

Kaiyu Yang

Research Scientist @ Meta FAIR

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<https://yangky11.github.io>

PROFESSIONAL APPOINTMENTS

Meta Fundamental AI Research (FAIR)
Research Scientist

New York, NY
6/2024 – Present

California Institute of Technology
Computing, Data, and Society Postdoctoral Fellow

Pasadena, CA
9/2022 – 5/2024

Advisors: Pietro Perona and Yisong Yue

EDUCATION

Princeton University
Ph.D. in Computer Science

Princeton, NJ
7/2022

Advisor: Jia Deng

University of Michigan
M.S. in Computer Science and Engineering

Ann Arbor, MI
8/2018

Tsinghua University
B.Eng. in Computer Science
B.S. in Mathematics

Beijing, China
7/2016
7/2016

RESEARCH INTERESTS

AI · Machine Learning · LLMs for Theorem Proving and Mathematical Reasoning

PUBLICATIONS

* Equal contribution. † Equal advising

- Preprint **Lean Finder: Semantic Search for Mathlib That Understands User Intents**
Jialin Lu, Kye Emond, Kaiyu Yang, Swarat Chaudhuri, Weiran Sun, Wuyang Chen.
In submission, 2025
- Preprint **ProofOptimizer: Training Language Models to Simplify Proofs without Human Demonstrations**
Alex Gu, Bartosz Piotrowski, Fabian Gloeckle, Kaiyu Yang, Aram Markosyan.
In submission, 2025
- Preprint **Goedel-Prover-V2: Scaling Formal Theorem Proving with Scaffolded Data Synthesis and Self-Correction**
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*.
In submission, 2025

- Preprint **Verina: Benchmarking Verifiable Code Generation**
Zhe Ye, Zhengxu Yan, Timothe Kasriel, Jingxuan He, Kaiyu Yang, Dawn Song.
In submission, 2025
- Preprint **Spectral Journey: How Transformers Predict the Shortest Path**
Andrew Cohen, Andrey Gromov, Kaiyu Yang, Yuandong Tian.
Preprint, 2025
- COLM 2025 **Goedel-Prover: A Frontier Model for Open-Source Automated Theorem Proving**
Yong Lin*, Shange Tang*, Bohan Lyu, Jiayun Wu, Hongzhou Lin, Kaiyu Yang, Jia Li, Mengzhou Xia, Danqi Chen, Sanjeev Arora, Chi Jin.
Conference on Language Modeling, 2025
- ICML 2025 **Formal Mathematical Reasoning: A New Frontier in AI**
CACM 2025 Kaiyu Yang, Gabriel Poesia, Jingxuan He, Wenda Li, Kristin Lauter, Swarat Chaudhuri, Dawn Song.
International Conference on Machine Learning (Position Papers Track), 2025, **Spotlight**
A separate version accepted to *Communications of the ACM*
- CAV 2025 **PyEuclid: A Versatile Formal Plane Geometry System in Python**
Zhaoyu Li*, Hangrui Bi*, Jialiang Sun*, Zenan Li, Kaiyu Yang, Xujie Si.
International Conference on Computer-Aided Verification (Tool Papers Track), 2025
- ICLR 2025 **Proving Olympiad Inequalities by Synergizing LLMs and Symbolic Reasoning**
Zenan Li*, Zhaoyu Li*, Wen Tang, Xian Zhang, Yuan Yao, Xujie Si, Fan Yang, Kaiyu Yang[†], Xiaoxing Ma[†].
International Conference on Learning Representations, 2025
- NeuS 2025 **Lean Copilot: Large Language Models as Copilots for Theorem Proving in Lean**
Peiyang Song, Kaiyu Yang, Anima Anandkumar.
International Conference on Neuro-symbolic Systems, 2025
- NeurIPS 2024 **SciInstruct: A Self-Reflective Instruction Annotated Dataset for Training Scientific Language Models**
Dan Zhang, Ziniu Hu, Sining Zhoubian, Zhengxiao Du, Kaiyu Yang, Zihan Wang, Yisong Yue, Yuxiao Dong, Jie Tang.
Conference on Neural Information Processing Systems (Datasets & Benchmarks Track), 2024
- COLM 2024 **A Survey on Deep Learning for Theorem Proving**
Zhaoyu Li, Jialiang Sun, Logan Murphy, Qidong Su, Zenan Li, Xian Zhang, Kaiyu Yang, Xujie Si.
Conference on Language Modeling, 2024
- ICML 2024 **Autoformalizing Euclidean Geometry**
Logan Murphy*, Kaiyu Yang*, Jialiang Sun, Zhaoyu Li, Anima Anandkumar, Xujie Si.
International Conference on Machine Learning, 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.
Conference on Neural Information Processing Systems (Datasets & Benchmarks Track), 2023, **Oral presentation**

