SOHAM GADGIL

sgadgil@cs.washington.edu | https://www.sohamgadgil.com | https://github.com/sgadgil6

RESEARCH INTERESTS

Explainable AI, Generative Modeling, AI for Healthcare, Multi-modal foundation models

EDUCATION

UNIVERSITY OF WASHINGTON **Seattle, WA**
- Ph.D. in Computer Science and Engineering Sept. 2022 - Present

STANFORD **Stanford, CA**
- M.S. in Computer Science GPA: **4.056** *Graduated: June 2021*
- Coursework: Deep Learning, Natural Language Processing, Computer Vision

GEORGIA INSTITUTE OF TECHNOLOGY **Atlanta, GA**
- B.S. in Computer Engineering, Minor in CS GPA: **4.0 (Faculty Honors)** *Graduated: May 2019*
- Selected in the China Summer Program (CSP) for study abroad in Summer 2016

PUBLICATIONS

[P] Explainable AI for computational pathology identifies model limitations and tissue biomarkers
*Jakub R. Kaczmarzyk, **Soham Gadgil**, Chanwoo Kim, Joel H. Saltz, Su-In Lee, Peter K. Koo*
Under Review at Nature Biomedical Engineering

[P] Ensembling Sparse Autoencoders [Paper]
***Soham Gadgil*,** *Chris Lin*, Su-In Lee*
Under Review

[P] DREAM: A framework for discovering mechanisms underlying AI prediction of protected attributes [Paper]
***Soham Gadgil**, J. DeGrave, D. Janizek, Sonnet Xu, Lotanna Nwandu, Fonette Fonjungo, Su-In Lee, Roxana Daneshjou*
Under Review at Nature Communications
Earlier version presented at CVPR 2024 DCAMI Workshop (Oral, Best Paper Runner-Up)

[J] Transparency of medical artificial intelligence systems [Paper] [News]
Chanwoo Kim, **Soham Gadgil***, Su-In Lee*
Nature Reviews Bioengineering 2025

[C] Transformer-based Time-Series Biomarker Discovery for COPD Diagnosis [Paper]
***Soham Gadgil,** Joshua Galanter, Mohammadreza Negahdar*
NeurIPS 2024 Workshop on Time Series in the Age of Large Models

[C] Data Alignment for Zero-Shot Concept Generation in Dermatology AI [Paper]
***Soham Gadgil**, Mahtab Bigverdi**
ICLR 2024 Workshop on Navigating and Addressing Data Problems for Foundation Model

[C] Estimating Conditional Mutual Information for Dynamic Feature Selection [Paper] [Code]
***Soham Gadgil**, Ian Covert*, Su-In Lee*
ICLR 2024

[J] Transparent medical image AI via an image-text foundation model grounded in medical literature [Paper] [Code]
*Chanwoo Kim, **Soham Gadgil**, Alex J. DeGrave, Zhou Ran Cai, Roxana Daneshjou, Su-In Lee*
Nature Medicine 2024

[C] Combining Expert Annotations with DNN-generated Saliency Maps for X-ray Segmentation [Paper] [Code]
***Soham Gadgil*,** *Mark Endo*, Emily Wen*, Andrew Y. Ng, Pranav Rajpurkar*
MIDL 2021

[C] Spatio-Temporal Graph Convolution for Functional MRI Analysis [Paper] [Code]
***Soham Gadgil,** Qingyu Zhao, Adolf Pfefferbaum, Edith V. Sullivan, Ehsan Adeli, Kilina M. Pohl*
MICCAI 2020

[C] Solving The Lunar Lander Problem under Uncertainty using Reinforcement Learning [Paper] [Code]
***Soham Gadgil**, Yunfeng Xin, Chengzhe Xu*
IEEE SoutheastCon 2020

*: equal contribution [J]: journal, [C]: conference, [P]: preprint

RESEARCH EXPERIENCE

Lee Lab of AI for bioMedical Sciences (AIMS) at UW – *Research Assistant* **Sept 2022 - Present**
Advised by Dr. Su-In Lee
- Explainable AI
  - Developing efficient representation learning methods to interpret the complex behavior of LLMs by extracting monosemantic features from dense embeddings

