# Ruiwen Zhou

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## Education

**National University of Singapore** Aug 2025 – Present
*Ph.D. student in Computer Science* *Singapore*

**Shanghai Jiao Tong University** Sep 2022 – Mar 2025
*M.Eng. student in Computer Science* *Shanghai, China*
**Thesis:** Design and Evaluation of LLM Complex Reasoning Methods and Agents

**Shanghai Jiao Tong University** Sep 2018 – Jun 2022
*B.Eng. in Information Engineering* *Shanghai, China*

## Interest

My goal is to build powerful language models and AI agents that can solve complex real-world tasks and inspire creative ideas for humans. To achieve this, my recent research works mainly focus on:

- LLM reasoning with complex context.
- Interactive AI agents and multi-agent collaboration on real-world tasks.
- Reinforcement learning for LLM reasoning and agentic AI.

**I am actively looking for 2026 summer research internship, starting around mid to late April, ending before August.**

## Publications

**RuleArena: A Benchmark for Rule-Guided Reasoning with LLMs in Real-World Scenarios** ACL 2025
***R. Zhou***, *W. Hua, L. Pan, S. Cheng, X. Wu, E. Yu, and W. Wang*

**AntiLeak-Bench: Preventing Data Contamination by Automatically Constructing Benchmarks with Updated Real-World Knowledge** ACL 2025
*X. Wu, L. Pan, Y. Xie, **R. Zhou**, Y. Ma, M. Du, R. Mao, S. Zhao, A. Luu, and W. Wang*

**Is Risk-Sensitive Reinforcement Learning Properly Resolved?** DAI 2025
***R. Zhou***, *M. Liu, K. Ren, X. Luo, W. Zhang, and D. Li*

**TRAD: Enhancing LLM Agents with Step-Wise Thought Retrieval and Aligned Decision** SIGIR 2024
***R. Zhou***, *Y. Yang, M. Wen, Y. Wen, W. Wang, C. Xi, G. Xu, Y. Yu, and W. Zhang*

**Learning Enhanced Representations for Tabular Data via Neighborhood Propagation** NeurIPS 2022
*K. Du, W. Zhang, **R. Zhou**, Y. Wang, X. Zhao, J. Jin, Q. Gan, Z. Zhang, and D. Wipf*

## Experience

**WING Lab (National University of Singpoare)** Aug 2025 – Present
*Student Researcher, Supervised by: Prof. Min-Yen Kan & Prof. Soujanya Poria* *Singapore*

- I worked as a student researcher under the supervision of Prof. Min-Yen Kan & Prof. Soujanya Poria.
- **I am now working on:** 1) inspiring LLMs to analyze historical and real-time responses from peer agents to improve their reasoning; 2) learning hierarchical contextual memory management with RL; and 3) building LLM-based ML engineering agents with RL and web search.

**APEX Lab (Shanghai Jiao Tong University)** Jan 2021 – Mar 2025
*Student Researcher, Supervised by: Prof. Weinan Zhang* *Shanghai, China*

- I worked as a student researcher under the supervision of Prof. Weinan Zhang.
- **I led the projects at MSRA and CPIC, and participated in the project at AWS when I worked in APEX Lab.**

**NLP Group (UC Santa Barbara)** Jul 2024 – Dec 2024

*Visiting Student, Supervised by: Prof. William Yang Wang* *Santa Barbara, U.S.*

- Proposed a challenging benchmark (**RuleArena**) from real-world scenarios to evaluate LLMs' ability in rule-guided reasoning, and conducted extensive analysis to uncover systematic issues that limit LLM performances.
- Revealed that: 1) existing state-of-the-art LLMs, mostly fail on our complex rule-guided reasoning tasks; 2) LLMs struggle to integrate multiple rules or facts cohesively and are prone to distraction by irrelevant information; and 3) common failure modes include inadequate rule recall, improper usage of similar rules, and computation errors.
- Participated in the design and data collection of **AntiLeak-Bench**, which aims to address the data contamination issue through automatically constructing benchmarks with continuously updated real-world knowledge.
- **Two papers accepted at ACL 2025. AntiLeak-Bench selected as SAC highlight.**

**China Pacific Insurance Company (CPIC)** Feb 2023 – Feb 2024

*Student Leader of a Collaboration Project* *Shanghai, China*

- Revealed that existing trajectory-wise few-shot LLM agents suffer from plausible expert demonstrations due to retrieval with task meta-data and noise from many irrelevant steps in expert trajectories.
- Proposed a step-wise demonstration retrieval and prompting method (**TRAD**) to better solve sequential decision making tasks with LLMs, which achieves state-of-the-art performances on ALFWorld and Mind2Web benchmarks.
- **One paper accepted at SIGIR 2024.**

**Amazon Web Service (AWS)** Feb 2022 – Feb 2023

*Research Intern, Mentored by: Quan Gan* *Shanghai, China*

- As existing retrieval-augmented tabular prediction models ignored either column-wise (across features) or row-wise (across samples) interaction, we aimed to develop a novel model architecture to unify both interactions and enhance the performance on various tabular prediction tasks.
- Participated in design and implementation of a novel tabular prediction model (**PET**) based on graph neural networks and relevant sample retrieval, which achieves state-of-the-art results on various tabular prediction benchmarks.
- **One paper accepted at NeurIPS 2022.**

**Microsoft Research Asia (MSRA)** Aug 2021 – Jan 2022

*Research Intern, Mentored by: Kan Ren* *Shanghai, China*

- Revealed a common theoretical issue in existing distributional risk-sensitive RL algorithms - the absence of history return distributions in policy and value functions leads to optimization divergence.
- Proposed a history-dependent reinforcement learning algorithm (**Trajectory Q-Learning**), which achieves theoretical optimality and decent practical performance in risk-sensitive policy optimization under distortion risk measures.
- **One paper accepted at DAI 2025.**

## Selected Awards

**NUS Graduate Research Scholarship** 2025

**Huatai Securities Fellowship** 2024

**First-Class Excellence Scholarship** 2024

**Zhiyuan Honors Scholarship (Top 5%)** 2019 – 2021

**China National Scholarship (Top 1 / 144)** 2020

**A-Class Excellence Scholarship (Top 1 / 144)** 2020

## Talks

**AntiLeak-Bench: Preventing Data Contamination by Automatically Constructing Benchmarks with Updated Real-World Knowledge** Jul 2025

*Oral Presentation at ACL 2025*

**TRAD: Enhancing LLM Agents with Step-Wise Thought Retrieval and Aligned Decision** Jul 2024

*Oral Presentation at SIGIR 2024*