- CVPR 2023 **Infinite Photorealistic Worlds using Procedural Generation**
 Alexander Raistrick*, Lahav Lipson*, Zeyu Ma*, Lingjie Mei, Mingzhe Wang, Yiming Zuo, Karhan Kayan, Hongyu Wen, Beining Han, Yihan Wang, Alejandro Newell, Hei Law, Ankit Goyal, Kaiyu Yang, Jia Deng.
Conference on Computer Vision and Pattern Recognition, 2023
- TMLR 2023 **Learning Symbolic Rules for Reasoning in Quasi-Natural Language**
 Kaiyu Yang and Jia Deng.
Transactions on Machine Learning Research, 2023
- EMNLP 2022 **Generating Natural Language Proofs with Verifier-Guided Search**
 Kaiyu Yang, Jia Deng, Danqi Chen.
Conference on Empirical Methods in Natural Language Processing, 2022, **Oral presentation**
- ICML 2022 **A Study of Face Obfuscation in ImageNet**
 Kaiyu Yang, Jacqueline Yau, Li Fei-Fei, Jia Deng, Olga Russakovsky.
International Conference on Machine Learning, 2022
- NeurIPS 2020 **Strongly Incremental Constituency Parsing with Graph Neural Networks**
 Kaiyu Yang and Jia Deng.
Conference on Neural Information Processing Systems, 2020
- NeurIPS 2020 **Rel3D: A Minimally Contrastive Benchmark for Grounding Spatial Relations in 3D**
 Ankit Goyal, Kaiyu Yang, Dawei Yang, Jia Deng.
Conference on Neural Information Processing Systems, 2020, **Spotlight**
- FAT* 2020 **Towards Fairer Datasets: Filtering and Balancing the Distribution of the People Subtree in the ImageNet Hierarchy**
 Kaiyu Yang, Klint Qinami, Li Fei-Fei, Jia Deng, Olga Russakovsky.
Conference on Fairness, Accountability, and Transparency, 2020
- ICML 2019 **Learning to Prove Theorems via Interacting with Proof Assistants**
 Kaiyu Yang and Jia Deng.
International Conference on Machine Learning, 2019
- ICCV 2019 **SpatialSense: An Adversarially Crowdsourced Benchmark for Spatial Relation Recognition**
 Kaiyu Yang, Olga Russakovsky, Jia Deng.
International Conference on Computer Vision, 2019
- ECCV 2016 **Stacked Hourglass Networks for Human Pose Estimation**
 Alejandro Newell, Kaiyu Yang, Jia Deng.
European Conference on Computer Vision, 2016

AWARDS AND GRANTS

- Neurosymbolic AI for Autonomy** 2023
Co-authored proposal awarded by Caltech's Center for Autonomous Systems and Technologies
- Siebel Scholar** 2022
42 computer science graduate students awarded annually from selected institutions worldwide
- Outstanding Reviewer** 2020, 2021
Top 20% at the Conference on Computer Vision and Pattern Recognition (CVPR)

Google Cloud Research Credits	2019
<i>Google Cloud Platform</i>	
Outstanding Teaching Assistant Award	2015, 2016
<i>Tsinghua University</i>	

MEDIA

Mathematicians' Newest Assistants Are Artificially Intelligent	2024
<i>Scientific American</i>	
Can LLMs Generate Mathematical Proofs that can be Rigorously Checked?	2023
<i>MarkTechPost</i>	
Exploring the Tradeoff Between Privacy and Algorithm Performance	2022
<i>Princeton Insights</i>	
Researchers Devise Approach to Reduce Biases in Computer Vision Data Sets	2020
<i>Princeton Engineering News</i>	
AI Is Biased. Here's How Scientists Are Trying to Fix It	2019
<i>Wired</i>	

