

Aarthi Venkat

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Education

Yale University

Ph.D. Computational Biology & Bioinformatics

Expected 2024

M.S. Computational Biology & Bioinformatics

December 2021

Honors & Awards — Yale Gruber Science Fellowship, Poorvu Center Public Communication Certificate, Office of Health Equity Research Award Finalist for Yale Research Excellence

Invited Reviewer — RECOMB 2024, Yale Journal of Biology and Medicine

The University of California, San Diego

B.S. Bioengineering: Bioinformatics, *magna cum laude*

June 2019

Honors & Awards — Outstanding Academic Achievement in Bioengineering, Excellence in Teaching Award, Tau Beta Pi Engineering Honors, Muir College Caledonian Honors, Provost Honors

Research Experience

Computational Biology & Bioinformatics Ph.D. Student

August 2019 - Present

Yale University, Dr. Smita Krishnaswamy

- Develop framework for learning representations leveraging geometric structure for scientific inquiry
- Elucidate cellular and molecular behavior in a variety of contexts through co-led collaboration

Research Intern

September 2021 - December 2021

Google Brain, Applied Science

- Collaborated with Google Genomics and UCSF for machine learning-guided biological sequence design
- Achieved top classification performance with model to predict CRISPR RNA guide efficacy and expression

Bioinformatics Research Assistant

October 2016 - September 2019

La Jolla Institute for Immunology, Dr. Ferhat Ay

- Characterized 3D structure and genomic features of malaria-related parasite genomes from Hi-C sequencing
- Corrected misassembly in *Toxoplasma gondii* genome with Hi-C and long-read sequencing

Computational Biology Research Assistant

September 2018 - August 2019

Institute for Genomic Medicine, Dr. Theresa Gaasterland

- Performed bioinformatic analysis of primary congenital glaucoma exomes to predict CNVs/SNP variations

Genome Informatics Intern

June 2018 - September 2018

Regeneron Pharmaceuticals, Regeneron Genetics Center

- Integrated enhanced loss-of-function variant annotation and target interpretation for over 500,000 exomes
- One of 7 presentations selected out of 250+ interns to speak at prestigious company-wide annual event

Data Analytics Intern

June 2017 - September 2017

Auris Health, Research & Development

- Built cloud-based pipeline to facilitate high-performance analysis of robot for endoscopic surgery
- Developed resources for cross-team usage of analysis pipeline and data science toolkit

Publications

*Co-first authorship

1. A Venkat*, S Youlten*, BP San Juan, M Amodio, DB Burkhardt, A Benz, C Purcell, J Holst, A Molbrink, J Lundeberg, D van Dijk, LD Goldstein, S Kummerfeld, S Krishnaswamy, CL Chaffer. AAnet deconvolutes primary and metastatic tumor heterogeneity into spatially-localized archetypes. In Preparation.
2. A Venkat, S Leone, S Youlten, E Fagerberg, J Attanasio, NS Joshi, S Krishnaswamy. Mapping the gene space at single-cell resolution with gene signal pattern analysis. In Review *Nature Computational Science*.
3. A Venkat*, J Chew*, F Cardoso Rodriguez, CJ Tape, M Perlmutter, S Krishnaswamy. Directed scattering for knowledge graph-based cellular signaling analysis. In Review ICASSP 2024.
4. D Bhaskar, S Magruder, E De Brouwer, A Venkat, F Wenkel, G Wolf, S Krishnaswamy. Inferring dynamic regulatory interaction graphs from time series data with perturbations. LoG Conference 2023.
5. S Leone, A Tong, G Huguet, A Venkat, G Wolf, S Krishnaswamy. Graph Fourier MMD for Signals on Graphs. SampTA 2023.
6. M Carlino*, B Lawton*, A Venkat* ... S Krishnaswamy, D Krause. Single-cell analysis reveals transcriptional dynamics in primary parathyroid tissue. In Review *Genome Research*.
7. A Tong*, M Kuchroo*, S Gupta, A Venkat ... CL Chaffer, S Krishnaswamy. Revealing dynamic temporal regulatory networks driving cancer cell state plasticity with neural ODE-based optimal transport. In Review *Nature*.
8. A Venkat, D Bhaskar, S Krishnaswamy. Multiscale geometric and topological analyses for characterizing and predicting immune responses from single-cell data. *Cell Trends in Immunology* 2023.
9. M Damo, N Hornick, A Venkat ... S Krishnaswamy, N Joshi. PD-1 prevents pathogenicity of effector CD8 T cells that infiltrate skin under homeostatic conditions. *Nature* 2023.
10. M Amodio, SE Youlten, A Venkat ... CL Chaffer, S Krishnaswamy. Single-cell multi-modal GAN reveals spatial patterns in single-cell data from triple-negative breast cancer. *Cell Patterns* 2022.
11. KA Connolly, M Kuchroo, A Venkat ... NS Joshi. A reservoir of stem-like CD8+ T cells in the tumor draining lymph node preserves the ongoing antitumor immune response. *Science Immunology* 2021.
12. Y Su*, A Venkat*, Y Yadav, L Puglisi, S Fodeh. Twitter-based analysis reveals differential COVID-19 concerns across areas with socioeconomic disparities. *CBM* 2021.
13. J Xia, A Venkat, ML Reese, KG Le Roch, F Ay, JP Boyle. Third generation sequencing revises the molecular karyotype for *Toxoplasma gondii* and identifies emerging copy number variants in sexual recombinants. *Genome Research* 2021.
14. EM Bunnik, A Venkat, J Shao, KE McGovern ... F Ay, KG Le Roch. Comparative 3D Organization in Apicomplexan Parasites. *PNAS* 2019.

