

# Lorenz Carvajal

lorenzcarvajal@ufl.edu | linkedin.com/in/Lorenz-Carvajal | (954) 261-7800

## EDUCATION

**University of Florida (UF), Herbert Wertheim College of Engineering**

Bachelor of Science in Computer Engineering

Relevant Coursework: Computer Engineering Design, Digital Design, Microprocessor Applications, Wireless and Mobile Networks, Operating Systems, Introduction to Signals and Systems, Introduction to Software Engineering

**Expected Graduation: May 2024**

GPA: 3.6 / 4.0

## TECHNICAL SKILLS

**Programming Languages:** C++, C, Python, Java, HTML, TypeScript, CSS, MATLAB, Assembly, VHDL

**Hardware Development Tools:** Altium Designer, Microchip Studio (AVR), Quartus, ModelSim, Raspberry Pi, Arduino, Digi XBee Zigbee

**Software Development Tools:** Mininet-WiFi, Wireshark, XCTU, VirtualBox, Angular, React, Cypress, ThingSpeak, Linux Virtual Machine, IPerf, Github, OpenCV

**Other:** Microsoft Excel, Microsoft Project, AutoCAD, SolidWorks, Asana, Autodesk Tinkercad

## EXPERIENCE

**Information Technology Institute for Advanced Study (ITIAS)**

Undergraduate Research Intern

**Gainesville, FL**

May 2023 – present

- Emulate various software-defined fifth-generation (5G) wireless topologies using the Mininet-WiFi Python API and CLI on a Linux Virtual Machine to demonstrate the differences in architecture and behavior and study propagation models.
- Implement mobility scenarios by specifying start and end times, mobility models, and velocity parameters to control the movement of station and access points to illustrate the OpenFlow protocol on switches that control packet associations and paths.
- Analyze received and transmitted data via Wireshark packet analyzer as well as throughput via IPerf and GnuPlot to verify functionality of OpenFlow-enabled switches that require manual resetting for operations in a mobility scenario.
- Integrate independent topologies and emulate a Heterogeneous Software-Defined Wireless Network using Internet Protocol subnet masking, mobility, and OpenFlow controller manipulation to exemplify the compatibility of real-world systems as well as pave the way for efficient multi-Radio Access Technology (RAT) handover and centralization of the control plane to push for the next generation of wireless technology.

**Wireless and Mobile (WAM) Systems Lab, UF Herbert Wertheim College of Engineering**

Undergraduate Research Assistant

**Gainesville, FL**

August 2023 – present

- Adapt the Mininet-WiFi backend using the Python API and a Multi Criteria Decision Making (MCDM) based handover algorithm to improve the spectral efficiency of cellular systems.
- Inspect functionality of algorithm using a multi-RAT testbed with the random direction mobility model and log-distance propagation model to record real-time data for each handover attempt: Received Signal Strength Indicators (RSSI), delay, and total throughput.
- Explore simulation results for various scenarios using varying quantities and speeds of base stations and access points, comparing results to the original baseline approach and determining efficiency of the custom algorithm.

## INVOLVEMENT

**Society of Hispanic Professional Engineers (SHPE) at UF**

Autonomous Vehicles Design Team Director

**Gainesville, FL**

May 2023 – present

- Prepare a project by compiling a timeline, budget, and tutorials to introduce approved members to mechatronics and guide them through the collaborative process of designing an autonomous vehicle, with two teams of computer, mechanical, aerospace, chemical, and biomedical engineers.
- Construct sensor circuits for the vehicle using ultrasonic distance sensors for collision avoidance, infrared light sensors for lane assistance, motor drivers to control DC motors for forward/backward movement, and servo motors for steering.
- Operate circuits using a Raspberry Pi microprocessor to communicate pulse-width modulated signals through general-purpose input/output pins and interpret live sensor data in an algorithm that allows the robot to maneuver around obstacles and follow a line, as well as incorporate image processing into the vehicle's algorithm by attaching a camera that transmits video data to the microprocessor in order to recognize street signs that signify different commands: stop, left/right turn, and speed limits.
- Engage teams in modular competitions by evaluating each component, emphasizing innovation, problem-solving, and efficient engineering practices.

Open AI Chess Arm Design Team Member

August 2022 – January 2023

- Participate in the design of a robotic arm that plays chess using AutoCAD, Raspberry Pi, and Arduino, splitting the work into specialized groups of 3D modeling and programming to set the foundations for collaborative interdisciplinary work.
- Process image data and decision-making algorithms by incorporating Stockfish AI and OpenCV into a Raspberry Pi to read board information and calculate the best possible move as well as precise movement information to transmit serially to the Arduino.
- Maneuver the physical arm with 3D-printed parts attached to servo motors controlled with the Arduino to pick up desired pieces and move them to the correct position on the board.

**Florida Club Rowing**

Varsity Team Athlete

**Gainesville, FL**

August 2021 – December 2022

- Compete every semester against Division I, II, and III teams and other university club teams in Tennessee and Florida, promoting teamwork, discipline, and perseverance by rowing in unison and maintaining a positive atmosphere.
- Volunteer in community events by overseeing commissions at UF sporting events and assembling care kits for the local homeless population, nurturing engagement and community.

## ADDITIONAL INFORMATION

**Awards:** Dean's List, Cum Laude (with Honors), National Merit Scholarship, Benacquisto Scholarship, Florida Academic Scholars Award (Bright Futures)

**Certifications:** Engineering Project Management Certificate, Tinkercad (Linkedin Learning)

**Languages:** Spanish (Native), English (Native)