

# Mario Daniel Panuco

☎ (408) 466-3553 | ✉ [mpanuco@ucsc.edu](mailto:mpanuco@ucsc.edu) | 🏠 [mdpan.dev](http://mdpan.dev) | 📄 [MarioDanielPанuco](#) | 🌐 [Mario-Daniel-Pанuco](#)

## Education

### University of California, Santa Cruz

Santa Cruz, CA

MASTER OF SCIENCE, SCIENTIFIC COMPUTING AND APPLIED MATHEMATICS (GPA: 3.96)

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 computing numerical solutions to the Kuramoto-Sivashinsky equation using Neural Operators.

### University of California, Santa Cruz

Santa Cruz, CA

BACHELOR OF SCIENCE, COMPUTER SCIENCE ENGINEERING (GPA: 3.49)

June 2023

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

## 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 on complex variables, linear algebra, and differential equations, reinforcing engineering applications of mathematical methods.
- Graded assignments and exams, offering constructive feedback to enhance students' grasp of key concepts.
- Collaborated with instructors to ensure consistency between lectures and discussion materials, and maintained grading accuracy.

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

Santa Cruz, CA

TEACHING ASSISTANT - PHYS 116A - MATHEMATICAL METHODS FOR PHYSICISTS

September 2023 - December 2023

- Led discussions on linear algebra, infinite series, and ordinary differential equations, providing support for students' problem sets.
- Graded assignments and exams, providing feedback to support students' understanding and application of complex mathematical methods.
- Ensured grading standards and teaching methods aligned with the course instructor's objectives.

### 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 key AI topics, including constraint satisfaction problems, adversarial search, Markov Decision Processes, and reinforcement learning.
- Provided comprehensive feedback to enhance students' understanding of AI principles and their practical applications.
- Collaborated with faculty to ensure fairness and resolve grading discrepancies.

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

Santa Cruz, CA

SUPPLEMENTAL INSTRUCTION LEADER - CSE 20 - INTRODUCTION TO PYTHON

January 2023 - March 2023

- Provided supplemental instruction in Python, delivering in-person sessions and developing Jupyter Notebooks to enhance student learning.
- Guided students in debugging strategies, applying algorithmic design patterns (recursion, sorting, OOP), and optimizing code for time and 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 peer-centered learning sessions focused on algorithm design patterns and optimization for time and space complexity.
- Mentored students in formalizing mathematical abstractions and applying algorithmic thinking to solve complex problems.

## Projects

### Linear Algebra Module - Fortran

SCHOOL PROJECT

January 2024 - April 2024

- Developed a Linear Algebra library in Fortran for scientific computing, implementing core operations such as matrix multiplication, vector norms, LU decomposition, Cholesky decomposition, and Singular Value Decomposition (SVD).
- Integrated LAPACK to enhance the efficiency of SVD for numerical applications in scientific computing.
- Implemented advanced solvers, including QR decomposition using Householder transformations, Gauss-Seidel, Gauss-Jacobi, Conjugate Gradient methods, and eigenvalue solvers for solving complex systems and eigenvalue problems.
- Optimized algorithms for performance and numerical precision, benchmarking results to evaluate computational efficiency and stability.

## Parallelized Game Of Life - Fortran

SCHOOL PROJECT

April 2024 - June 2024

- Developed a parallelized version of Conway's Game of Life in Fortran, utilizing MPI for inter-process communication and SIMD for vectorized computations across processors.
- Applied domain decomposition techniques to split the simulation grid across multiple processors, improving parallel scalability on distributed-memory systems.
- Used non-blocking MPI operations to optimize boundary communication between processes, minimizing synchronization delays.
- Performed theoretical analysis of computational complexity as a function of scaling with processors, demonstrating a solid understanding of parallel algorithms.

## Multi-Threaded HTTP Server - C

INDEPENDENT PROJECT

March 2023 - June 2023

- Designed and implemented a multi-threaded HTTP server in C99, conforming to POSIX standards, with a thread pool architecture for handling concurrent requests.
- Implemented synchronization mechanisms (mutexes, condition variables) to ensure atomic and coherent handling of HTTP requests, optimizing for high-throughput and low-latency performance.
- Developed an audit log system to track request order, ensuring correct linearizability and facilitating debugging and performance analysis.
- Performed security analysis, identifying and patching vulnerabilities to ensure robustness and secure operations in a networked environment.

## PlankAI - Rust

INDEPENDENT PROJECT

July 2022 - September 2022

- Developed an AI model to optimize agent behaviors using Rust, leveraging knowledge of statistics, machine learning, and scientific computing.
- Utilized key Rust libraries such as nalgebra (linear algebra), rand\_chacha (random number generation), and wasm\_bindgen (WebAssembly integration) to create efficient, high-performance solutions.
- Employed a test-driven development approach to design and refine 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,  $\LaTeX$ , Rust, Bash, Julia, MATLAB, Java

### Frameworks/Libraries

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

**Tools** GIT, Markdown, Shell Scripting, Nix, Anaconda, Docker, Google Cloud Platform  
**Languages:** English (Native), Spanish (Native), French (Conversational)