Peiyang Song

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Education

6/2026 **California Institute of Technology** Pasadena, CA
B.S. in Computer Science & Minor in Robotics
Advisors: Prof. Steven Low & Prof. Günter Niemeyer. GPA: **4.2/4.0**

Research Interests

Machine Learning · Natural Language Processing · Automated Reasoning · Neuro-Symbolic AI

Work Experience

6/2024 – Present **Stanford University** Palo Alto, CA
Researcher @ Stanford AI Lab (SAIL) and Computation & Cognition Lab
Advisors: Prof. Noah Goodman (Stanford), Gabriel Poesia (Stanford)

2/2023 – 2/2025 **California Institute of Technology** Pasadena, CA
Research Fellow @ Anima AI+Science Lab
Advisors: Prof. Anima Anandkumar (Caltech), Dr. Kaiyu Yang (Meta)

11/2022 – 6/2024 **University of California, Santa Barbara** Santa Barbara, CA
Researcher @ Computer Architecture Lab (ArchLab)
Advisors: Prof. Timothy Sherwood (UCSB), Dr. Jeremy Lau (Google)

Selected Publications

Preprint **Towards Large Language Models as Copilots for Theorem Proving in Lean**
Peiyang Song, Kaiyu Yang, Anima Anandkumar
NeurIPS Mathematical Reasoning and AI (MATH-AI) Workshop, 2023

Preprint **LeanProgress: Guiding Search for Neural Theorem Proving via Proof Progress Prediction**
Suozhi Huang, Peiyang Song, Robert Joseph George, Anima Anandkumar

In submission, manuscript available upon request

Preprint **Temporal Activation and Real-Soft-Max Functions**
Peiyang Song, Rhys Gretsch, Jeremy Lau, and Timothy Sherwood
In submission, manuscript available upon request

ICLR 2025 **LeanAgent: Lifelong Learning for Formal Theorem Proving**
Adarsh Kumarappan, Mo Tiwari, Peiyang Song, Robert Joseph George, Chaowei Xiao, Anima Anandkumar
International Conference on Learning Representations (ICLR) 2025

EMNLP 2024 **Creative and Context-Aware Translation of East Asian Idioms with GPT-4**
Kenan Tang*, Peiyang Song*, Yao Qin, Xifeng Yan (* Equal Contribution)
Findings of Empirical Methods in Natural Language Processing (EMNLP), 2024

EMNLP 2024 **In-Context Learning May Not Elicit Trustworthy Reasoning: A-Not-B Errors in Pretrained Language Models**
Pengrui Han*, Peiyang Song*, Haofei Yu, Jiaxuan You (* Equal Contribution)
Findings of Empirical Methods in Natural Language Processing (EMNLP), 2024

ASPLOS 2024 **Energy Efficient Convolution with Temporal Arithmetic**
Rhys Gretsch, Peiyang Song, Advait Madhavan, Jeremy Lau, Timothy Sherwood
ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2024

NeurIPS 2023 **LeanDojo: Theorem Proving with Retrieval-Augmented Language Models**
Kaiyu Yang, Aidan Swope, Alex Gu, Rahul Chalamala, Peiyang Song, Shixing Yu, Saad Godil, Ryan Prenger, Anima Anandkumar
Neural Information Processing Systems (NeurIPS), 2023, **Oral presentation**

Awards & Honors

8/2023 **Early Research Scholarship**

4/2023 **Caltech SURF award**

9/2022 **UCSB Creative Studies Honors**

Selected Media

2024 **Mathematicians' Newest Assistants Are Artificially Intelligent**
Scientific American

2024 **LeanAgent: The First Life-Long Learning Agent for Formal Theorem Proving in Lean**
MarkTechPost

2024 **Lean Copilot: An AI Tool that Allows Large Language Models (LLMs) to be used in Lean for Proof Automation**
MarkTechPost

2023 **Can LLMs Generate Mathematical Proofs that can be Rigorously Checked?**
MarkTechPost

Languages

Programming Python, C++, Lean 4, Java, C, PASCAL, OCaml, C#

Natural English (TOEFL 117/120), Mandarin (Native)

Invited Talks & Tutorials

Tutorial: Neuro-Symbolic Theorem Proving with Lean

9/2024 3rd Neuro-Symbolic AI Summer School (NSSS)

Towards An AI Mathematician

12/2023 UC Santa Barbara NLP Lab
11/2023 CCS Research & Creative Activities Conference (RACA-CON)
8/2023 Caltech SURF Seminar Day

Academic Services

Reviewer Conference on Neural Information Processing Systems (NeurIPS)
International Conference on Learning Representations (ICLR)
International Conference on Machine Learning (ICML)
Association for Computational Linguistics (ACL) Rolling Review
Annual Meeting of the Association for Computational Linguistics (ACL)
NeurIPS Mathematical Reasoning and AI (MATH-AI) Workshop

NeurIPS Workshop on Behavioral Machine Learning
ICLR VerifAI: AI Verification in the Wild Workshop
ICLR Workshop on Representational Alignment (Re-Align)
ICML Workshop on LLMs and Cognition