Zeinab Mohammadi
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CURRENT POSITION

Princeton University, Princeton, NJ
Postdoctoral researcher; Advisor: Jonathan Pillow, Jan 2021 - present

EDUCATION

University of Colorado, CO, USA
Ph.D. in Electrical Engineering – Neuroengineering, 2016 - 2020, GPA: 3.88/4

University of Colorado, CO, USA
M.Sc. in Electrical Engineering – Signal Processing, 2016 - 2019, GPA: 3.78/4

Ferdowsi University of Mashhad, Mashhad, Iran
M.Sc. in Electrical Engineering – Wireless Systems, 2011 - 2014, GPA: 3.83/4

Iran University of Science and Technology, Tehran, Iran
B.Sc. in Electrical Engineering – Electronics, 2005 - 2010

RESEARCH & TEACHING EXPERIENCES

- **Princeton University,** 2020- present
  Using Hidden Markov Model (HMM) and Bayesian state-space models to study animal decision-making task and analyze behavioral data
- **AbbVie Internship,** Biopharmaceutical and Biotech Company, Chicago, IL, summer 2019
  - Working with experts in the field of medical devices and understanding various aspects of the field including engineering research and testing, human factors, quality and regulatory compliance
  - Analyzing data in various tools, scripting and macro building opportunity for automation, and electromechanical engineering testing.
  - Setting up and validating equipment for wireless communication testing (analyzers, data sniffers, EM chambers, etc. for Bluetooth, NFC, PCB design and similar technologies).
- **University of Colorado (CU)**, 2016 - 2020
  - Using machine learning and signal processing techniques for computational neuroscience
  - Employing KiloSort2 and MountainSort to analyze microelectrode array (MEA) recordings
  - Closed-loop stimulation for neurological disorders
  - Developing a Brain-machine interface based on a new spike sorting algorithm (EGNG)
- **University of Colorado Anschutz Medical Campus**, 2017 – 2020
  - Large scale electrophysiology with Neuropixels probes
  - In vitro and in vivo studies/experiments
  - Medical imaging project
- **Sapienza University of Rome and Northumbria University at Newcastle**, 2015 - 2016
  Research Project: Visible light communication (VLC)
- **Ferdowsi University of Mashhad**, 2012 - 2014
  Thesis: Multicarrier communication system (score: 19/20)

- **Iran University of Science and Technology**, 2009 - 2010
  Thesis: Removing noise from medical images using wavelet transform on FPGA (19.5/20)

- Affiliate Faculty (Part-Time): Logic Design (Verilog and FPGA) and Electronic Lab, CU, 2019
- Affiliate Faculty (Part-Time): Circuit II, Metropolitan State University (MSU), 2018 - 2019
- Affiliate Faculty (Part-Time): Advanced C Programming, MSU, 2018 - 2019
- Teaching Assistant: Signal and Systems, and Modern Control, CU, 2016 - 2018
- Head of laboratory and lecturer of Logic Circuits Lab and Electronic Lab, Iran, 2012 - 2014

AWARDS/HONORS

Swartz Foundation Postdoctoral Fellowship, Princeton University, 2021-2023

EE Graduate Support Award, $5k, CU, 2017 - 2019

RaCAS Award Winner in Engineering and Math, CU, 2018

CEAS Award, $2k, CU, 2017

The most outstanding applicant award (Scholarship), $34 k, CU, 2016 - 2017

Research scholarship, Sapienza University of Rome, Italy, 2015 - 2016

Ranked 2nd among students of Master's in Electrical Engineering program, 2014

Top 3% of the Master's degree participants in the National Entrance Exam, 2011

Top 0.1% among over 360,000 students in Iranian University Entrance Exam, 2005

MANUSCRIPTS, PREPRINTS & PUBLICATIONS

[1] **Mohammadi, Z.**, Ashwood, Z., IBL., Pillow J. W., 2023. Learning what drives state transitions underlying behavior using GLM-HMM with GLM-based transitions. (Under preparation)

[2] **Mohammadi, Z.**, Ashwood, Z., Pinto, L., Tank, D. W., Brody C. D., Pillow J. W., 2022. Identifying latent states in decision-making from cortical inactivation data. *Computational and Systems Neuroscience Conference.*

