Curriculum Vitae

William Desueza
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EDUCATION

University of Miami *August 2020 - May 2024*
Major in Electrical Engineering, Medical Concentration
Summa Cum Laude
GPA: 4.0

Relevant Coursework: VLSI, Computer Organization, Digital Design, Linear Control Systems, Digital Signal Processing, Analog Electronics, Network Client-Server Programming, Electromagnetic Field Theory, Machine Learning, Data Structures, Modern Physics

RESEARCH EXPERIENCE

Florida International University, Metamaterials Lab *May 2023 - August 2023*
NSF CELL-MET Program
Advisor: Dr. Lihua Lou

Studied the mechanical and chemical properties of *Mimosa Pudica* for potential applications in the extracellular matrix of cardiac tissue. Designed a poster and presentation for an intercollegiate CELL-MET event involving 3+ academic institutions on the biomimetic applications of vascular plants (including *M. Pudica*) at FIU's metamaterials lab for cardiac tissue engineering. Conducted a literature review, involving 10+ research papers on the Mimosa Pudica, prepared weekly research updates for the team which elevated productivity, and was the first to design a unique experimental procedure. Prepared 100+ viscoelastic samples for nanoindentation to determine forces and elastic modulus of material.

University of Miami, Biomedical Engineering Department *January 2022 - December 2023*
Multichannel Galvanic Skin Response
Advisor: Dr. Jorge Bohorquez

Conducted literature review for a multichannel galvanic skin response (GSR) system which prevents disadvantages of habituation to diagnose patients with spinal cord injuries (SCI). Reviewed amplifier design of 4+ schematics to measure the susceptance/conductance of current in skin. Coded simulation in MATLAB to predict behavior of lock-in amplifier design and soldered components onto PCBs. 3D printed a container for the circuitry using CAD software (with OnShape).

University of Miami, Biophysics and Physiology Department *May 2022 - August 2022*
Anatomical Labeling with AI
Advisor: Dr. Stephen Roper

Read through DeepLabCut documentation, a neural network specialized in labeling anatomy, for the purposes of labeling anatomical parts of mice with 95% accuracy, aiding in analyzing their behavior. Coded a prototype on Python that analyzed the gait of a cat with a pre-trained model, paving the way for future code that can be used to train and analyze models for mice from sample videos taken in the lab.

PROJECTS

Muscle Memory *August 2023 - May 2024*
Electrical Engineering Department, University of Miami

Created a wearable device that predicts certain hand movements to use an input for general software applications. Researched different stages of the analog filtering of surface electromyography (sEMG) signals to ensure ideal signal-to-noise ratio is within 80% of market standard. Designing convolutional neural network (CNN) with PyTorch library on Python to classify hand gestures and movements that exceeds 90% accuracy. Used Discrete Wavelet Transforms (DWT) to digitally filter the signals and improve predictive accuracy. Programmed an Adafruit Feather 32u4 microcontroller in C++ with low-power Bluetooth protocol (BLE).

Sunset Showdown *January 2024 - May 2024*
Computer Engineering Department, University of Miami

Used Node.JS, NGINX, and Google Cloud to host a top-down battle royale online game. Front-end was programmed using Unity WebGL and various custom-designed assets were created. Custom request/response types were created using native WebSockets in Javascript.

CMOS VLSI Design of ALU *August 2023 - December 2023*
Electrical Engineering Department, University of Miami

Used Cadence Virtuoso to design pull-up networks, pull-down networks, and transmission gates in 20+ modules necessary for 4-bit arithmetic logic unit (ALU) with a 5V power supply. Performed DC and transient simulations to ensure ALU can drive load of a minimum of 0.1pF at 100MHz. Conducted power simulations on the top-level ALU to ensure its consumption was minimized to approximately 1.20mW.

