Aakash Patel

New Haven, CT aakash.patel.ap2853@yale.edu (734) 233-7721 aakashdp6548 aakashdp6548

Professional Summary

PhD student in Computer Science at Yale, specializing in biomedical AI with a focus on single-cell genomics. My research explores interpretable AI, multimodal learning, and large language models for biological data analysis, including spatial transcriptomics and fMRI-based clinical prediction.

Education

Yale University *Ph.D. in Computer Science* *Aug 2024 - Current*

- Advised by Dr. David van Dijk.

University of Michigan *M.S. in Computer Science, Mathematics* *Sep 2022 - May 2024*

- Supervised by Prof. Jeffrey Regier and Prof. Camille Avestruz.

University of Michigan *B.S. in Neuroscience, Computer Science, Data Science* *Sep 2016 - May 2020*

Experience

Graduate Research Associate *New Haven, CT*
Yale University *Aug 2024 – Current*

- Developed Cell2Sentence, a foundation model that encodes single-cell gene expression as natural language to enable few-shot reasoning and biological question-answering.
- Led model development for predicting cell-cell interactions using spatial transcriptomics, integrating gene expression, spatial proximity, and ligand-receptor priors.
- Applied Cell2Sentence to identify a novel cancer therapy drug, and validated this discovery with targeted wet-lab experiments.

Graduate Research Associate *Ann Arbor, MI*
University of Michigan *May 2023 – Sep 2023*

- Developed a statistical deep learning model to improve object detection and characterization in astronomical images.

Software Engineer *Verona, WI*
Epic *Nov 2020 – Aug 2022*

- Designed and implemented software enhancements for hospital pharmacy workflows.
- Organized monthly team meetings to analyze quality metrics and development standards.

Publications

Scaling Large Language Models for Next-Generation Single-Cell Analysis *Apr 2025*
Preprint (Under Review)

- Rizvi, S. A.*, Levine, D.*, **Patel, A.***, Zhang, S.*, Wang, E.*, ... & van Dijk, D. (2025).

Intelligence at the Edge of Chaos *Apr 2025*
International Conference on Learning Representations (ICLR)

- Zhang, S.*, **Patel, A.***, Rizvi, S. A., Liu, N., He, S., Karbasi, A., ... & van Dijk, D.

Neural Posterior Estimation for Cataloging Astronomical Images with Spatially Varying Backgrounds and Point Spread Functions. *Aug 2025*
The Astronomical Journal

- **Patel, A.***, Zhang, T., Avestruz, C., Regier, J., & LSST Dark Energy Science Collaboration.

Awards and Honors

- Degree awared with Highest Distinction (Top 3% of graduating class), May 2020
- James B. Angell Scholar, Mar 2020
- William J. Branstrom Freshman Prize, Mar 2017
- Seven-time recipient of University Honors, 2016-2020

Presentations

- Invited speaker at the Yale Data Science × Astrophysics Seminar, Sep 2025
- Presented *BrainLM: Toward a Foundational Model of Cognition Bridging Brain Imaging and Language* at the Envisioning AI at Yale Symposium, May 2025
- Presented *Intelligence at the Edge of Chaos* at ICLR, May 2025
- Presented *Neural Posterior Estimation for Cataloging Astronomical Images* to the DESC CWR, Feb 2025
- Presented *Neural Posterior Estimation for Cataloging Astronomical Images* to Machine Learning for Transient Science (MaLTS), Nov 2024

Skills

Programming Languages: Python, C++, Javascript, R

AI/ML: Deep learning in PyTorch and Huggingface, training and evaluating LLMs, multi-modal alignment, RLHF

Computational biology: Data processing for transcriptomic data in Python and R.