

## Education

University of Science and Technology of China (USTC)

Sep. 2020 – May 2024

Bachelor of Science in Artificial Intelligence. Rank: **top3%**. GPA: **3.90/4.30 (90.26/100)**

Hefei, Anhui

## Selected Coursework

- ▶ Mathematical Analysis II (90)
- ▶ Discrete Mathematics (95)
- ▶ Information Theory (94)
- ▶ Introduction to Pattern Recognition-A (95)
- ▶ Data Structures and Algorithms (95)
- ▶ Introduction to Data Science (96)
- ▶ Functions of Complex Variables (93)
- ▶ Thermodynamics-A (97)
- ▶ Electromagnetics-A (92)
- ▶ Knowledge Engineering (97)
- ▶ Mathematics-Physics Methods (91)
- ▶ Introduction to Artificial Intelligence (93)
- ▶ Introduction to Brain and Cognitive Science (90)
- ▶ Compiler Principles (91)
- ▶ Operating Systems (90)
- ▶ Introduction to Computing System (92)
- ▶ Principles of Computing Systems and Embedding Systems (91)

## Research Interest

I am interested in **statistical and computational principles** that underlie the success of modern machine learning and artificial intelligence, with a focus on the conceptualization and development of efficient and scalable machine learning algorithms and architectures empirically and theoretically.

## Research Experience

### University of Washington

Jul. 2023 – Jan. 2024

Research Assistant at SAMPL, supervised by **Prof. Luis Ceze**

Seattle, WA

*Quantum Transformer With Linear Attention* — Yifei Zuo\*, Xiaochuang Han, Luis Ceze, 2023 in preparation

- ★ Reduced the computational complexity and memory requirements of current language models.
- ★ Leveraged quantum probability theory to develop a novel Transformer framework with linear attention.
- ★ Accelerated the optimization process of attention map via quantum Natural Gradient Descent.

*LoraBoost: Boosting Low-Rank Adaptation* — Yifei Zuo\*, Zihao Ye, Tianqi Chen, Luis Ceze, 2023 in preparation

- ★ Efficient low-rank adaptation for language model fine-tuning with quantization integration.
- ★ Supported on-device training with limited memory and computational resources.
- ★ Achieved better expressiveness and generalization performance via boosting mechanism.

*Positional Expressive Power of Transformers* — Xiyu Zhai\*, Jian Qian, Yifei Zuo, Ma Xiao, Simon Du, Alexander Rakhlin, 2023 in preparation

- ★ Theoretically investigated the expressive power of Transformer with positional encoding.
- ★ Demonstrated the representation ability for expressing several vision tasks from low level to high level.

### Massachusetts Institute of Technology | Remote Work

Jul. 2022 – Jan. 2023

Research Assistant at CSAIL, supervised by **Prof. Samuel Madden** and Postdoc. Lei Cao

Cambridge, Mass

*Robust Entity Resolution with Contrastive Learning* — Yifei Zuo\*, Lei Cao, Samuel Madden, 2022 (Not submitted)

- ★ Improve the efficiency of Entity Resolution (ER) inference model with contrastive learning on Siamese encoder.
- ★ Identify a trick that improved the robustness of classification leveraging geometric properties of the representation space in contrastive learning.

*Generic Entity Resolution Models* — Jiawei Tang\*, Yifei Zuo, Lei Cao, Samuel Madden, *NeurIPS 2022 workshop*

- ★ General fine-tuned entity resolution model for cross-domain adaptation with linear probing.

## Other Experience

### Teaching Assistant in Discrete Mathematics Course

Mar. 2023 – Jun. 2023

### New Experiment Framework For Compiler Principle Course

Nov. 2022 – Jan. 2023

An educational compiler framework implemented in C++ for future Compiler Principle course experiments.

### USTC Robogame

Sep. 2021 – Oct. 2021

Annual robotics competition with the goal of designing and implementing a robot that can complete a series of tasks.

## Main Honors

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- Nominee of **Guo Moruo Scholarship (highest honor in the university)** Nov. 2023
- **Gold Award** of Outstanding Student Scholarship (**annual top 1 student**) Sep. 2022
- **Silver Medal Winner** of Robogame (university robotics competition) Oct. 2021
- **First Price Winner** in school Traditional Calligraphy Competition Dec. 2021
- **Silver Award** of Outstanding Student Scholarship Sep. 2021
- Cultural Ambassador of USTC Nov. 2020
- Outstanding campers in **Shing-tung Yau Mathcamp.** (top 20/70) Sep. 2019

## Technical Skills

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**System Development:** Rust, C/C++, CUDA, also a vim user

**Theorem Proving:** Lean

**Machine Learning:** Python

**Language:** Chinese (native), English (TOEFL iBT 101 in 2022)

## Leadership

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- Head of Class Academic Committee Sep. 2022 – Present
- President of Shuangxin Chinese Calligraphy Club Sep. 2022 – Sep. 2023
- Vice President of Shuangxin Chinese Calligraphy Club Sep. 2021 – Sep. 2022
- Class Psychological Commissioner Sep. 2021 – Sep. 2022
- Class Monitor Sep. 2020 – Sep. 2021