

# CARLOS AREVALO RIVAS

## Research and Infrastructure Engineer

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### PROFESSIONAL APPOINTMENTS

#### Computational Life Science Research Professional

##### Stanford University

📅 09/2023 - 11/2023 📍 Stanford, CA

#### Computational Research Specialist

##### University of California

📅 02/2023 - 06/2023 📍 Santa Cruz, CA

#### Computational Biologist

##### Dana-Farber Cancer Institute, Harvard Medical School (HMS)

📅 07/2022 - 01/2023 📍 Boston, MA

#### Visiting Computational Biologist

##### Broad Institute of MIT and Harvard

📅 06/2022 - 07/2023 📍 Cambridge, MA

#### Associate Computational Biologist

##### Broad Institute of MIT and Harvard

📅 07/2021 - 05/2022 📍 Cambridge, MA

### TEACHING EXPERIENCE

#### Undergraduate Research Mentor

##### Broad Institute of MIT and Harvard

📅 07/2021 - 05/2022

#### Journal Club Co-Presenter and Moderator

##### DNA Deviants

📅 01/2022 - 05/2022

#### Biological Sciences Tutor

##### Contra Costa College

📅 10/2018 - 05/2019

#### Middle-school Tutor and Mentor

##### Contra Costa College

📅 09/2017 - 05/2019

### COMPUTATIONAL SKILLS

#### Selected Programming Languages

Python, C++, R, Bash, Go, Rust, Julia, SQL, JavaScript, CSS, HTML,

#### Selected Frameworks

Python / C++: Numpy, SciPy, Pandas, Polars, TensorFlow, Torch, Scikit-Learn, Keras, Jax, Matplotlib, CV. R: tidyverse, tidyr, dplyr, plyr, ggplot2, ggpubr, stats, matrix.

#### Full-Stack Software Engineering & Software Development

Research pipelines, infrastructure, methods, HPC systems, software and systems design, development operations and data visualization tools, and software development across the full-stack. Continuous integration (CI) and continuous deployment (CD). Benchmarking, testing, and software containerization (i.e., Docker, Nextflow, Singularity).

### RESEARCH EXPERIENCE

#### Computational Associate

##### Broad Institute of MIT and Harvard

📅 07/2020 - 06/2021 📍 Cambridge, MA

#### BSRP Fellow

##### Broad Institute of MIT and Harvard

📅 06/2020 - 07/2020 📍 Cambridge, MA

#### Undergraduate Researcher

##### University of California, Santa Cruz

📅 09/2019 - 06/2021 📍 Santa Cruz, CA

#### Neuroscience Summer Research Assistant

##### Massachusetts General Hospital, HMS

📅 05/2019 - 08/2019 📍 Boston, MA

#### Research Assistant

##### Contra Costa College

📅 08/2018 - 05/2019 📍 San Pablo, CA

### SELECTED PUBLICATIONS

For a complete, up-to-date list of my work:

[Google Scholar](#) [PubMed](#) \* Equal contributions

Ayshwarya Subramanian, ..., Carlos Arevalo Rivas, et al. *Cell Reports*, June 2024.

🔗 [DOI](#)

Sung-Hee Yoon, Mark Meyer\*, Carlos Arevalo Rivas\*, et al. *JCI*, March 2023.

🔗 [DOI](#)

Cameron Soulette, Eva Hrabeta-Robinson, Carlos Arevalo Rivas, et al., *LSA*, July 2023.

🔗 [DOI](#)

Nicolas Wieder, Juliana Coraor, ..., Carlos Arevalo Rivas, et al. *Cell Metabolism*, February 2023.

