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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 aim to 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 EEG, EMG & biomechanical data. Analyses included biomechanical behavior, EEG spectrotemporal analysis & cortico-muscular connectivity.
- Developed new 3D position recording methods to digitize EEG electrode locations, using a motion capture system and 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 & Transfemoral Amputees.

Bachelor of Science (with Honors)

Tehran Polytechnic | Biomedical Engineering

Sep. 2007 – Sep. 2011

- top 3rd in the department

SKILLS

- Biomedical signal acquisition
 - EEG, EMG, Motion Capture, Force
- 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 Transactions on Neural Systems and Rehabilitation Engineering, 2021. link to the article: [10.1109/tnsre.2021.3057054](https://doi.org/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](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.