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RESEARCH INTERESTS

I am a second-year PhD student specializing in Foundation Models for healthcare applications. My research focuses on developing scalable model architectures that can effectively process diverse medical data for diagnostic and prognostic tasks. I build systematic benchmarking frameworks to evaluate these models and develop techniques to identify and fix performance gaps through better training data and model alignment. Currently, I work on methods for safe and efficient model deployment in clinical settings, with an emphasis on translating research advances into practical healthcare improvements.

EDUCATION

Doctor of Philosophy, Biomedical Data Science Sep 2023 – Sep 2028
Stanford University
Co-Advisors: Dr. Nigam Shah and Dr. Sanmi Koyejo
GPA - 4.07

Bachelor of Science, Data Science Aug 2019 - May 2023
University of Texas at Dallas
GPA - 4.00
Summa Cum Laude

WORK AND TEACHING EXPERIENCE

Teaching Assistant Sep 2024 – Dec 2024
Stanford University, Palo Alto, CA

- BIOMEDIN 215: Data Science in Medicine
- Independently led an advanced technical lecture on Large Language Models, covering transformer architectures, attention mechanisms, and the complete LLM pipeline from pre-training to deployment. Deep-dived into transformer variants (GPT, BERT, T5), fine-tuning approaches, and alignment techniques like RLHF
- Mentored 70+ students in developing robust SQL queries for large-scale medical databases, focusing on data preprocessing, ETL pipelines, and implementing machine learning models

Student Researcher Jan 2022 – Aug 2023
Google, Mountain View, CA

- Developed a biomedical knowledge graph integrating (300K+ entities, 950K triples) integrating 25+ healthcare datasets; implemented custom embeddings and entity linking, boosting model performance
- Built retrieval-augmented LLM system for clinical data access, reducing clinician query time and increasing dataset utilization

Research Intern Jun 2021 – Dec 2021
Institute for Systems Biology, Seattle, WA

- Analyzed multi-omics datasets (genomics, transcriptomics, proteomics) using ML classification models to identify predictive biomarkers for pregnancy outcomes
- Implemented feature selection and correlation analysis pipelines to discover significant patterns in high-dimensional omics data

Research Assistant

Jan 2021 – Jun 2021

University of Texas at Dallas, Dallas, TX

- Benchmarked and compared normalization methods for spatial transcriptomics data; developed R package for streamlined gene expression analysis
- Applied clustering algorithms and dimensionality reduction techniques (PCA, UMAP) for automated cell-type identification in spatial data

Research Assistant

Aug 2019 – Jun 2021

Functional Genomics Lab, Dallas, TX

- Implemented ML methods in Visual Basic for phylogenetic analysis of interferons; built automated pipeline for variant and gene fusion detection across neurological databases
- Developed integrated analysis workflow combining RNA-seq and ChIP-seq data to identify key genomic signatures

PUBLICATIONS

⁺**First/Co-first author**

1. Rethinking Evaluation of Large Language Models in Healthcare

Suhana Bedi⁺, Nigam Shah, Sanmi Koyejo

CPI Tech Chronicles

Proposed a consequential validity-driven evaluation framework for LLMs in healthcare, addressing gaps in conventional NLP benchmarks by integrating real-world clinical impact, workflow integration, and policy implications.

2. Distilling Large Language Models for Efficient Clinical Information Extraction

Karthik S. Vedula ⁺, Annika Gupta ⁺, Akshay Swaminathan ⁺, Ivan Lopez, **Suhana Bedi**, Nigam Shah

Under Review

Demonstrated distilled BERT models achieve 101x lower costs and 12x faster inference than LLMs, with comparable clinical NER performance.

3. Context Clues: Evaluating Long Context Models for Clinical Prediction Tasks on EHR Data

Michael Wornow⁺, **Suhana Bedi**⁺, Miguel Hernandez, Ethan Steinberg, Jason Fries, Chris Ré, Sanmi Koyejo, Nigam Shah

International Conference on Learning Representations (ICLR), 2025

Conducted first systematic evaluation of long-context Foundation Models on EHR data, showing significant performance gains across clinical tasks.

4. ZIP-FIT: Embedding-Free Data Selection via Compression-Based Alignment

Elyas Obbad ⁺, Iddah Mlauzi, Brando Miranda, Rylan Schaeffer, Kamal Obbad, **Suhana Bedi**, Sanmi Koyejo

Under Review

Developed novel compression-based method for efficient training data selection without embedding computations.