🔗 [DOI](#)

### EDUCATION

#### Bachelor of Science in Molecular, Cellular, and Developmental Biology

##### University of California, Santa Cruz

📅 2019 - 2021 📍 Santa Cruz, CA

#### Associate of Arts in Mathematics and Science

##### Contra Costa College

📅 2016 - 2019 📍 San Pablo, CA

## COMPUTATIONAL SKILLS

### Artificial Intelligence & Machine Learning

Language models (LLMs) and transformer-based architectures for autoregressive, multi-modal and generalist, diffusion, vision, and sequence-to-sequence artificial intelligence and machine learning systems. Convolutional neural networks (CNN), Feed-forward networks (FFN), and Recurrent neural networks (RNN) models and architectures. Vision transformer (ViT), Residual neural networks (ResNet), Denoising diffusion probabilistic (DDPMs), Variational auto-encoders (VAEs), Multi-layer perceptrons (MLPs), and Diffusion transformers (DiTs) models and architectures. Data modalities: Vision-language (i.e., text, image), control environments (i.e., image, observations, actions, proprioceptions), audio and video. Data tokenization (i.e., multimodal, patching, image, and sequence), embedding, and positional encoding. Deep neural network architectures, models, and systems for regression, classification and prediction inference.

### Bioinformatics & Computational Biology

Genomics: Long-read sequencing (LRS), whole-genome sequencing (WGS), and whole-exome sequencing (WES) analysis, variant and mutation calling, cancer driver gene and mutation discovery. Genome-wide association study (GWAS), and statistical modeling and analysis. Transcriptomics: single-cell and single-nuclei RNA sequencing, and bulk-RNA sequencing analysis. Proteomics: single-cell and bulk mass-spectrometry-based proteomics and phosphoproteomics analysis. Epigenomics and metabolomics analysis.

### Data Science & Data Analytics

Data processing, analysis and visualization. Regression models (i.e., linear regression, logistic regression, regression models for survival analysis, generalized linear models). Statistical learning, modeling, and testing. Dimensionality reduction and clustering: principal component analysis (PCA), t-distributed stochastic neighbor embedding (t-SNE), uniform manifold approximation and projection (UMAP). Remote server, high-performance computing (HPC), cloud-based computational environments (i.e., Google-cloud platform (GCP), Gradient) and notebooks. Bash and Shell (Unix and Linux) scripting, virtual environments and machines, and notebooks.

## SELECTED REFERENCES

### Anna Greka, M.D. Ph.D.\*

Phone: +1 617-525-5939  
Email: agreka@broadinstitute.org

### Evan Bordt, Ph.D.\*

Phone: +1 724-816-3556  
Email: ebordt@mgh.harvard.edu

### Alexander Gusev, Ph.D.\*

Email:  
alexander\_gusev@dfci.harvard.edu

### Angela Brooks, Ph.D.\*

Phone: +1 831-502-7275  
Email: anbrooks@ucsc.edu

### Ayshwarya Subramanian, Ph.D.\*

Phone: +1 412-708-7538  
Email: as3894@cornell.edu

**\* I do not waive my right to access this report**

## EDUCATION

Certificate of Achievement in Science, Technology, Engineering, and Mathematics

### Contra Costa College

📅 2016 - 2019 📍 San Pablo, CA

## SELECTED HONORS AND AWARDS

Dean's Undergraduate Award

University of California, Santa Cruz

📅 06/2021

MSTP BOOST Fellow

Stanford University School of Medicine

📅 02/2021

NIH-NHGRI Research Institute Fellow

University of California, Santa Cruz Genomics Institute

📅 09/2019 - 2021

BSRP Fellow

Broad Institute of MIT and Harvard

📅 06/2020 - 07/2020

Summer Research Fellow

Center for Science Excellence, Contra Costa College

📅 05/2019

SHPEP'S Little Einstein Award

Wester University of Health Sciences

📅 06/2018

SHPEP Fellow

Western University of Health Sciences

📅 06/2018 - 07/2018

Academic Excellence Scholarship

Center for Science Excellence, Contra Costa College

📅 09/2017 - 05/2019

Dean's Undergraduate Honors

Contra Costa College

📅 2017 - 2019