

## Senior/Staff Bioinformatics Engineer

Architecting Pipelines & Tools | Data Analysis & Modeling | Cross-functional Collaboration | Mentorship & Technical Leadership  
Scientific Research | Product / Platform Development | NGS (short and long-read) Data Analysis | Reproducible Genomic Pipelines

Innovative and detail-oriented Computational Biologist with a PhD in Electrical and Computer Engineering and a focus on genomic data analysis, single-cell pipelines, and bioinformatics tool development. Experienced in building scalable, high-performance computational workflows, statistical models, and software solutions that support R&D and enable robust genomic research. Proven success in cross-functional biotech environments, supporting assay development and platform innovation.

### Core Competencies

- **Programming Languages:** Python, Rust, C++, C#, Bash, Martian
- **Bioinformatics Tools:** Cellranger, IGV, SAMTools, BLAST
- **Data Analysis and Visualization:** Polars, Pandas, NumPy, Seaborn, Matplotlib, Scikit-learn
- **Environments:** Linux, Git, HPC clusters, Docker
- **Concepts:** Statistical modeling, deep learning fundamentals, object-oriented design

## Career Experience

### Senior Computational Biologist/Computational Biologist II | 10X Genomics – Pleasanton, CA | Sep 2021 – May 2025

Served as a pivotal link between software engineering and experimental science, transforming complex research needs into scalable, production-grade computational solutions implemented in Cellranger, accelerating the development and commercialization of advanced single-cell assays.

#### Product & Pipeline Development

- Developed and optimized multi-stage computational pipelines in Cellranger software for antigen capture, immune profiling, and CRISPR screening assays using Rust, Python, and Martian.
- Enabled scalable and reproducible single-cell and perturbation data analysis supporting R&D assay teams.
- Designed data processing workflows that significantly improved performance and maintainability of production pipelines.

#### Cross-functional Collaboration & Support

- Acted as key computational partner to assay development scientists, translating research needs into robust software tools and analytical workflows.
- Leveraged a functional understanding of cell biology and immunology and provided ongoing computational biology support, data interpretation, and rapid iteration to experimental development teams.
- Collaborated closely with the customer support team to resolve pipeline issues reported by users.

#### Key Achievements

- Presented a poster on antigen capture assay in a regional 10X Genomics user group meeting as a representative from the R&D team.
- Delivered production-grade pipelines that accelerated time-to-market for new 10X Genomics products.
- Improved software performance and accuracy for gene expression and immune profiling applications.

### Data Science Intern | Dyno Therapeutics – Boston, MA | Mar 2021 – Jun 2021

Contributed to gene therapy R&D by engineering bioinformatics workflows that provided performance metrics and selection insights for AAV capsid variants.

#### AAV Capsid Analysis

- Designed and implemented methods for evaluating AAV capsid variants using sequencing datasets.
- Developed custom analysis workflows leveraging both short-read and long-read genomic data.
- Informed capsid engineering and selection strategies through quantitative performance metrics.

## **Computational Biology Intern | 10X Genomics – Pleasanton, CA | Jun 2020 – Sep 2020**

Built foundational components for immune profiling pipelines that enhanced modularity and scalability, enabling rapid iteration in early-stage product development.

### **Pipeline Engineering**

- Contributed core modules to the single-cell immune profiling of Cellranger pipeline in Rust and Python.
- Developed reusable and testable components to support rapid prototyping and production scaling.

## **Oncology Bioinformatics Intern | Illumina – San Diego, CA | Jun 2018 – Sep 2018**

Advanced the precision of somatic variant detection in oncology by optimizing algorithmic performance and implementing rigorous software engineering practices.

### **Variant Calling & Algorithm Optimization**

- Improved somatic variant calling algorithms to meet strict clinical and research pipeline criteria.
- Implemented test-driven C# code modules and participated in GitHub-based code review.
- Performed large-scale benchmarking in an HPC environment to validate improvements.

### **Stakeholder Engagement**

- Presented results and technical specifications to internal engineering and marketing teams, aligning product and technical goals.

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## ***Research Projects & Open-Source Contributions***

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### **PhD Research Project | GangSTR | UC San Diego | 2017 – 2021**

Pioneered a high-impact bioinformatics tool for genome-wide analysis of STR expansions.

- Developed a novel tool for genome-wide profiling and genotyping of STR expansions using short-read sequencing data.
- Engineered a maximum likelihood model in C++ after Python prototyping; validated with simulation and experimental methods.
- Presented at ASHG and ISMB; recognized in the top **10%** of ASHG 2020 abstracts (Reviewers' Choice Award).

### **Toolkit Development | TRTools | UC San Diego | 2020**

Contributed a harmonized toolkit to the genomics community for tandem repeat variation analysis.

- Created a suite of tools for harmonizing and analyzing tandem repeat genotyping datasets.
- Released as a widely used open-source Python package supporting multiple variant callers.

### **Modular IoT Middleware Project | Context Engine | UC San Diego | 2016**

Led development of an IoT middleware framework integrating local sensing, embedded systems, and cloud analytics.

- Designed and integrated a modular IoT system for local sensing, machine learning, and cloud communication.
- Led system integration and embedded interfacing, culminating in a live demo and poster session.

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## ***Academic Experience***

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### **Teaching Assistant | UC San Diego & Sharif University | 2014 – 2018**

- Designed lab materials, graded coursework, and mentored students across Digital Systems, Bioinformatics, and Electrical Engineering courses.

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## ***Education and Professional Development***

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**PhD, Electrical & Computer Engineering (Concentration: Bioinformatics & Human Genetics)** University of California, San Diego

– Advisor: Prof. Melissa Gymrek

**Master's degree, Electrical and Computer Engineering**, UC San Diego, Jacobs School of Engineering

**BSc, Electrical Engineering – Digital Systems**, Sharif University of Technology, Tehran, Iran