Michael S. Yao

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Research Statement

My research focuses on building safe and reliable neural networks for medical image analysis and patient healthcare data. I explore problems related to model robustness and distribution shift for applications in radiology and treatment effect estimation for patient care. I also work on methods to improve patient accessibility to healthcare.

Education

University of Pennsylvania — Philadelphia, PA
MD-PhD Candidate, Department of Bioengineering — 2021 - Present
Advised by Osbert Bastani and James Gee. *GPA: 4.00, USMLE Step 1: Pass*
T32 HHMI/NIBIB Interfaces Scholar

California Institute of Technology — Pasadena, CA
BS, Applied Physics — 2017 - 2021
Advised by Mikhail Shapiro. *GPA: 4.00, Class Rank: 3/233*
George W Housner Prize Winner, Henry Ford II Scholar

Experience

Scale AI — Remote
Part-Time Medical LLM Consultant — Summer 2023

- Evaluate use cases of large language models (LLMs) for healthcare applications
- Technical assessment and adversarial stress testing of LLMs for accuracy and hallucinations to help train models that are safer for patient care

Microsoft Research — Redmond, WA
Research Scientist Intern — Summer 2022

- Develop ML methods for accelerated MRI image reconstruction using undersampled datasets
- Investigate techniques for sequential learning and fine-tuning of image reconstruction models
- Presented work at NeurIPS ML4H workshop

Hyperfine — Guilford, CT
Software Engineering Intern — Summer 2021

- Write and analyze computational algorithms for more robust MRI signal acquisition and image post-processing implemented into production software across 25+ hospital sites internationally

Publications

2023 **Deployment Strategies for Machine Learning Algorithms in Radiology**
Chae A*, **Yao MS***, Sagreiya HS, Chatterjee N, MacLean MT, Duda J, Elahi A, Borthakur A, Ritchie MD, Rader D, Kahn C, Witschey WR, Gee J. RSNA Radiology | GitHub

2023 **SynthA1c: Clinically Interpretable Patient Representations for Diabetes Risk Stratification**
Yao MS*, Chae A*, MacLean MT, Verma A, Duda J, Gee J, Torigian DA, Rader D, Kahn C, Witschey WR, Sagreiya HS. PRIME MICCAI | GitHub

2023 **Echo Planar Spectroscopic Imaging with a Columnar Excitation for "Virtual Biopsies"**
Yao MS, Van A, Gee J, Grossman M, Irwin DJ, Tisdall MD. Proc ISMRM | GitHub

2022 **A Path Towards Clinical Adaptation of Accelerated MRI**
Yao MS, Hansen MS. ML4H (Machine Learning for Health) | GitHub

2022 **Ultrasound-controllable Engineered Bacteria for Cancer Immunotherapy**
Abedi MH, **Yao MS***, Mittelstein DR, Bar-Zion A, Swift MB, Lee-Gosselin A, Barturen-Larrea P, Buss MT, Shapiro MG. Nature Communications

2022 **Seamless Gene Correction in the CFTR Locus by Vector Replacement and Insertion Events**
Suzuki S, Chosa K, Barillà C, **Yao MS**, Zuffardi O, Kai H, Shuto T, Suico MA, Kan YW, Sargent RG, Gruenert DC. Frontiers in Genome Editing

2020 **Longitudinal Medical Education Model for POCUS in Resource-Limited Settings**
Yao MS, Uhr L, Daghlian G, Amrute JM, Deshpande R, Mathews B, Patel SA, Henri R, Liu G, Reierson K, Johnson G. POCUS Journal

2019 **Stakeholder Perceptions of POCUS Implementation in Resource-Limited Settings**
Maw AM, Galvin B, Henri R, **Yao MS**, Exame B, Fleshner M, Fort MP, Morris MA. Diagnostics

Teaching

2023 **Head TA**, CIS 7000: Health, Healthcare and Technology (University of Pennsylvania)
Seminar course on healthcare informatics, technology and engineering in medicine

2023 **TA**, Clinical Ultrasound Skills (University of Pennsylvania)
Introduction to clinical ultrasound for first- and second- year medical students

2023 **TA**, Pre-Clinical Medicine (University of Pennsylvania)
Student instructor for pre-clinical courses for first- and second- year medical students

2021 **Head TA**, ACM 95a: Methods of Applied Mathematics (Caltech)
Engineering course on complex analysis and differential equations

2020 **TA**, Ph 106a: Topics in Classical Physics (Caltech)
Graduate course on advanced methods in classical mechanics

2020 **TA**, Ph 12b: Quantum Physics (Caltech)
Undergraduate course for physics majors on the fundamentals of quantum mechanics

2019 **TA**, CS 24: Operating Systems (Caltech)
Undergraduate CS course on dynamic resource management, caching, and low-level computing

Mentoring and Outreach

2023 - Present Admissions Committee Member, University of Pennsylvania School of Medicine
2023 - Present Peer Tutor, University of Pennsylvania School of Medicine
2023 - Present Technology Committee Vice-Chair, American Physician Scientists Association
2023 - Present Director of Data Science and AI, MDplus
2023 - Present Patient Navigator, Center for Surgical Health
2021 - Present Student Advisor and Software Developer, MD Collective
2021 - Present Peer Mentor, University of Pennsylvania Step-Ahead Mentorship Program
2020 - 2021 Editor-in-Chief, Caltech Undergraduate Research Journal
2019 - 2021 Volunteer Tutor, Caltech RISE Tutoring Program
2018 - 2021 Peer Tutor, Caltech Deans' Office
2017 - 2019 Student Body Representative, Caltech Academics and Research Committee