Zeinab Esmaeilpour

PhD candidate, Neural engineering Lab, Department of Biomedical Engineering, The City College of New York of the City University of New York

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Qualification

- +5 years of experience in biological signal processing (EEG, fMRI, hippocampal gamma oscillation)
- Thorough familiarity with ML in clustering, classification and regression algorithms with SciKit-Learn, PyTorch, Numpy and pandas, Jupyter, matplotlib libraries in python.
- Experience in data visualization using couple of brain imaging visualization softwares.

Education and Training:

PhD Biomedical Engineering at Neural Engineering Lab, Department of Biomedical Engineering, The City College of New York of the City University of New York (CUNY) (2017-Present, expected in 2022)

Internship at Neural Engineering Lab, Department of Biomedical Engineering, The City College of New York of the City University of New York (CUNY), (2016-2017)

Research assistant Biomedical engineering, Amirkabir university of Technology, Tehran, Iran, (2013-2015)

MSc Biomedical engineering, Bioelectric, Tehran University, Tehran, Iran (2010, 2012).

BSc Electrical Engineering-Control, Sharif University of Technology, Tehran, Iran (2005-2009)

Experience

Graduate Research Assistant (City college of New York)

- Design and implement experiments to answer how high frequency electrical stimulation affects gamma oscillation signals in hippocampus
- Used signal processing, pattern recognition, and statistical models to analyze electrophysiology data using Matlab/Python to predict physiological response to treatment.
- Implemented computational neuronal network model to explain modulations observed in hippocampus

Graduate Research Assistant (Tehran University)

- Analyzing EEG and Auditory brainstem response (ABR) signals using time-dependent and Recurrence qualification analysis (RQA) to extract features for ADHD and neurologically normal population.
- Build classifiers using support vector machine (SVM) to classify ADHD children based on the extracted features

University/ College Lecturer, Teacher assistant

- Biomedical Transducers and instrumentation
- Bioelectrical circuits
- Signal processing

Research area of Interest:

- Biological Signal Processing
- Computational modeling
- Non-invasive Brain stimulation (tDCS, tACS, tRNS)
- Structural and computational modeling of head and morphological differences
- fMRI analysis, connectivity and dynamic evaluations

Programing Languages and technical skills:

- Programing: MATLAB, R, Python, NEURON, COMSOL
- Data Analysis: Biomedical signal processing and machine learning
- Experimental Neuroscience: In-vitro electrophysiology
- Medical imaging and design: fMRI analysis (SPM, FSL), FEM modeling

Publications:

Esmaeilpour, Z., Kronberg, G., Reato, D., Parra, L.C., Bikson, M. Temporal interference stimulation targets deep brain regions by modulating neural oscillations. Brain stimulation, 2020.

Esmaeilpour, Z., Shereen, A.D., Ghobadi-Azbari, P., Datta, A., Woods, A.J., Ironside, M., O'Shea, J., Kirk, U., Bikson, M., Ekhtiari, H.,Methodology for tDCS integration with fMRI. Human Brain Mapping, (2020)

Adair, D., Truong, D., Esmaeilpour, Z., Gebodh, N., Borges, H., Ho, L., Bremner, J.D., Badran, B.W., Napadow, V., Clark, V.P. Electrical stimulation of cranial nerves in cognition and disease. Brain Stimulation, (2020)

Jiang, J., Truong, D.Q., Esmaeilpour, Z., Huang, Y., Badran, B.W., Bikson, M. Enhanced tES and tDCS computational models by meninges emulation. Journal of Neural Engineering, (2020)

Bikson, M., Esmaeilpour, Z., Adair, D., Kronberg, G., Tyler, W.J., Antal, A., Datta, A., Sabel, B.A., Nitsche, M.A., Loo, C. Transcranial electrical stimulation nomenclature. Brain Stimulation, (2019)

Morya, E., Monte-Silva, K., Bikson, M., Esmaeilpour, Z., Biazoli, C.E., Fonseca, A., Bocci, T., Farzan, F., Chatterjee, R., Hausdorff, J.M., Beyond the target area: an integrative view of tDCS-induced motor cortex modulation in patients and athletes. Journal of neuroengineering and rehabilitation, (2019)

Meiron, O., Gale, R., Namestnic, J., Bennet-Back, O., Gebodh, N., Esmailpour, Z., Mandzhiyev, V., Bikson, M. Antiepileptic Effects of A Novel Non-Invasive Neuromodulation Treatment in a Subject with Early-Onset Epileptic Encephalopathy: Case report with 20 sessions of HD-tDCS intervention. Frontiers in Neuroscience, (2019)

Gebodh, N., Z. Esmaeilpour, D. Adair, K. Chelette, J. Dmochowski, A. J. Woods, E. S. Kappenman, L. C. Parra and M. Bikson. Inherent physiological artifacts in EEG during tDCS. NeuroImage, (2018).

Bikson, M., B. Paneri, A. Mourdoukoutas, Z. Esmaeilpour, B. W. Badran, R. Azzam, D. Adair, A. Datta, X. H. Fang and B. Wingeier. Limited output transcranial electrical stimulation (LOTES-2017): Engineering principles, regulatory statutes, and industry standards for wellness, over-the-counter, or prescription devices with low risk. Brain Stimulation: Basic, Translational, and Clinical Research in Neuromodulation,(2018).

Meiron, O., R. Gale, J. Namestnic, O. Bennet-Back, J. David, N. Gebodh, D. Adair, Z. Esmaeilpour and M. Bikson. "High-Definition transcranial direct current stimulation in early onset epileptic encephalopathy: a case study." Brain injury, (2018).

