

# Shouvik Mani

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## Education

**Stanford University**, Stanford, CA  
*PhD in Computer Science*

September 2023 – Present

**Columbia University**, New York, NY  
*MS in Computer Science*, GPA: 3.57/4.33  
Advisor: Dr. Elham Azizi

September 2021 – May 2023

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  
*BS in Statistics and Machine Learning*, GPA: 3.43/4.0

August 2014 – May 2018

## Publications

### **DIISCO: Dynamic Intercellular Interactions in Single Cell Transcriptomics**

Cameron Park\*, **Shouvik Mani\***, Satyen Gohil, Katie Maurer, Catherine J. Wu, Elham Azizi  
*International Conference on Machine Learning (ICML) 2022, Workshop on Computational Biology*  
[journal submission under preparation] [[talk](#)]

### **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](#)]

### **Expansion of a CD8+ NK-like TEMRA Population and Activating T-cell Interactions Characterize the Graft Versus Leukemia Response in Relapsed AML**

Katie Maurer, Cameron Park, Mehdi Borji, **Shouvik Mani**, Crystal Shin, Jackson Southard, Samouil L. Farhi, Domenic Abbondanza, Shuqiang Li, Kenneth J. Livak, Jerome Ritz, Robert J. Soiffer, Pavan Bachireddy, Catherine J. Wu, Elham Azizi  
*American Society of Hematology (ASH) Annual Meeting 2022*

### **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](#)]

## Research Experience

### **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 (1) the mechanisms of response and resistance in relapsed leukemia patients treated with DLI immunotherapy, and (2) 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 and Harvard Medical School to integrate biological prior knowledge on receptor-ligand complexes into model.
- Presented results through talks at the Northeast Bioengineering Conference (NEBEC) 2022 and the International Conference on Machine Learning (ICML) 2022 Workshop on Computational Biology, and a poster at the American Society of Hematology (ASH) Annual Meeting 2022.

### **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.
- Presented results in a talk at Neural Information Processing Systems (NeurIPS) 2022, Learning Meaningful Representations of Life (LMRL) Workshop.

## 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: Prof. 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***Software Engineering Intern*

Developed a bug tracking and analytics web application to support engineers.

Santa Clara, CA

Summer 2015

**Service and Leadership**

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.