# FRANCISCO FERNANDO CAVAZOS

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## EDUCATION

**University of Texas at El Paso** — Anticipated: December 2025

*Bachelor of Science in Computer Science, Minor in Mathematics* — *GPA: 3.80*

## TECHNICAL SKILLS

**Languages**: Java, Python, C/C++, R, PHP, JavaScript, HTML/CSS, SQL, Bash, AWK
**Developer Tools**: Git, RStudio, CMake, Unix/Linux, JUnit, VS Code, PyCharm, IntelliJ
**Libraries**: pandas, NumPy, Matplotlib, ggplot2
**Relevant Courses**: Computer Architecture, Programming Languages, Database Management, Adv. Object Oriented Programming

## EXPERIENCE

**University of North Carolina at Chapel Hill** — Chapel Hill, NC

*Laboratory Technician* — *Jan. 2024 – Present*

- Performed computational data analysis of high-throughput sequencing data to support multi-omic research projects
- Developed command-line tools and R package for RNA analysis using Python, C, and RStudio on Linux/Unix systems
- Collaborate with laboratory to create statistical tools leveraging Python, R, BASH, and AWK, enhancing productivity
- Contributed to research on over 100 RNA-binding proteins, species-specific k-mer conservation, and iron-regulatory elements, aiding the completion of 2 peer-reviewed publications and contributing to 2 ongoing manuscripts

*Undergraduate Research Assistant* — *May. 2022 – Aug. 2022*

- Developed scripts for k-mer counting, enrichment analysis, and structure preference for RNA-RBP interactions
- Efficiently scheduled script jobs reducing execution time by utilizing Longleaf high-performance compute cluster
- Presented findings on computational biology projects to over 30 researchers, showcasing approaches to RNA analysis
- Partnered with graduate student researchers to develop and refine data-driven workflows, assisting their research

**Texas A&M University** — College Station, TX

*Undergraduate Researcher* — *June 2023 – Aug. 2023*

- Developed a real-time reinforcement learning model for autonomous vehicle navigation using python and pytorch
- Implemented reduced-information training to boost training efficiency and decision-making in real-world scenarios
- Continuous improvement in model performance over 85 training episodes, with the model's reward increasing steadily
- Collaborated with the professor, undergraduate, and graduate students to write a technical paper and present a resarch poster

## PROJECTS

**KATSS - K-mer Analysis Tools for Sequence and Structure** | *C, CMake, RStudio, Unix, Bash*

- Developed a suite of tools for analyzing RNA-binding protein (RBP) interactions using RNA sequence and structure
- Created a high-performance, thread-safe library for parsing fasta/fastq files, achieving 2x faster performance than industry-standard libraries by optimizing file handling and memory management in a zlib-compatible API
- Created algorithms and pipeline for motif discovery, base-pair probability preference, and sequence clustering
- Implemented efficient data structures, being able to analyze 60 million sequences (˜7.5GB) in 5 seconds on an M1 chip
- Utilized CMake to configure cross-compatibility for Unix/Linux, MacOS, and Windows, enabling broader accessibility

**Database Management System** | PHP, SQL

- Led design of a SQL database for managing student, partner, and opportunity data, ensuring scalability and data integrity
- Created ER model with complex relationships (many-to-many, one-to-many) to implement our student-partner database
- Implemented SQL queries and procedures to enforce constraints and enable efficient, real-time data management
- Developed PHP front end for secure data input, user login, and role-based access to streamline data management

**Gomoku GUI Application & AI** | *Java, Swing, PHP, JUnit*

- Created GUI application for the Gomoku board game using the Java Swing library and PHP
- Implemented over 70 unit tests using JUnit, achieving 100% code coverage across 5 classes and 46 functions
- Developed an AI player using a min-max algorithm, determining the best move from searching a depth of 20 moves
- Created Gomoku API using PHP to determine computer moves, storing game data efficiently using JSON

## PUBLICATIONS

Sarah E Harris, Maria S Alexis, Gilbert Giri, **Francisco F Cavazos Jr**, Yue Hu, Jernej Murn, Maria M Aleman, Christopher B Burge, and Daniel Dominguez. Understanding species-specific and conserved rna-protein interactions in vivo and in vitro. *Nature Communications*, 15(1):8400, 2024

Maya L. Gosztyla, Lijun Zhan, Sara Olson, Xintao Wei, Jack Naritomi, Grady Nguyen, Lena Street, Grant A. Goda, **Francisco F. Cavazos**, Jonathan C. Schmok, Manya Jain, Easin Uddin Syed, Eunjeong Kwon, Wenhao Jin, Eric Kofman, Alexandra T. Tankka, Allison Li, Valerie Gonzalez, Eric Lécuyer, Daniel Dominguez, Marko Jovanovic, Brenton R. Graveley, and Gene W. Yeo. Integrated multi-omics analysis of zinc-finger proteins uncovers roles in rna regulation. *Molecular Cell*, 2024

Sarah E. Harris, Yue Hu, Kaitlin Bridges, Bryan B. Guzmán, **Francisco F. Cavazos**, Justin G. Martyr, Jernej Murn, Maria M. Aleman, and Daniel Dominguez. Dissecting rna selectivity mediated by tandem rna-binding domains. *bioRxiv*, 2024

## LEADERSHIP

**CAHSI Advocate** Sep. 2024 – Present

*University of Texas at El Paso* *El Paso, TX*

- Facilitated community-building among Hispanic students in computing by organizing and promoting CAHSI initiatives, effectively increasing awareness and engagement in inclusive academic and career opportunities.
- Connected peers with valuable resources by sharing CAHSI practices and events through workshops, social media, and email campaigns, fostering a supportive academic environment and enhancing student retention
- Collaborated with campus organizations to co-host events that highlighted professional development, mentorship, and academic success strategies, strengthening cross-campus networks
- Participated in bi-weekly regional and national virtual meetings, contributing ideas for effective student engagement strategies and to enhance leadership skills

## HONORS & AWARDS

2024 Dean's List Spring 2024
2023 Anheuser-Busch Charitable Trust Fund Scholarship
2023 Dean's List Fall 2023
2023 Dean's List Spring 2023
2022 Dean's List Fall 2022