WUQIONG ZHAO

Ph.D. Student at the University of California San Diego

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Summary

I am a Ph.D. student at the **University of California San Diego (UCSD)** supervised by Professor Xinyu Zhang. I received my B.E. degree with honors from Southeast University (SEU) in 2024. My expertise lies in wireless communications, systems and networking and FPGA implementation, as well as machine learning. Beyond academia, I have a deep appreciation for open-source software and the collaborative spirit it fosters.

Education

▶ **University of California San Diego** (Ph.D. Student in ECE), La Jolla, CA, USA   Sep. 2024 — Present

▶ **Southeast University** (B.E. in Information Engineering), Nanjing, China   Sep. 2020 — Jun. 2024
- GPA: 3.98/4.00 (top 1%); Outstanding Graduate of Jiangsu Province (top 1%)
- Thesis: *Efficient Channel Estimation in B5G/6G Cell-Free Massive MIMO Systems* (in Chinese)

Internship

▶ **University of California San Diego**, La Jolla, CA, USA.   Jun. 2023 — Sep. 2023

Journal Papers

[J1] W. Huang*, W. Zhou*, Y. Sun, **W. Zhao**, Z. Tan, Y. Huang, X. You, C. Zhang, "**SHINE: Symbol-based Heuristic Iterative NB-LDPC Coded MIMO BP Detection and Decoding**," *IEEE Commun. Lett. (CL)*, Jul. 2025. [IEEE ↗] [PDF ↗]

[J2] **W. Zhao***, Y. Dai*, Y. You, L. Zhang, X. You, and C. Zhang, "**Efficient Data Transmission With Compressed Channel Estimation in RIS-Assisted mmWave MIMO Systems**," *IEEE Wireless Commun. Lett. (WCL)*, Nov. 2024. [IEEE ↗] [PDF ↗]

[J3] **W. Zhao***, C. Li*, Z. Ji, Z. Guo, X, Chen, Y. You, X. You, Y. Huang, and C. Zhang, "**Flexible High-Level Synthesis Library for Linear Transformations**," *IEEE Trans. Circuits Syst. II (TCAS-II)*, Jul. 2024. [IEEE ↗] [PDF ↗] [GitHub ↗] [website ↗]

[J4] Y. You*, **W. Zhao***, L. Zhang, X. You, and C. Zhang, "**Beam Pattern and Reflection Pattern Design for Channel Estimation in RIS-Assisted mmWave MIMO Systems**," *IEEE Trans. Veh. Technol. (TVT)*, Apr. 2024. [IEEE ↗] [PDF ↗]

[J5] **W. Zhao***, Y. You*, L. Zhang, X. You, and C. Zhang, "**OMPL-SBL Algorithm for Intelligent Reflecting Surface-Aided mmWave Channel Estimation**," *IEEE Trans. Veh. Technol. (TVT)*, Nov. 2023. [IEEE ↗] [PDF ↗]

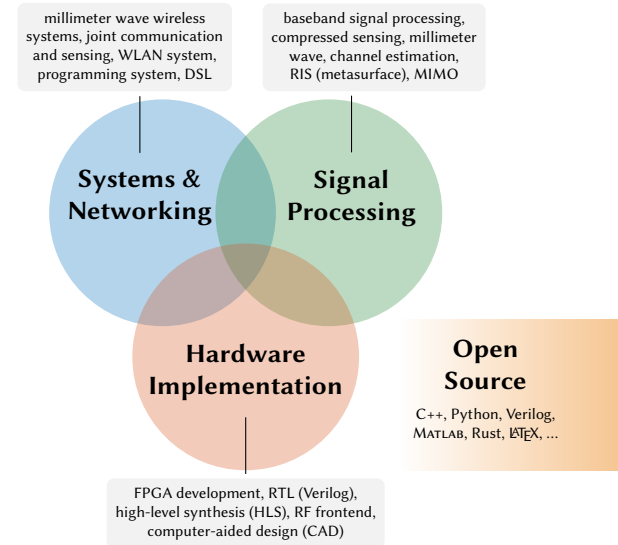*: co-primary authors.

