Yifan Yang

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Google Scholar: https://scholar.google.com/citations?user=ooRvdTUAAAAJ

Areas of Interest

Medical AI · AI safety · Natural Language Processing · Machine Learning.

Education

expected 2025 **PhD Candidate in Computer Science**,
University of Maryland College Park.
Advisor: Furong Huang

Current **NIH Visiting fellow**,
National Library of Medicine, NIH
Advisor: Zhiyong Lu, PhD FACMI FIAHSI

2020 BS in Computer Science with high honors,
University of Maryland College Park.

Awards

2022 - Current NIH Predoctoral Visiting Program Award

2024 NIH director's challenge award

Researches

Assisting Clinical and Biomedical Tasks with LLMs and Algorithms

- Accelerated and improved patient-to-trial matching using LLMs and clinician notes.
- Automated diagnosis in ophthalmology through multimodal LLMs (e.g., pigmentation, drusen size analysis)
- Fast, interactive exploration of genomic data using advanced indexing algorithms

Avaliable publications:

Matching patients to clinical trials with large language models.

Epiviz File Server: Query, Transform and Interactively Explore Data from Indexed Genomic Files.

Enhancing LLMs with Medical Tools and Biomedical Knowledge

- Integrated gene-specific knowledge into LLMs using multistep foundational model training (e.g. pre-training, fine-tuning, reinforcement learning)
- Improved gene analysis accuracy via biomedical databases and knowledge graphs
- LLM agents that auto-generate clinical calculators to predict mortality from EHR data
- Deployed domain-specific tools in LLM agents to reduce hallucinations and boost accuracy in gene-related tasks

Avaliable publications:

AgentMD: Empowering Language Agents for Risk Prediction with Large-Scale Clinical Tool Learning.

Knowledge-guided contextual gene set analysis with large language models.

GeneGPT: augmenting large language models with domain tools for improved access to biomedical information.

LLM Safety and Capabilities in Biomedical Tasks

- Enhancing patient privacy in generative AI via controlled text decoding while preserving medical capabilities
- Safeguarding medical LLM through five principles and ten aspects (e.g., hallucination, bias, privacy)
- Benchmarking multimodal LLMs in CT scan analysis

Avaliable publications:

Protecting Patient Privacy Through Controlled Text Generation

Beyond Multiple-Choice Accuracy: Real-World Challenges of Implementing Large Language Models in Healthcare.

Ensuring Safety and Trust: Analyzing the Risks of Large Language Models in Medicine. (MedGuard)

Memorization in Large Language Models in Medicine: Prevalence, Characteristics, and Clinical Implications.

Adversarial Attacks on Large Language Models in Medicine.

CT-Bench: A Comprehensive Benchmark for Multimodal AI in Computed Tomography Analysis.

Publications

2025 **Protecting Patient Privacy Through Controlled Text Generation.** Yifan Yang, Yuancheng Xu, Qiao Jin, Anran Li, Qingyu Chen, Furong Huang, Zhiyong Lu. *AMIA 2025*

2025 **Beyond Multiple-Choice Accuracy: Real-World Challenges of Implementing Large Language Models in Healthcare.** Yifan Yang, Qiao Jin, Qingqing Zhu, Zhizheng Wang, Francisco Erramuspe Álvarez, Nicholas Wan, Benjamin Hou, and Zhiyong Lu. *Annual review of biomedical data science, 10.1146/annurev-biodatasci-103123-094851*

2025 **Large Language Models and Causal Inference in Collaboration: A Comprehensive Survey.** Xiaoyu Liu, Paiheng Xu, Junda Wu, Jiaxin Yuan, Yifan Yang, Yuhang Zhou, Fuxiao Liu, Tianrui Guan, Haoliang Wang, Tong Yu, Julian McAuley, Wei Ai, Furong Huang. *NAACL findings, 2025*

2024 **Matching patients to clinical trials with large language models.** Qiao Jin, Zifeng Wang, Charalampos S Floudas, Fangyuan Chen, Changlin Gong, Dara Bracken-Clarke, Elisabetta Xue, Yifan Yang, Jimeng Sun, Zhiyong Lu. *Nature Communications volume 15, Article number: 9074 (2024)*

2024 **Unmasking and Quantifying Racial Bias of Large Language Models in Medical Report Generation.** Yifan Yang, Xiaoyu Liu, Qiao Jin, Furong Huang, Zhiyong Lu. *Communications Medicine, volume 4, Article number: 176 (2024)*

2024 **Opportunities and challenges for ChatGPT and large language models in biomedicine and health.** Shubo Tian, Qiao Jin, Lana Yeganova, Po-Ting Lai, Qingqing Zhu, Xiuying Chen, Yifan Yang, Qingyu Chen, Won Kim, Donald C Comeau, Rezarta Islamaj, Aadit Kapoor, Xin Gao, Zhiyong Lu. *Briefings in Bioinformatics, Volume 25, Issue 1, January 2024, bbad493*

2024 **A survey of recent methods for addressing AI fairness and bias in biomedicine.** Yifan Yang, Mingquan Lin, Han Zhao, Yifan Peng, Furong Huang, Zhiyong Lu. *Journal of Biomedical Informatics 154, 104646.*

2024 **GeneGPT: augmenting large language models with domain tools for improved access to biomedical information.** Qiao Jin, Yifan Yang, Qingyu Chen, Zhiyong Lu. *Bioinformatics, Volume 40, Issue 2, February 2024, btae075.*

