

Xinghan Li

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Education

Bachelor of Science in Computer Science (Artificial Intelligence Track)

2022 - Present

IIIS (Yao Class), Tsinghua University

- Selected Coursework: Deep Learning (4.0), Natural Language Processing (4.0), Economics and Computation (4.0), Algebra and Computation (4.0), Probability and Statistics (4.0), Artificial Intelligence: Principles and Techniques (4.0), Advanced Theoretic Computer Science (4.0, graduate course), Introduction to Optimization (4.0), Multi-modal Machine Learning (4.0), Brain Inspired Computing and Brain Inspired Computing System Technology (4.0)
- GPA: 3.85/4.00 (Ranking: 36/94)

Research Experience

Low-Cost Offline Strategies for Stimulating Mathematical Reasoning in Pre-Trained Language Models

May 2025 - Present

Research Intern, University of Washington, Seattle

Advisor: Simon Shaolei Du

- Investigated low-cost, offline alternatives to RL for enhancing mathematical reasoning in LLMs, aiming to bridge the gap between expensive online methods and efficient SFT.
- Established strong performance baselines by systematically evaluating a suite of non-training, prompt-based techniques, achieving a score within 2.2% of the online RL target.
- Proposed and implemented novel offline training methods designed to mimic RL reward mechanisms within a static SFT framework.

Adam Reduces a Unique Form of Sharpness: Theoretical Insights Near the Minimizer Manifold (NeurIPS 2025 Poster)

July 2024 - May 2025

Advisor: Kaifeng Lyu

- Captured the long-term behavior of the Adam optimizer near the minimizer manifold using Stochastic Differential Equations (SDEs)
- Demonstrated that Adam implicitly minimizes a unique form of sharpness distinct from SGD and provided case studies analyzing the impact of this discrepancy
- Proved high-probability convergence analysis for Adam near the minimizer manifold

Quantitative Research Intern

August 2023

Advisor: Jian Li

- Developed and backtested various financial factors based on classic reversal and liquidity factors
- Invoked Optuna to tune factors based on machine learning methods which benefited outcome

Course Projects

‘Stubbornness’ of LLMs: Connecting Counterfactual Context Reliance and Knowledge Editing

November 2024 - December 2024

Natural Language Processing course project

- Empirically demonstrated that the reliance of LLMs on counterfactual context align with the difficulty of performing knowledge editing on them, revealing an underlying ‘stubbornness’ property of LLMs.

- Analyzed the effect of knowledge popularity on finetuning, observing that models trained on less popular data exhibit a slower context-parametric inversion (CPI)

Diffusion Models and Adversarial Robustness: A Comprehensive Survey

June 2024

Advanced Theoretical Computer Science course project

- Explored the use of diffusion models for adversarial robustness and categorized literature into: Denoised Smoothing, Robust Classifiers, and Adversarial Training with DM-generated data
- Highlighted a gap between theory and practice in adversarial robustness and emphasized the need for cross-inspiration between different research directions to effectively leverage diffusion models and enhance robustness

Diffusion4Text

April 2024 - June 2024

Deep Learning course project

- Adopted the GENIE diffusion-for-text architecture, created a supervised code dataset which we fine-tuned on
- Witnessed a satisfying performance in the code description task and the diffusion process on an abstract semantic level

The Past and Present of Brain-Inspired Computing Algorithms

January 2024

Brain-Inspired Computing and Brain-Inspired Computing System Technology course project

- Reviewed the characteristics of Spiking Neural Networks (SNNs), focusing on neuron models, neural coding and learning methods, and outlined an evolving research trajectory towards increasingly brain-like simulations.

Extracurricular Experience

Elected Class Monitor, Computer Science Class 22

September 2023 - September 2024

- Elected by classmates as the class monitor, demonstrating strong leadership and peer recognition
- Organized numerous external activities including a networking event with the Neurobiology Class of Peking University, and established a class database and the Class GPT Plus sharing program
- Led the class to win honors such as “First-Class Youth League Branch” and “Best Class Culture Branch”

Member, Tsinghua University Symphonic Band

September 2022 - Present

- Trombone player, awarded as an outstanding member and received the Art Excellence Scholarship

Honours and Awards

- Comprehensive Merit Scholarship of Tsinghua University (2024)
- Tsinghua Xuetang Talents Program Scholarship (2022, 2023, 2024)
- Second-class Freshman Scholarship of Tsinghua University (2022, 2023, 2024)
- Art Excellence Scholarship of Tsinghua University (2023, 2024)
- Asia-Pacific Informatics Olympiad, Gold Medal (2021)
- National Olympiad in Informatics, Silver Medal (2020, 2021)

Skills

Programming Languages: C, C# & C++, Python, LaTeX, Triton, Java

Languages: Chinese (Native), English (TOEFL 108), Japanese (JLPT N2)

Current Research Interests: RL for Math Reasoning, Learning Dynamics of Optimizers

Other Interested Areas: Interpretability, Adversarial Robustness, Physics of LLMs

Personal Interests: Photography, Rail Transit Systems