INVITED TALKS

Formal Reasoning Meets LLMs: Towards AI for Mathematics and Verification

University of Southern California	11/2025
Duke University	10/2025
Georgia Institute of Technology	4/2025
ICERM, Brown University	4/2025
Simons Institute for the Theory of Computing	4/2025
University of California, Berkeley	4/2025
Rutgers University	4/2025

Towards an AI Mathematician

Brown University	9/2024
University of California, Los Angeles	5/2024
University of Chicago	4/2024
Meta FAIR	4/2024
University of Texas, Austin	3/2024

Towards Large Language Models as Copilots for Theorem Proving

Lean Together Annual Meeting	1/2024
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Theorem Proving via Machine Learning

Lean for the Curious Mathematician Colloquium	9/2023
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LeanDojo: Theorem Proving with Retrieval-Augmented Language Models

Conference on Neural Information Processing Systems (NeurIPS) Oral Presentation	12/2023
Stanford Software Research Lunch	10/2023
Conference on Artificial Intelligence and Theorem Proving (AITP)	9/2023
Hoskinson Center for Formal Mathematics, CMU	5/2023
Rutgers University	7/2023

Neurosymbolic Reasoning, From Formal Logic to Natural Language

University of California, Los Angeles	2/2023
University of California, Santa Barbara	11/2022
University of Southern California	10/2022

Teaching Machines to Reason Symbolically

OpenAI	3/2022
Google	2/2022
University of Pennsylvania	2/2022
NSF Expeditions “Understanding the World Through Code”	1/2022
Caltech	1/2022

Generating Natural Language Proofs with Verifier-Guided Search

N2Formal Group, Google	7/2022
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RESEARCH MENTORING

Zhaoyu Li <i>PhD student @ U of Toronto</i>	2025 – Present
Jiacheng Chen <i>Undergrad @ South China University of Technology → PhD student @ CUHK</i>	2024 – 2025
Peiyang Song <i>Undergrad @ UCSB → Undergraduate @ Caltech</i>	2023 – 2024
Rahul Chalamala <i>Undergrad @ Caltech → Researcher @ Together AI</i>	2023
Shixing Yu <i>Master’s student @ UT Austin → PhD student @ Cornell</i>	2022 – 2023
Gene Chou <i>Undergrad @ Princeton → PhD student @ Cornell</i>	2021
Jacqueline Yau <i>Master’s student @ Stanford → PhD student @ UIUC</i>	2019 – 2020

TEACHING EXPERIENCE

Advanced Large Language Model Agents <i>Guest Co-instructor, UC Berkeley & MOOC</i>	Spring 2025
AIST 5030: Generative Artificial Intelligence <i>Guest Lecturer, Chinese University of Hong Kong</i>	Spring 2025
CS 159: Large Language Models for Reasoning <i>Guest Lecturer, Caltech</i>	2024/5
COS 484/584: Natural Language Processing <i>Teaching Assistant, Princeton University</i>	2021/2 – 2021/5
Data Structures and Algorithms <i>Head Teaching Assistant, Tsinghua University</i>	2013/8 – 2016/7

SERVICE

Organizer

- The 5rd Workshop on Mathematical Reasoning and AI @ NeurIPS 2025
- The 3rd Workshop on Mathematical Reasoning and AI @ NeurIPS 2023
- Tutorial on Machine Learning for Theorem Proving @ NeurIPS 2023

Area Chair

- International Conference on Machine Learning (ICML), 2025
- European Conference on Computer Vision (ECCV), 2024

Reviewer

- National Science Foundation (NSF) Panel
- National Academies Workshop Proceedings: “AI to Assist Mathematical Reasoning”
- European Research Council (ERC) Advanced Grant

International Conference on Machine Learning (ICML)
Neural Information Processing Systems (NeurIPS)
International Conference on Learning Representations (ICLR)
Journal of Machine Learning Research (JMLR)
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
Computer Vision and Pattern Recognition (CVPR)
International Conference on Computer Vision (ICCV)
European Conference on Computer Vision (ECCV)