Vinay Swamy

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EDUCATION

University of California, Los Angeles: Biochemistry, BS; GPA: 3.36 June 2018

RESEARCH EXPERIENCE

Bioinformatics Group, Ophthalmic Genetics and Visual Function branch, National Eye Institute
Intramural Research Training Fellow July 2018—Present

- Designed parallel, containerized pipeline for automated download, quality control, and analysis of >20TB of publicly available bulk RNA-seq data from the Sequence Read Archive, routinely run to build EyeIntegration, a webapp for visualizing gene expression in 10 ocular and 42 other human sub-tissues
- Constructed *de novo* transcriptomes using this data set to identify novel gene isoforms expressed in 6 ocular sub-tissues. Validated short read transcriptome of one subtissue using PacBio long read RNA-seq to construct a ground truth long read transcriptome
- Extended accuracy of long read transcriptomes to remaining short read ocular transcriptomes by designing a method for classifying RNA sequences using NLP embedding techniques and deep learning algorithms and removing false positive transcripts from transcriptomes
- Designed Shiny web app for visualizing transcriptomes, displaying transcript models, gene and transcript expression, evolutionary conservation and associated SNPS.

Coller Lab, Department of Molecular, Cellular, and Developmental Biology, UCLA
Student Lab Assistant August 2017—June 2018

- Analyzed 3' sequencing data and bulk RNA-seq to quantify usage of different alternative polyadenylation sites and analyzed polyadenylation factor binding motifs in RNA transcripts to study the role of polyadenylation in in regulating cellular quiescence

Cornea Genetics Lab, Stein Eye Institute, UCLA
Student Lab Assistant March 2017—June 2018

- Designed pipelines for analyzing and visualizing bulk RNA-seq data from corneal or corneal-like cells across multiple projects (see publications)

TEACHING

Software Carpentry Workshop, National Eye Institute June 2019
Assistant

- Assisted in teaching a 2 day course on the basics of git, the bash command line, and programming and data visualization using R to scientists at the National Eye Institute

Foundation for Advanced Education in Science, National Institutes of Health
Teaching Assistant, *Applied Machine Learning (BIOF 509)* February 2019—Present

- Helped teach introductory machine learning concepts like data wrangling, classification, regression, clustering, dimensionality reduction, and project organization, and lead lesson on methods for machine learning on imbalanced data sets and its application to biological data

First Code Academy, San Francisco, CA
Remote Instructor May 2018—October 2019

- Taught students age 9-18 programming in Python, covering topics such as introductory programming, basic data structures, and object-oriented programming via a web-based platform
- Assisted in development of programming curriculum for beginner, experienced, and advanced students

PUBLICATIONS

- Ricardo F. Frausto, **Vinay S. Swamy**, Gary S. L. Peh, Payton M. Boere, E. Maryam Hanser, Doug. D. Chung, Marco Morselli, Liyo Kao, Rustam Azimov, Matteo Pellegrini, Ira Kurtz, Jodhbir S. Mehta, Anthony J. Aldave "Phenotypic and functional characterization of corneal endothelial cells during in vitro expansion" *Scientific Reports,* February 13 2020(in press) doi: https://doi.org/10.1101/717405 (preprint)

- Jorge L. Alió del Barrio MD, PhD*, Doug D. Chung PhD*, Olena Al-Shymali MD , Alice Barrington , Kavya Jatavallabhula , **Vinay S. Swamy** , Pilar Yébana OD , Maria Angelica Henriquez-Recine MD , Ana Boto-de-los-Bueis MD, PhD , Jorge L. Alió MD, PhD , Anthony J. Aldave MD "Punctiform and Polychromatic Pre-Descemet Corneal Dystrophy: Clinical Evaluation and Identification of the Genetic Basis" *American Journal of Ophthalmology,* Nov 19 2019. doi: https://doi.org/10.1016/j.ajo.2019.11.024
- **Vinay S. Swamy**, David McGaughey "Eye in a Disk: eyeIntegration human pan-eye and body transcriptome database version 1.0" *Investigative Ophthalmology and Vision Science*, July 1 2019. doi:10.1167/iovs.19-27106 (https://www.ncbi.nlm.nih.gov/pubmed/31343654)
- Ricardo F Frausto, Doug D Chung, Payton M. Boere, **Vinay S. Swamy**, Huong N.V.Duong, Liyo Kao, Rustam Azimov, Wenlin Zhang, Liam Carrigan, Davey Wong, Marco Morselli, Marina Zakharevich, E. Maryam Hanser, Austin C. Kassels, Ira Kurtz, Matteo F Pellegrini, Anthony J. Aldave "ZEB1 insufficiency causes corneal endothelial cell state transition and altered cellular processing" *PLOS One*; June 13, 2019. doi: https://doi.org/10.1371/journal.pone.0218279
- Mithun Mitra, Elizabeth L Johnson, **Vinay S. Swamy**, Lois E Nersesian, David C Corney, David G Robinson, Daniel G Taylor, Aaron M Ambrus, David Jelinek, Wei Wang, Sandra L Batista and Hilary A Coller "Alternative polyadenylation factors link cell cycle to migration" *Genome Biology*. Oct 25, 2018 doi: https://doi.org/10.1186/s13059-018-1551-9

AWARDS

- MIT Hacking Medicine Grandhack in DC 2019, 2nd place and Veteran Affairs Innovation Award
- Knight Templar Foundation ARVO Travel Grant, 2019
- Siemens National Merit Scholarship, 2014

PRESENTATIONS AND POSTERS

- "*De novo* Transcriptomes Built From Hundreds of Ocular Tissue Samples", *Association for Research in Vision and Ophthalmology Annual Meeting, 2019* (oral presentation)
- "Transcriptomic Profiling of Slc4a11 Null Murine Corneal Endothelial Cells", *Association for Research in Vision and Ophthalmology Annual Meeting, 2018* (oral presentation)
- "Alternative Polyadenylation Links Cell Cycle to Migration", *International Conference on Systems Biology of Human Disease, 2018* (poster)