SOHAM GADGIL

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EDUCATION

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

STANFORD UNIVERSITY — **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

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

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

Discovering mechanisms underlying medical AI prediction of protected attributes [Paper]
Soham Gadgil, Alex J. DeGrave*, Roxana Daneshjou, Su-In Lee*
CVPR 2024 Workshop on Data Curation and Augmentation in Medical Imaging (Best Paper Runner-Up Award)

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

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

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

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

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

RESEARCH INTERESTS

Clinical and Explainable AI, Computer Vision, Generative Modeling, Interpretability, Foundation Models

RESEARCH EXPERIENCE

Lee Lab of AI for bioMedical Sciences (AIMS) at UW – *Research Assistant* — **Sept 2022 - Present**
Advised by Dr. Su-In Lee
- AI in Dermatology (In collaboration with Dr. Roxana Daneshjou from Stanford)
  - Developing diffusion-model based XAI methods to manipulate specific attributes in dermatology images
  - Analysing AI-specific signals enabling classifiers to detect protected attributes with high performance
  - Developed an image-text foundation model to automatically annotate concepts in dermatology images
- Dynamic Feature Selection for Emergency Medicine (In collaboration with Dr. Nathan White from UW Medicine)
  - Formulated DIME, a novel information-theoretic approach to estimate conditional mutual information
  - Network learns which features to collect for each patient for efficient and cost-effective diagnosis
  - DIME allows per-sample budgets, enables non-uniform costs, and can be extended to any architecture
  - Our method consistently performed better than recent dynamic and static feature selection methods

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%**, accepted into MICCAI 2020

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

Mixed Signal Design Group at Georgia Tech – *Research Assistant* **Aug 2016 - May 2017**
Advised by Dr. Madhvan Swaminathan, sponsored by Intel and Semiconductor Research Corporation

- Used machine learning to create behavioural circuit models by macro-modelling of transistor models
- Designed and trained a feed forward neural network using Python to reduce complexity up to 14x

Georgia Tech Bionics Lab – *Research Assistant* **Aug 2017 – May 2018**
Led by Dr. Ghovanloo, sponsored by NSF and the National Institutes of Health

- Worked on developing an assistive technology for speech impaired people
- Developed an algorithm to track lips in real time using the picamera
- Optimized video frame transfer from the camera to the system by 5 fps using the Micro-USB OTG port

W O R K E X P E R I E N C E

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

- Utilized raw spirogram data to assess prognostic value for predicting exacerbations in COPD patients
- Developed deep learning techniques using spatio-temporal attention to extract features from volumetric blows
- Gaussian smoothening with patch-based BERT-style transformer achieved SoTA across three clinical endpoints

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%**

Microsoft – *Program Manager Intern* **May 2019 – Aug 2019**

- Worked on the Windows Updates team to analyse telemetry data in the order of petabytes
- Designed and implemented quantifiable metrics to optimize release decisions for newer Windows builds
- New system reduced token utilization in compute resources by **10%**

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

Bank of America – *Software Development Intern* **June 2017 – Aug 2017**

- Worked on full stack development for the migration of an internal application
- Established necessary DDL, DML trigger scripts using T-SQL and developed requisite data models
- Developed SSIS packages to transfer over 1,000,000 records from Oracle to SQL server

T E A C H I N G

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
- Explainable AI (CSE 574): TA for a new graduate course on transparency in ML
- Created new homework assignments and held office hours every week

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
- Created and graded homework, developed materials for the lab sections, and managed course logistics

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)
- Collaborated with the lead instructor for grading and held weekly office hours

S K I L L S

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