Stanford

Robert Holland

Postdoctoral Scholar, Radiology

Bio

BIO

I'm a postdoctoral scholar in Stanford's Artificial Intelligence in Medicine and Imaging (AIMI) Center. My research focuses on developing self-supervised methods for aiding image-based clinical decision making and accelerating the discovery of new, prognostic biomarkers for disease. I am now advancing these applications by developing foundation models that integrate longitudinal, multimodal medical data from population-scale cohorts.

STANFORD ADVISORS

- Akshay Chaudhari, Postdoctoral Research Mentor
- Sergios Gatidis, Postdoctoral Faculty Sponsor

LINKS

- Personal Site: https://www.robbieholland.com/about

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My research focuses on developing self-supervised methods for aiding image-based clinical decision making and accelerating the discovery of new, prognostic biomarkers for disease. I am now advancing these applications by developing foundation models that integrate longitudinal, multimodal medical data from population-scale cohorts.

LAB AFFILIATIONS

- Akshay Chaudhari, MIMI (11/25/2024)

Publications

PUBLICATIONS

- **Contrastive Anatomy-Contrast Disentanglement: A Domain-General MRI Harmonization Method**
  Scholz, D., Erdur, A., Holland, R., Ehm, V., Peeken, J. C., Wiestler, B., Rueckert, D.
  edited by Gee, J. C., Alexander, D. C., Hong, J., Iglesias, J. E., Sudre, C. H., Venkataraman, A., Golland, P., Kim, J. H., Park, J.
  SPRINGER INTERNATIONAL PUBLISHING AG.2026: 100-110

- **Specialized curricula for training vision language models in retinal image analysis.** *NPJ digital medicine*
  Holland, R., Taylor, T. R., Holmes, C., Riedl, S., Mai, J., Patsiamanidi, M., Mitsopoulou, D., Hager, P., Muller, P., Paetzold, J. C., Scholl, H. P., Bogunovic, H., Schmidt-Erfurth, et al
  2025; 8 (1): 532

- **Metadata-enhanced contrastive learning from retinal optical coherence tomography images.** *Medical image analysis*
  Holland, R., Leingang, O., Bogunović, H., Riedl, S., Fritsche, L., Prevost, T., Scholl, H. P., Schmidt-Erfurth, U., Sivaprasad, S., Lotery, A. J., Rueckert, D., Menten, M. J.
  2024; 97: 103296

- **Evaluation and mitigation of the limitations of large language models in clinical decision-making.** *Nature medicine*
  Hager, P., Jungmann, F., Holland, R., Bhagat, K., Hubrecht, I., Knauer, M., Vielhauer, J., Makowski, M., Braren, R., Kaissis, G., Rueckert, D.
  2024; 30 (9): 2613-2622

- **Deep Learning-Based Clustering of OCT Images for Biomarker Discovery in Age-Related Macular Degeneration (PINNACLE Study Report 4).** *Ophthalmology science*
  Holland, R., Kaye, R., Hagag, A. M., Leingang, O., Taylor, T. R., Bogunović, H., Schmidt-Erfurth, U., Scholl, H. P., Rueckert, D., Lotery, A. J., Sivaprasad, S., Menten, M. J.
  2024; 4 (6): 100543

- **Exploring Healthy Retinal Aging with Deep Learning.** *Ophthalmology science*
  Menten, M. J., Holland, R., Leingang, O., Bogunović, H., Hagag, A. M., Kaye, R., Riedl, S., Traber, G. L., Hassan, O. N., Pawlowski, N., Glocker, B., Fritsche, L. G., Scholl, et al
  2023; 3 (3): 100294

- **A skeletonization algorithm for gradient-based optimization**
  Menten, M. J., Paetzold, J. C., Zimmer, V. A., Shit, S., Ezhov, I., Holland, R., Probst, M., Schnabel, J. A., Rueckert, D., IEEE
  IEEE COMPUTER SOC.2023: 21337-21346

- **Clustering Disease Trajectories in Contrastive Feature Space for Biomarker Proposal in Age-Related Macular Degeneration**
  Holland, R., Leingang, O., Holmes, C., Anders, P., Kaye, R., Riedl, S., Paetzold, J. C., Ezhov, I., Bogunovic, H., Schmidt-Erfurth, U., Scholl, H. P. N., Sivaprasad, S., Lotery, et al
  edited by Greenspan, H., Madabhushi, A., Mousavi, P., Salcudean, S., Duncan, J., Syeda-Mahmood, T., Taylor, R.
  SPRINGER INTERNATIONAL PUBLISHING AG.2023: 724-734

- **Self-supervised pretraining enables deep learning-based classification of AMD with fewer annotations**
  Holland, R., Menten, M., Leingang, O., Bogunovic, H., Hagag, A. M., Kaye, R., Riedl, S., Traber, G., Fritsche, L., Prevost, T., Scholl, H. P., Schmidt-Erfurth, U., Sivaprasad, et al
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- **Automatic Detection of Bowel Disease with Residual Networks**
  Holland, R., Patel, U., Lung, P., Chotzoglou, E., Kainz, B.
  edited by Rekik, Adeli, E., Park, S. H.
  SPRINGER INTERNATIONAL PUBLISHING AG.2019: 151-159

PRESENTATIONS

- Stanford AI in Medicine - Sparse Autoencoders - Stanford University