# Seyed Yahya Shirazi, Ph.D.

## Postdoctoral Associate, New York University

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## EXPERIENCE (SELECTED)

### Postdoctoral Associate

**New York University**

May 2021 – Present  New York, NY

- Study the cortico-muscular connectivity during stroke rehabilitation using high-density EEG and high-density EMG for an NSF/FDA-funded project. I explore objective biomarkers to evaluate the efficacy of rehabilitation devices.
- Study muscle network biomarkers of stroke rehabilitation and fatigue. We quantify changes in intermuscular connectivity using network metrics.

### Graduate Research Assistant

**University of Central Florida**

Jan. 2017 – April 2021  Orlando, FL

- Studied young and older adults' responses to mechanical perturbations during a seated exercise. I collected & analyzed high-density EEG, EMG & biomechanical data. Analyses included biomechanical behavior, EEG spectrotemporal analysis, source estimation using ICA, & cortico-muscular connectivity.
- Developed new 3D position recording methods to digitize EEG electrode locations, using a motion capture system abd 3D scanners. I implemented several image-processing & clustering techniques including iterative closest point (ICP) & Gaussian mixture model (GMM).
- Constructed deep neural network models for online classification of EEG signals to find movement intention in a locomotor task prior to movement execution.

## EDUCATION

### Doctor of Philosophy

**University of Central Florida | Mechanical Engineering**

Jan. 2017 – April, 2021

- Dissertation : Corticomuscular adaptation to mechanical perturbations in a seated locomotor task

### Master of Science

**Tehran Polytechnic | Biomedical Engineering**

Sep. 2011 – Feb. 2014

- Thesis : Dynamic Postural Stability Analysis on Standing Normal Subjects & Transtibial Amputees.

### Bachelor of Science (with Honors)

**Tehran Polytechnic | Biomedical Engineering**

Sep. 2007 – Sep. 2011

- top 3rd in the department

## SKILLS

- Biomedical signal acquisition
  - HD-EEG, HD-EMG, EMG, Motion Capture (reflective marker and markerless), Kinectics
- Signal processing and machine learning
  - Matlab: EEGLAB, SP, NN, DL, Image processing
  - Simulink: IoT (Raspberry, Arduino), Control
  - Python: Numpy, Pandas, Scipy, Scikit Learn, MNE
  - GitHub, VSCode, Docker, Ray (futures), Dask
- Human 3D modeling
  - Mimics, XOR
- Product development
  - SolidWorks, Ansys (Structural, CFD, FSI), Visio

## PROJECTS (ECA, SELECTED)

**Perturbations on-the-go**

- Developed a real-time controller to create resistive perturbations during stepping exercise.
- The controller is scalable to small to small exercise devices using an IoT kit.

**Zombie ant biomechanics using ResNet**

- Implemented DeepLabCut toolbox (a ResNet network for pose estimation and tracking) to track antennae and limb segments of Carpenter ants before and after infecting with Ophiocordyceps unilateralis (Zombie) fungus. link to the video: `pic.twitter.com/59Qk9fLJHU`

## PUBLICATIONS (SELECTED)

**Shirazi, S. Y.** & Huang, H. J. *Differential theta-band signatures of the anterior cingulate and motor cortices during seated locomotor perturbations*, IEEE TNSRE, 2021. link to the article: `10.1109/tnsre.2021.3057054`

**Shirazi, S. Y.** & Huang, H. J. *More reliable EEG electrode digitizing methods can reduce source estimation uncertainty, but current methods already accurately identify Brodmann areas*, Frontiers in Neuroscience, 2019. link to the article: `10.3389/fnins.2019.01159`

## PATENT

**S.Y.Shirazi**: *Centrifugal Micro-viscometer. A lab-on-a-chip device to assess viscosity of biological fluids*, Iran Patent #77944, June 2012.