Luis Mesias

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EDUCATION:

Case Western Reserve University, Cleveland, Ohio (CWRU)
- Ph.D. candidate in Electrical Engineering, 3.82 GPA — Sep 2025
- Bachelor of Science in Engineering: 3.96GPA, Summa Cum Laude. — Aug 2020
  Electrical Engineering Major, Biomedical Engineering Minor

Hillsborough Community College, Tampa, Florida (HCC) — May 2018
- Associates in Arts - Engineering concentration, Honors Institute, 3.95GPA

Universidad del Valle de Guatemala, Guatemala (UVG) — Jan 2015 – Nov 2016

RESEARCH EXPERIENCE:

- Design of a Haptic Interface Based on Surface Electrical Nerve Stimulation — Feb 2024 – Present
  - Designed a low profile wearable haptic interface compatible with **Meta Quest** 3 optical hand tracking.
  - Integrated electrical stimulation to deliver intensity modulated haptic feedback to all five fingertips without occluding them or the palmar surface.
  - Reduced number of trials with sensations on undesired locations from 27% to 4% and increased the number of trials with sensations at the fingertips from 70% to 92%.
  - Develop a publicly available data collection tool to record haptic sensation location
  - Appearances: 2024 **IEEE** Conference on Telepresence (doi.org/10.1109/Telepresence63209.2024.10841536)
- An Operator-centric Design of an Avatar System using Digital Nerve Stimulation — Jun 2020 – Present
  - Developed a **VR** interface that gave the operator manipulation and locomotion control of a robot that was more than 2,000 miles away.
  - Transformed pressure data from the robot's fingertips into haptic feedback at the operator's fingertips at low latencies using electrical stimulation.
  - Implemented low latency video interfaces into the **VR** environment using **WebRTC** technology.
  - Appearances: 2022 Robotics Science and Systems (**RSS**) conference, **National Geographic** June 2022 issue, **PBS** News Hours, Human Fusions Institute submission to the ANA avatar **XPRIZE semifinals**
- Vestibulo-Ocular Reflex (VOR) diagnosis and evaluation using VR — Aug 2020 – Present
  - Developed eye tracking **VR** applications used to diagnose VOR disorders using the **VARJO** HMD
  - Developed a fruit catching **VR** rehabilitation game to help veterans with TBI improve their convergence by 40% over an 8 week period.
- Artificial touch feedback through skin-surface electrical stimulation — Jun 2019 – Dec 2023
  - Developed a new haptic technology that used surface electrical stimulation to convey intensity modulated sensation to the fingertips.
  - Generated sensation at the targeted finger in 84% of the trials.
  - Aided in the patenting process of the stimulation technology **patent licensed** to **Afference Inc. (**no. WO2023244529A1) as the lead inventor, and a stimulation glove design **provisional patent**
  - Appearances: Published in the **Journal of Neural Engineering** (DOI: 10.1088/1741-2552/ad0563)

RELEVANT PROJECTS:

- The Benefits of a Virtual Reality Lab Over a Lab Manual
  - Used **Unity** and **Google cardboard** to develop three **VR** labs that replaced traditional physics prelabs. After comparing the results VR lab showed a 10% improvement in learning outcomes and more engagement on behalf of the students over traditional prelabs.
- Founder of Tech Love Project:
  - Through donations, obtained and assembled two computer labs in underserved schools

in Guatemala.
- Using Python, created a voice-activated inventory program used by illiterate mechanics at Auto Partes Los Luises. The inventory program allowed voice output and control.
- Designed and published a mobile application for building a community in the Honors Institute HCC.
- Designed and fabricated a non-invasive muscle myographic circuit using Ultiboard for a class project at UVG

COMPETITION & ACHIEVEMENTS:

- ANA Avatar **XPRIZE**: Jan 2020 – Sep 2021
  - Developed an operator center teleoperation system with tactile feedback, Operator tracking, anthropomorphic hand, and low latency real time video.
  - Semifinalist on a worldwide competition
  - Lead VR and stimulation researcher of the HFI team
- Phi Theta Kappa Honors Society: Aug 2017 – May 2018
  - 2018 All-USA Academic Team
  - Florida New Century Transfer Pathway Scholar
  - All-Florida Academic Team
- Phi Beta Lambda (PBL) **National** Conference Jun 2017 & Jun 2018
  - Testing: 9th Place Computer Concepts, 3rd Place Programming Concepts
  - Project Base: 1st Place Mobile Application Development
    - Developed an Android mobile app to help connect the organization by replicating its leadership structure
- Phi Beta Lambda **State** Competition Mar 2017 & Mar 2018
  - Testing: 2nd Place Computer Concepts, 3rd Place Networking Concepts, 3rd Place Cyber Security, 1st Place Programming Concepts, and 3rd Place Computer Concepts
  - Project base: 1st Place Mobile App Development: Developed a mobile app for the PBL organization
- HCC's Student Excellence Awards: Service award for NSCS, Leadership Award for the Engineering Club May 2017 & May 2018
- National Collegiate Honors Conference, Atlanta, Georgia
  Nov 2017
  - *Innovation for Tomorrow Award*: Developed a virtual reality mobile application that is designed to help students understand physics content such as vectors and projectile motion.
- Honor for Academic Merit, Universidad del Valle de Guatemala Jan 2015 – Dec 2015

CONFERENCES & PRESENTATIONS:

