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 1-st (4.0/4.0) for the past year.
- **Selected A Courses:** Data Mining ($A+$), Ordinary Differential Equation ($A+$), Game Theory and Mechanism Design, Probability and Statistics, Artificial Intelligence, Advanced Linear Algebra, Discrete Mathematics, Computational Humanities and Social Sciences, Computer Networks, Computer Graphics, Calculus A(2), etc.
- **Academic Interests:** ML, NLP (AI for Math, ML for NLP).

Research Experiences

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

- Research intern, advised by Prof. Chi Jin. Worked with Dr. Yong Lin.
- Working on automated math theorem proving. Core member of Goedel project.
- I was responsible for the whole training process. I built high-performance training (SFT & RL) and inference infra, studied algorithms for multi-stage training and continuable RL training.
- Currently I'm responsible for building the test-time scaling pileline.

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

- Research intern, advised by Prof. Rose Yu. Worked with Dr. Yadi Cao.
- Led **adapting while learning** project that proposes a new learning paradigm for efficient scientific agents, allowing the models to self-evolve and act adaptively.

Tsinghua NLP Lab | Beijing, China 2023.07 - 2024.06

- Research intern, advised by Prof. Zhiyuan Liu. Worked with Prof. Xin Cong, Dr. Yujia Qin.
- Led **OpenAct & OpenAgent** (ACL Main) and **Reasoning Prism** (in submission) projects, 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 Intelligent Tool Usage Adaptation**. ***International Conference on Machine Learning** (ICML) 2025*, *AAAI Fall Symposium Series (Oral) 2024*, *featured at Agentic AI Summit 2025 @ Berkeley RDI*.

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*.

3. Bohan Lyu*, Xin Cong*, Heyang Yu, Pan Yang, Yujia Qin, Yining Ye, Yaxi Lu, Zhong Zhang, Yukun Yan, Yankai Lin, Zhiyuan Liu, Maosong Sun. **Enhancing LLM's Capabilities in Open Domains via Autonomous Tool Integration**. ***Proceedings of Annual Meeting of the Association for Computational Linguistics** (ACL Main) 2025*.

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*.

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*.

Highlighted Projects

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

- **PI: Chi Jin**, Sanjeev Arora, Danqi Chen, Yejin Choi.
- **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.

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

- **PI: Rose Yu**, Taylor Berg-Kirkpatrick, Leon Bergen, Duncan Watson-Parris.
- **Background:** Current LLM-based Agents can't learn from tools and over-rely on tools.
- **Methods:** 1. *World Knowledge Learning*: LLMs internalize scientific knowledge by learning from solutions generated with the assistance of tools, and 2. *Tool Usage Adaptation*: Train LLMs to maintain direct reasoning for easy problems while resorting to tools adaptively for hard ones.
- **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
- **No. 1/636**, Baidu Inc. Data Mining Competition (Loan Default Prediction) 2024.06
- **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 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.