Aarthi Venkat

linkedin.com/in/aarthi-venkat/ • aarthi.venkat@yale.edu • (408) 799-9189

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
- Develop curriculum and policy incorporating AI literacy and DEI principles

Networking Chair, Yale Gruber Science Fellowship — August 2022 - Present
- Host networking talks, panels, and discussion to foster Gruber scientific community

Representative, Graduate Student Assembly — August 2023 - Present
- 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
- Manage manuscripts for quarterly publication, including inviting reviewers and making editorial decisions

Social Services and Insurance Counseling, HAVEN Free Clinic — August 2022 - August 2023
- Provided high-quality healthcare guidance and resources to uninsured New Haven residents

Cancer Biology Training Program Trainee & Shadowee — August 2021 - August 2023
- Completed certificate in cancer biology through additional translational coursework
- Shadowed GI oncologist Dr. Pamela Kunz and regularly discussed translational relevance of my research