2023 **Improving model fairness in image-based computer-aided diagnosis.** Mingquan Lin, Tianhao Li, Yifan Yang, Gregory Holste, Ying Ding, Sarah H. Van Tassel, Kyle Kovacs, Zhangyang Wang, Zhiyong Lu, Fei Wang, Yifan Peng. *Nature Communications 14.1 (2023): 6261.*

2023 **C-Disentanglement: Discovering Causally-Independent Generative Factors under an Inductive Bias of Confounder.** Xiaoyu Liu, Jiaxin Yuan, Bang An, Yuancheng Xu, Yifan Yang, Furong Huang. *NeurIPS 2023*

2022 **Comfetch: Federated Learning of Large Networks on Memory-Constrained Clients via Sketching.** Tahseen Rabbani, Brandon Feng, Yifan Yang, Arjun Rajkumar, Furong Huang. *AAAI-22*

2020 **Epiviz File Server: Query, Transform and Interactively Explore Data from Indexed Genomic Files.** Jayaram Kancherla, Yifan Yang, Hyeyun Chae, Hector Corrada Bravo. *Bioinformatics* Poster & Presentation at ISMB 2019.

Under review at journal or conference (Avaliable as preprints)

2025 **CT-Bench: A Comprehensive Benchmark for Multimodal AI in Computed Tomography Analysis.** Qingqing Zhu, Qiao Jin, Tejas Sudharshan Mathai, Yin Fang, ZhiZheng Wang, Yifan Yang, Maame Sarfo-Gyamfi, Benjamin Hou, Ran Gu, Praveen T. S. Balamuralikrishna, Kenneth C. Wang, Ronald Summers, Zhiyong Lu

2025 **RAG-Gym: Optimizing Reasoning and Search Agents with Process Supervision.** Guangzhi Xiong, Qiao Jin, Xiao Wang, Yin Fang, Haolin Liu, Yifan Yang, Fangyuan Chen, Zhixing Song, Dengyu Wang, Minjia Zhang, Zhiyong Lu, Aidong Zhang.

2024 **Memorization in Large Language Models in Medicine: Prevalence, Characteristics, and Clinical Implications.** Anran Li, Mengmeng Du, Yu Yin, Yan Hu, Zihao Sun, Yihang Fu, Lingfei Qian, Erica Stutz, Xuguang Ai, Qianqian Xie, Rui Zhu, Jimin Huang, Yifan Yang, Siru Liu, Yih-Chung Tham, Lucila Ohno-Machado, Hyunghoon Cho, Zhiyong Lu, Hua Xu, Qingyu Chen.

2024 **Adversarial Attacks on Large Language Models in Medicine.** Yifan Yang, Qiao Jin, Furong Huang, Zhiyong Lu.

2024 **Ensuring Safety and Trust: Analyzing the Risks of Large Language Models in Medicine.** Yifan Yang, Qiao Jin, Robert Leaman, Xiaoyu Liu, Guangzhi Xiong, Maame Sarfo-Gyamfi, Changlin Gong, Santiago Ferrière-Steinert, W. John Wilbur, Xiaojun Li, Jiaxin Yuan, Bang An, Kelvin S. Castro, Francisco Erramuspe Álvarez, Matías Stockle, Aidong Zhang, Furong Huang, and Zhiyong Lu.

2024 **AgentMD: Empowering Language Agents for Risk Prediction with Large-Scale Clinical Tool Learning.** Qiao Jin, Zhizheng Wang, Yifan Yang, Qingqing Zhu, Donald Wright, Thomas Huang, W John Wilbur, Zhe He, Andrew Taylor, Qingyu Chen, Zhiyong Lu.

2024 **Knowledge-guided contextual gene set analysis with large language models.** Zhizheng Wang, Chi-Ping Day, Chih-Hsuan Wei, Qiao Jin, Robert Leaman, Yifan Yang, Shubo Tian, Aodong Qiu, Yin Fang, Qingqing Zhu, Xinghua Lu, Zhiyong Lu.

2024 **Demystifying Large Language Models for Medicine: A Primer.** Qiao Jin, Nicholas Wan, Robert Leaman, Shubo Tian, Zhizheng Wang, Yifan Yang, Zifeng Wang, Guangzhi Xiong, Po-Ting Lai, Qingqing Zhu, Benjamin Hou, Maame Sarfo-Gyamfi, Gongbo Zhang, Aidan Gilson, Balu Bhasuran, Zhe He, Aidong Zhang, Jimeng Sun, Chunhua Weng, Ronald M Summers, Qingyu Chen, Yifan Peng, Zhiyong Lu.

2023 **Improving Fairness in Medical Imaging Through Causal Learning.** Yifan Yang, Xiaoyu Liu, Mingquan Lin, Yifan Peng, Furong Huang, Zhiyong Lu.

Talks

2024 Adversarial Attack on Large Language Models in Medicine. *AMIA 2024*

2024 Fairness in biomedical AI. *University of Delaware*

Internships

Summer 2022 Intern - Data Science and Statistical Computing - Visualization and Interactive Data Analytics, gRED, Genentech.

Skills

Programming: Python, R, C, C++, Java
Frameworks: transformers, accelerate, deepspeed, pytorch, numpy, pandas