

# Sergio Zavala

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## EDUCATION

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**California State University Monterey Bay | Seaside, CA**

**Expected: May 2026**

B.S. in Computer Science

**GPA: 3.78**

Data Science Concentration

- **Relevant Courses:** Data Structures and Algorithms, Computer Architecture, Database Systems, Operating Systems, Internet Programming, Intro to Data Science, Advanced Machine Learning, Software Engineering
- **Research Interests:** AI for Science, Scientific Machine Learning, Machine Learning for Security, Computer Vision, ML Systems, High-Dimensional Data Modeling

## RESEARCH

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**Capstone Undergrad Researcher** | California State University, Monterey Bay

**January 2026 - Present**

- **Advisor:** Dr. Cao Thang Bui
- **Project:** When Do Side-Channel Attacks Break? A Robustness Study of Neural Architectures for AES
- **Description:** Reproducing and extending state-of-the-art deep learning attacks for AES side-channel analysis by re-implementing CNN, ResNet, and Transformer models on the ASCAD datasets, evaluating real attack effectiveness using Key Rank-based metrics.
- **Relevant Skills:** Python, PyTorch, Matplotlib, Side-Channel Analysis, Cryptography, Machine Learning Evaluation

**NIH NHGRI GREAT Undergrad Researcher** | University of California, Santa Cruz

**June 2025 - Present**

- **Principal Investigator:** Dr. Benedict Paten
- **Project:** Pangenome Annotation Toolkit: A Solution for Mapping Gene Annotations Through a Graph
- **Description:** Engineered a prototype tool to project genomic annotations onto pangenome graphs, removing linear-reference bias across 462 human assemblies. Built a scalable Python pipeline to map millions of annotations and benchmark accuracy.
- **Relevant Skills:** Python, Bash, Algorithms, Data Analysis, Data Structures, and Pangenomics

**Course-Based Undergraduate Researcher** | California State University, Monterey Bay **March 2023 - May 2023**

- **Course:** MATH 170 - Discrete Mathematics
- **Principal Investigator:** Professor Lipika Deka
- **Project:** How many standard Young Tableaux are of L shape with a total of n boxes?
- **Description:** Co-investigated enumeration of L-shaped standard Young tableaux using combinatorial proofs and Python search tools; derived recurrence relations and presented findings.
- **Relevant Skills:** Formal proof techniques, discrete mathematics, mathematical modeling, and data analysis.

## POSTER PRESENTATIONS

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**Sergio Zavala, Prajna Hebbar, Dr. Benedict Paten.** "Pangenome Annotation Toolkit: A solution for mapping gene annotations through a graph" presented at SACNAS NDiSTEM Conference, 2025, October 31; Columbus, OH.

**Sergio Zavala, Prajna Hebbar, Dr. Benedict Paten.** "Pangenome Annotation Toolkit: A solution for mapping gene annotations through a graph" presented at CSUMB's Summer Research Symposium, 2025, August 15; Seaside, CA.

## PROFESSIONAL EXPERIENCE

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**Computing Talent Initiative (CTI) | Software Engineer**

**February 2025 - Present**

- CTI is a program designed to broaden the tech pipeline by supporting diverse college students.
- Currently working on CTI-sys (CTI's data management system) to engineer sanitisation methods in JavaScript to avoid malicious requests, allowing for case switches, and creating endpoints to return program data to Sheets for data analysis.

**California State University, Monterey Bay** | Instructional Student Assistant **August 2025 - Present**

- ISA for the Intro to Data Structures course, where I assisted students during office hours, in-class activities, weekly labs, and through Slack. I also created a comprehensive guideline for integrating AI into coursework.
- Upcoming ISA to the Intro to Computer Architecture course at CSU Monterey Bay.

**EBSCO Information Services** | CodeDay, Software Engineer Intern **October 2024 - November 2024**

- Built a Python + Pandoc pipeline to convert arXiv data to JSON for Longformer training; deployed Flask API, cutting reading time by 80%.

