Sihao Chen

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Bio

Sihao Chen is currently a Senior Applied Scientist in Microsoft's Office of Applied Research. His current research focuses on reinforcement learning (RL) and post-training techniques for large language models (LLMs) and AI agents. He received his Ph.D. from the University of Pennsylvania in 2024. Sihao's passion lies in developing methods and engineering solutions to support autonomous and continual learning of LLMs or AI Agents. Through his work, he realizes there is still a big gap between how we train LLMs today and the vision of self-evolving AI agents that can learn from the environment. He is motivated to bridge this gap through his work.

Work Experience

Senior Applied Scientist 10/2024 - Now
Microsoft - Office of Applied Research

- Reinforcement learning (RL) post-training research for Microsoft's enterprise Copilot agents in the Microsoft-OpenAI partnership.
- Lead research and development of the RL post-training pipeline for privacy-preserving synthetic data generation with LLMs. The framework has now become the primary method for synthetic user grounding data generation (e.g. user profile, emails, documents, meeting transcripts, etc) for enterprise AI agent training and evaluation for Microsoft's enterprise Copilot agents.
- Leads continual learning research effort for collaborative AI agents (e.g., virtual co-workers that learn to help teams in their daily work). Developed an tool-call RL training algorithm for teaching LLMs to self-reflect and read/write their past memories and experiences (e.g. user logs or environmental feedback) during RL exploration.

Education

Ph.D. in Computer and Information Science 06/2019 - 10/2024
University of Pennsylvania
Thesis Advisor: Dan Roth

B.S. in Computer Engineering *with Honor* 08/2014 - 01/2018
University of Illinois at Urbana Champaign

Internship Experience

Part-Time Student Researcher 09/2021 - 05/2023, 09/2023 - 01/2024
Google Research (*Now Google DeepMind*)
Host: Alex Fabrikant
Topic: Factuality Estimation of Large Language Models.

Research Intern 05/2023 - 08/2023
Tencent AI Lab
Host: Hongming Zhang, Dong Yu
Topic: Retrieval Augmented Generation [A4, A5], Stability of RLHF Training [P12].

Research Intern 05/2021 - 08/2021, 05/2022 - 08/2022
Google Research

Host: Alex Fabrikant, Donald Metzler
Topic: Text Embeddings + Citation Generation for LLMs [P9, P10]

Research Intern 05/2020 - 08/2020
Google Ads
Host: Kazoo Sone
Topic: Hallucination in Small Language Models [P7].

Publications

See Google Scholar page for up-to-date publications + preprints.

Peer-Reviewed Publications

[P22] "Teaching Language Models To Gather Information Proactively"
Tenghao Huang, **Sihao Chen**, Muhao Chen, Jonathan May, Longqi Yang, Mengting Wan, Pei ZhouTenghao Huang, Sihao Chen, Muhao Chen, Jonathan May, Longqi Yang, Mengting Wan, Pei Zhou
EMNLP (Findings), 2025

[P21] "LogiCoL: Logically-Informed Contrastive Learning for Set-based Dense Retrieval"
Yanzhen Shen, **Sihao Chen**, Xueqiang Xu, Yunyi Zhang, Chaitanya Malaviya, Dan Roth.
EMNLP, 2025

[P20] "Know me, respond to me: Benchmarking llms for dynamic user profiling and personalized responses at scale"
Bowen Jiang, Zhuoqun Hao, Young-Min Cho, Bryan Li, Yuan Yuan, **Sihao Chen**, Lyle Ungar, Camillo J Taylor, Dan Roth.
COLM, 2025

[P19] "On Reference (In-) Determinacy in Natural Language Inference"
Sihao Chen, Chaitanya Malaviya, Alex Fabrikant, Hagai Taitelbaum, Tal Schuster, Senaka Buthpitiya, Dan Roth.
NAACL (Findings), 2025

[P18] "Dense X Retrieval: What Retrieval Granularity Should We Use?"
Tong Chen, Hongwei Wang, **Sihao Chen**, Wenhao Yu, Kaixin Ma, Xinran Zhao, Dong Yu, Hongming Zhang.
EMNLP, 2024

[P17] "MixGR: Enhancing Retriever Generalization for Scientific Domain through Complementary Granularity"
Fengyu Cai, Xinran Zhao, Tong Chen, **Sihao Chen**, Hongming Zhang, Iryna Gurevych, Heinz Koeppl.
EMNLP, 2024

[P16] "Beyond Relevance: Evaluate and Improve Retrievers on Perspective Awareness"
Xinran Zhao, Tong Chen, **Sihao Chen**, Hongming Zhang, Tongshuang Wu.
COLM, 2024

[P15] "The Language Barrier: Dissecting Safety Challenges of LLMs in Multilingual Contexts"
Lingfeng Shen, Weiting Tan, **Sihao Chen**, Yunmo Chen, Jingyu Zhang, Haoran Xu, Boyuan Zheng, Philipp Koehn, Daniel Khashabi
ACL (Findings), 2024

[P14] "Sub-Sentence Encoder: Contrastive Learning of Propositional Semantic Representations"
Sihao Chen, Hongming Zhang, Tong Chen, Ben Zhou, Wenhao Yu, Dian Yu, Baolin Peng,

