# AIM-AHEAD

## 2023 Health Equity Data Challenge Lightning Talks

## University of Hawai‘i Team

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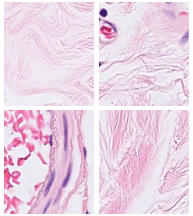
Office of Data Science Strategy

# Model Development



256* 256 Patches from Whole-Slide Biopsy Images

ResNet50 with ImageNet Weights

Demographic Balanced sampling

Pre-processing Technique for Fairness

Fine-tuned ResNet50

Stage Classification Head

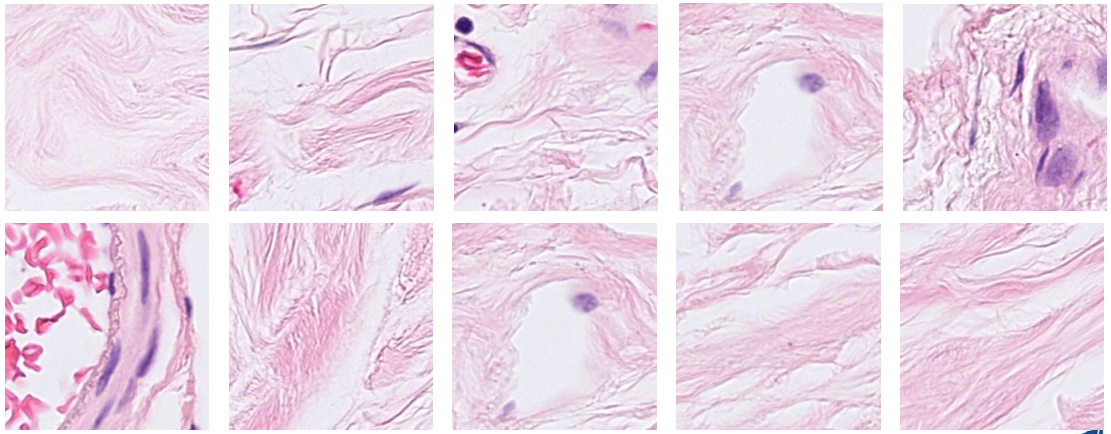
# Methodology and Model Used

- A ResNet50 was fine-tuned to take in a single (256 x 256) patch randomly selected from the whole-slide image to predict cancer stage.
- Balanced sampling was used during model training and validation to ensure every **group** in the dataset was represented equally.

White or Caucasian
Black or African American
American Indian or Alaska Native
Asian
Native Hawaiian or Pacific Islander
Other

# Model Evaluation

1. 10 probabilistic stage predictions generated per slide
2. Mean-pooling to a single slide-wide prediction
3. *n* slides mean-pooled per biopsy



# Results and Conclusions

- 0.68 Nightingale score on held-out, demographic-balanced test set

**One vs. Rest AUROC by Stage**

- Stage 0: 0.752
- Stage 1: 0.712
- Stage 2: 0.524
- Stage 3: 0.698
- Stage 4: 0.785

# Acknowledgement and References


[1] Cancer at a Glance 2014-2018, Hawai‘i Tumor Registry, 2022.

[2] Bifulco, C., Piening, B., Bower, T., Robicsek, A., Weerasinghe, R., Lee, S., Foster, N., Juergens, N., Risley, J., Nachimuthu, S., Haynes, K., & Obermeyer, Z. (2021). Identifying high-risk breast cancer using digital pathology images [Data set]. Nightingale Open Science. https://doi.org/10.48815/N5159B

[3] Mullainathan, S., & Obermeyer, Z. (2022). Solving medicine’s data bottleneck: Nightingale Open Science. Nature Medicine, 28(5), 897–899. https://doi.org/10.1038/s41591-022-01804-4



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Thank you

**Poster #90**

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