

# Fenghao Zhu

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## Education

- Zhejiang University**, B.E. in Information Engineering Sep. 2019 – Jun. 2023
- GPA: 3.90/4.0
  - **Coursework:** Data analysis and Algorithm Design, Matrix Theory, Probability and Mathematical Statistics, Principles of Communications, Signal Processing.
- Zhejiang University**, M.S. in Information and Communication Engineering Sep. 2023 – Jun. 2026
- Supervisor: Prof. Chongwen Huang

## Experience

- Program Leader**, Graduate Student Research Training Program Sep. 2023 - Sep. 2026
- Developed a neuron-inspired flexible neural network beamforming architecture to enhance robustness in dynamic and noisy environments.
  - Developed a training-free manifold meta-learning architecture that collaborates the optimization of phase shifting matrix and precoding matrix in RIS-aided communications.
- Program Contributor**, International Joint Research Program Dec. 2022 - Dec. 2025
- Developed a beamforming inferring architecture to reduce beamforming overhead.
- Standard Contributor**, IMT-2030 Standard Promotion Group Nov. 2023 - Mar. 2024
- Presented research findings on intelligent RIS topics at the IMT-2030 Promotion Group standards discussion meeting, contributing to the development and advancement of industry standards.
- Research Assistant**, Zhejiang University, Department of Information and Communication Aug. 2022 - Oct. 2022
- Design a Graph Neural Network (GNN)-based channel decoding algorithm to reduce bit error rate in end-to-end machine learning empowered wireless communications systems.
- Research Assistant**, Zhejiang University, Department of Electronics Jul. 2022 - Aug. 2022
- Implement the Discontinuous Galerkin Time Domain (DGTD) method in electromagnetic and thermal coupled fields problems.

## Publications

- Robust Beamforming for RIS-aided Communications: Gradient-based Manifold Meta Learning** [Code] [Blog] [PDF] Aug. 2024
- F. Zhu, X. Wang, C. Huang, Z. Yang, X. Chen, A. Alhammedi, Z. Zhang, C. Yuen, M. Debbah  
Accepted by *IEEE Transactions on Wireless Communications*, 2024 (*JCR Q1*).
- Beamforming Inferring by Conditional WGAN-GP for Holographic Antenna Arrays** [PDF] Jul. 2024
- F. Zhu, X. Wang, C. Huang, A. Alhammedi, H. Chen, Z. Zhang, C. Yuen, M. Debbah  
Published in *IEEE Wireless Communications Letters (JCR Q1)*, vol. 13, no. 7, pp. 2023-2027, Jul. 2024
- Robust Continuous-Time Beam Tracking with Liquid Neural Network** [PDF] Dec. 2024
- F. Zhu, X. Wang, C. Huang, R. Jin, Q. Yang, A. Alhammedi, Z. Zhang, C. Yuen, M. Debbah  
Accepted by *Proc. of the 2024 IEEE Global Communications Conference (GLOBECOM)*, Dec. 2024.
- Robust Millimeter Beamforming via Self-Supervised Hybrid Deep Learning** [PDF] Sep. 2023
- F. Zhu, B. Wang, Z. Yang, C. Huang, Z. Zhang, G. C. Alexandropoulos, C. Yuen, M. Debbah  
Published in *European Signal Processing Conference (EUSIPCO)*, Sep. 2023.

<b>Multi-Sources Information Fusion Learning for Multi-Points NLOS Localization</b> [PDF]	Jun. 2024
B. Wang, <b>F. Zhu</b> , M. Liu, C. Huang, Q. Yang, A. Alhammadi, Z. Zhang, M. Debbah Accepted by <i>2024 IEEE 99th Vehicular Technology Conference (VTC2024-Spring)</i> , Jun. 2023.	
<b>Robust Beamforming with Gradient-based Liquid Neural Network</b> [Code] [PDF]	Aug. 2024
X. Wang, <b>F. Zhu</b> , C. Huang, A. Alhammadi, F. Bader, Z. Zhang, C. Yuen, M. Debbah Published in <i>IEEE Wireless Communications Letters (JCR Q1)</i> . <i>Published in early access</i> .	
<b>Energy-efficient Beamforming for RISs-aided Communications: Gradient Based Meta Learning</b> [Code] [Blog][PDF]	Jun. 2024
X. Wang, <b>F. Zhu</b> , Q. Zhou, Q. Yu, C. Huang, A. Alhammadi, Z. Zhang, C. Yuen, M. Debbah Accepted by <i>Proc. of the 2024 IEEE International Conference on Communications (ICC)</i> , Jun. 9, 2024.	