- Formulated DIME, a novel information-theoretic approach for dynamic feature selection to make accurate and interpretable predictions from a subset of features *(ICLR 2024)*
- AI in Dermatology (In collaboration with Dr. Roxana Daneshjou from Stanford)
  - Developing unsupervised concept discovery methods for medical AI systems using sparse-autoencoders and LLMs tuned with post-training techniques
  - Steering concept presence in images by fine-tuning conditional diffusion models in a low-data regime
  - Developed an image-text foundation model (MONET) to enhance the transparency of AI systems in medical imaging *(Nature Medicine 2024)*
  - Used counterfactual generative models to analyse AI-specific signals enabling classifiers to detect protected attributes with high performance (*CVPR 2024 DCAMI Workshop)*

Stanford Computational Neuroscience Lab (CNS^{LAB}) – *Research Assistant* **Sept 2019 – March 2020**
Advised by Dr. Kilian Pohl

- Used deep learning techniques to perform sex classification from functional-MRI scans
- Formulated the non-stationary nature of functional connectivity within the context of spatio-temporal graphs
- The model beat previous approaches with an accuracy of **83.7%** (*MICCAI 2020*)

Stanford Machine Learning Group (AI for Healthcare) – *Research Assistant* **Sep 2020 – June 2021**
Advised by Dr. Andrew Ng and Dr. Pranav Rajpurkar

- Developed CheXseg, a semi-supervised method for multi-pathology segmentation
- CheXseg leverages expert annotations and saliency maps generated by image classification models
- Compared to weak supervision, CheXseg reduces the mIoU gap with radiologists by **71.6%** (*MIDL 2021*)

WORK EXPERIENCE

Genentech – *Research Intern* **June 2024 – Sep 2024**

- Designed efficient transformer-based models for raw spirogram time-series data, enabling accurate prognosis of COPD exacerbations under clinical compute constraints
- Applied patch-based BERT-style architectures with attention to model compactness and scalability, achieving SoTA across three endpoints (NeurIPS 2024 TSALM workshop)

Microsoft – *Data Engineer* **Jul 2021 – August 2022**

- Worked on a small, fast-paced team to provide automation tooling for Windows experience
- Served **~1500** customers with a RESTful smart service to spin up secure cloud VMs for OS development
- Saved over **300** hours of developer time spent on setting up machines, access policies, and repo cloning

Microsoft – *Software Engineering Intern* **June 2020 – Sep 2020**

- Worked in the Windows Toolkits team on an Azure hosted web portal to automate backporting bug fixes
- Developed a RESTful web API using .NET Core 3.1 with a Model-View-Controller (MVC) design pattern
- Automated web-app deployments using custom CI/CD pipelines and improved team productivity by **15%**

Goldman Sachs – *Technology Analyst Intern* **June 2018 – Aug 2018**

- Developed a backend application in Java to merge legal entities with metadata in over **100** tables
- Established a stream to collect, validate, and process data events by making REST compliant API calls

TEACHING

School of Computer Science and Engineering at University of Washington **Jan 2021 – June 2021**

- Introduction to AI (CSE 473): TA for undergraduate course with ~150 students

School of Computer Science at Stanford **Jan 2021 – June 2021**

- Trustworthy ML (CS 329T): TA for a new course being offered for the first time with ~50 students

School of Mathematics and ECE at Georgia Tech **Aug 2017 – May 2019**

- Math 1554 - Linear Algebra: Taught two 50-minute recitations each week (Aug 2017 – Dec 2017)
- ECE 3056 - Computer Architecture, Concurrency, and Energy in Computation (Jan 2018 – Dec 2018)
- ECE 2035 - Programming for hardware and software systems (Jan 2017 – May 2017)

HONORS & AWARDS

- Best paper runner-up award at CVPR 2024 DCAMI Workshop
- Accepted into the ORS (Opportunity Research Scholars) program for undergraduate research at Georgia Tech
- Recipient of the Electrical and Computer Engineering (ECE) Senior award for highest academic average
- Part of the team that developed and first offered the Trustworthy Machine Learning (CS 329T) course at Stanford

SKILLS

- **Languages:** Python, Java**,** C++, C#, MATLAB, T-SQL, PL/SQL, HTML, CSS, JavaScript
- **Frameworks:** PyTorch, NumPy, Pandas, Scikit-Learn, Hugging Face, Tensorflow, Slurm