- 2024 **IEEE** Conference on Telepresence: Design and Evaluation of a Low-profile Haptic Interface Based on Surface Electrical Nerve Stimulation Oct 2024
- 2022 **RSS** Conference: An Operator-centric Design of an Avatar System using Digital Nerve Stimulation Jun 2022
- E-Stim for Educators: Games to introduce K12 students to biomedical engineering Jul 2021, 2022
  - Used Backyard Brains kits to introduce EMG and muscle stimulation. Furthermore, developed
    a modified version flappy bird that uses EMG signals as controls
- MetroHealth Rehabilitation Institute Journal Club: Immersive virtual reality health games: a narrative review of game design. (remote presentation) Jun 2021
- Society of Hispanic Professional Engineers National Convention Nov 2018
  - Extreme Engineering Challenge: General Motors team member and leadership award nominee: Developed a working prototype of a TV Table that interacted with **Amazon Alexa**
- Florida International Leaders Conference, Peer Leader, DeLeon Springs, Florida Mar 2017, Mar 2018
  - Workshop presenter: *How to research in your first years of college*
- Association of Florida Colleges Legislative Conference, Tallahassee, Florida Feb 2018
  - Conference where college's Trustees and Presidents organize a collective effort

to support or stop specific policies that affect education.

- Florida Collegiate Honors Conference, Fort Desoto, Florida — Apr 2018
  - Workshop Presenter: *How to sustain your research through grad school*
- National Collegiate Honors Conference, Atlanta, Georgia — Nov 2017
  - Poster: *Virtual Reality in the Classroom: A Student's Discovery*: developed a virtual reality app to supplement physics labs and improve learning outcomes
- HackGT Hackathon, Georgia Tech, Atlanta, Georgia — Oct 2017
  - Developed a HoloLens app than in combination with an Android mobile app helps oversee warehouses through GPS tracking and package tracking
- National Collegiate Honors Conference, Seattle, Washington — Nov 2016
  - Poster: *Developing a Community Using a Mobile App*: Using firebase as the backend, developed an Android and iOS mobile app that helped students in the Honors program interact with each other

LEADERSHIP EXPERIENCE:

- Journal Reviewer for Virtual Reality, Journal of NeuroEngineering and Rehabilitation, IEEE Transactions on Biomedical Circuits and Systems — May 2023 – Present
- Conference paper reviewer for multiple conferences — Jan 2022 – Present
- Faculty Search Committee: graduate student representative — Jan 2022 – May 2022
  - Served in a search for an electrical engineering faculty with emphasis in biomedical application
- Tau Beta Phi – The Engineering Honors Society: New member interviewer — Apr 2019 – May 2020
- Hillsborough Community College Board of Trustees: First Student Appointment — Aug 2017 – Jun 2018
  - Helped the Board of Trustees and the college's president and its cabinet arrive at compromises that favor the students and allow the college to continue functioning under a budget.
- Honors Institute: Honors Ambassador, Board of Directors, SGA Representative — Jan 2016 – May 2018
  - Oriented and guided new honor's students on their first semester in the program.
- Engineering Club: President, SGA Representative at HCC — Aug 2016 – May 2018
  - Increased club membership to 35 members (+340%) by implementing interactive projects
- National Society of Collegiate Scholars (NSCS) at HCC: VP of Community Service — Aug 2016 – May 2018
  - Organized two community service events per month and developed a mobile app and a blog to showcase the activities the club had done to the National Headquarters.

TEACHING EXPERIENCE:

- Introduction to Computer Game Design and Implementation Teaching Assistant — Jan 2023 – May 2023
- Advance Game Development Project Teaching Assistant — Aug 2022 – Dec 2022
- Semiconductor Electronic Devices Teaching Assistant — Jan 2022 – May 2022
- E-Stim for Educators: Games to introduce K12 students to biomedical engineering — 2021, 2022, 2023, 2024
- Introduction to Circuits and Instrumentation Teaching Assistant — May 2019 – Jun 2020

WORK EXPERIENCE:

- Computer Tech Support, Epidemiology & Biostatistics department — Aug 2019 – May 2020
- Research Assistant: Dr. Philip Feng Research Group — Jan 2019 – Aug 2019
  - Programing and designing wireless low power, long range sensors
  - Measured power output of EnOcean's energy harvesters and power consumption of low power transceivers
- Case Western Reserve University: Career Resource Center Office Assistant — Aug 2018 – May 2019
- Hillsborough Community College: Resident Assistant — Jun 2016 – May 2018
- Auto Partes Los Luises: Treasurer — Jan 2015 – Dec 2015

SKILLS:

- **Programming Languages:** C#, Java, Python, R, C++, MATLAB, Swift, Assembly
- **Programming Tools:** Unity, n8n, Arduino, Android studio, Simulink, MongoDB, Firebase, Xcode, Amazon Alexa, Microsoft Azure, ModelSim

- **Other Technical Skills:** Analog circuit design, neural interfaces modeling, PCB design, CAD
- **General Skills:** Statistical analysis, IRB approval experience, Native Spanish speaker, Human subject data collection

SERVICE:

- Volunteer 140+ hours serving families in extreme poverty conditions in Guatemala installing stoves, water filters, and solar panels, and helping with triage medical missions.
- Volunteer 40+ hours as Mobile App developer for the STEM Center program at Hillsborough Community College. The app was developed in Android and Apple and uses Firebase as backend.
- Volunteer 20+ as a website developer for the Autism Shifts organization
- Volunteer 350+ hours in college clubs and programs like Arete, NSCS and PBL
- Developed Autism Shifts' webpage

References:

- References provided upon request.