Esmaeilpour, Z., P. Marangolo, B. M. Hampstead, S. Bestmann, E. Galletta, H. Knotkova and M. Bikson. Incomplete evidence that increasing current intensity of tDCS boosts outcomes. Brain stimulation, (2018).

Esmaeilpour, Z., M. Milosevic, K. Azevedo, N. Khadka, J. Navarro, A. Brunoni, M. R. Popovic, M. Bikson and E. T. Fonoff. Intracranial voltage recording during transcranial direct current stimulation (tDCS) in human subjects with validation of a standard model. Brain Stimulation: Basic, Translational, and Clinical Research in Neuromodulation,(2018)

Esmaeilpour, Z., P. Schestatsky, M. Bikson, A. R. Brunoni, A. Pellegrinelli, F. X. Piovesan, M. M. Santos, R. B. Menezes and F. Fregni. Notes on human trials of transcranial direct current stimulation between 1960 and 1998. Frontiers in human neuroscience, (2017).

Gebodh, N., D. Adair, K. Chelette, Z. Esmaeilpour, M. Bikson, J. Dmochowski, L. Parra, A. Woods and E. Kappenman. Modulation of physiologic artifacts during concurrent tDCS and EEG. Brain Stimulation: Basic, Translational, and Clinical Research in Neuromodulation, (2017)

Gebodh, N., D. Adair, K. Chelette, Z. Esmaeilpour, M. Bikson, J. Dmochowski, A. Woods and E. Kappenman Physiologic Artifacts When Combining EEG and tDCS. Brain Stimulation: Basic, Translational, and Clinical Research in Neuromodulation, (2017).

Alonzo, A., S. Aaronson, M. Bikson, M. Husain, S. Lisanby, D. Martin, S. M. McClintock, W. M. McDonald, J. O'Reardon and Z. Esmaeilpour. Study design and methodology for a multicentre, randomised controlled trial of transcranial direct current stimulation as a treatment for unipolar and bipolar depression. Contemporary clinical trials, (2016)

Esmaeilpour, M., F. Allahabadi and Z. Esmaeilpour. Regularized logistic regression algorithm learns progressive sweep algorithm. Image and Vision Computing New Zealand (IVCNZ), 2015 International Conference on, IEEE,(2015).

Esmailpoor, Z., A. M. Nasrabadi and S. Malayeri. An auditory brainstem response-based expert system for ADHD diagnosis using recurrence qualification analysis and wavelet support vector machine. Electrical Engineering (ICEE), 2015 23rd Iranian Conference on, IEEE, (2015).

Book Chapter:

Gebodh, N., Z. Esmaeilpour, D. Adair, P. Schestattsky, F. Fregni and M. Bikson (2019). Transcranial Direct Current Stimulation Among Technologies for Low-Intensity Transcranial Electrical Stimulation: Classification, History, and Terminology. Practical Guide to Transcranial Direct Current Stimulation, Springer: 3-43.

Bikson, M., W. Paulus, Z. Esmaeilpour, G. Kronberg and M. A. Nitsche (2019). Mechanisms of Acute and After Effects of Transcranial Direct Current Stimulation. Practical Guide to Transcranial Direct Current Stimulation, Springer: 81-113.

Woods, A. J., M. Bikson, K. Chelette, J. Dmochowski, A. Dutta, Z. Esmaeilpour, N. Gebodh, M. A. Nitsche and C. Stagg (2019). Transcranial Direct Current Stimulation Integration with Magnetic Resonance Imaging, Magnetic Resonance Spectroscopy, Near Infrared Spectroscopy Imaging, and Electroencephalography. Practical Guide to Transcranial Direct Current Stimulation, Springer: 293-345.

Presentations:

- Diversity in Neuromodulation, panelist: *How enhancing Representation enhances the science* Neuromodulation and science conference, Napa, Oct 2019, Napa.

- Society for Neuroscience, Poster: *Amplitude-Modulated High-Frequency Electric Field Stimulation of Hippocampal Gamma Oscillations in-vitro*, Oct 2019, Chicago.
- North American Neuromodulation Society, poster: *How structural and functional MRI can be leveraged to investigate variance in response to tDCS: A methodological note on study design and parameter space*, Sep 2018, New York.
- Society for electroporation-based technology and treatment, poster: *Testing the feasibility of non-invasive brain electroporation using rat and human models*, Sep 2017, Norfolk, Virginia.
- Society for Neuroscience, Poster: *How do we know tDCS works*, Oct 2016 San Diego, California.
- "Biophysical Approach to Transcranial Current Stimulation" workshop on tDCS ($5^{th}, 6^{th}$ round), Iranian National Center for Addictive Studies (INCAS) (http://incas.tums.ac.ir/) 20-21 Jan & 17-18 Sep 2015, Tehran.
- "Biophysical Approach to Transcranial Current Stimulation" workshop on tDCS ($3^{th}, 4^{th}$ round), Iranian National Center for Addictive Studies (INCAS) (http://incas.tums.ac.ir/) 22-23 Aug & 16-17 Jan 2014, Tehran.
- "Computational modeling and transcranial current stimulation", in Basic and Clinical Neuroscience Congress (BCNC), 2013, Tehran.

Activities & Memberships:

- Neural Engineering seminar and speaker series meeting organizer 2019-Present
- Reviewer for journals: Brain stimulation, Cortex, iscience, Neuroimage, frontiers, Neuromodulation: Technology at the Neural Interface, Brain research 2016 - Present
- Social media editor for Brain stimulation journal 2020 - Present
- Society for Neuroscience Member 2016 - Present
- Organization for computational Neuroscience Member 2017 - Present

Awards:

- Young Investigator Award, The 2018 joint meeting of NYC neuromodulation Conference & NANS summer series
- Poster prize for 64th Annual meeting of DGKN 2020, German society for clinical neurophysiology and functional imaging