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, 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

Undergraduate Research Assistant — Jan. 2024 – Present
University of North Carolina at Chapel Hill — *Chapel Hill, NC*

- Performed computational **data analysis** of high-throughput sequencing data to aid in genomic research
- Developed **command-line** programs and **R packages** for RNA analysis using **C** and **RStudio** on **Linux/Unix** systems
- Researched over 100 RNA-binding proteins, aided 3 publications, and currently working on another 2 publications
- Collaborated with scientists to develop 3 **statistical tools** using **python**, **R**, **BASH**, and **AWK** to increase productivity

Undergraduate Researcher — June 2023 – Aug. 2023
Texas A&M University — *College Station, TX*

- 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