Daniel Carbonero

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BIOMEDICAL ENGINEERING, MACHINE LEARNING, NEUROSCIENCE WEBSITE: dannycarbonero.github.io

SELECTED PROFESSIONAL EXPERIENCE

Graduate Research Fellow
Neuronal Dynamics Lab – Department of Biomedical Engineering at Boston University
Supervisor: **John White PhD**
March 2020 – Present

- Develop and adapt linear and manifold learning dimensionality reduction (DR) machine learning methods for unsupervised neuronal network dynamic analyses recorded with calcium imaging under unique neural contexts.
- Built constraining for non-negative matrix factorization DR to also allow semi-supervised analysis approaches to neuronal network dynamics.
- Develop and write software wrapper packages to make complex machine learning methods more easily accessible and implementable to end users.
- Collaborate with experimental lab scientists to best apply developed analytical methods to their collected data to answer groundbreaking, novel, and complex neurological questions.

Associate Engineer
Bio-Vitro Incorporated
Supervisor: **Siddarth Rawal MD**
May 2019 – August 2019

- Optimized design of previously constructed fluid handling platform for unattended, automated, cell culture and cell signaling analysis under physiological conditions for production and sending to collaborating labs to make organs-on-chips more technically accessible.
- Supported/troubleshot collaborators on use of produced platforms.

Undergraduate Research Assistant
Duke University Research Experience for Undergraduates – Neurological Prosthesis Laboratory
Supervisor: **Warren Grill PhD**
May 2018 – August 2018

- Modified and completely automated a fully computational, Deep Brain Stimulation, Parkinson's Disease (PD) Neurological model to simulate networks of neurons using experimentally recorded data as inputs.
- Modeled PD in rat brain using upstream, experimentally recorded, neuron firing as input to simulate, characterize, and analyze downstream Thalamus function and activity to assess effectiveness of Deep Brian Stimulation as treatment for PD.

Undergraduate Research Assistant
Physiomimetic Microsystems Laboratory – Biomedical Nanotechnology Institute at the University of Miami (BioNIUM)
Supervisor: **Ashutosh Agarwal PhD**
May 2017 – May 2019

- Developed automated software pipelines for immunohistochemical fluorescent microscope image data acquisition, processing, and analysis for reproducible quantification of microphysiological systems.
- Wrote front-end software packages to allow end users to easily and reproducibly process and analyze image data for various platforms (heart, neuro-muscular junction, metastasis.
- Designed, prototyped, and manufactured an integrated and completely automated platform for continuous cell culture and dynamic cell secretion analysis of microphysiological systems.

EDUCATION

Boston University
Expected Doctor of Philosophy in Biomedical Engineering (2024)

Boston University
Master of Science in Biomedical Engineering (August 2022)

University of Miami
Bachelor of Science in Biomedical Engineering (May 2019)
Cum Laude

SKILLS

Programming: Highly Proficient in: Python, MATLAB.
Comfortable with: HTML, CSS, R. Familiar with: C, C++, Java
Engineering Design: CAD, SOLIDWORKS, Rapid Prototyping
Software: Arduino IDE, COMSOL Multiphysics, ImageJ
Document Preparation: Microsoft Office, Adobe Illustrator
Certifications: Six Sigma Green Belt
Languages: Native in Spanish, fluent in English

HONORS AND AWARDS

NSF Research Traineeship Program Understanding the Brain: Neurophotonics Trainee
NIH Translational Research in Biomaterials Training Grant Trainee
Boston University Biomedical Engineering Distinguished Fellowship
University of Miami College of Engineering Senior Design Industry Impact Award
Alpha Eta Mu Beta - National biomedical engineering honor society
Omicron Delta Kappa Honor Society - National leadership honor society
Tau Beta Pi Honor Society -National engineering honor society