16-bit RISC CPU with Pipelining *August 2023 - December 2023*
Computer Engineering Department, University of Miami

Designed functional CPU using Vivado as CAD software and Verilog HDL with a 16x16 register file and 16-bit ISA. Implemented CPU using UART and PuTTY software to output operations, which are completed in 2 cycles using pipelining. Simulated CPU design through Vivado and achieved on-chip power consumption of less than 4.2W.

FGPA Timebomb Minigame *January 2023 - May 2023*
Electrical Engineering Department, University of Miami

Designed a 2-player minigame where one player sets a passcode and the other guesses using Quartus Prime and Verilog HDL. Created multiple submodules for the top-level design, including the controller with an ASM, a memory block, and a module which allows the game to be output on a seven-segmented display using a De1-SoC board.

WORK EXPERIENCE

Emergency Department Scribe *September 2023 - January 2024*
West Kendall Baptist Hospital, Florida

Attended and recorded emergency physician notes during patient interviews at 3 different freestanding emergency clinics. Wrote 500+ notes using FirstNet's charting system, which includes the patient's HPI, ROS, MDM, Plan/Assessment, and Reevaluation. Called in-patient clinics for stat consults and provided RNs with printed discharge instructions.

Teaching Assistant *August 2023 - December 2023*
University of Miami, Florida

Lectured 7+ groups of undergraduates in both Biomedical Signal Analysis and Biomedical Instrumentation, guiding students through a wide variety of different MATLAB programs and custom designed PowerPoint presentations throughout the semester. Graded and provided feedback for 10+ projects, resulting in an improved performance on midterms. Aided the development of a final Arduino project, which detected ST segments in an EKG using signal analysis.

Peer Tutor *September 2021 - January 2022*
Camner Center, Florida

Scheduled 100+ hours of tutoring appointments on-campus for Calculus I, Calculus II, Physics I, and Physics II. Prepared independent practice exam material resulting in exam and assignment score improvements and high retention rates among tutees. Co-hosted and presented a public review session for Calculus I during finals week involving 50+ students.

ACTIVITIES

Debate Chair of Ethics Society *August 2023 - May 2024*
University of Miami

- Moderated weekly discussions of the ethics society on-campus and prepared for discussion topics.
- Searched for and worked with the club to enroll in debate competitions available in the country.

Active Member of IEEE-HKN *August 2022 - January 2024*
University of Miami

- Tutored undergraduates on a wide variety of electrical engineering courses as a requirement for the honors society for electrical and computer engineers on campus.
- Supported other electrical engineers academically and professionally as a member of the honors organization.

Front-End Developer *July 2021 - August 2022*
Unihop

- Designed the first renditions of the UI/UX for the website of an on-campus delivery service start-up company, which increased sales by 100%+. Used a combination of available Shopify's APIs as well as HTML/CSS/Javascript.
- Built and debugged the front-end for 5+ different pages including the homepage, shopping page, and contact us page.

Co-Founder *February 2020 - February 2022*
Desueza-Freire Capital LLC

- Co-founded a company to create an efficient method of managing and investing the assets of several different colleagues in the stock market.
- Primarily focused on options trading and market analysis. Programmed regression analysis tools using Python to aid in the financial analysis.

SKILLS

Programming: C++, Java, C#, ARM Assembly, Python, MATLAB, HTML, CSS, JS, Typescript
HDL/CAD: VHDL, Verilog, PSpice, LTSpice, AutoCAD, Cadence Virtuoso, Quartus Prime

AWARDS

Norman G. Einspruch Scholar Award *May 2024*
College of Engineering

Awarded to the graduating student with the highest GPA in the college of engineering.

HSF Scholar *June 2023*
Hispanic Scholarship Fund

Designated as an HSF Scholar for 2023. Granted to 10,000 students selected to be an HSF Scholar from a pool of 124,000+ applicants.

Eliahu I. and Joyce Jury Award *December 2022*
College of Engineering

Awarded to one undergraduate student a year at UM in recognition of their exceptional performance in Electrical Engineering.