Bohan Lyu Undergraduate

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Education

Tsinghua University Beijing, China
Dual Major: Computer Science and Technology & Economics and Finance 2022 - 2026

- **GPA:** 3.9/4.0, **Rank**ed 1st (4.0/4.0) for the 3nd year.
- **Selected A Courses:** Data Mining ($A+$), Ordinary Differential Equation ($A+$), Game Theory and Mechanism Design, Probability and Statistics, Artificial Intelligence, Artificial Neural Networks, Advanced Linear Algebra, Discrete Mathematics, Computational Humanities and Social Sciences, Computer Networks, Computer Graphics, Calculus A(II), etc.

Research Experiences

I'm interested in **AI for Science/Math** and **ML for NLP**, especially (1) AI (LLM/Agents) for Science and Math under long-context and complex-reasoning settings, (2) Scalable and robust algorithms, like RL, for self-evolving systems, and (3) Verification of super-intelligent systems for trustworthy generation.

Princeton Language and Intelligence (PLI), Princeton | Remote 2024.11 - Present

- Research intern, advised by Prof. Chi Jin. Worked with Dr. Yong Lin.
- Core member of **Goedel-Prover** project (COLM, AI4MATH@ICML Oral), SOTA open-source formal math prover to date, surpassing DeepSeek-Prover-V2-671B with an 8B model.
- I **built** end-to-end training infrastructure, including high-performance SFT & RL pipelines and inference systems. I **devised** robust algorithms for multi-stage SFT and continuable RL training.
- I'm **spearheading** the development of the test-time scaling pipeline.

Rose Spatiotemporal Lab, UCSD | San Diego, CA, USA 2024.07 - 2024.11

- Research intern, advised by Prof. Rose Yu. Worked with Dr. Yadi Cao.
- I led **Adapting while Learning** project (ICML), proposing a novel paradigm for scientific agents that enables self-evolution and adaptive tool utilization, significantly improving efficiency.

Tsinghua NLP Lab | Beijing, China 2023.07 - 2024.06

- Research intern, advised by Prof. Zhiyuan Liu. Worked with Prof. Xin Cong, Dr. Yujia Qin.
- I led **OpenAct & OpenAgent** project (ACL Main), member of **XAgent** (GitHub $8.5k$ stars) team.

Publications

1. Bohan Lyu*, Yadi Cao*, Duncan Watson-Parris, Leon Bergen, Taylor Berg-Kirkpatrick, Rose Yu. **Adapting While Learning: Grounding LLMs for Scientific Problems with Tool Usage Adaptation.** ***International Conference on Machine Learning (ICML) 2025***, *AAAI Fall Symposium Series (Oral) 2024*, *featured at Agentic AI Summit 2025 @ Berkeley RDI*.
`https://icml.cc/virtual/2025/poster/44034`

2. Yong Lin*, Shange Tang*, Bohan Lyu*, Ziran Yang*, Jui-Hui Chung*, Haoyu Zhao*, Lai Jiang*, Yihan Geng*, Jiawei Ge, Jingruo Sun, Jiayun Wu, Jiri Gesi, Ximing Lu, David Acuna, Kaiyu Yang, Hongzhou Lin, Yejin Choi, Danqi Chen, Sanjeev Arora, Chi Jin. **Goedel-Prover-V2: Scaling Formal Theorem Proving with Scaffolded Data Synthesis and Self-Correction**. *AI4Math @ ICML (Oral) 2025*.
`https://arxiv.org/abs/2508.03613`

3. Bohan Lyu*, Xin Cong*, Heyang Yu, Pan Yang, Cheng Qian, Zihe Wang, Yujia Qin, Yining Ye, Yaxi Lu, Chen Qian, Zhong Zhang, Yukun Yan, Yankai Lin, Zhiyuan Liu, Maosong Sun. **Enhancing Open-Domain Task-Solving Capability of LLMs via Autonomous Tool Integration from GitHub**. ***Proceedings of Annual Meeting of the Association for Computational Linguistics (ACL Main) 2025***.
`https://aclanthology.org/2025.acl-long.845`

