# Kamran Hussain

Silicon Valley, CA | (650) 272-7076 | Kamran.hssn05@gmail.com
GitHub.com/KamranHussain05

## Professional Summary

Aspiring neural engineer eager to be mentored in the areas of signal processing and bioelectrode fabrication with the goal of developing multi-modal brain-computer interfaces (BCIs) for neuroprosthetics in a collaborative team environment.

## Education

**University of California, Santa Cruz**                                    Sep 2023 - Jun 2027 (Expected)
*Bachelor of Science in Electrical Engineering and Neuroscience*
**Homestead High School**                                                            Aug 2019 - Jun 2023
*High School Diploma*

## Experience

**SURFiN Research Fellow**                                                      September 2024 - Present
*Neuroprosthetics Translational Lab, Stanford University*                              *Palo Alto, CA*
- Developing speech neuroprosthetics for humans with dysarthria caused by ALS or stroke.
- Interfacing with Utah Arrays and Blackrock Neuroports to capture and record neural signals from ventral precentral gyrus and broca's area for speech decoding.
- Analyzing the neural correlates of speech rate and using that information to improve performance of speech BCIs at faster speech rates, enabling BCI decoders to approach conversational speeds.

**Undergraduate Neural Research Engineer**                                           Oct 2023 - Present
*Braingeneers, UC Santa Cruz Genomics Institute*                                      *Santa Cruz, CA*

- Built a Retrieval Augmented Generation (RAG) pipeline for a chatbot interfacing with documentation
- Developing an LLM to control IoT wet lab equipment, run experiments, and launch analysis pipelines
- Researching electrophysiological signal processing to decode neural activity from brain organoids
- Developing a foundation model for cortical organoid electrophysiology

**Founder & CEO**                                                                    Jul 2023 - Mar 2024
*TensorLearn LLC*                                                                 *San Francisco, CA*

- Led team to build GenAI and EdTech solution, raised successful bootstrapped funding round
- Accepted into Google Cloud Startup program, innovating in LLMs and GenAI architectures
- Recruited and managed a team of 14 engineers developing generative AI systems and infrastructure

**Flight Dynamics, Trajectory, and Controls Intern**                                Jan 2022 - May 2023
*NASA Ames Research Center*                                                          *Moffett Field, CA*

- Developed Transformer-based language models for classification of services on the Data and Reasoning Fabric
- Collaborated with NASA partners to create novel machine learning datasets of aviation communication data
- Conducted a study of existing language modeling and classification algorithms

**Neural Data Science Intern**                                                       Jul 2022 - Mar 2023
*Translational Neuroengineering Lab, UC San Diego*                                    *San Diego, CA*

- Analyzed neural data recorded from Neuropixel arrays implanted in Zebra Finch songbirds.
- Contributed to establishing Zebra Finch songbirds as models for vocal neuroprosthetics
- Converted datasets to the NWB format and created associated jupyter notebooks for dataset analysis

**Organizer and Director**                                                           Apr 2020 - Nov 2020
*COVID Run Fundraiser*                                                               *Silicon Valley, CA*
- Developed a fundraiser strategy and established strategic partnerships with the community service agencies of Mountain View, Sunnyvale, and Cupertino
- Strategized and implemented a social media marketing strategy to increase donations and maximize the fundraisers impact
- Raised over $2,500 in funds for food, sanitation equipment, rent assistance, and personal protective equipment at the height of the COVID-19 pandemic

## Skills

**Languages**: Python, C/C++, JavaScript, Swift, Java, Objective-C/C#, R, Shell, RISC-V
**Frameworks**: Pytorch, TensorFlow/Keras, NumPy/SciKit, CUDA, NWB, SpikeInterface, ReactJS, NodeJS CoreNLP/Stanza/NLTK, OpenCV
**Platforms**: Kubernetes, S3, AWS, GCP, Linux, Unity, SSH, Git/GitHub, Jupyter Notebook

## Posters

**Does Speech Rate Matter for Intracortical Speech BCIs?**                                    October 2024
*K. Hussain, E. Kunz, N. Hahn, A. Singh, F. R. Willett, J. M. Henderson*
**Building a Baseline for Neural Activity Prediction and Analysis: Machine Learning on HD-MEA Data**          May 2024
*K. Hussain, A. Robbins, D.F. Parks, H. Schweiger, S. Hernandez, M. Mostajo-Radji, M. Teodorescu. D. Haussler*
**LLM Automated Control of the IoT Integrated System**                                           May 2024
*J. Liao, K. Hussain, K. Voitiuk, S. Seiler, M. Teodorescu, D. Haussler*

## Conference Presentations

**Generative Foundation Model for Cortical Organoid Electrophysiology**                  May 2024, *UCSC*
*ACM Undergraduate Research Conference*

## Selected Coursework

| | |
|---|---|
| AM 10 Linear Algebra | *UC Santa Cruz,* Summer 2024 |
| AM 20 Differential Equations | *UC Santa Cruz,* Summer 2024 |
| ECE 13 C Programming and Systems | *UC Santa Cruz,* Spring 2024 |
| CSE 12 Assembly and Computer Systems | *UC Santa Cruz,* Fall 2023 |
| MATH 23A Vector Calculus | *UC Santa Cruz,* Spring 2024 |
| Physics 5B Fluids, Optics, and Waves | *UC Santa Cruz,* Spring 2024 |
| Physics 5C Electricity and Magnetism | *UC Santa Cruz,* Spring 2024 |
| Physics 5D Thermodynamics | *UC Santa Cruz,* Spring 2024 |
| AP Computer Science A | *Homestead High School,* 2021 - 2022 |
| AP Biology | *Homestead High School,* 2021 - 2022 |
| AP Physics 1: Mechanics | *Homestead High School,* 2022 - 2023 |
| Advanced Object Oriented Programming in Python | *Foothill College,* Winter 2021 |
| Chemistry Honors | *Homestead High School,* 2020-2021 |

## Awards

| | |
|---|---|
| 2nd Place (SushiAgent by SushInnovation) | Sushi Hackathon, 2024 |
| Shenoy Undergraduate Fellowship in Neuroscience | Simons Foundation, 2024 |
| AP Scholar | College Board, 2023 |
| California Seal of Biliteracy (French) | State of California, 2023 |
| Division 1 Class A Athlete | USA Fencing, 2022 - Present |
| 1st Place (Gesture Driven Augmented Reality Navigation) | Helix Hacks II, August 2021 |
| 3rd Place (Link Saver) | BAYCO Hackathon, April 2021 |

## Projects

| | |
|---|---|
| **Sushi Agent** - *AI Agents that find Private Coupons* | 2024 |
| **TensorLearn** - *Prototype website with student study tools July* | Jul - Aug 2023 |
| **StatScanner** - *iOS Data Visualization App* | 2021 - 2023 |
| **Rubauto** - *ML diffusion model for stylistic music generation* | 2022 |
| **Gesture Driven AR Navigation** - *Computer Vision assisted tech in VR* | 2021 |
| **Project Tourist** - *Travel planner using NLP techniques* | 2021 |
| **Kam Show Podcast** - *Science and Engineering Podcast* | 2020 - 2021 |
| **Link Saver** - *Student online organizer for zoom meetings and assignments* | 2021 |