Hector D Orozco Perez

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Education

- **McMaster University** — Hamilton, ON, Canada
  MSc Psychology, Neuroscience, and Behavior — *Sept. 2016 - Present*
- **Monterrey Institute of Technology and Higher Education** — Santa Fe, Mexico City, Mexico
  BSc in Music Production Engineering, Honors Mention (Elect Eng + Music Prod) — *Aug. 2011 - Dec. 2015*

Experience

- **Montreal Neurological Institute** — Montreal, QC, Canada
  Graduate Research Trainee — *May 2018 - Present*
  - **megFingerprinting**: I used advanced digital signal processing (spatial and spectral filtering, dimensionality reduction, hilbert transform...) to extract features from resting state magnetic brain activity recordings. Using these, I built a classifier (artificial neural network) to answer the question: are brain connectivity patterns specific to individuals?
- **NeuroTechX** — Montreal, QC, Canada
  Research Collaborator — *March 2016 - Sept 2016*
  - **Brainlock**: We aimed to develop an authentication system based on a specific kind of electrical brain response (the N400, an event-related potential). In this design, we flash different acronyms to the user with the expectation that they will know some of them. These known acronyms will elicit the N400, helping us identify the individual.
- **McGill University** — Montreal, QC, Canada
  Undergraduate Research Trainee — *Jan. 2015 - June 2016 & March 2016 - Sept. 2016*
  - **Binaural Beats**: We characterized brain responses to Binaural Beats. I developed several skills, from finding gaps in the scientific literature to basic processing of electrical brain signals (preprocessing, fourier analysis, hypothesis testing...).
  - **Toning**: We aimed to elucidate if toning, a music therapy technique, regulates anxiety, or if it only acts as a placebo. My role was to develop software (Max MSP) that (1) showed an animated circle indicating participants how they had to breath, and (2) synchronized the EEG data stream with the physiology data acquisition tools.

Projects

- **hyperMusic**: In my masters thesis project, I aim to characterize a mapping of the neural substrates of social interaction by using advanced signal processing (beamforming, filtering, time-frequency decompositions) and information theory techniques (symbolic transfer entropy).

Programming Skills

- **Languages**: Python (Keras, Pandas, NumPy, SciPy, Scikit-learn, Matplotlib/Seaborn), MATLAB, Max MSP, R (basic), C (basic), Arduino (basic)

Relevant Courses

- **Graduate**: Digital Signal Processing, Analyzing Neural Time Series Data
- **On-line**: Deep Learning Prerequisites: The Numpy Stack and Linear Regression in Python, Deep Learning in Python, Deep Learning A-Z: Hands-On Artificial Neural Networks (On-Going), Intro to Data Analysis (On-going)
- **Workshops**: Summer School in Nonlinear Dynamics (2018)
- **Undergraduate**: Problem solving with programming, Audio programming, Differential Equations, Electric Circuits, Digital Systems, Electronics

Award Summary

- **McMaster University (2017 - 2018)**: International Student Excellence Scholarship
- **NSERC-CREATE Complex Dynamics (2017-2018)**: Graduate Fellowship
- **McMaster University Library (2017)**: OpenCon Travel Scholarship