



# PARHAM MOSTAME

PhD candidate at U. of Illinois at Urbana Champaign

Coding portfolios: [GitHub](#)

Social media: [LinkedIn](#) | [Twitter](#)

Academic portfolio: [Google Scholar](#)

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Technical expertise

- Python (4 years)
  - MATLAB (10 years)
- Human biomedical data (fMRI | EEG | ECG | CT)
  - Data cleaning & manipulation
- Machine learning
  - Deep learning
- Signal processing
  - Image processing
- Statistical testing
  - Network analysis

Education

- Doctoral degree in neuroscience –with a minor in computer science– at the University of Illinois at Urbana Champaign, IL, USA. (GPA: 3.9) (Current; 2018-2024)
  - Master’s degree in biomedical engineering at the University of Tehran, Tehran, Iran. (GPA: 4.0) (2015-2017)
  - Bachelor’s degree in electrical engineering (control systems) at the University of Tehran, Tehran, Iran. (GPA: 3.2) (2010-2015)

Selected Research Projects

- Decoded human perception of ambiguous stimuli using fMRI brain data. I predicted participant responses to upcoming ambiguous stimuli using kernel SVM that was trained on functional brain network data of participants five seconds prior to the stimulus onset. Model performance considerably exceeded a data-driven null model (Z-score > ~10).
- In a rare concurrent fMRI and intracranial EEG human data, I studied the principles governing the spatio-temporal convergence of brain networks across data modalities. Using clustering techniques, I identified brain states where the networks derived from fMRI and iEEG converge. This study was a highly collaborative project with several neurosurgeons and engineers based across the US and Europe.
- Led a pilot study that received funding by the NFS (National Foundation of Science) in 2023. I implemented a real-time Graphic User Interface (GUI) to create a complicated cognitive task design and collected behavioral responses of ~40 healthy subjects.
- Implemented a full data cleaning pipeline for scalp EEG which includes visual inspection, filtering, interpolation, Independent Component Analysis, spectral analysis, etc.

Relevant Personal Projects

- Implemented a multiple-model deep learning architecture to detect presence of abdominal trauma in five abdominal organs using over 400GB of CT images. After an in-depth data inspection and cleaning, I trained a 2D U-Net from scratch to segment the organs (>90% dice score). Then, CT images masked with extracted segmentations were fed to CNN architectures to identify the extent of abdominal trauma in each organ (<0.20 log-loss error).
- Constructed a high-precision SVM classifier (99%) for predicting eye state from scalp EEG data. This accuracy was achieved due to rigorous data cleaning and feature extraction, utilizing ICA for blink artifact removal, interpolation for electrode jump correction, and zero-phase filtering for alpha band oscillations.
- Constructed Network of Networks (NoN) in the brain by implementing MANE algorithm from scratch using EEG data, emphasizing interactions among multiple functional networks across neural timescales.
- Designed a CNN architecture to classify Melanoma skin cancer from other benign skin conditions. I achieved an ~90% accuracy in predicting the true skin conditions.

Courses & Certifications

- Applied data science (Coursera Specialization)
  - SQL for data science (Coursera)
- Machine learning
  - Principles of data mining
- Neural network modeling lab
  - Digital signal processing
- Digital image processing
  - Stochastic processes

Honors & Awards

- Invited talk at the Mayo clinic, Rochester, MN, USA. (2022)
  - Graduate student fellowship of Beckman institute for advanced science and technology (one out of seven total awardees), IL, USA (2020)
  - Invited talk at Big Data Neuroscience Workshop, Ann Arbor, MI, USA. (2019)

Work Experience

- Setting up a collaborative infrastructure between the university of Illinois and the Carle hospital to collect intracranial human brain recordings from epileptic patients. I prepared the IRB documents and will be directly involved in data acquisition alongside the neurosurgeons. (2022)
- Mentoring undergraduate students for their summer internship and/or their volunteer research studies. (2019-2022)
- Teaching experience in relevant courses such as Digital signal processing, Digital image processing, Stochastic processes, Biomedical signal processing, etc. (2014-2020)

Selected Publications

- **Mostame P.**, Wirsich J., Alderson T., Ridley B., Giraude A., Carmichael D. W., Vulliemoz S., Guye M., Lemieux L., Sadaghiani S. (2022). “Concurrent fMRI and intracranial EEG capture spatially similar connectome states at asynchronous and frequency-specific times”. *bioRxiv*.
- **Mostame P.**, & Sadaghiani S. (2021). “Oscillation-based connectivity architecture is dominated by an intrinsic spatial organization, not cognitive state or frequency”. *Journal of Neuroscience*, 41(1), 179-192.
- **Mostame, P.**, & Sadaghiani, S. (2020). Phase-and amplitude-coupling are tied by an intrinsic spatial organization but show divergent stimulus-related changes. *NeuroImage*, 219, 117051.
- **Mostame, P.**, Moharrampour, A., Hossein-Zadeh, G. A., & Babajani-Feremi, A. (2019). Statistical significance assessment of phase synchrony in the presence of background couplings: an ECoG study. *Brain topography*, 32, 882-896.
- Moharrampour, A., **Mostame, P.**, Hossein-Zadeh, G. A., Wheless, J. W., & Babajani-Feremi, A. (2018). Comparison of statistical tests in effective connectivity analysis of ECoG data. *Journal of Neuroscience Methods*, 308, 317-329.

Hobbies

- Volleyball, Boxing, Cooking, House plants, Ping Pong, Nonfiction books.