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Bohan Lyu

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Education

Tsinghua University 2022 - 2026 (expected)
Dual Major: Computer Science and Technology & Economics and Finance *GPA: 3.9/4.0*
University of California, San Diego July 2024 - Sept. 2024
Research Intern at Department of CSE, advised by Prof. Rose Yu.

Course Work

Selected A Courses: Data Mining ($A+$, Top 1), Ordinary Differential Equation ($A+$, Top 1), Probability and Statistics, Artificial Intelligence, Artificial Neural Networks, Computational Humanities and Social Sciences, Human-Computer Interaction, Principles of Computer Networks, Software Engineering, Computer Graphics, Linear Algebra (Advanced), Discrete Mathematics, Linear Algebra, Calculus A(2), etc.

Academic Work

Member of 'Sparking Program', the most prestigious and selective academic organization at Tsinghua Uni.
Reviewer of ICLR 2025, LLMAgents @ ICLR 2024, AI4MATH @ ICML 2024.
Academic Interests: Natural Language Processing, AI for Science.

Publications & Projects (⋆ indicates equal contribution)

Adapting While Learning: Grounding LLMs for Scientific Problems with Intelligent Tool Usage Adaptation | *First Author* | https://arxiv.org/abs/2411.00412 Oct. 2024
Bohan Lyu⋆, Yadi Cao⋆, Duncan Watson-Parris, Leon Bergen, Taylor Berg-Kirkpatrick, Rose Yu
AAAI Fall Symposium Series 2024 (Oral), Submitted to ICML 2025
Developed a fine-tuning framework for LLMs to internalize knowledge and balance reasoning with tool usage, achieving a 28.18% improvement in answer accuracy and a 13.89% increase in tool usage precision, surpassing state-of-the-art models.

Goedel-Prover: A New Frontier in Automated Theorem Proving | https://goedel-lm.github.io | https://github.com/Goedel-LM (Code) Feb. 2025
Yong Lin⋆, Shange Tang⋆, **Bohan Lyu**, Jiayun Wu, Hongzhou Lin, Kaiyu Yang, Jia Li, Mengzhou Xia, Danqi Chen, Sanjeev Arora, Chi Jin
Developed a 7B model that achieved state-of-the-art performance in open-source automated theorem proving, with a 7% improvement on miniF2F, topping the PutnamBench leaderboard, and solving nearly twice as many problems on Lean Workbook.

Enhancing LLM's Capabilities in Open Domains via Autonomous Tool Integration | *First Author* | http://lyubh.cn/pdfs/GitAgent.pdf (An updated version) | https://arxiv.org/abs/2312.17294 Dec. 2023
Bohan Lyu⋆, Xin Cong⋆, Heyang Yu, Pan Yang, Yujia Qin, Yining Ye, Yaxi Lu, Zhong Zhang, Yukun Yan, Yankai Lin, Zhiyuan Liu, Maosong Sun
Developed an autonomous agent that leverages GitHub repositories to extend its capabilities to address diverse user queries. Introduced a new agent architecture that achieved SOTA performance on SciAct.

XAgent | *Team member* | https://github.com/OpenBMB/XAgent Oct. 2023
7k-star project on Github. I am responsible for algorithm optimization and autonomous tool extension of the Agent.

Research & Internship Experiences

Chi Jin's Group, Princeton University | *Research Intern* Nov. 2024 – Present

- Advised by Prof. Chi Jin. Working with Dr. Yong Lin.
- Working on autonomous math proving with formal language (LEAN4) with LLMs.

Rose Spatiotemporal Lab, UCSD | *Research Intern* July 2024 – Nov. 2024

- Hosted and advised by Prof. Rose Yu. Co-advised by Prof. Taylor Berg-Kirkpatrick, Prof. Leon Bergen and Prof. Duncan Watson-Parris. Worked with Dr. Yadi Cao.
- Worked on LLM Alignment, especially Physics-Guided LLM.

Tsinghua University NLP Lab | *Research Intern* July 2023 – July 2024

- Advised by Prof. Zhiyuan Liu. Worked with Dr. Yujia Qin.
- Led IDM and SciAct projects and contributed to XAgent team.
- Exploring how multimodal (GUI) agents can learn to act from tutorial videos with imitation learning.

Awards & Achievements

Baidu Inc. Data Mining Competition | **No. 1**/636 — June 2024
National College Student Mathematical Modeling Contest | **First Prize** in Beijing — Oct. 2023
Tsinghua University's Challenge Cup | **Second Place, Newcomer Prize**, Team Leader — Apr. 2024
Contest of Scientific Communication | **Best Paper of Popularity**, Independent contributor — May 2024
Mid-term Outstanding Project of the Academic Advancement Program — Nov. 2024
Digital Economy Research Project | **Team Gold Prize** — Nov. 2023
Tsinghua University's Business Imitation Contest | **Third Place**, Team Leader — Oct. 2022

Awarded Research Grants & Scholarships

Global Exploration Initiative | **¥30,000**, Grade A, Independent Applicant — Apr. 2024
Academic Advancement Program | **¥20,000**, Grade B, Applicant — May 2024
Technology Innovation Excellence Scholarship | **¥5,000**, Independent Applicant — Oct. 2024
'Sparking Program' | **¥5,000**, Independent Applicant — May 2024
Student Research Training | **¥5,000**, Independent Applicant — Mar. 2024
Tsinghua University's Challenge Cup | **¥3,000** — Mar. 2024

Skills

Languages: English, Chinese.
Computer Languages: C/C++, Python, System Verilog, LEAN4, MATLAB, LaTeX.
Tools: DeepSpeed, vllm, pytorch, trl, Git, Shell, Vim, ssh, Docker, gdb & pdb, SQL, etc.

Community Involvement

Mentor at 'Program Buddy', assisting peers with data structures, algorithms, and programming challenges.
Grade Representative of the Tsinghua University High School Alumni Association.
Core member of Academic Department of Student Union, SEM, Tsinghua University.