

Ruizhe Shi

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Education

Tsinghua University, Beijing, China

Sept. 2021 – Present

Undergraduate at Special Pilot Class in Computer Science (Yao class)

- Major: *Computer Science and Technology*
- Minor: *Chinese Language and Literature*

GPA 3.93/4.00

GPA 4.00/4.00

University of Washington, Seattle, USA

Feb. 2024 – July 2024

Research Visitor at Paul G. Allen School of Computer Science

Publications & Manuscripts

(* indicates equal contribution.)

- [5] **(Manuscript)** Ruizhe Shi*, Runlong Zhou*, Simon S. Du. “The Crucial Role of Samplers in Online Direct Preference Optimization”.[\[link\]](#)
- [4] **(NeurIPS 2024)** Ruizhe Shi, Yifang Chen, Yushi Hu, Alisa Liu, Hannaneh Hajishirzi, Noah A. Smith, Simon S. Du. “Decoding-Time Language Model Alignment with Multiple Objectives”.[\[link\]](#)
- [3] **(ICML 2024)** Chenhao Lu, Ruizhe Shi*, Yuyao Liu*, Kaizhe Hu, Simon S. Du, Huazhe Xu. “Rethinking Transformers in Solving POMDPs”.[\[link\]](#)
- [2] **(ICLR 2024)** Ruizhe Shi*, Yuyao Liu*, Yanjie Ze, Simon S. Du, Huazhe Xu. “Unleashing the Power of Pre-trained Language Models for Offline Reinforcement Learning”.[\[link\]](#)
- [1] **(NeurIPS 2023)** Yanjie Ze, Yuyao Liu*, Ruizhe Shi*, Jiaxin Qin, Zhecheng Yuan, Jiashun Wang, Huazhe Xu. “H-InDex: Visual Reinforcement Learning with Hand-Informed Representations for Dexterous Manipulation”.[\[link\]](#)

Research Experiences

Optimization Theory of Online DPO

May 2024 – Sept. 2024

Supervised by Prof. Simon S. Du

CSE, University of Washington

- We study convergence rates of (online) DPO from optimization perspective, and show the impact of samplers through a theoretical separation and empirical experiments. Under review.

Multi-Objective Language Model Alignment

Dec. 2023 – May 2024

Supervised by Prof. Simon S. Du

CSE, University of Washington

- We propose a training-free, simple yet effective decoding-time algorithm for multi-objective alignment of language models, with optimality guarantees. First-authored work accepted by **NeurIPS 2024**.

Representation Theory of Transformer in Decision-Making

Nov. 2023 – Jan. 2024

Supervised by Prof. Huazhe Xu

IIIS, Tsinghua University

- We challenge the common wisdom and prove theoretically and empirically that Transformers are not suitable for Partially Observable RL, while advocating Linear RNN as a promising alternative. Second-authored work accepted by **ICML 2024**.

Training Language Model for Decision-Making

June 2023 – Sept. 2023

Supervised by Prof. Huazhe Xu

IIIS, Tsinghua University

- We leverage the power of pre-trained Language Models for solving decision-making problems. First-authored work accepted by **ICLR 2024**.

Awards & Honors

First-level Comprehensive Scholarship

Nov. 2024

Tsinghua University

top scholarship

Yao Award (Silver Medal)

Sept. 2024

IIIS, Tsinghua University

top scholarship [\[link\]](#); 3 students institute-wide

Jiang Nanxiang Scholarship

Nov. 2023

Tsinghua University

top scholarship; 1 student institute-wide

China National Endeavor Scholarship

Oct. 2022

Beijing Education Bureau

1 student institute-wide

First Prize in National High School's Mathematics Competition of China

Oct. 2020

Chinese Mathematical Society

top 20 province-wide

Service

Conference Reviewer

NeurIPS 2024, ICLR 2025, AISTATS 2025

Yao Class Seminar Host

Co-organize weekly research seminars [\[link\]](#)

2024 Fall – Present

Tsinghua University

Teaching Assistant

Natural Language Processing

2024 Fall

Tsinghua University

Voluntary Drop-in Tutoring

Tutor freshmen in basic Courses

Oct. 2022 – July 2024

Tsinghua University

*I have **157** hours of officially recorded volunteering work.*

Selected Courses

Mathematics and Theory: Calculus (**A**⁺), Linear Algebra (**A**), Abstract Algebra (**A**), Introduction to Complex Analysis (**A**), Probability and Statistics (**A**), Basic Topology (**93**), Introduction to Optimization (**A**), Theory of Computation (**A**), Physics of Information (**A**);

Programming and AI: Introduction to Programming in C/C++ (**A**⁺), Type-safe Modern System Practice (**A**), Machine Learning (**A**), Artificial Intelligence: Principles and Techniques (**A**), Natural Language Processing (**A**).

Technical Skills

Programming Skills: Python, C/C++, L^AT_EX, Bash, Scala, Matlab.

Language Skills: Chinese Mandarin (native), English (TOEFL 104 [R30/L26/S23/W25], GRE 327+3.5 [V157/Q170]).