

**RESEARCH STATEMENT**

My research focuses on trustworthiness and robustness for deep learning, offline optimization, meta-learning, and bandit problem formulations. I am broadly interested in developing methods that leverage prior knowledge to help algorithms better generalize to new distributions. I explore these problems in the setting of generative design, AI4Science, minority health disparities, and medical imaging.

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**EDUCATION****University of Pennsylvania, MD-PhD Program**

NIH F30 NRSA Fellow, HHMI-NIBIB Interfaces Fellow | 2021 - Present

Advised by [Osbert Bastani](#) and [James Gee](#)

Penn Engineering Teaching Award Recipient

MD-PhD, Bioengineering (in progress)

MSE, Computer Science (in progress)

**California Institute of Technology**

Salutarian | 2017 - 2021

Advised by [Mikhail Shapiro](#)

BS, Applied Physics

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**EXPERIENCE****Human Frontier Collective Intern, [Scale AI](#)**

Remote | 2025

Developed complex, multi-step reasoning datasets for LLM training model and evaluation for code, math, and medical reasoning.

**Health VC Fellow, [25madison](#)**

New York City | 2024

Bridged clinical and engineering teams to help drive clinical operations for stealth healthtech incubation. Led exploratory investment research into digital health sectors.

**AI Clinical Fellow, [Glass Health](#)**

Remote | 2023-2024

Released and assessed clinical guideline articles as knowledge sources for large language models (LLM). Investigated applications of LLMs for medical education.

**Medical LLM Consultant, [Scale AI](#)**

Remote | 2023

Evaluated use cases of LLMs for healthcare. Red team-tested LLMs for accuracy and trustworthiness in real-world clinical workflows.

**PhD Research Intern, [Microsoft](#)**

Redmond, WA | 2022

Developed ML methods for accelerated MRI imaging. Proposed novel techniques for better generalization of MRI image reconstruction models.

**Software Engineer, [Hyperfine Research](#)**

Guilford, CT | 2021

Implemented and validated algorithms for more robust MRI signal acquisition and image post-processing in MR software across 25+ hospital sites.

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## SELECTED PUBLICATIONS

- [1] **Yao MS**, Gee JC, Bastani O. Diversity by design: Leveraging distribution matching for offline model-based optimization. ICML. (2025). [Link](#)
  - [2] Gee JC, **Yao MS**. Effective structured information extraction from chest radiography reports using open-weights large language models. Radiology (Editorial). (2025). [Link](#)
  - [3] Wu Y, Liu Y, Yang Y, **Yao MS**, Yang W, Shi X, Yang L, Li D, Liu Y, Gee JC, Yang X, Wei W, Gu S. A concept-based interpretable model for the diagnosis of choroid neoplasias using multimodal data. Nature Communications. (2025). [Link](#)
  - [4] **Yao MS**, Huang L, Leventhal E, Sun C, Stephen SJ, Liou L. Leveraging datathons to teach AI in undergraduate medical education: Case study. JMIR Med Educ 11:e63602. (2025). [Link](#)
  - [5] **Yao MS**, Chae A, Kahn CE, Witschey WR, Gee JC, Sagreiya H, Bastani O. Evidence is all you need: Ordering imaging studies via language model alignment with the ACR Appropriateness Criteria. Under peer review. (2024). [Link](#)
  - [6] **Yao MS**, Zeng Y, Bastani H, Gardner J, Gee JC, Bastani O. Generative adversarial model-based optimization via source critic regularization. NeurIPS. (2024). [Link](#)
  - [7] Yang Y, Gandhi M, Wang Y, Wu Y, **Yao MS**, Callison-Burch C, Gee JC, Yatskar M. A textbook remedy for domain shifts: Knowledge priors for medical image analysis. NeurIPS (Spotlight). (2024). [Link](#)
  - [8] Chae A†, **Yao MS**†, Sagreiya H, Goldberg AD, Chatterjee N, MacLean MT, Duda J, Elahi A, Borthakur A, Ritchie MD, Rader D, Kahn CE, Witschey WR, Gee JC. Strategies for implementing machine learning algorithms in the clinical practice of radiology. Radiology. (2024). [Link](#)
  - [9] **Yao MS**†, Chae A†, MacLean MT, Verma A, Duda J, Gee JC, Torigian DA, Rader D, Kahn CE, Witschey WR, Sagreiya H. SynthA1c: Towards clinically interpretable patient representations for diabetes risk stratification. PRIME MICCAI. (2023). [Link](#)
  - [10] **Yao MS**, Hansen MS. A path towards clinical adaptation of accelerated MRI. Proc ML4H. (2022). [Link](#)
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## TEACHING

**Instructor and Curriculum Lead**, Ethical Algorithms for the Modern Clinician | [Link](#)  
**TA**, Distributed Systems (CIS 5050, Penn) | Spring 2025  
**TA**, Principles of Deep Learning (ESE 5460, Penn) | Fall 2024  
**TA**, Imaging Informatics (EAS 5850, Penn) | Spring 2024, Summer 2024  
**Head TA**, Healthcare and Technology (CIS 7000, Penn) | Fall 2023, Fall 2024  
**TA**, Diagnostic Ultrasound for Medical Students (Penn) | 2023 - Present  
**TA**, Pre-Clinical Medicine (Penn) | 2023 - Present  
**Head TA**, Applied Mathematics (ACM 95a, Caltech) | Winter 2021  
**TA**, Graduate Classical Physics (Ph 106a, Caltech) | Fall 2020  
**TA**, Applied Mathematics (ACM 95b, Caltech) | Spring 2020  
**TA**, Quantum Physics (Ph 12b, Caltech) | Winter 2020  
**TA**, Electrodynamics and Magnetism (Ph 1c, Caltech) | Spring 2019  
**TA**, Operating Systems (CS 24, Caltech) | Spring 2019  
**TA**, Waves and Oscillations (Ph 12a, Caltech) | Fall 2019  
**TA**, Electrodynamics and Magnetism (Ph 1c, Caltech) | Spring 2019

SERVICE

Referee

RSNA Radiology

RSNA Radiology: Artificial Intelligence

AMIA Annual Symposium

Neural Information Processing Systems (NeurIPS)

International Conference on Learning Representations (ICLR)

International Conference on Machine Learning (ICML)

AHLI Conference on Health, Inference, and Learning (CHIL)

Ongoing

**Anti-Racism Curriculum Lead**, Medical Education, University of Pennsylvania SOM

**AI Curriculum Task Force Member**, University of Pennsylvania SOM

**Board Member**, Radiology Interest Group, University of Pennsylvania SOM

**Admissions Committee**, University of Pennsylvania SOM

**Peer Tutor**, University of Pennsylvania SOM

**Technology Committee Vice-Chair**, [American Physician Scientists Association](#)

**Director of Data Science & AI**, [MDplus](#)

**Peer Mentor**, University of Pennsylvania [Step-Ahead Mentorship Program](#)

Prior Service

**Editor-in-Chief**, [Caltech Undergraduate Research Journal](#)

**Volunteer Tutor**, [Caltech RISE Tutoring Program](#)

**Peer Tutor**, Caltech Deans' Office

**Student Body Representative**, [Caltech Academics and Research Committee](#)