Wang Haocheng

PhD Student, Data Science and Analytics Thrust, HKUST (Guangzhou)
+86 183 3994 2921 | hcwang942@gmail.com | haocheng.wang@inf.ethz.ch
Github | Homepage | Google Scholar

RESEARCH INTERESTS

Formal theorem proving with large language models, covering proof search, subgoal decomposition and proof-checker feedback. Autoformalization and the diagnosis of semantic drift between natural language and formal statements. Agentic coding, with LLM agents that construct and repair machine-verifiable artifacts, and reinforcement learning over execution-grounded reward.

EDUCATION

Hong Kong University of Science and Technology (Guangzhou) Jan. 2026 - Jan. 2030 (Expected)
Doctor of Philosophy, Data Science and Analytics Thrust, LARK Lab. Supervisor: Prof. Zhijiang Guo
Postgraduate Studentship (PGS) recipient

Xiamen University Sep. 2020 - Jun. 2025
Bachelor of Science, Mathematics and Applied Mathematics (Honours).
Final year thesis: Formalization of Auction Theory in Lean 4 and Mathlib4, advised by Prof. Ma Jiajun. repository

SELECTED PUBLICATIONS

Over 21,700 citations, h-index 8 (Google Scholar).

Core Contributions

FormalRx: Rectify and eXamine Semantic Failures in Autoformalization **ICML 2026**
Haocheng Wang, B. Huang, Y. Wan, X. Zhu, X. Liu, Y. Huang, Z. Guo. arXiv:2607.04655

DeepSeek-Prover-V2: Formal Mathematical Reasoning via RL for Subgoal Decomposition **2025**
Z.Z. Ren, Z. Shao, J. Song, H. Xin, **Haocheng Wang**, W. Zhao, et al. arXiv:2504.21801

DeepSeek-Prover-V1.5: Proof Assistant Feedback for RL and Monte-Carlo Tree Search **ICLR 2025**
H. Xin, Z.Z. Ren, J. Song, Z. Shao, W. Zhao, **Haocheng Wang**, B. Liu, et al. arXiv:2408.08152

Delta Prover: Solving Formal Math Problems by Decomposition and Iterative Reflection **2025**
Y. Zhou, J. Zhao, Y. Zhang, B. Wang, S. Wang, L. Chen, J. Wang, A. Jie, **Haocheng Wang**, et al. arXiv:2507.15225

Other Contributions

DeepSeek-R1: Incentivizing Reasoning Capability in LLMs via Reinforcement Learning **Nature 2025**
DeepSeek-AI. Nature 645(8081), 633-638. arXiv:2501.12948

DeepSeek-V4: Towards Highly Efficient Million-Token Context Intelligence. DeepSeek-AI. arXiv:2606.19348 **2026**

DeepSeek-V3.2: Pushing the Frontier of Open Large Language Models. DeepSeek-AI. arXiv:2512.02556 **2025**

DeepSeek-V3 Technical Report. DeepSeek-AI. arXiv:2412.19437 **2024**

Mathlib4: Second-Price Auction DSIC and Myerson's Lemma. PR #13248 **2024**

RESEARCH EXPERIENCE

HKUST (Guangzhou), LARK Lab Jan. 2026 - Present
Doctoral Researcher, supervised by Prof. Zhijiang Guo Guangzhou, China

- Co-first author of FormalRx, a diagnostic evaluation framework for autoformalization built on a 28-class SCI Error Taxonomy covering semantic, constraint and implementation failures.
- Trained FormalRx-8B, which does verdict, categorization, localization and correction in one forward pass. Built the data synthesis pipeline behind it, scaling 17.8k seed pairs into a 56k corpus, and released FormalRx-Test with a 1.7B to 8B model family.

ETH Zurich, Department of Computer Science (D-INFK) Aug. 2025 - Present
Scientific Assistant, working with Prof. Rasmus Kyng and Dr. Sorrachai Yingchareonthawornchai Zurich, Switzerland

- Built a multi-role agentic pipeline turning natural-language problems into machine-checked Lean 4 specs over 2,869 problems and CLRS exercises, trained with multi-stage RL against compiler reward.
- Post-trained with SFT, multi-stage GRPO (verl) and expert iteration over verifier-filtered samples. Ran distributed rollout and verification on GH200 nodes under SLURM with vLLM.

