# Zhexian Zhou

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## Education

**Carnegie Mellon University** Pittsburgh, PA

*Master of Science in Artificial Intelligence Engineering (ECE) – GPA: **4.0*** *Aug 2024 – Dec 2025*

- Selected Coursework: Advanced Computer Vision, Introduction to Machine Learning, Introduction to Deep Learning, Trustworthy AI, Estimation Detection and Learning, Systems and Tool Chains for AI
- Lab: CMU AirLab and Team Chiron - Advisor: Prof. Sebastian Scherer

**University of Electronic Science and Technology of China (UESTC)** Chengdu, China

*Bachelor of Engineering in Software Engineering (Elite Program) – GPA: **3.94*** *Aug 2020 – July 2024*

- Selected Coursework: Digital Signal Processing, Computer Networks, Modern C++ Programming
- Lab: Digital Information System Research Laboratory - Advisor: Prof. Yongbin Yu and Prof. Qing Guan

## Publications

1. **Accepted**: Luo, Y., **Zhou, Z.**, Chen, H., Qiu, K., Savvides, M., Li, S., Wang, J. "KnowledgeSmith: Uncovering Knowledge Updating in LLMs with Model Editing and Unlearning." *ICLR 2026*, Open Review: openreview.net/forum?id=znnA2Opw6v.
2. **Published**: **Z. Zhou** et al., "Design of Fixed-point FFT Algorithm Based on Memristor," *CAIT 2023*, pp. 152–158, 2023. 10.1109/CAIT59945.2023.10468999.
3. **Published**: X. Zhong, Y. Yu, C. Zhou, X. Wang, X. Feng, **Z. Zhou**, J. Shen, J. Wang, and X. Han, "A Matrix Coding Genetic Algorithm Based on Memristor for Image Edge Detection," *Proc. ICCIP '23*, 2024, pp. 67–75. doi:10.1145/3638884.3638895.

## Research Experience

**Research Assistant** Sep 2024 – Present

*CMU AirLab & Team Chiron – DARPA Triage Challenge*

- Developed vision modules and ROS2–based end-to-end edge inference and benchmark pipeline for multimodal VLMs triage VQA across UAV/UGV platforms, API supporting SOTA VLMs (QwenVL, InternVL, Llama, VILA)
- Proposed RGBT knowledge-transfer and SFT fine-tuned NVILA improved IR Hemo Acc from 36.6% to 54.1%
- Proposed and built quantization + multi-turn KV-cache for AGX Orin, achieving real-time <1s follow-up latency
- Developed Air-Infer project to stream ROS2 Messages and Vision Tensor over gRPC/HTTP for robust inference

**Researcher** Mar 2025 – Present

*CMU AirLab – 2D and 3D Skeletonization*

- Proposed a feature-aware envelope EDT with geometry-adaptive neighborhood interpolation, boosting reduction rate 96.51→96.81% while raising reconstruction IoU 88.14→99.59% on 2D scikit-image blob dataset.

**Undergrad Researcher** Oct 2022 – Jun 2024

*UESTC Digital Information System Research Lab*

- Outstanding Thesis (UESTC 2024). Proposed dynamic confidence and edge-aware semi-supervised learning for sparse segmentation; mIoU improved 70.5→76.0→83.9→86.9 as the supervision rate increased 10→20→50→100
- Proposed geometry-aware skeletonization and route-pattern recognition for tubular structures (e.g., blood vessels)

**Undergrad Researcher** Jan 2023 – Jun 2024

*UESTC Memristor & Digital Information System Research Lab*

- Proposed novel approaches on fixed-point FFT and evolutionary algorithms using memristor crossbar circuits
- Proposed a memristor-based fixed-point FFT architecture that maps FFT stages onto memristor arrays and basic compute units to exploit inherent device-level parallelism for resource-constrained acceleration
- Validated the design via circuit-level simulation on image FFT transformation/retrieval workloads; characterized precision limits and designed normalization-based noise mitigation

**Researcher** Jun 2022 – Jun 2024

*UESTC & TibetU Tibetan Language Automatic Recognition Technology*

- Built diffusion-based OCR/scene-text augmentation platform integrated into the project training pipeline system
- Selected as the outstanding undergraduate researcher on MoST CN 2030 Key R&D Program (No.2022ZD0116100)

**Research Intern** May – Aug 2023

*Peking University*

- Adapted NeRF for urban scenes: trained on KITTI and transferred to nuScenes for improved 3D rendering.

## Projects

**Adaptive Reasoning for Vision-Language Models** Jan – Apr 2025

- Proposed LoRA fine-tuning with GRPO reward, enabling step-by-step reasoning; increased overall accuracy from 59.81% to 62.01% across image/video datasets (MathVision, VQA-CP, LLaVA-150k, Video-ChatGPT, Shot2Story)

**Feature-Fusion Face Detection** Jan – Apr 2025

- Developed HOG/PCA/K-means feature-fusion on SVR/AdaBoost/YOLO, achieved 98.09% mAP50 on validation

**MatSAR - C++ Math Toolkits Development** Aug 2022 – Aug 2024

- Architected and developed cross-platform C++ toolkit with Multi-dimensional Matrix Core, Matrix Operations, and Math Functions. Led developer team to develop over 200 algorithms across Linear Algebra, DSP, and Calculus

**C++ Database Management System** Oct 2022 – Feb 2023

- Designed and developed server–client DBMS supporting multiple data types and common operations; built core storage and query components
- Open-sourced on GitHub: JakoError/cppDBMS

**Compiler Toolkits for SysY programming language** Dec 2021 – Jan 2022

- Developed compiler using Flex/Bison, including lexical analyzer, syntax parser, intermediate-code generator, and basic optimizer
- Open-sourced on GitHub: JakoError/CompileStudy

**DiaryInUESTC - Diary Mobile App** Sep – Dec 2021

- Developed diary, bookkeeping, and memo application with AMap (Gaode) location features and a MyBatis-based persistence layer
- Open-sourced on GitHub: JakoError/DiaryInUESTC

## Skills

**Languages**: C/C++, Python, Java, MATLAB, SQL, JavaScript, HTML/CSS
**Frameworks**: ROS2, PyTorch, PyTorch Lightning, TensorFlow/Keras, NumPy, gRPC/REST, PySpark, Spring Boot
**Developer Tools**: Git, Docker, AWS, VS Code, Visual Studio, GCC, CMake

## Honors & Awards

**Outstanding Undergraduate Thesis Award**: UESTC, Jun 2024
**Outstanding Graduate Award**: UESTC, Jun 2024
**Science & Technology Innovation Seedling Award**: Sichuan Science & Technology Seedling Program, Oct 2023
**CASC Scholarship**: China Aerospace Science and Technology Corporation Scholarship, Dec 2022
**Academic Outstanding Student Scholarship**: UESTC Academic Scholarship, Dec 2022
**Academic Outstanding Student Scholarship**: UESTC Academic Scholarship, Dec 2021
**China Southwest Hackathon – 3rd Place (Final)**: China Southwest Hackathon, Oct 2020