

# Wenyuan Zhao — CV

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1st year Ph.D. student in Electrical and Computer Engineering department at Texas A&M University, focusing on Information Science and Learning Systems. **Homepage:** <https://warrenzha.github.io/>

## Research Interest

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- Deep Gaussian Process and Diffusion Model
- Information and Coding Theory
- Machine Learning for Wireless Communication

## Education

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### Texas A&M University

Ph.D., Information Science and Learning Systems

College Station, TX

2023-Now

### University of California San Diego

M.S., Communication Theory and Systems

La Jolla, CA

2021-2023

### Southeast University

B.E., Information Engineering

Nanjing, China

2017-2021

## Publications

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- Zhao, Wenyuan, et al. "Weakly Private Information Retrieval from Heterogeneously Trusted Servers." arXiv preprint arXiv:2402.17940, 2024.
- Zhao, Wenyuan. "Machine Learning-based Matrix Optimization Algorithm in Massive MIMO." Undergraduate Thesis at Southeast University, 2021.
- Zhao, Wenyuan. "A Survey on Fog Computing Applications in Internet of Vehicles." 2021 2nd International Conference on Computing and Data Science (CDS), pp. 27-32. Stanford, CA, USA, 2021.
- Zhao, Wenyuan. "Classification of Customer Reviews on E-commerce Platforms Based on Naive Bayesian Algorithm and Support Vector Machine." Journal of Physics: Conference Series. Vol. 1678. No. 1. IOP Publishing, 2020.

## Research and Internship Experiences

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### Deep Gaussian Process and Diffusion Models

Advisor: Prof. Tian Chao, ECE Dept, TAMU

Sept. 2023 - present

- Theory and algorithm development: sparse expansion for deep Gaussian Processes (GPs)
- An efficient scheme for accurate inference and efficient training based on a range of GPs
- Software development: develop deep GPs as multi-layer Bayesian Neural Networks

### Weakly Private Information Retrieval

Advisor: Prof. Tian Chao, ECE Dept, TAMU

Sept. 2023 - present

- Weakly private information retrieval (PIR) problem allowing limited leakage to trustful servers
- PIR Code scheme with homogeneity and heterogeneity in servers' trustfulness
- Optimized code with the trade-off between the download cost and the amount of privacy leakage

### AI-driven Dynamic mmWave Mesh Backhaul

Advisor: Prof. Xinyu Zhang, ECE Dept, UC San Diego

Mar. 2022 - Aug. 2023

- Proposed RL-driven method for dynamic mmWave mesh configuration
- Bridging the Simulation-to-Reality gap in mmWave interference mapping
- Hybrid simulation framework and testbed design for dynamic mmWave mesh

## Machine learning-based Matrix Optimization in Massive MIMO

Advisor: Prof. Lei Wang, NCRL, SEU

Nov. 2020 - Jun. 2021

- Complex matrix inversion in precoding algorithms for massive MIMO downlink
- Proposed Complex-valued Gradient Neural Network to solve the complex matrix inversion problem
- Validated CVGNN in Rayleigh channel and showed its power in massive MIMO applications

## Machine Learning and Data Science

Advisor: Prof. Mark Vogelsberger, MIT

Jun. 2020 - Sept. 2020

- Word segmentation and text frequency extraction in Chinese Semantic sentiment analysis
- Proposed a Machine Learning-based method to classify customer reviews on e-commerce platforms
- Evaluated the classification accuracy and robustness on Chinese e-commerce reviews

## AI-driven Large-scale mmWave Transmission Scheme

Advisor: Prof. Cheng Zhang, NCRL, SEU

Feb. 2019 - Jun. 2020

- Formulated mmWave beam alignment and tracking (BA/T) as a stochastic bandit learning problem
- Implemented greedy strategy and upper confidence bound (UCB) strategy for optimal beam searching
- Evaluated bandit learning-driven mmWave BA/T in dynamic environments

## High Resolution Sensor Platform Design

Advisor: Prof. Fei Li, SEU

Apr. 2018 - Apr. 2019

- Designed a data sampling platform with STM32f373
- Improved sampling precision from 16-bit to 20-bit based on Nyquist sampling theorem

## Academic Projects

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### GAN-based EEG Signal Generation

Instructor: Prof. Yuanyuan Shi, ECE Dept, UC San Diego

Mar. 2022 - Jun. 2022

- Designed a generative adversarial network (GAN) model to diverse electroencephalographic (EEG) data
- Solved vanishing gradient problem and model collapse problem in GAN by using Wasserstein distance

### Blind Deconvolution Using Convex Programming

Instructor: Prof. Piya Pal, ECE Dept, UC San Diego

Jan. 2022 - Feb. 2022

- Solved a blind deconvolution problem: recover two signals  $w$  and  $x$  from their convolution  $y = w * x$
- Implemented the convex optimization algorithm to recover signals from their blind convolution
- Evaluated the robustness of the algorithm against sparsity and low-rank condition

## Honors and Awards

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| ○ Sun Qingyun Scholarship ( <b>Top 3 out of 280</b> )  | Jun. 2020 |
| ○ First Prize of Mathematical Contest in Modeling (CUMCM) ( <b>Top 0.7%, best from SEU</b> ) | Nov. 2019 |
| ○ Mitsubishi Electric Corporation Scholarship ( <b>Top 2 out of 245</b> )                    | Jun. 2019 |
| ○ Honorable Mention of Mathematical Contest in Modeling Competition (MCM)                    | Jan. 2019 |
| ○ Academic Records Scholarship   | Apr. 2018 |

## Technical Strengths

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- **Programming Languages:** C/C++, Python, Verilog, MATLAB
- **Machine Learning Tools:** PyTorch, TensorFlow, DeepLearning Toolbox
- **Others:**  $\LaTeX$ , VSCode, PyCharm, Xcode, ISE, Vivado

## Positions of Responsibility

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- **Teaching assistant** for courses like *Communication Networks* and *Computer Programming*
- **Director** (*Student Union 2018-19, SEU*): Involved in the communication and coordination of companies and universities and assisting them in recruiting students for internships