ByteDance Co., Ltd., Seed Jan. 2025 - Jul. 2025
Student Researcher Shanghai, China

- Drove the data pipeline for Delta Prover, a training-free agent framework that lets general-purpose LLMs construct Lean 4 proofs through reflective decomposition and iterative repair, reaching 95.9 percent on miniF2F-test.
- Built a scoring and self-refinement agent pipeline for natural language proofs, supplying informal to formal training pairs. Proposed a sketch-incorporated long chain-of-thought reasoning method and led quality control for cold-start data.

DeepSeek AI Co., Ltd. Jun. 2024 - Sep. 2024
Student Researcher Beijing, China

- Contributed to DeepSeek-Prover-V1.5 and V2, building LeanAgent, a multimodal agent for Lean 4 autoformalization supporting data preparation and supervised fine-tuning.
- Developed ProverBench, a domain-categorized benchmark of 325 college-level and competition-level problems, and annotated Lean 4 demonstration data over miniF2F, FIMO and IMO problems.
- Annotated and quality-controlled cold-start reasoning data, and ran expert-iteration training loops that fed verifier-filtered proofs back as supervision for the next round.

ADDITIONAL INDUSTRY EXPERIENCE

Huabao Securities Co., Ltd. Jan. 2024 - Apr. 2024
Research Assistant Shanghai, China
- Built a quantitative fund selection and back-testing system in Python that screens funds against configurable criteria. Implemented and compared nine regression models for position estimation, covering OLS, WLS, windowed LASSO and ridge.

Wind Information Co., Ltd. Aug. 2023 - Sep. 2023
Product Manager Shanghai, China
- Analyzed and visualized A-share restricted share reduction on WindEDB under CSRC rules, and ran competitive analysis of comparable financial data products, proposing visualization improvements and AI plugins for the roadmap.
- Designed the Wind Mobile interface and UI/UX for WindESG and Wind Global Asset in Axure RP.

Beijing Shiguang Study Culture Media Co., Ltd. Mar. 2022 - May 2022
Intern Lecturer Beijing, China
- Lectured 48 high-school mathematics tutorial videos totaling over 960 minutes, and revised course content and exercise solutions from collected user feedback.

ACADEMIC SERVICE

Program Chair, 3rd AI4Math Workshop at ICML 2026, Seoul 2026

Area Chair, ACL 2026 2026

Reviewer, ICLR 2026, ACL 2025, 2nd AI4Math Workshop at ICML 2025 2025 - 2026

TEACHING

Teaching Assistant, Formalizing Analysis of Algorithms, ETH Zurich Autumn Term 2025

Teaching Assistant, AI4Math: Lean 4 and Formal Mathematics, Shanghai Jiao Tong University Jul. 2025

Teaching Assistant, AI4Math: Formalizing Mathematical Theories and Proofs, BICMR, Peking University 2024

INVITED TALKS

Toward Bridging the Informal-Formal Gap, AI4Math Workshop, Zhejiang University Jul. 2026

Verifiable Theorem Proving with Large Language Models, XJTLU Dec. 2025

AI for Theoretical Computer Science in Lean, ETH Zurich Aug. 2025

Frontier of Formal Theorem Proving with LLMs, Xiamen University Dec. 2024

WORKSHOPS

AI4Math Workshop, Zhejiang University Jul. 2026

3rd AI4Math Workshop at ICML 2026, Seoul Jul. 2026

ITP 2025 Lean Workshop, Reykjavik University Oct. 2025

AI4Math: Lean 4 and Formal Mathematics, Shanghai Jiao Tong University Aug. 2025

Workshop on Formal Proofs and Lean, Department of Mathematics, NUS Apr. 2024

AI4Math Workshop on Lean, BICMR, Peking University Dec. 2023

AWARDS AND HONOURS

Intel Young Talent Award, 34th China Adolescents Science and Technology Innovation Contest 2019

First Place, 33rd Henan Province Science and Technology Innovation Competition 2019

Students' Projects Third Award, 34th China Adolescents Science and Technology Innovation Contest 2019

Grand Award First Place, International Youth Science Fair for Discovery Videos 2017, 2018

First Prize, Scientific Inquiry Documentary, 9th China Adolescents Science Video Festival 2018

Best Photography Award, 9th China Adolescents Science Video Festival 2018

SKILLS

Formal methods: Lean 4, Mathlib, autoformalization and specification generation, proof search, verifier-in-the-loop pipelines
Programming: Python, PyTorch, C++, R, Matlab
Post-training: supervised fine-tuning, LoRA, GRPO (verl), expert iteration, reward design over execution-grounded signals
Infrastructure: SLURM on GH200 clusters (CSCS Alps), distributed inference with vLLM and SGLang, LLM-as-judge evaluation
Languages: Mandarin Chinese (native), English (fluent, IELTS 7, GRE 318)