenren Xu*, ACM MobiCom, 2019.

2019 **Poster: Polarization-based QAM for Visible Light Backscatter Communication**, *Purui Wang, Yue Wu, Chenren Xu*, ACM MobiCom, 2019.

2019 **Poster: Retroreflective MIMO Communication**, *Yue Wu, Kenuo Xu, Hao He, Zihang Wu, Chenren Xu*, ACM HotMobile, 2019.

2018 **Long Range Retroreflective V2X Communication with Polarization-based Differential Reception**, *Xu, Xieyang and Shen, Yang and Chen, Guojun and Wu, Yue and Feng, Lilei and Wang, Qing and Xu, Chenren*, ACM SenSys, 2018.

2018 **Software-defined Visible Light Backscatter Network**, *Xu, Xieyang and Shen, Yang and Chen, Guojun and Wu, Yue and Feng, Lilei and Wang, Qing and Xu, Chenren*, ACM MobiSys, 2018.

2017 **Poster: Smart RF Table Enables IoT on a Desk**, *Wu, Yue and Li, Caihua and Shi, Jieqi*, ACM MobiCom, 2017.

Travel

U.S. **Tutorial in ISCA**, *6.27 - 7.1, 2026*, Raleigh, North Carolina.

U.S. **Invited Talk in QEC**, *6.7 - 6.12, 2026*, Santa Barbara, California.

U.S. **Talk in APS March Meeting**, *3.3 - 3.8, 2024*, Minneapolis, Minnesota.

U.S. **Talk in IEEE QCE'23**, *9.17 - 9.22, 2023*, Bellevue, Washington.

U.S. **Research Intern at Microsoft Azure Quantum**, *6.5 - 8.25, 2023*, Redmond, Washington.

U.S. **Talk in APS March Meeting**, *3.5 - 3.10, 2022*, Las Vegas, Nevada.

U.S. **Attending IEEE QCE'22**, *9.18 - 9.23, 2022*, Broomfield, Colorado.

U.S. **Talk in APS March Meeting**, *3.14 - 3.18, 2022*, Chicago, Illinois (remote).

U.S. **Talk in SigComm'22**, *8.22 - 8.26, 2022*, (remote).

M.X. **Poster in ACM MobiCom'19**, *10.21 - 10.25, 2019*, San Jose, Baja california sur.

U.S. **Summer Intern at Rice University**, *6.25 - 9.7, 2019*, Houston, Texas.

U.S. **Poster in ACM HotMobile'19**, *2.26 - 3.2, 2019*, Santa Cruz, California.

China **Demo in ACM SenSys'18**, *11.3 - 11.7, 2018*, Senzhen, Guangdong.

U.S. **Summer Intern at Rice University**, *7.1 - 9.8, 2018*, Houston, Texas.

U.S. **Poster in ACM MobiCom'17**, *10.16 - 10.21, 2017*, Snowbird, Utah.

U.S. **Health++ Hackathon**, *10.15 - 10.23, 2017*, San Francisco, California.

Skills

Software Rust, C/C++, Python, JavaScript, HTML/CSS, Go, SQL, Verilog/VHDL, Scala

Hardware Circuit design (Schematic and PCB), Welding, MCU and FPGA system developing

Mechanical 3D design and printing, CAD