

# Yuxin (Shirley) Li

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## EDUCATION BACKGROUND

The Hong Kong University of Science and Technology

2022-2026 (expected)

Bachelor of Engineering in Computer Science

University of California, Berkeley

2023

Summer Session – CS61BL Data Structures & Programming Methodology

## RESEARCH PROJECTS

\* Denotes equal contribution

**MA-LoT: Multi-Agent Lean-based Long Chain-of-Thought Reasoning enhances Formal Theorem Proving**

2025

[ICML 2025] Ruida Wang\*, Rui Pan\*, Yuxin Li\*, Jipeng Zhang, Yizhen Jia, Shizhe Diao, Renjie Pi, Junjie Hu, Tong Zhang

- This paper introduces MA-LoT, a comprehensive model-collaboration framework to balance NL reasoning and FL verification under the Long CoT paradigm for Lean4 theorem proving, allowing the model to generate in-depth formal reasoning through NL planning and analysis. Developed LoT-TL, a training-inference pipeline that makes field-specific Long CoT capabilities emerge to LLMs without requiring explicitly annotated datasets.
- The framework achieves a 61.07% accuracy rate on the Lean4 version of the MiniF2F-Test dataset, outperforming DeepSeek-V3 (33.61%), Goedel-Prover (58.20%, SOTA for whole-proof generation) and Intern-LM-2.5-StepProver (50.70%, SOTA tree-search method).
- Engaged in initial idea discussion, implemented the significant parts of the codebase and served as one of the primary manuscript authors.

**Let's Reason Formally: Natural-Formal Hybrid Reasoning Enhances LLM's Math Capability**

2025

[EMNLP 2025 under review] Ruida Wang\*, Yuxin Li\*, Yi R.(May) Fung, Tong Zhang

- This paper introduces an end-to-end framework that augments natural-language mathematical reasoning with formal-language verification. Designed NL-FL Problem Alignment to reformulate NL QA tasks as FL existence theorems, enabling direct interaction with a formal prover. Developed a Mixed Problem Input mechanism allowing the formal agent to solve QA and existence problems concurrently.
- The framework achieves 89.80% and 84.34% accuracy rates on the MATH-500 and the AMC benchmarks, surpassing the NL baseline by 4.60% and 4.82%, respectively; solved several problems unreachable by the NL baseline even with more trials.

**Explore Selective Disclosure Bias with Networks of LLM-based Agents**

2024

*Research Assistant (Supervised by Professor Yongren Shi, The University of Arizona)*

- Developed a simulation to study how selective disclosure bias affects opinion segregation.
- Built simulation environments to model how LLM-based agents form and update opinions under selective information sharing.
- Designed experiments to examine the effects of disclosure patterns on opinion clustering and polarization in agent networks.

**Knowledge Discovery over Machine Learning**

2023

*Undergraduate Research Assistant (Supervised by Professor Minhao Cheng, The Pennsylvania State University)*

- Conducted in-depth analysis to translate mathematical concepts and practical machine learning algorithms and model behaviours.

## SKILLS & CAPABILITIES

**Technical skills:** Python, C++, Java, Scala, RISC-V, LaTeX.

**Selected courses:**

Math:	Multivariable Calculus, Linear Algebra, Applied Statistics, Probability, Discrete Mathematical Tools.
Computer science:	Machine Learning, Large-Scale Machine Learning for Foundation Models, Design and Analysis of Algorithms.
Applied math & CS:	Actuarial Mathematics, Electro-Robot Design, Electronic and Information Technology.

## OTHER ITEMS

- Peer Mentor, Computer Science and Engineering Department, The Hong Kong University of Science and Technology, 2025.
- Deep Learning Certification, NVIDIA Deep Learning Institute 2024
- Member, China Entrepreneur Network, The Hong Kong University of Science and Technology, 2022-2023.