4. Yong Lin*, Shange Tang*, **Bohan Lyu**, Jiayun Wu, Hongzhou Lin, Kaiyu Yang, Jia Li, Mengzhou Xia, Danqi Chen, Sanjeev Arora, Chi Jin. **Goedel-Prover: A Frontier Model for Open-Source Automated Theorem Proving.** ***Conference on Language Modeling (COLM) 2025.***
`https://openreview.net/forum?id=x2y9i2HDjD`

5. **Bohan Lyu***, Siqiao Huang*, Zichen Liang*, Qi-An Sun, Jiaming Zhang. **SURGE: On the Potential of Large Language Models as General-Purpose Surrogate Code Executors.** ***Proceedings of Conference on Empirical Methods in Natural Language Processing (EMNLP Main, top 0.3% meta score) 2025.***
`https://aclanthology.org/2025.emnlp-main.162/`

Highlighted Projects

Goedel Prover Series | V1 → *COLM 2025*, V2 → *AI4MATH @ ICML 2025 (Oral)*

- **Background:** LLM-based automated math theorem proving with formal language.
- **Methods:** 1. *Verifier-guided self-correction* where model learns to correct its own answer based on compiler feedback, 2. *Scaffolded Learning* that synthesizes appropriately difficult questions to provide better learning signals, and 3. *Model Averaging* that boosts model's output diversity and enables multi-stage continue-training.
- **Results:** Our 8B model outperforms the 80× bigger DeepSeek-Prover-V2-671B; our 32B model achieved and has since maintained as open-source SOTA, solving 3 IMO/USAMO and 39 Putnam problems that have never been solved with Lean. Our model received 100k downloads last month, while DeepSeek-Prover-V2-671B received only 400. Our model and data are adopted by works from top companies like DeepSeek, Apple, Nvidia, Meta, Google, etc.

Adapt while Learning for Scientific Agents | *ICML 2025, AAAI FSS 2024 (Oral)*

- **Background:** Current LLM-based Agents struggle to learn from tool interactions and exhibit over-reliance on external tools.
- **Methods:** 1. *World Knowledge Learning*: LLMs internalize scientific knowledge by learning from solutions generated together with tools, and 2. *Tool Usage Adaptation*: Train LLMs to prioritize internal reasoning for simple queries and adaptively leverage tools for complex problems.
- **Results:** Our 8B models achieve 29.11% higher answer accuracy and 12.72% better tool usage accuracy in 6 scenarios, surpassing GPT-4o and Claude-3.5-Sonnet.

Awards

- **National Scholarship** (**Top 0.4%** nation-wide) 2025.10
- **Comprehensive Excellence Award** of Tsinghua University 2025.10
- **Spark Scientific and Technological Innovation Fellowship** (**Top 1%** in Tsinghua) 2024.05
- **Scientific and Technological Innovation Excellence Scholarship** 2024.11
- **First Prize**, National College Student Mathematical Modeling Contest (Beijing) 2023.10
- **Second Place & Newcomer Prize**, Tsinghua University's Challenge Cup 2024.04
- **Best Paper of Popularity**, Contest of Scientific Communication in Tsinghua 2024.05
- **Academic Advancement Program**, Excellent Program 2024.11

Academic Services

Vice President of *the Student Association for Science and Technology*, SEM, Tsinghua University.

Reviewer: *ICLR 2026, ARR Feb./May/July/Oct. 2025, ICLR 2025, AI4MATH @ ICML 2024, LLMAgents @ ICLR 2024.*

Volunteer: *ICML 2025, EMNLP 2025, NeurIPS 2025.*

Skills

Languages: English (TOEFL 107), Chinese.

Programming: Python, C/C++, System Verilog, Lean4.

Tools: Ray, DeepSpeed, vllm, PyTorch, Docker, etc.