# Allan Marcio Frederick

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LinkedIn profile  Personal website

## EDUCATION

**Bachelor of Science, Electrical Engineering** **December/2021**
Technical Core: Data Science and Information Processing
The University of Texas at Austin

**Pursuing Master of Science, BioElectrical Engineering** **August/2022 – Present**
Clinical Neuroprosthetics and Brain Interaction Lab (CNBI Lab)
The University of Texas at Austin

## PROJECTS

**In-Ear EEG Device, CNBI Lab** *at The University of Texas Austin* **February/2022 – Present**
- Developing a novel in-ear EEG device using a conductive hydrogel to record EEG signals inside the ear
- Established both hardware and software optimization protocols to streamline device fabrication, recording, signal processing and analysis
- Fabricated conductive hydrogel in the lab to integrate with electrical components and earpiece
- Created specialized 3D earpiece models for printing, using SLA technology to interface with hydrogel
- Designed experimental protocols for recording neural signals, including visual interfaces for subjects
- Performed signal processing and analysis of EEG data using MATLAB to evaluate the in-ear EEG device signal

**Automated Laboratory Smoking Machine,** *Baylor College of Medicine* **January/2023 – Present**
- Collaborating with a cross-disciplinary team to build an automated cigarette exposure chamber for in-vivo experiments to study the impact of smoking on cancer therapy and chronic obstructive pulmonary disease
- Designed and implemented electrical and real-time operating system; includes effective human-computer interaction, Raspberry Pi and Arduino serial communication for efficient control, operation sequence firmware, sensor processing, PCB design

**Social Link-Prediction using Mobility Data,** *University of Texas Austin* **Fall 2023**
- Created a social network leveraged from Foursquare human mobility and points of interested data in order to predict social interactions
- Constructed a network learning pipeline utilizing Node2Vec embeddings and GNNs for link prediction to predict who might interact with whom and where the interaction might occur in the social network

**IoT Brain Computer Interface,** *The University of Texas Austin* **February/2023 – April/2023**
- Collaborated with one other colleague to design and build an assistive BCI to control various IoT devices using object detection for selection and EEG Motor Imagery signals for binary control
- Implemented real-time object detection using Google Edge TPU, programmed microcontroller firmware
- Streamlined object detection model and EEG motor imagery decoder to microcontroller over wireless communication protocols

## SKILLS

Programming/Software: MATLAB, Python, Jupyter Notebook, Arduino, Meshmixer, PreForm, KiCAD
Applications: Machine-learning, digital signal processing, digital fabrication, prototyping, PCB design
Languages: Fluent in Portuguese, Spanish