Shouvik Mani

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Education

Stanford University, Stanford, CA   September 2023 – Present
PhD in Computer Science

Columbia University, New York, NY   September 2021 – May 2023
MS in Computer Science
Advisor: Dr. Elham Azizi
Master's Thesis: Biologically-informed Machine Learning for Modeling Spatiotemporal Dynamics of Cell States and Interactions in Acute Myeloid Leukemia [abstract] [slides]

Carnegie Mellon University, Pittsburgh, PA   August 2014 – May 2018
BS in Statistics and Machine Learning

Publications

Coordinated Immune Cell Networks in the Bone Marrow Microenvironment Define the Graft versus Leukemia Response with Adoptive Cellular Therapy
Katie Maurer, Cameron Park, **Shouvik Mani**, Mehdi Borji, Livius Penter, Yinuo Jin, Jia Yi Zhang, Crystal Shin, James R Brenner, Jackson Southard, Sachi Krishna, Wesley Lu, Haoxiang Lyu, Domenic Abbondanza, Chanell Mangum, Lars Ronn Olsen, Donna S Neuberg, Pavan Bachireddy, Samouil L Farhi, Shuqiang Li, Kenneth J Livak, Jerome Ritz, Robert J Soiffer, Catherine J Wu, Elham Azizi
Under review at Cell

DIISCO: A Bayesian framework for inferring dynamic intercellular interactions from time-series single-cell data
Cameron Park*, **Shouvik Mani***, Nicolas Beltran-Velez, Katie Maurer, Satyen Gohil, Shuqiang Li, Teddy Huang, David A. Knowles, Catherine J. Wu, Elham Azizi
Research in Computational Molecular Biology (RECOMB) 2024

SPOT: Spatial Optimal Transport for Analyzing Cellular Microenvironments
Shouvik Mani*, Doron Haviv*, Russell Z. Kunes, Dana Pe'er
Neural Information Processing Systems (NeurIPS) 2022, Learning Meaningful Representations of Life (LMRL) Workshop [talk]

Variational Autoencoders for Biologically-informed Cell Type Assignment
Nicholas Hou, **Shouvik Mani**, Guntaash Sahani, David A. Knowles
Machine Learning in Computational Biology (MLCB) 2022

Automatic Digitization of Engineering Diagrams using Deep Learning and Graph Search
Shouvik Mani*, Michael A. Haddad*, Dan Constantini, Willy Douhard, Qiwei Li, Louis Poirier
Computer Vision and Pattern Recognition (CVPR) 2020, Diagram Image Retrieval and Analysis Workshop
[supplemental] [talk] [blog post]

Expert-guided Regularization via Distance Metric Learning
Shouvik Mani, Mehdi Maasoumy, Sina Pakazad, Henrik Ohlsson
Neural Information Processing Systems (NeurIPS) 2019, Learning with Rich Experience Workshop

Intelligent Pothole Detection and Road Condition Assessment
Umang Bhatt*, **Shouvik Mani***, Edgar Xi*, J. Zico Kolter
Bloomberg Data for Good Exchange 2017 [video] [blog post]

* indicates equal contribution

Research Experience

Kundaje and Kasowski Labs, Stanford University   Stanford, CA
Research Assistant   September 2023 – Present
- Investigating gene regulatory mechanisms in pediatric leukemia by developing new computational methods to process and analyze single-cell multi-omic datasets.

Azizi Lab, Columbia University   New York, NY
Research Assistant   September 2021 – August 2023
- Developed DIISCO, a Bayesian machine learning framework to infer dynamic intercellular interactions from longitudinal single-cell RNA-sequencing data.
- Applied DIISCO to investigate the mechanisms of response and resistance in relapsed leukemia patients treated with DLI immunotherapy, and interaction dynamics between CAR-T cells and leukemia cells in a co-culture experiment.
- Collaborated with researchers in Dr. Catherine Wu's lab at Dana-Farber Cancer Institute to integrate biological prior knowledge on receptor-ligand complexes into model.

Pe'er Lab, Memorial Sloan Kettering Cancer Center   New York, NY
Research Intern   May 2022 – February 2023
- Created SPOT, a framework to analyze cellular microenvironments in spatial transcriptomic data, featuring methods to represent environments, measure their similarities, and perform clustering.
- Applied SPOT to find canonical microenvironments in mouse primary motor cortex and embryo with distinct cell type compositions and gene expression profiles.

Teaching

Columbia University
Teacher for Columbia AI4ALL high school summer program   Summer 2022
Teacher and Curriculum Developer for Girls Who Code at Columbia   Spring 2022
Teaching Assistant for COMS 4995: Applied Machine Learning   Fall 2021

Woodside High School (Woodside, CA)   August 2019 – June 2021
TEALS Volunteer Teacher for Introduction to Computer Science (Snap, Python)

Hillsdale High School (San Mateo, CA)   August 2018 – June 2019
TEALS Volunteer Teaching Assistant for AP Computer Science (Java)

Carnegie Mellon University   Spring 2018
Teaching Assistant for 15-388/688: Practical Data Science
Instructor: Dr. Zico Kolter

Industry Experience

C3 AI   Redwood City, CA
Senior Data Scientist   January 2021 – August 2021
Data Scientist   May 2018 – December 2020
Developed mission-critical software applications with machine learning capabilities for various organizations including the U.S. Air Force, U.S. Army, and Shell.

Salesforce   San Francisco, CA
Data Science Intern   Summer 2017
Created time series models for daily forecasting of customer support case volume to assist with the planning of short-term staffing for Salesforce support centers.

Software Engineering Intern   Summer 2016
Built a time series anomaly detection feature in Java for an infrastructure data monitoring system.

Palo Alto Networks   Santa Clara, CA
Software Engineering Intern   Summer 2015
Developed a bug tracking and analytics web application to support engineers.

Service and Leadership

Teacher, Stanford Splash Computational Biology course for high school students. Dec 2023.

Volunteer, Student-Applicant Support Program to advise Stanford CS PhD applicants. Nov 2023.

Experiment Leader, Girls' Science Day at Columbia University for middle school students. Nov 2022, April 2023.

Fundraiser, Velocity Bike Ride for Herbert Irving Comprehensive Cancer Center at Columbia University. Oct 2022.