## Services

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**Reviewer for Journals:** *IEEE Transactions on Communications (JCR Q1)*, *IEEE Communications Letters*, *Frontiers of Information Technology & Electronic Engineering*.

**Reviewer for Conferences:** *WS22 IEEE ICC 2023 2nd Workshop on Holographic MIMO Communications*, *2023 IEEE/CIC International Conference on Communications in China (ICCC Workshops)*, *2023 International Conference on Wireless Communications and Signal Processing (WCSP)*, *2024 IEEE/CIC International Conference on Communications in China (ICCC Workshops)*.

**Technical Program Committee Member:** *2023 IEEE/CIC International Conference on Communications in China (ICCC Workshops)*, *2024 IEEE/CIC International Conference on Communications in China (ICCC Workshops)*.

## Scholarships

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**2023:** JiaShen Scholarship

**2022:** Zhejiang University Scholarship

**2022:** Yongpin Scholarship

**2022:** ChinaGreentown Scholarship

**2021:** Zhejiang University Scholarship

**2021:** Yongpin Scholarship

**2021:** ChinaGreentown Scholarship

**2020:** Zhejiang University Scholarship

## Awards

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**2023:** Outstanding Graduates of Zhejiang University

**2022:** Zhejiang University Academic Excellence Award

**2021:** Zhejiang University Outstanding Student Award

**2021:** Zhejiang University Artistic and Athletic Achievement Award

**2021:** Zhejiang University Academic Excellence Award

**2020:** Zhejiang Provincial Advanced Mathematics Competition Award for University Students

**2020:** Zhejiang Provincial University Students Physics Innovation Competition Award

**2020:** Zhejiang University International Engagement Award

**2020:** Zhejiang University Student Volunteer Award

**2020:** Zhejiang University Academic Excellence Award

## Patents

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<b>Robust multi-modal beam forming design method based on liquid neural network</b> [Link]	Aug. 2024
X. Wang, <b>F. Zhu</b> , B. Wang, C. Huang	

Published in State Intellectual Property Office, China, 2024, CN118300656A.

**RIS auxiliary robust beamforming design method based on manifold meta learning**

Apr. 2024

[Link]

F. Zhu, X. Wang, C. Huang, C. Zhu, Z. Yang, X. Chen, Z. Zhang

Published in State Intellectual Property Office, China, 2024, CN117879669A.

**Cross-scene robust beamforming design method based on hybrid meta learning**

Jan. 2024

[Link]

X. Wang, F. Zhu, Q. Zhou, Q. Yu, C. Zhu, C. Huang

Published in State Intellectual Property Office, China, 2024, CN117459106A.

**An intelligent cross-dataset and cross-scenario robust beamforming design method**

Nov. 2023

[Link]

C. Huang, F. Zhu, X. Chen, C. Zhong, Z. Zhang

Published in State Intellectual Property Office, China, 2023, CN117097379A.

**Channel decoding method and system based on graph neural network** [Link]

Jan. 2023

X. Wang, F. Zhu, Q. Zhou, Q. Yu, C. Zhu, C. Huang

Published in State Intellectual Property Office, China, 2023, CN115664899A.

## Skills and Hobbies

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**Programming:** Python, Pytorch, Latex, C, etc.

**Software:** Docker, MATLAB, HFSS, CST Studio Suite, Altium Designer, etc.

**Sports:** Table Tennis and Badminton, holding Zhejiang University Table Tennis Referee Certificate

**IELTS:** 7.0