Yorguin José Mantilla Ramos

Calle 28 #75-15, Medellín, Antioquia

 +57 3115154452 • ✉ yjmantilla@gmail.com • 🌐 yjmantilla.github.io

If printed, hyperlinks can be found in

Undergraduate electronic engineering student. Passionate about anything-inspired models, algorithms and AI (particularly from nature). I like to think critically about them: how data and concepts are represented and visceralized, their interpretability and explainability, how cognitive models arise and why they are the way they are. I'm enraptured by systems, complexity, curious dynamics and emergence. Amateur musician, occasional poet, chaotic dancer and trying algorithmic artist. My work is built upon my values of responsibility, commitment, honesty, attention to detail, problem solving and critical thinking.

Education

Universidad de Antioquia   **Medellín, Colombia**
Student of Electronic Engineering for a Bachelor's degree.   *February 2018 – On Going*

Universidad Simón Bolívar   **Miranda, Venezuela**
Student of Electronic Engineering for 9 trimesters.   *September 2013 – March 2017*

Technical skills

○ **Software and Programming/Markup Languages**
  - Experience with: Python, Matlab, Latex.
  - Courses on: C, Cpp, Assembly, VHDL, Verilog, Sci-lab, Multisim, Spice, QtCreator.
  - Played with: Javascript, HTML, Processing, Arduino-flavored Cpp, Wolfram Mathematica, Comsol Multiphysics.

○ **Domain Specific Knowledge**
  - Experience with: EEG & MEG Processing, Classic ML models, High-Density EEG Acquisition, Neuroscience, Music.
  - Course-level Knowledge in: Optimization, Artificial Intelligence, Image Processing, Time-Series Processing, Sound & Acoustics.
  - Introductory Knowledge in: Cognitive Science, Complex & Dynamical Systems, Bioinformatics & Systems Biology, Computational Models.

○ **Other Skills**
  - Experience with: Scientific Programming, Quantitative Research, Writing of structured reports.
  - Introductory-level: Writing of Scientifc Articles, Qualitative Research.

Previous experience

Neuropsychology and Behaviour Group (GRUNECO) — **Medellín, Colombia**
Undergraduate Researcher — *June 2018 – On Going*

I did 3 internships for a total of 3 years under the supervision of Carlos Andrés Tobón Quintero and John Fredy Ochoa Gómez. A letter of recommendation from this group can be read here.

- Main Projects
  - Exploratory research on the processing of resting state EEG signals focused on group-level independent component analysis.
  - Development of software for resting-state EEG processing and group-level statistical analysis.
  - Characterization of the didactic perspectives of the research training carried out in GRUNECO, under the guidance of professor Rosa Maria Bolivar Osorio.
- Main Tasks
  - Develop python and matlab software according to the needs of the group, such as contributing to the pyprep python package.
  - Motivate the adoption of the BIDS standard in the laboratory.
  - Assist in the building of the data infrastructure of the group.
  - Make my own research projects: 1) Effects of the normalization by a "recording- specific constant" on the separation quality of the group ICA of EEG signals. 2) Automatic inference of thresholds for artifactual epoch detection in EEG signals: A statistical dataset-wise approach.
  - Assist in the acquisition of high-density EEG signals.
  - Give talks about BIDS, the data-science workflow/infrastructure, and about my research.

Mitacs Globalink Research Internship — **Montreal, Canada**
Intern — *May 2022 – August 2022*

I worked in the Cognitive & Computational Neuroscience Lab (CoCo Lab) at the University of Montreal. Mainly I participated in a MEG study regarding the neural tracking of the fundamental frequency of the voice in relation to the changes caused by speech rate variations. I mostly did data organization and the codification and execution of processing and connectivity computation pipelines. Main learnings were: the treatment of MEG signals, differences between connectivity metrics, the coregistration of MEG with MRI, MRI structural preprocessing with freesurfer, head modeling through a watershed-based BEM approach, source reconstruction with minimum-norm estimates and LCMV beamformers, morphing, and the use of high-performance computing clusters (in particular, Compute Canada) through command-line interfaces, specifically for parallelization of tasks across nodes. My primary supervisor was Karim Jerbi, but I was too under the guidance of Annalisa Pascarella, Ana Sofía Hincapié Casas and Véronique Boulenger. I also contributed to a preprint called "Class imbalance should not throw you off balance: Choosing the right classifiers and performance metrics for brain decoding with imbalanced data". A certificate can be found here.

Google Summer of Code — **Australia (Remote)**
Intern — *June 2021 – August 2021*

Development of sovabids, an open-source software for EEG to BIDS conversion funded by the Google Summer of Code 2021 program and organized by the INCF organization. The project was done in collaboration with the Swinburne University of Technology, the University of Queensland and the Australian National Imaging Facility. Documentation can be found online. My main supervisor was Oren Civier, who provided a letter of recommendation in this link. The certificate provided by Google can be found here.

Computational Neuroscience Student Group (NEUROCO) — **Medellín, Colombia**
Adviser of the EEG line — *2019 – On Going*

I Led the EEG line of research from early 2021 to the middle of 2022. My tasks were giving talks to the students about EEG processing and Machine Learning, helping students with their research and coding projects and miscellaneous administrative duties. A certificate can be found here.

Genetics and Biochemistry of Microorganisms Group (GEBIOMIC)   **Medellín, Colombia**

Undergraduate Researcher   *August 2019 – On Going*

I have been working on the processing and visualization of protein-expression data to help the modelling of the immune system of Galleria Mellonella (a moth). I'm supervised by Mauricio Corredor, who gave a letter of recommendation available here.

Biohacking Colombia   **Medellín, Colombia**

From Regular Member to Leader of R&D   *Mid 2018 – Late 2019*

I led and helped diverse projects coming from free technologies and the do-it-yourself movement. Most notably, the development of a low-cost veterinary neurostimulator for assistance in regional anesthesia. Moreover, I assisted in the elaboration of educational material. I also gave a workshop of ten 4-hour sessions to parents and their children regarding robotics in "Casa de la Cultura" at Los Colores, Medellin. In this organization I learned a lot about collaborative working and scientific dissemination. I was supervised by Juan Felipe Zapata Martinez, who gave a letter of recommendation that can be read here.

USB's Audio Club (CAUSB)   **Miranda, Venezuela**

From regular member to vice-president   *2015 – 2017*

I was one of the first members of "Club de Audio USB" (Simón Bolívar University's Audio Club). During my time there I was promoted from regular member to vice-president. Mostly my main responsibility consisted on either leading or developing the projects of the group regarding the academic study of sound and acoustics: doing public speakings, developing courses, contacting experienced people inside and outside of the university, etc. I was often trusted with other jobs like developing content for social media, managing our research-oriented room in the university, helping on the construction of our first music studio, on the fund-raising activities and on the organization of events. Moreover, I helped professor Julio Walter with the development of a guitar pedal based on a differential vacuum tube amplifier. Mostly my job consisted on mounting circuits, gaining information on available similar pedals, and testing our pedal with musicians to acquire feedback from them. During this time I also helped him by building a database of electronic components which gave me a basic skill with Microsoft Access. In addition, I started the development of a piezoelectric-based ultrasound transducer for underwater pulse-echo imaging under the direction of José Cappelletto. I could only do literature research for this as I migrated to Colombia shortly after.