

Aakash Patel

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Professional Summary

PhD student in Computer Science at Yale, specializing in biomedical AI with a focus on single-cell genomics and neuroimaging. 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.
- Designed a virtual screen to identify a novel cancer therapy drug using Cell2Sentence, and coordinated validation of this discovery with targeted wet-lab experiments.
- Currently leading efforts in the lab to develop multimodal neuroscience foundation models as part of the Wu Tsai Institute's initiative for understanding cognition.

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.

Selected Publications

The AI Neuroscientist: An Interactive Agentic Interface for Neuroimaging Analysis Dec 2026

BrainBodyFM and AgenticLS Workshops at NeurIPS 2026

- Patel, A., Ketonis, P., Noah, A., Saxena, S., Krishnaswamy, S., & van Dijk, D.

Induced T1 Degradation Selectively Destabilizes Surface-Mapped fMRI Representations Dec 2026

BrainBodyFM Workshop at NeurIPS 2026

- Patel, A., Ketonis, P., Krishnaswamy, S., & van Dijk, D.

Benchmarking Foundation Models for Immunotherapy Response Prediction in Renal Cell Carcinoma

Nov 2026

Abstract accepted to SITC 2026

- Patel, A., Wahi, S., Tang, C., Braun, D. A., & van Dijk, D.

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

- Selected for the inaugural cohort of Yale's Peter Salovey and Marta Moret Data Science Fellows Program, Aug 2026
- Degree awarded 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

- Presented *Knowledge-Grounded Reinforcement Learning for High-Fidelity Single-Cell Cluster Captioning* at the AI at Yale Symposium, April 2026
- Presented *Predicting renal cell carcinoma outcomes from clinical trial data using multimodal genomic foundation models* at Yale AI in Cancer Workshop and Yale Medical AI Symposium, Mar 2026
- Organized the *Toward an AI Neuroscientist* workshop at the Wu Tsai Institute, Feb 2026
- Invited speaker at the Columbia Eating Disorder Research Seminar, Jan 2026
- 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.