Vimal Selvarajan

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Education

University of California - Riverside **Riverside, CA**

Bachelor of Science in Computer Science with Business Applications *March 2027*

Technical Skills

Languages: C++, Embedded C/C++, Python, Assembly, Bash, React, JavaScript, HTML, CSS
Developer Tools: Git, VS Code, STM32, AWS Cloud9, Altium, SolidWorks
Technologies/Frameworks Firmware Design, Linux, Next.js
Bus/Protocols: I2C, SPI, CAN, RS232, USB, TCP/IP, GPIB
Bioinformatics: Biopython, Genomic Data Science and Clustering, Sequence Alignment, NGS Data Processing

Relevant coursework

Multivariable Calculus, Linear Algebra, Probability & Statistics for Engineering, Discrete Structures, Ordinary Differential Equations for Physical Sciences and Engineering, Logic Design, Intermediate Data Structures & Algorithms, Software Construction, Design of Operating Systems, Algorithms for Bioinformatics, Computer Architecture

Experience

Lonardi Lab, University of California, Riverside **Riverside, CA**

Undergraduate Researcher *June 2025 – present*

- Conduct research on computational genomics under the supervision of Dr. Stefano Lonardi, focusing on genome assembly optimization and k-mer–based read selection methods.
- Met project goals set by PI by optimizing AWinK into MTP Lite, decreasing genome assembly fragmentation by 91% without loss in accuracy (99.9% genome fraction; 99.9% sequence identity).
- Utilized computational genomics tools including Jellyfish, Minimap2, BWA, Samtools, Pysam, Hifiasm, and Seqkit for read analysis, alignment, and assembly evaluation.

Hastest Solutions **San Jose, CA**

Software Engineer Intern *June 2024 – August 2024*

- Designed and executed a comprehensive HTOL test for RF Amplifier Modules, collecting and analyzing performance data from 48 modules over 1000 hours.
- Collaborated with customers and hardware teams to define test requirements and develop DAC and Current Sense PCBAs, ensuring accurate bias and current measurements.
- Developed automated Python-based test systems integrating Keysight and TI hardware for DAC, DAQ, and power supply control, including bias voltage algorithms, real-time data logging, and full power sequencing.

Projects

Hastest DAC, DAQ, and Power Supply Control Suite

Python, PyFTDI, PyVISA, Virtual Environment, Git

- Designed a scalable object-oriented driver framework for instrument control and application integration.
- Developed a driver module for Texas Instruments AMC7836 DAC/ADC device using PyFtdi and SPI bus.
- Developed driver modules for Keysight power supplies (E36200, E36300, N5700 series) and data acquisition system (DAQ970A) using PyVISA.

Mini Genome Assembler

Python, BioPython, NetworkX, FASTA parsing, Graph algorithms

- Developed a Python-based genome assembler to reconstruct a synthetic genome from short, error-free reads using efficient k-mer indexing and exact suffix–prefix overlap detection.
- Constructed and analyzed a directed overlap graph to identify unitigs via mutual maximum-overlap relationships and maximal non-branching path traversal.
- Assembled and validated the final genome by merging unitigs based on overlap lengths and verifying the result against a known reference sequence.

24E Dashboard Gen one

Altium Designer, CAD, STM32 Cube IDE, Embedded C/C++, GitHub

- Engineered the driver dashboard for the '24E vehicle using Altium Designer, integrating the STM32F405 series chip.
- Included LED matrices and decoders for real-time visual displays, integrated a buck converter for efficient power management, and implemented communication transceivers for seamless data transmission.
- Enabled the dashboard to display critical fault notifications from the Battery Management System (BMS) and the Vehicle Control Unit (VCU).