Kaiyu Yang

Research Scientist @ Meta FAIR

☎ 734-389-9696
✉ kaiyuy@meta.com
https://yangky11.github.io

PROFESSIONAL APPOINTMENTS

Meta Fundamental AI Research (FAIR)   New York, NY
Research Scientist   6/2024 – Present

California Institute of Technology   Pasadena, CA
Computing, Data, and Society Postdoctoral Fellow   9/2022 – 5/2024

      Advisors: Pietro Perona and Yisong Yue

EDUCATION

Princeton University   Princeton, NJ
Ph.D. in Computer Science   7/2022

      Advisor: Jia Deng

University of Michigan   Ann Arbor, MI
M.S. in Computer Science and Engineering   8/2018

Tsinghua University   Beijing, China
B.Eng. in Computer Science   7/2016
B.S. in Mathematics   7/2016

RESEARCH INTERESTS

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

PUBLICATIONS

* Equal contribution. † Equal advising

Preprint   **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.
In submission, 2025

Preprint   **Spectral Journey: How Transformers Predict the Shortest Path**

Andrew Cohen, Andrey Gromov, Kaiyu Yang, Yuandong Tian.
In submission, 2025

ICML 2025   **Formal Mathematical Reasoning: A New Frontier in AI**

Kaiyu Yang, Gabriel Poesia, Jingxuan He, Wenda Li, Kristin Lauter, Swarat Chaudhuri, Dawn Song.
International Conference on Machine Learning (Position Papers Track), 2025

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	**Towards 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 presentation**

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
Google Cloud Platform
Outstanding Teaching Assistant Award 2015, 2016
Tsinghua University

MEDIA

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

INVITED TALKS

Formal Reasoning Meets LLMs: Towards AI for Mathematics and Verification

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

Theorem Proving via Machine Learning

Lean for the Curious Mathematician Colloquium	9/2023

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

RESEARCH MENTORING

Zhaoyu Li   2025 – Present
PhD student @ University of Toronto
Jiacheng Chen   2024 – Present
Undergraduate @ South China University of Technology
Peiyang Song   2023 – 2024
Undergraduate @ UCSB → Undergraduate @ Caltech
Rahul Chalamala   2023
Undergraduate @ Caltech → Researcher @ Together AI
Shixing Yu   2022 – 2023
Master's student @ UT Austin → Ph.D. student @ Cornell
Gene Chou   2021
Undergraduate @ Princeton → Ph.D. student @ Cornell
Jacqueline Yau   2019 – 2020
Master's student @ Stanford → Ph.D. student @ UIUC

TEACHING EXPERIENCE

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

SERVICE

Organizer

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)