**Oppia** | CodeDay, Software Engineer Intern **June 2024 - August 2024**

- Resolved critical resource-loading bug impacting 1M+ users and implemented TypeScript validation checks and unit tests.

**Open Energy Dashboard** | CodeDay, Software Engineer Intern **January 2024 - February 2024**

- Authored integration tests verifying PostgreSQL-API consistency in Dockerized staging; streamlined energy-data pipeline used by 10k+ users.

**PROJECTS****CAPTCHA Robustness Analysis** | TensorFlow, Keras, VGG16, OpenCV **December 2025**

- Built a multi-output CNN on top of a pretrained VGG16 base to decode noisy, line-obstructed CAPTCHA; improved accuracy by 20%+ through targeted augmentation and transfer learning.

**GaelCraves** | React-Native, Java, Docker **October 2025 - December 2025**

- Developed a full-stack web ordering platform with Spring Boot and React Native to optimize order management and workflow automation for a small business.

**Injury Classification** | Scikit-learn, pandas, matplotlib **May 2025**

- Trained a basic Logistic Regression to determine whether injury severity in car crashes can be determined based on environmental conditions. Improved baseline accuracy by 16% after filtering out noise.

**Personal Website** | *EXPRESS.JS*, *MYSQL*, *EJS* **May 2025 - June 2025**

- Developed a dynamic full-stack portfolio site with a secure admin CMS for blog management with JWT-protected CRUD CMS for posts and projects, enabling in-browser content management without external tools.

**Gen AI Feedback Tool** | *GOOGLE APPS SCRIPT* **February 2025 - June 2025**

- Contracted by CTI to develop an AI-driven grading pipeline using high-quality prompts and create a new rubric for student blog posts. The tool cutback feedback delivery time from weeks to ~10 minutes for 100+ students.

**PROFESSIONAL DEVELOPMENT, VOLUNTEER, & MENTORSHIP****United Way of Monterey County** | Volunteer **Spring 2026 - Present**

- As a volunteer, I work with real program data to organize datasets, analyze participation/outcomes, and create summary statistics/visuals to integrate into their website.

**NIH NHGRI GREAT Scholar Program** | Mentor **Spring 2026 - Present**

- Upcoming mentor for the next cohort of undergraduate researchers in the GREAT Scholars program at CSU Monterey Bay.

**Mentors in Tech Program** | Mentee **Fall 2025 - Present**

- Accepted into the MinT program: a program for overlooked and underserved computer science students from smaller colleges who get paired with industry professionals for yearlong, high-touch mentorship.

**Computing Talent Initiative (CTI Accelerate Program)** | Student Assistant **Summer 2025 - Present**

- Supporting new student cohorts during CTI Accelerate 2025-2026 through mentoring, onboarding assistance, and technical guidance.

**CS++ Program** | Student Ambassador **Fall 2022 - Fall 2023**

- Actively participated in community outreach events, presenting the CS++ program at local high schools to encourage students to pursue careers in computer science and STEM.

**HONORS & AWARDS**

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<b>NSF ExLENT CTCtoAI Student Fellowship</b>	<b>2025 - Present</b>
<b>Outstanding Research Poster - CSUMB Summer Symposium</b>	<b>2025</b>
<b>JFW Cares Scholarship</b>	<b>2025 - Present</b>
<b>NIH NHGRI GREAT Scholar</b>	<b>2024 - Present</b>
<b>CSUMB College of Science Dean's List Recipient</b>	<b>2022 - Present</b>

**SKILLS**

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**Languages & Tools:** Python, Java, JavaScript/TypeScript, SQL, Bash, Git, Docker

**Frameworks & Libraries:** FastAPI, Flask, Django, Spring Boot, React, Angular

**Databases:** PostgreSQL, MySQL, SQLite

**Data & ML:** Pandas, NumPy, scikit-learn, matplotlib, Tensorflow (Keras), Jupyter Notebook

**Software Engineering:** Full-stack development, REST APIs, Auth, Testing (Mocha/Chai), CI/CD