

# Yuantao Zhang

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## Education

<b>National University of Singapore</b> <i>Master of Computing (Artificial Intelligence Specialisation)</i>	2024.8 – Present GPA: 4.83/5
<b>Nanyang Technological University, Singapore</b> <i>Undergraduate Exchange Program</i>	2023.1 – 2023.5
<b>The Chinese University of Hong Kong (Shenzhen)</b> <i>Degree - Bachelor of Engineering with Honours, First Class</i> <i>Major - Computer Science and Engineering</i>	2020.9 – 2024.7 CGPA: 3.706 / 4 (top 10%) MGPA: 3.798 / 4 (top 10%)

## Publications

- M. Li\*, Y. Zhang\*, W. Wang, W. Shi, Z. Liu, F. Feng, T. Chua.  
*Self-Improvement Towards Pareto Optimality: Mitigating Preference Conflicts in Multi-Objective Alignment.*  
2025 ACL Findings (\*Equal contribution). [Arxiv, GitHub]
- Y. Zhang, Z. Yang.  
*A Perplexity and Menger Curvature-Based Approach for Similarity Evaluation of Large Language Models.*  
First submission to TACL received review scores of 5, 3, and 2 out of 5. [Arxiv, GitHub]

## Patents

- B. Yang, Z. Yang, Y. Zhang. (2024). *An Approach for Generating Diverse Images Based on Latent Diffusion Models.* CN Patent No. 202411135613.6.

## Research Interests

Natural Language Processing   LLM Alignment   Reinforcement Learning

## Research Experience

- Research Intern in LLM Alignment at NExT++** 2024.8 – Present  
Mentor: Dr. Moxin Li, Prof. Wenjie Wang, Prof. Tat-Seng Chua
- Conducted preliminary experiments to analyze the impact of conflicting preference pairs on the Pareto Front in Multi-Objective Alignment, iteratively refined strategies for generating Pareto-optimal responses, performed ablation studies, and contributed to paper writing.
  - (Present) Investigating data-centric alignment issues in LLMs, with a particular focus on Multi-Objective Alignment.
- Research Intern at National Supercomputing Center in Shenzhen** 2024.3 – 2024.7  
Mentor: Dr. Zhankui Yang (Postdoc)

- Conceptualized a metric utilizing **Perplexity Curves**, which plot the perplexity of sub-sequences in a sentence against word indices, and **Menger Curvature Difference** of these curves to assess the similarity between LLMs. This metric can aid in **detecting unethical practices in LLM usage**, such as marginally altering an existing LLM to falsely claim a new development or covertly distilling domain-specific knowledge from one LLM to another.
- Assisted in developing the idea of a patent.

#### Large Language Model Research

2023.9 – 2023.12

Mentor: Dr. Feng Jiang (Postdoc), Prof. [Haizhou Li](#)

- Conducted literature review on popular open-source LLMs, including GLM and Baichuan; systematically organized findings and contributed to a public resource. [[GitHub](#)]
- Trained a 560M Phoenix LLM and applied it to various language processing tasks.

#### Data Distillation Using the Stable Diffusion Model

2023.5 – 2023.8

Mentor: Dr. Haonan Wang, Prof. Kenji Kawaguchi

- Reviewed key literature on **Generative Models** and **Data Distillation** techniques.
- Developed a pipeline to map images to token embeddings using Stable Diffusion, employing Gradient Matching Loss to optimize these embeddings for generating distilled images. [[GitHub](#)]

#### Convergence Rate Analysis of FedDualAvg

2022.9 – 2023.5

Mentor: Prof. [Ming Yan](#)

- Reviewed literature on **Federated Optimization**, with a focus on the integration of the Bregman Proximal Gradient Method and FedAvg, particularly in algorithms like FedDualAvg.
- Analyzed the convergence rate of FedDualAvg in different settings (different constraints of data heterogeneity, non-convex setting) and conducted experiments to verify theoretical results.

### Internships

#### Shenzhen Tibo Ruike Network Technology Co., LTD

2021.8 – 2022.1

Back-end Developer

- Developed and tested back-end APIs for web applications aimed at enhancing students' campus life experience, using Postman and unit testing frameworks.
- Contributed to the back-end development of "Yummy," a food ordering mini-program in collaboration with CUPL, ensuring accurate processing of user requests. [[GitHub](#)]

### Awards & Honors

#### AY2024-2025 Semester 1 Dean's List

National University of Singapore, School of Computing

2025.1

#### AY2020-21, AY2021-22, AY2022-23, AY2023-24 SDS Dean's List

The Chinese University of Hong Kong (Shenzhen), School of Data Science

2021.9-2024.9

#### AY2022-23 SDS TA/USTF Award

The Chinese University of Hong Kong (Shenzhen), School of Data Science

2023.11

#### AY2021-22 Academic Performance Scholarship: Class C

20000 RMB

The Chinese University of Hong Kong (Shenzhen), School of Data Science

2022.12

#### Undergraduate Research Award

The Chinese University of Hong Kong (Shenzhen), the URA Selection Committee

2022.8

#### Bowen Scholarship

35000 RMB

The Chinese University of Hong Kong (Shenzhen)

2020.9

### Languages & Skills

Languages – English (GRE: 328 + 3.5, TOEFL: 102), Mandarin (native)

Skills – Pytorch, Tensorflow, SQL, C++, Java, Linux, Latex