Kaihua (William) Hou

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Education

University of California, Berkeley
University of California, San Francisco — **California, U.S.**
Ph.D., Computational Precision Health — *Aug. 2023 – May. 2028 (Expected)*

Johns Hopkins University — **Maryland, U.S.**
B.S., Computer Science — *Aug. 2019 – May. 2023*

Research Experiences

- **University of California, Berkeley** — **Berkeley, CA, U.S.**
  Computational Precision Health (CPH) — *Aug. 2024 – Present*
  Advisors: Ahmed Alaa, Geoff Tison
  Designing contrastive and self-supervised frameworks for time-series video representation learning.
  Building echocardiogram video learning models for early detection of disease progression.
- **University of California, Berkeley** — **Berkeley, CA, U.S.**
  Computational Precision Health (CPH) Rotation — *Aug. 2023 – Aug. 2024*
  Advisors: Adam Yala, Rima Arnaout
  Designing attention architecture for memory-efficient self-supervised learning in medical imaging.
  Using large language models and knowledge graph to harmonize and structure clinical text data.
- **Massachusetts Institute of Technology** — **Boston, MA, U.S.**
  Clinical and Applied Machine Learning Group — *Jun. 2022 – May. 2023*
  Advisors: Emma Pierson, John Guttag
  Using probabilistic modeling and machine learning to estimate relative prevalences of underdiagnosed diseases.
  Investigating how different ways of reporting demographic info can affect classic AI for health tasks.
- **Johns Hopkins University** — **Baltimore, MD, U.S.**
  Malone Center for Engineering in Healthcare — *May. 2021 – May. 2023*
  Advisors: Jithin Yohannan, Mathias Unberath
  Forecasting rapid glaucoma worsening using Long Short-Term Memory (LSTM) and Transformer models.
  Regenerating visual field measurements with optical coherence tomography (OCT) data using GAN.
  Investigating how AI predictions affect the decision-making process of ophthalmologists.
- **Johns Hopkins Medicine** — **Baltimore, MD, U.S.**
  Division of Health Sciences Informatics — *Aug. 2020 – Jan. 2022*
  Advisors: Ali Afshar, Hadi Kharrazi
  Analyzed & visualized 6 million hospital admissions in the Healthcare Cost and Utilization Project (HCUP) in R.
  Developed interpretable machine learning models to predict hospital readmission using the HCUP dataset.

Publications

7. Divya Shanmugam, **Kaihua Hou**, Emma Pierson. **Quantifying Disparities in Underreported Health Conditions: An Application to Intimate Partner Violence**. *npj Women's Health*. 2024.
6. Rajiv Movva*, Divya M Shanmugam*, **Kaihua Hou**, Priya Pathak, John Guttag, Nikhil Garg, Emma Pierson. **Coarse race data conceals disparities in clinical risk score performance**. *Machine Learning for Health (ML4H) Conference* ***Best Findings Paper (Honorable Mention)***. 2023.

5. **Kaihua Hou**, Chris Bradley, Patrick Herbert, Chris Johnson, Michael Wall, Pradeep Ramulu, Mathias Unberath, Jithin Yohannan. **Predicting Visual Field Worsening with Longitudinal Optical Coherence Tomography Data Using a Gated Transformer Network**. *AAAI Conference. Ophthalmology*. 2023.
4. Patrick Herbert, **Kaihua Hou**, Christopher Bradley, Greg Hager, Michael Boland, Pradeep Ramulu, Mathias Unberath, Jithin Yohannan. **Forecasting Risk of Future Rapid Glaucoma Worsening Using Early Visual Field, Optical Coherence Tomography, and Clinical Data**. *Ophthalmology Glaucoma*. 2023.
3. Chris Bradley, Patrick Herbert, **Kaihua Hou**, Pradeep Ramulu, Mathias Unberath, Jithin Yohannan. **Comparing the accuracy of peripapillary OCT scans and visual fields to detect glaucoma worsening**. *Ophthalmology*. 2023.
2. **Kaihua Hou***, Jasdeep Sabharwal*, Patrick Herbert, Chris Bradley, Chris Johnson, Michael Wall, Pradeep Ramulu, Mathias Unberath, Jithin Yohannan. **A deep learning model incorporating spatial and temporal information successfully detects visual field worsening using a consensus based approach**. *Scientific Reports.* 2023.
1. Chris Bradley, **Kaihua Hou**, Patrick Herbert, Mathias Unberath, Michael Boland, Pradeep Ramulu, Jithin Yohannan. **Evidence-Based Guidelines for the Number of Peripapillary OCT Scans Needed to Detect Glaucoma Worsening**. *Ophthalmology*, 2023.

Honors & Awards

- **Diversity, Equity, and Inclusion Fellowship**
  University of California, Berkeley — *Aug. 2024*
- **AAAI Undergraduate Consortium Scholar**
  Association for the Advancement of Artificial Intelligence (AAAI) — *Jan. 2023*
- **Outstanding Undergraduate Researchers Nominee**
  Computing Research Association & Johns Hopkins University — *Oct. 2022*
- **Provost's Undergraduate Research Award**
  Johns Hopkins University — *Oct. 2022*
- **FUTURE Ignited Fellow**
  California Institute of Technology — *Oct. 2022*
- **Members-in-Training Most Outstanding Poster Award Nominee**
  Association for Research in Vision and Ophthalmology (ARVO) Annual Conference — *May. 2022*
- **Intuitive Surgical Best Project Award**
  Intuitive Surgical Inc. & Johns Hopkins University — *May. 2022*

Professional Services

- **Reviewer** — **Berkeley, CA**
  The Pacific Symposium on Biocomputing (PSB) — *Aug. 2024*
- **Assistant Moderator** — **Washington D.C.**
  The 37th Association for the Advancement of Artificial Intelligence (AAAI) Conference — *Feb. 2023*
- **Teaching Assistant** — **Johns Hopkins University**
  EN.601.464/664: Artificial Intelligence — *Aug. 2022 – May. 2023*
- **Teaching Assistant** — **Johns Hopkins University**
  EN.601.484/684: Interpretable Machine Learning Design — *May. 2022 – Dec. 2022*