Mario Daniel **Panuco**

Graduate Student

San Jose, CA; Santa Cruz, CA

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Education

University of California, Santa Cruz
Santa Cruz, CA

Master of Science, Scientific Computing and Applied Mathematics (GPA: 3.96) *September 2023 - June 2024*

- Relevant courses: Dynamical Systems, Fluid Mechanics, Numerical Methods for Differential Equations, Applied PDEs, Computational Genomics, High Performance Computing, Numerical Linear Algebra.
- Research: Conducted research in the numerical solution of the Kuramoto-Sivashinsky equation using Neural Operators.

University of California, Santa Cruz
Santa Cruz, CA

Bachelor of Science, Computer Science Engineering (GPA: 3.49) *September 2021 - June 2023*

- Relevant courses: Algorithm Analysis, Modern Algorithmic Toolkit, Functional Programming, Systems Design, Artificial Intelligence, Computational Methods and Applications.

DeAnza Community College
Cupertino, CA

Computer Science Engineering Transfer Degree (GPA: 3.90) *September 2019 - May 2021*

- Dean's Honour List: F19, W20, F20, W21, S21
- Relevant courses: Calculus, Discrete Math, Data Structures and Algorithms, C++.

Work Experience

Baskin Engineering, University of California, Santa Cruz
Santa Cruz, CA

Teaching Assistant - AM 10 - Mathematical Methods For Engineers 1 *January 2024 - June 2024*

- Led weekly discussions, covering complex variables, linear algebra, and solving differential equations for engineering applications.
- Graded assignments/exams and provided detailed feedback to support students' understanding of mathematical concepts.
- Collaborated with instructors to ensure alignment between lecture and discussion materials, as well as consistency in grading.

Physics Department, University of California, Santa Cruz
Santa Cruz, CA

Teaching Assistant - PHYS 116A - Mathematical Methods for Physicists *September 2023 - December 2023*

- Led weekly discussions focused on linear algebra, infinite series, and ODEs, addressing student questions on problem sets.
- Graded homework assignments and exams, providing feedback to help students improve their understanding of course material.
- Worked with the course instructor to ensure consistency in grading and teaching methodology.

Baskin Engineering, University of California, Santa Cruz
Santa Cruz, CA

Grader/Reader for CSE 140 - Artificial Intelligence *April 2023 - June 2023*

- Evaluated assignments and exams on core AI topics, including constraint satisfaction problems, adversarial search, Markov Decision Processes, and reinforcement learning.
- Provided detailed feedback to enhance students' understanding of AI algorithms and their practical applications.
- Worked with faculty to discuss and resolve any discrepancies in grading, upholding fairness and accuracy.

Learning Support Services at University of California, Santa Cruz
Santa Cruz, CA

Supplemental Instruction Leader - CSE 20 - Introduction To Python *January 2023 - March 2023*

- Provided students with supplemental instruction/material for Python in the form of in-person instruction & Jupyter Notebooks
- Helped diagnose and guide student's debugging strategies
- Helped students debug code, understand algorithm design patterns (recursion, sorting, OOP), and optimize for time/space complexity.

Learning Support Services, University of California, Santa Cruz
Santa Cruz, CA

Small Group Tutor - CSE 102 - Introduction to Algorithm Analysis *August 2022 - December 2022*

- Facilitated a peer-centered learning environment for students
- Assisted students in developing skills to meta-cognitively recognize design patterns to algorithmic problems as well as in developing skills to formally communicate mathematical abstractions
- Provided insight to applying algorithmic thinking, optimizing for time and space complexity, to tackle algorithmic problems

Projects

Parallelized Game Of Life - Fortran

Independent Project *April 2024 - June 2024*

- Implemented a parallelized version of Conway's Game of Life using Fortran, applying domain decomposition techniques to split the grid across multiple processors.
- Utilized MPI or inter-process communication, leveraging non-blocking communication to optimize boundary data exchanges between processes and minimize computational delays.
- Designed the simulation to scale across distributed-memory systems.
- Demonstrated strong knowledge of high-performance computing concepts, including parallelization strategies, process synchronization, and load balancing.

Multi-Threaded HTTP Server - C

Independent Project *March 2023 - June 2023*

- Developed a multi-threaded HTTP server in C99, following POSIX standards, capable of handling concurrent client requests using a thread pool architecture.
- Implemented thread-safe request handling with synchronization mechanisms (mutexes, condition variables) to ensure atomic and coherent processing of HTTP requests.
- Designed and maintained an audit log to track request handling order, ensuring linearizability and consistent logging for debugging and performance analysis.
- Conducted security testing, identifying and patching potential vulnerabilities to ensure reliable and secure request processing.
- Optimized server throughput by balancing load across worker threads and reducing latency through non-blocking operations.

PlankAI - Rust

Independent Project *July 2022 - September 2022*

- Utilized knowledge of Statistics, AI, and Scientific Computing to design a model that optimizes agent behaviors.
- Constructed the codebase using Rust packages such as nalgebra, rand_chacha, serde, and wasm_bindgen.
- Employed a test-driven approach for the development of the Neural Network and Genetic Algorithm modules.

Honors & Awards

2021 **Recipient,** UCSC Campus Merit Hihn Scholar *Santa Cruz, CA*

Skills

Programming/Scripting Languages C, C++, Python, Fortran, Rust, Bash, Julia, MATLAB, LaTeX, Java

Frameworks

Language	Frameworks
Python	Pytorch, Numpy, Polars, Pandas, SciPy, Ski-kit Learn, FastAPI, Seaborn
Fortran	MPI, OpenMP, LaPack
Rust	Dioxus, Axum, Tokio, Clap, Tower-HTTP, Tracing, Serde, Polars, TUI, WASM_Build
Julia	Statistics, Sparse Arrays, Linear Algebra, SparseArrays, Bio

Tools GIT, Markdown, Shell Scripting, Nix, Anaconda, Docker, Google Cloud Platform

Languages: English (Native), Spanish (Native), French (Proficient)