5. meds_reader: A fast and efficient EHR processing library

Ethan Steinberg⁺, Michael Wornow⁺, **Suhana Bedi**⁺, Jason Fries, Matthew McDermott, Nigam Shah
Machine Learning for Health Symposium (ML4H), 2024

Built optimized Python package achieving 10-100x efficiency improvements in EHR data processing.

6. [Oral Presentation] **QUEST-AI: A System for Question Generation, Verification, and Refinement using AI for USMLE-Style Exams**
Suhana Bedi⁺, Scott Fleming⁺, Chia-Chun Chiang, Keith Morse, Aswathi Kumar, Birju Patel, Jenelle Jindal, Conor Davenport, Craig Yamaguchi, Nigam Shah
Pacific Symposium on Biocomputing (PSB), 2025
 Developed system for automated generation and validation of high-quality USMLE-style medical exam questions.
7. [Editor's Choice] **Testing and Evaluation of Health Care Applications of Large Language Models**
Suhana Bedi⁺, Yutong Liu⁺, Lucy Orr Ewing⁺, Dev Dash, Sanmi Koyejo, Alison Callahan, Jason Fries, Michael Wornow, Akshay Swaminathan, Lisa Lehmann, Hyo Jung Hong, Mehr Kashyap, Akash Chaurasia, Nirav Shah, Karandeep Singh, Troy Tazbaz, Arnold Milstein, Michael Pfeffer, Nigam Shah
Journal of the American Medical Association (JAMA), 2024
 Led largest systematic review of 519 healthcare LLM studies, identifying critical gaps in real-world evaluation and deployment.
8. **Feasibility of Automatically Detecting Practice of Race-Based Medicine by Large Language Models**
 Akshay Swaminathan⁺, Sid Salvi, Philip Chung, Alison Callahan, **Suhana Bedi**, Alyssa Unell, Mehr Kashyap, Roxana Daneshjou, Nigam Shah, Dev Dash
AAAI 2024 Spring Symposium on Clinical Foundation Models
 Created automated methods to detect and analyze race-based medicine in clinical AI systems.
9. **Spatial Transcriptomics Arena (STAr): an Integrated Platform for Spatial Transcriptomics Methodology Research**
 Xi Jiang⁺, Danni Luo, Esteban Fernández, Jie Yang, Huimin Li, Kevin W Jin, Yuanchun Zhan, Bo Yao, **Suhana Bedi**, Guanghua Xiao, Xiaowei Zhan, Qiwei Li, Yang Xie
bioRxiv, 2023
 Built computational platform for efficient spatial transcriptomics data analysis and visualization.
10. **Similarities between bacterial GAD and human GAD65: Implications in gut mediated autoimmune type 1 diabetes**
Suhana Bedi⁺, Tiffany M Richardson⁺, Baofeng Jia⁺, Hadeel Saab, Fiona SL Brinkman, Monica Westley
PLoS One, 2022
 Investigated molecular similarities between bacterial and human proteins to understand autoimmune diabetes mechanisms.

AWARDS AND HONORS

1. William R. Hewlett Fellowship, Stanford University 2023 - 2026
 - Highly selective fellowship awarded to outstanding PhD students in Computer Science
2. Academic Excellence Scholarship, University of Texas at Dallas 2019 - 2023
 - Full-tuition merit scholarship awarded to top 1% of incoming undergraduates

GRANTS

- 2024-2027 Rare Disease Detection
 Source: Chan Zuckerberg Initiative DAF
 Title: Identifying Patients With Undiagnosed Rare Diseases Using Foundation Models
 Role: Graduate Researcher

TALKS

1. “Testing and Evaluation of Health Care Applications of Large Language Models (**Healthy ML Group**), *Massachusetts Institute of Technology, 2024*
2. “LLMs for Operational Efficiency and Enhancing Clinical Support Systems (**AI + Health Conference**), *Stanford University, 2024*
3. “Large Language Models in Healthcare: A Technical Deep Dive” (**Guest Lecture: Data driven medicine**), *Stanford University, 2024*
4. “Evaluating Large Language Models with frameworks and tools for healthcare” *BrainX, 2025*

SERVICE (Journal Reviewer)

- New England Journal of Medicine AI 2024
- Nature Medicine 2024
- Journal of the American Medical Informatics Association Open 2025