[3] **Mohammadi, Z.**, DJ Denman, A. Klug, and T. C. Lei. A fully automatic multichannel neural spike sorting algorithm with spike reduction and positional feature. (On bioRxiv and under review in *Nature Communications engineering*)

[4] **Mohammadi, Z.**, Kincaid, J.M., Pun, S.H., Klug, A., Liu, C. and Lei, T.C., 2019. Computationally inexpensive enhanced growing neural gas algorithm for real-time adaptive neural spike clustering. *Journal of Neural Engineering.*

[5] **Mohammadi, Z.**, Klug, A., Liu, C. and Lei, T.C., 2019, March. Data reduction for real-time enhanced growing neural gas spike sorting with multiple recording channels. In 2019 *9th International IEEE/EMBS Conference on Neural Engineering (NER)* (pp. 1084-1087). *IEEE*.

[6] Pergoloni, S., **Mohamadi, Z.**, Vegni, A. M., Ghassemlooy, Z., & Biagi, M. (2017). Metameric indoor localization schemes using visible lights. *Journal of Lightwave Technology*, *35*(14), 2933-2942. *IEEE*.

[7] Pergoloni, S., **Mohamadi, Z.**, Vegni, A. M., Ghassemlooy, Z., & Biagi, M. (2017, May). Visible Light indoor positioning through colored LEDs. In 2017 *IEEE International Conference on Communications Workshops (ICC Workshops)* (pp. 150-155). *IEEE*.

[8] **Mohammadi, Z.**, & Zamiri-Jafarian, H. (2015, May). MIMO filter-bank multicarrier system using unique word OFDM. In *Electrical Engineering (ICEE)*, 2015 23rd Iranian Conference on (pp. 483-488). *IEEE*.

PATENT

Lei, T.C., **Mohammadi, Z.**, Klug, A. and Liu, C., 2020. *Process and hardware implementation of adaptive real-time neural spike sorting*. U.S. Patent Application 16/868,340.

CONFERENCES/WORKSHOPS

- Allen Institute Modeling Software Workshop, Seattle, July 2023
- International Brain Laboratory meeting by the Simons Foundation, New York, April 2023
- National Postdoctoral Association annual conference, Philadelphia, April 2023
- COSYNE conference, Montreal, Canada, March 2023
- Presentation at the Swartz Foundation Annual Meeting, CSHL, Aug 2022
- Give a talk in International Brain Laboratory annual science meeting, Portugal, May 2022
- Presenting at the Princeton Neuroscience Institute retreat, May 2022
- Presenting at the COSYNE conference, Lisbon, Portugal, 2022
- Presenting at the "IEEE Brain Neurotech Workshop", AZ, December 2019
- Poster presented at the Rocky Mountain Regional Neuroscience Group (RMRNG), a local area chapter of the National Society for Neuroscience (SfN), CO, April 2019
- Poster session presented at the 9th International IEEE Engineering in Medicine and Biology Society Conference on Neural Engineering San Francisco, CA, March 2019
- Ranked 3rd at the AbbVie poster session, IL, August 2019
- Poster presented at the RaCAS (Research and Creative Activities Symposium), CU, 2018

TECHNICAL SKILLS

Python, MATLAB, C, Verilog (FPGA), AVR microcontroller (Code vision)

KiloSort2, MountainSort and KlustaViewa

ImageJ, Quartus II, Orcad, Pspice, Modelsim

EXTRA ACTIVITIES

Participating in "WOMEN AS INNOVATORS: Creating success in the workplace", Anschutz Medical Campus, Feb. 7, 2020

Participating in "Leadership Certificate in Sustainability" program, CU, spring 2020

Participating in "Emerging Leaders" program, CU, spring 2020

Cooperation in holding Spring Summit Conference as a committee member, The SWE Rocky Mountain Section and Colorado School of Mines Section, April 2020

Participation in "International Space Apps Challenge in collaboration with NASA and Sapienza University of Rome", Italy, 2016

Cooperation in holding 21 & 23 Iranian Conferences on Electrical Eng. at Sharif University, Iran, 2015

REFERENCES

- Jonathan Pillow, Ph.D., Professor of Psychology, Princeton University
  pillow@princeton.edu, 609 258 7848
- Carlos Brody, Ph.D., Professor of Neuroscience, Princeton University
  brody@princeton.edu, 609 258 7645