Presentations

1. A Venkat, M Damo, NS Joshi, S Krishnaswamy. Mapping the gene space at single-cell resolution with gene signal pattern analysis. Yale Department of Genetics Symposium Poster Presentation 2023.
2. A Venkat, M Damo, NS Joshi, S Krishnaswamy. Mapping the gene space at single-cell resolution with gene signal pattern analysis. Gruber Science Fellowship Symposium Poster Presentation 2023.
3. A Venkat, F Cardoso, J Chew, M Perlmutter, C Tape, S Krishnaswamy. Learning directed and hyperbolic embeddings. Graph Signal Processing Workshop Oral Presentation 2023.
4. A Venkat, S Magruder, A Gouy, M Kostadima, H Ghosh, F Naji, S Krishnaswamy. PHATE reveals cell state transformation in Tercen biomedical data analysis platform. CYTO Oral Presentation 2023.

5. [A Venkat](#), M Damo, NS Joshi, S Krishnaswamy. Mapping the gene space at single-cell resolution with gene signal pattern analysis. AAI Immunology Poster Presentation 2023.
6. [A Venkat](#), C Garcia. Elucidating mechanisms of endocrine-exocrine signaling in obesity-driven pancreatic cancer. Yale Single Cell Symposium 2022.
7. M Carlino*, B Lawton*, [A Venkat](#)* ..., S Krishnaswamy, D Krause. Single-cell analysis reveals transcriptional dynamics in primary parathyroid tissue. Hypopara Think Tank 2022.
8. [A Venkat](#), D Miyagishima, A Tong, M Günel, S Krishnaswamy. Manifold-based gene density estimates reveal immune signaling in meningioma. ISMB Conference Poster Presentation 2021.
9. [A Venkat](#), M Damo, NS Joshi, S Krishnaswamy. Archetypal analysis of antigen-specific T cell responses across conditions. CSHL Systems Immunology Conference Poster Presentation 2021.
10. [A Venkat](#), T Gaasterland. Bioinformatics Analysis of Primary Congenital Glaucoma Exomes. UCSD Bioengineering Day Poster Presentation 2019.
11. [A Venkat](#), S Balasubramanian. Leveraging the Power of Human Genetics through Knockout Discovery. Regeneron Speaker Presentation & Poster 2018.

Teaching Experience

Teaching Assistant, Computational Genomics Workshop	November 2022 - December 2022
Cold Springs Harbor Laboratory, David Hawkins, Danny Miller, Lauren Mills	
Teaching Fellow, Deep Learning Theory and Applications	February 2021 - May 2021
Yale Computer Science, Dr. Smita Krishnaswamy	
Teaching Assistant, Machine Learning for Single-cell Analysis	May 2020, January 2021
Yale Genetics, Yale SEAS, Dr. Smita Krishnaswamy	
Teaching Assistant, Introduction to Biomedical Data Science and Health Informatics	June 2020
Yale Center for Medical Informatics	
Undergraduate Tutor / Instructional Assistant, Genetics	September 2017 - June 2019
UC San Diego Biological Sciences, Dr. Keefe Reuther, Dr. Lisa McDonnell	

Other Professional Activities

Student Advisory Board, Poorvu Center for Teaching & Learning	October 2023 - Present
<ul style="list-style-type: none"> Develop curriculum and policy incorporating AI literacy and DEI principles 	
Networking Chair, Yale Gruber Science Fellowship	August 2022 - Present
<ul style="list-style-type: none"> Host networking talks, panels, and discussion to foster Gruber scientific community 	
Representative, Graduate Student Assembly	August 2023 - Present
<ul style="list-style-type: none"> Advocate for CB&B graduate students and improve healthcare literacy and policy at Yale Health 	
Reviewing Editor, Yale Journal of Biology & Medicine	July 2023 - Present
<ul style="list-style-type: none"> Manage manuscripts for quarterly publication, including inviting reviewers and making editorial decisions 	
Social Services and Insurance Counseling, HAVEN Free Clinic	August 2022 - August 2023
<ul style="list-style-type: none"> Provided high-quality healthcare guidance and resources to uninsured New Haven residents 	
Cancer Biology Training Program Trainee & Shadowee	August 2021 - August 2023
<ul style="list-style-type: none"> Completed certificate in cancer biology through additional translational coursework Shadowed GI oncologist Dr. Pamela Kunz and regularly discussed translational relevance of my research 	