

SADEGH EBRAHIMI

sdgh.ebrahimi@gmail.com, (650) 766-3687

[ebrahimisadegh.github.io](https://github.com/ebrahimisadegh)

EDUCATION

Stanford University, Palo Alto, CA

Sep 2012 - June 2019

- PhD Electrical Engineering - Computational neuroscience at Schnitzer-Lab
- MSc Electrical Engineering - Computer architecture

Sharif University of Technology, Tehran, Iran

Sep 2008 - June 2012

- BS Electrical Engineering

EXPERIENCES

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- **Quantitative/Neural Engineer - Feinstein Institute for Medical Research** *Aug 2021 - Present*
Decoded hand movements from electrode array or EMG recordings of spinal cord injury patients using machine learning. Engineered software for statistical analysis and experimental use during human clinical studies of patients with spinal cord injury.
 - **Lead AI and Software Engineer - Neuvotion-Inc** *Aug 2021 - Present*
Developed firmware with embedded AI for wearable neuro muscular stimulators.
 - **Post Doctoral Scholar in computational neuroscience - Stanford University** *June 2019 - Aug 2021*
Supervised jointly by Prof. Surya Ganguli and Prof. Mark Schnitzer, applied machine learning and statistical methods to analyze large-scale cortical neural imaging in mice. Designed and built a miniature spherical VR setup for mice neural imaging studies.
 - **Software Engineer Intern - Oracle** *June 2017 - Sep 2017*
Designed a machine learning method to summarize large numbers of failure events on computer networks which was patented by Oracle (See below).

SKILLS

Programming: Python (SciPy, NumPy, Scikit-learn, TensorFlow, PyTorch), C++, MATLAB, C.
Machine Learning: Regression, Hypothesis testing, Signal Processing, Unsupervised Learning, Deep Learning, Time-series Analysis, Neural Decoding.
Hardware Programming: Arduino IDE, LabView.
Graphical Design: Illustrator, Inventor (3D printing).

SELECTED PROJECTS

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- **Large scale study of neural coding in mouse cortical networks:** Applied machine learning and statistical analysis methods on large scale neural recordings of mouse cortex to study stability of neural decoders over time and information sharing between brain areas. Led the entirety of the project and the results were published in the **Nature** journal (details and news coverage in [personal website](#)).
 - **Embedded AI for smart wearable neuro-muscular electrical stimulator:** Designed an embedded AI using Tensorflow Lite to decode a patient's motor intentions and activate intended hand and finger movements using neuromuscular stimulation. Developed the firmware to run the AI in real-time on the wireless wearable smart stimulator that is configured by a mobile app and drives neuro-muscular interfaces (see [Neuvotion](#)).
 - **Visual reconstruction of natural scene images from neural activities using deep learning:** Using deep encoder-decoder networks, reconstructed the natural scene images that the mouse was looking at during a VR navigation from its neural activity in the visual cortex. Conceived and led the project during post-doc and was awarded a **Simons Foundation grant**. Initial results are under review to be published in NeuroIPS22 (details and examples on [personal website](#)).
 - **Quantitative study of the effect of residual connections in deep neural networks :** Studied in detail the effect that adding residual connections to a deep convolutional neural net has on training time, overfitting, and accuracy. Conceived the project during the Convolutional Neural Networks class with Prof. Feifei Li and Dr. Karapathy (see below for the publication).

AWARDS AND HONORS

Simons Collaboration on the Global Brain Pilot Awards , Stanford University	2021
Stanford EE Departmental Fellowship , Stanford University	2012 - 2013
Ranked 24th in the nation in Iran's national university entrance exam.	2008

SELECTED PUBLICATIONS

- *Emergent reliability in sensory cortical coding and inter-area communication*, Ebrahimi et al., 2022, **Nature**.
- *Study of residual networks for image recognition*, Ebrahimi, M.S.; Abadi H.K., Intelligent Computing 2021, Springer. **Cited By 30**.
- *Monolithic 3D integration advances and challenges: From technology to system levels.*, Ebrahimi et. al., Intelligent Computing 2021, Springer. **Cited By 24**.
- *Using and updating topological relationships amongst a set of nodes in event clustering*, Ebrahimi, M.S.; Patti, R.H.R.; Garvey, D.; Oracle International Corp, 2020. U.S. Patent 10,678,610. **Cited By 1**.