Hongwei Wang, Dan Roth, Dong Yu.
NAACL, 2024

[P13] "ExpertQA: Expert-Curated Questions and Attributed Answers"
Chaitanya Malaviya, Subin Lee, **Sihao Chen**, Elizabeth Sieber, Mark Yatskar, Dan Roth.
NAACL, 2024

[P12] "The Trickle-down Impact of Reward (In-) Consistency on RLHF"
Lingfeng Shen, **Sihao Chen**, Linfeng Song, Lifeng Jin, Baolin Peng, Haitao Mi, Daniel Khashabi, Dong Yu
ICLR, 2024

[P11] "Using LLM for Improving Key Event Discovery: Temporal-Guided News Stream Clustering with Event Summaries"
Nishanth Nakshatri, Siyi Liu, **Sihao Chen**, Daniel J. Hopkins, Dan Roth, Dan Goldwasser
EMNLP Findings, 2023

[P10] "PropSegmEnt: A Large-Scale Corpus for Proposition-Level Segmentation and Entailment Recognition"
Sihao Chen, Senaka Buthpitiya, Alex Fabrikant, Dan Roth, Tal Schuster
ACL Findings, 2023

[P9] "Stretching Sentence-pair NLI Models to Reason over Long Documents and Clusters"
Tal Schuster, **Sihao Chen**, Senaka Buthpitiya, Alex Fabrikant, Donald Metzler
EMNLP Findings, 2022

[P8] "Design Challenges for a Multi-Perspective Search Engine"
Sihao Chen*, Siyi Liu*, Xander Uyttendaele, Yi Zhang, William Bruno, and Dan Roth
NAACL Findings, 2022

[P7] "Improving Faithfulness in Abstractive Summarization with Contrast Candidate Generation and Selection"
Sihao Chen, Fan Zhang, Kazoo Sone and Dan Roth
NAACL, 2021

[P6] "MultiOpEd: A Corpus of Multi-Perspective News Editorials"
Siyi Liu, **Sihao Chen**, Xander Uyttendaele and Dan Roth
NAACL, 2021

[P5] "Evaluating NLP Models via Contrast Sets"
Matt Gardner, Yoav Artzi, Victoria Basmova, Jonathan Berant, Ben Bogin, **Sihao Chen**, Pradeep Dasigi, Dheeru Dua, Yanai Elazar, Ananth Gottumukkala, Nitish Gupta, Hanna Hajishirzi, Gabriel Ilharco, Daniel Khashabi, Kevin Lin, Jiangming Liu, Nelson F. Liu, Phoebe Mulcaire, Qiang Ning, Sameer Singh, Noah A. Smith, Sanjay Subramanian, Reut Tsarfaty, Eric Wallace, Ally Zhang and Ben Zhou.
EMNLP Findings, 2020

[P4] "Navigating Information Pollution: Penn's COVID-19 Information Platform"
Sihao Chen*, Xander Uyttendaele* and Dan Roth.
The Responsible Data Summit, Spotlight Award, 2020, *Media Coverage by PennToday*

[P3] "Do VQA Models Know What To Look At?"
Weiyu Du, **Sihao Chen**, Yijie Zhao, Jianbo Shi and Dan Roth.
Women in CV (WiCV) Workshop, ECCV, 2020

[P2] "PerspectroScope: A Window to the World of Diverse Perspectives"
Sihao Chen, Daniel Khashabi, Chris Callison-Burch and Dan Roth.
ACL (Demo), 2019

[P1] "See Things from a Different Angle: Discovering Diverse Perspectives about Claims"
Sihao Chen, Daniel Khashabi, Wenpeng Yin, Chris Callison-Burch and Dan Roth.
NAACL, 2019

Book Chapters

[B1] "Toward Automatic Discovery of Diverse Perspectives"
with Daniel Khashabi and Dan Roth
in "*Creating a More Transparent Internet: The Perspective Web*"
Cambridge University Press, 2022

Invited Talks

1. "Language Models as Generative Search Engines – Past, Present and Future."
   At Microsoft Research, 04/2024
2. "Towards a more contextualized view of the web."
   At Google Research, 04/2024
   At Allen Institute for Artificial Intelligence, 04/2024
   At Duolingo, 03/2024
3. "Towards a more contextualized view of the web."
   At Duolingo, 03/2024
4. "Dense X Retrieval – How We Represent Non-Parametric Knowledge Matters."
   At Google Research, 01/2024
5. "Sub-Sentence Encoder: Contrastive Learning of Propositional Semantic Representation"
   At Google Research, Mountain View, CA, 11/2023
6. "Towards Automatic Discovery of Diverse Perspectives"
   At *Mid-Atlantic Student Colloquium on Speech, Language and Learning*
   University of Maryland College Park, 03/2020

Teaching

As *Teaching Assistant* –
Spring 2022, *Applied Machine Learning*, Instructor: Dinesh Jayaraman & Mark Yatskar
Spring 2020, *Computational Linguistics*, Instructor: Chris Callison-Burch

Professional Service

As *Program Committee Member* – AAAI, EMNLP, ACL, IJCAI, NAACL, Computational Linguistics, ICLR