

# SEYED YAHYA SHIRAZI

## Ph.D. Candidate in Mechanical Engineering

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in /seyedyahya   /neuromechanist

## EXPERIENCE

### Graduate Research Assistant

#### UCF BRaIN Lab

Jan. 2017 – Present   Orlando, FL

- Study responses of young and older adults to mechanical perturbations during exercise on a robotic recumbent stepper. We collect & analyze EEG, EMG & biomechanical data. Analyses span from studying the biomechanical behavior to cortico-muscular connectivity analysis.
- Developed new 3D position recording methods to digitize EEG electrode locations, using a motion capture system or 3D scanners. For this project, we 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.

### Graduate Research Assistant

#### Tehran Polytechnic

Sept. 2011 – Feb. 2014   Tehran, Iran

- Studied responses of transtibial amputees and healthy participants to different mechanical perturbations during standing.
- Designed and created a multi-directional perturbing mechanism that disturbs participants in the pitch and roll directions.
- Designed a pneumatic control system to create rapid movements for the perturbing mechanism using LabVIEW.

## EDUCATION

### Doctor of Philosophy

#### University of Central Florida | Mechanical Engineering

Jan. 2017 – Apr. 2021 (expected)

- Post Candidacy, GPA: 3.75

### Master of Science

#### Tehran Polytechnic | Biomedical Engineering

Sept. 2011 – Feb. 2014

- Thesis : Dynamic Postural Stability Analysis on Standing Normal Subjects & Transtibial Amputees.
- GPA: 3.76

### Bachelor of Science (with Honors)

#### Tehran Polytechnic | Biomedical Engineering

Sep. 2007 – Sep. 2011

- Bachelor Project: Development of a Stability Analyzer featuring a Perturbation Module
- GPA: 3.70 (top 3rd in the department)

## SKILLS

- Biomedical signal acquisition
  - EEG, EMG, Motion Capture, Force
- Signal processing and machine learning
  - Matlab: 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](https://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 Transactions on Neural Systems and Rehabilitation Engineering, 2020 (submitted)

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](https://doi.org/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.