

# Daniel Carbonero

EMAIL: dcarbo@bu.edu

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/troubleshoot 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 Brain 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

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