Conference Papers / Presentations

[C1] K. Zheng, **W. Zhao**, T. Woodford, R. Zhao, X. Zhang, and Y. Hua, "**Enhancing mmWave Radar Sensing Using a Phased-MIMO Architecture**," in *Proc. ACM Int. Conf. Mobile Syst. Appl. Services (MobiSys)*, Jun. 2024. [ACM ↗] [PDF ↗]

[C2] Y. Dai, **W. Zhao**, Y. You, Y. Huang, and C. Zhang, "**Local Subdivisional Channel Estimation in RIS-Assisted THz MIMO-OFDM Systems**," in *Proc. Inf. Commun. Technol. Conf. (ICTC)*, May 2024. [IEEE ↗] [PDF ↗]

[C3] **W. Zhao**, C. Li, Z. Ji, Y. You, X. You, and C. Zhang, "**Automatic Timing-Driven Top-Level Hardware Design for Digital Signal Processing**," in *Proc. IEEE Int. Conf. ASIC (ASICON)*, Oct. 2023. [IEEE ↗] [PDF ↗]

[C4] X. Wang, Z. Wang, X. Jiang, **W. Zhao**, Y. Xue, Y. Huang, J. Wu, M. Ding, and C. Zhang, "**Bionic Manipulator System Controlled by Sensor Gloves**," in *Proc. IEEE Int. Symp. Circuits Syst. (ISCAS)*, Jun. 2022, winner of student design competition in IEEE Region 10. [video demo ↗] [manual ↗]

Research

My research integrates **systems & networking**, **signal processing**, and **hardware implementation** to solve amazing problems.

Machine learning and **AI** technologies are employed in all these three fields, yielding promising results.

▶ **Compressed Channel Estimation**: Channel estimation in wireless systems using compressed sensing, considering sparsity in the angular domain. [J2] [J4] [J5] [C2] [P5]

▶ **Computer-Aided Designs for Digital Circuits**: High-level synthesis (HLS) and domain-specific language (DSL) for digital circuit designs. [J3] [C3] [P12]

▶ **Wireless Systems and Networking**: Wireless sensing using 60 GHz millimeter wave, and real-time channel impulse response (CIR) estimation on RFSoC FPGA. [C1] [P2]

Selected Open-Source Projects

1. **seuthesis2024b** (LaTeX Template of Southeast University Thesis for Class of 2024 Bachelors) [GitHub (55 stars) ⬈]

2. **SDR PSK FPGA** (Dual-Mode PSK Transceiver on SDR With FPGA) [GitHub (41 stars) ⬈] [report ⬈]

3. **PDF2PPT** (PDF to PPT Conversion Tool in Python) [GitHub (34 stars) ⬈]

4. **seu-ml-assign** (LaTeX Template for SEU Machine Learning Assignment) [GitHub (29 stars) ⬈] [CTAN ⬈]

5. **mmCEsim** (Millimeter Wave Channel Estimation Simulator) [GitHub (17 stars) ⬈] [website ⬈] [manual ⬈]

6. **Fractal Designer** (Fractal Video Making GUI App in C++) [GitHub (15 stars) ⬈] [website ⬈]

7. **NGSPICE CMOS** (NGSPICE Simulation of CMOS Circuits) [GitHub (14 stars) ⬈] [website ⬈] [report ⬈]

8. **Dice Simulation** (Simulator Based on ReactPhysics3D in C++) [GitHub (9 stars) ⬈] [website ⬈]

9. **ARM Lite** (Pipelined CPU with Hazard Detection and Forwarding in Verilog) [GitHub (9 stars) ⬈] [report ⬈]

10. **color-cv** (Colorful CV Template in LaTeX) [GitHub (7 stars) ⬈]

11. **Water Filling** (Command Line App with Plotting Support in C++) [GitHub (7 stars) ⬈] [report ⬈]

12. **FLAMES** (Flexible High-Level Synthesis Library for Linear Transformations) [GitHub (6 stars) ⬈] [website ⬈]

Honors and Awards

▶ Excellent Undergraduate Thesis Award of Jiangsu Province   Oct. 2024

▶ UC San Diego Department of Electrical and Computer Engineering (ECE) Fellowship   Sep. 2024

▶ Outstanding Graduates of Jiangsu Province   Jun. 2024

▶ Excellent Undergraduate Thesis Award of Southeast University   Jun. 2024

▶ Most Influential Undergraduate Student of Southeast University (1st place)   May 2024

▶ Excellent Academic Paper Award of *The 16th Nat. College Students Innovation Annu. Meeting in China*   Dec. 2023

▶ 2021–2022 Student Design Competition Winner in IEEE Region 10 (Asia-Pacific)   Jun. 2022

Services

▶ **Reviewer** for journals *IEEE TCAS-II*, *IEEE WCL*, etc.   Mar. 2023 — Present

▶ **Reviewer** for conference *ISCAS '23, '25*   Dec. 2022 — Present

▶ **Teaching Assistant** of Advanced Electromagnetic Fields & Waves at SEU   Feb. 2023 — Jun. 2023

▶ **Special Student Assistant** to President of Southeast University   Nov. 2020 — Nov. 2021

Skills

▶ **Research**: wireless communications, signal processing, FPGA development, software programming, machine learning, etc.

▶ **Programming**: C++, Python, Matlab, Verilog, Rust, LaTeX, etc.