TUNYU ZHANG

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EDUCATION

B.S. in Artificial Intelligence, University of Science and Technology of China — June, 2025 (expected)

RESEARCH EXPERIENCE

Research Student — September, 2021 - June, 2022
MOE Key Laboratory, University of Science and Technology of China — Hefei, China
Work with Professor Yuqing Wang:

- Non-equilibrium phase transitions mechanisms in exclusive network and node model of heterogeneous assignment
- Physical mechanisms of exit dynamics in micro channels of non-equilibrium transport systems.

Research Assistant — July, 2023 - present
Department of Computer Science, University of Hong Kong (HKU) — Hong Kong, China
Work with Professor Difan Zou:

- Sampling method (for Diffusion Model), especially for discrete data sampling and sparse data sampling.
- The mathematical reasoning ability of the small transformer-based model

Research Assistant — July, 2024 - present
Department of Computer Science, Rutgers University — New Brunswick, USA
Work with Professor Hao Wang:

- Multimodal Needle In A Haystack: A benchmark for multimodal large language models.
- Truthfulness self-control of large language models at the representations level.

PUBLICATIONS AND PREPRINTS

1. Zhang, Tunyu, et al. ”Understanding the Arithmetic Logic in Small Transformers: Case Studies on Addition and Judgment Tasks”. (Under Review, submitted to NeurIPS 2024 Workshop MATH-AI)
2. Wang, Hengyi, et al. ”Multimodal Needle in a Haystack: Benchmarking Long-Context Capability of Multimodal Large Language Models.” arXiv preprint arXiv:2406.11230 (2024).
3. Wang, Yu-Qing, et al. ”Study of nonequilibrium phase transitions mechanisms in exclusive network and node model of heterogeneous assignment based on real experimental data of KIF3AC and KIF3CC motors.” The European Physical Journal Plus 137.10 (2022): 1148.
4. Wang, Yu-Qing, et al. ”Physical mechanisms of exit dynamics in microchannels of nonequilibrium transport systems.” International Journal of Modern Physics B 38.15 (2024): 2450193.

PROJECTS

SZD image generation [Code] [Thesis (in Chinese)]
Electromagnetics Course Paper

- Tried to use CGAN to predict the microstructure of electromagnetic thin films.
- Introduced ACGAN to solve the *Mode Crash*.
- Implemented a complete, user-friendly, and scalable visual training tool.

HONORS AND FELLOWSHIPS

2022 **Outstanding Student Scholarship Gold Award of USTC**, awarded to students with excellent achievements

2022 **Cyrus Tang Moral Education Scholarship** , awarded to students with good academic and moral performance

2022 **Second Prize of Asia and Pacific Mathematical Contest in Modeling**, awarded to players with outstanding performance

2023 **Outstanding Student Scholarship Bronze Award of USTC**, awarded to students with excellent achievements

SKILLS

Languages Chinese, English
Programming Languages Python, C/C++
Tools and Frameworks LaTeX, Jupyter, VScode, Pytorch, Pandas, Wandb & Numpy
Operating Systems Windows, Linux & MacOS