Mahdiyar Shahbazi

CONTACT INFORMATION

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EDUCATION

Ph.D., Computational Neuroscience | Harvard University, USA **09/2023 - Present**

- Department of Organismic & Evolutionary Biology
- Advisor: Bence Ölveczky
- Currently on a leave of absence

MSc, Computational Neuroscience | Western University, Canada **01/2021 - 08/2023**

- Schulich School of Medicine & Dentistry
- Advisor: Jörn Diedrichsen and Andrew Pruszynski

BSc, Electrical Engineering | Sharif University, Iran **09/2016 - 07/2020**

- Department of Electrical Engineering
- Advisor: Hamid Aghajan and Hamed Nili

RESEARCH EXPERIENCES

Research Associate | Western University, Canada **08/2023 - Present**

- Implemented recurrent neural network (RNN) models that replicate task generalization
- Explored task generalization by analyzing high-dimensional neural network activity

Graduate Researcher | Western University, Canada **01/2021 - 07/2023**

- Managed four international research projects, yielding six research articles
- Presented findings at 4 international conferences with support from competitive travel awards
- Developed and implemented experimental devices for sensorimotor research
- Collected and analyzed behavioral data from 160 participants and functional MRI data from 40 participants
- Implemented a new statistical model evaluation pipeline for multivariate brain data analysis (Matlab & Python)

Undergraduate Researcher | Sharif University, Iran **01/2018 - 12/2020**

- Designed and implemented a geometry-aware metric for enhanced analysis of multivariate data
- Analyzed multiple functional MRI datasets
- Developed innovative weight initialization schemes for Convolutional Neural Networks, boosting training efficiency and network performance
- Authored papers and delivered presentations in various invited talks

Teaching Experience

Five years of teaching-related experience. **A curated selection follows:**

- **Intro to Data Science (undergrad & grad)** - Western Uni. **2021 - 2022**
  Led tutorials and designed homework
- **Data Analytics (undergrad)** - Western Uni. **Spring 2022**
  Led tutorials and graded homework
- **Causal Inference (grad)** - Sharif Uni. **Fall 2019**
  Led tutorials, designed, and graded homework
- **Deep Learning (grad)** - Sharif Uni. **Fall 2019**
  Led tutorials, designed, and graded homework
- **Signals and Systems (undergrad)** - Sharif Uni. **Spring 2018**
  Designed and graded homework, quizzes, and projects

Professional Experience

Data Science Intern | Digikala.com, Iran **06/2019 - 09/2019**

- Conducted causal time-series analyses to assess the impact of advertisements on purchases
- Delivered biweekly presentations, effectively communicating data insights to representatives

Member of the rsagroup | `https://github.com/rsagroup` **2021 - Present**

- Implemented Python code in an open-source toolbox for analyzing brain data

Mentorship

- Lingling Lin (MSc Thesis) - Western Uni. **10/2021 - 2023**
- Amy Jing (Undergraduate Researcher) - Western Uni. **1/2022 - 9/2022**
- Ryan Weiner (Undergraduate Researcher) - Western Uni. **9/2021 - 3/2022**
- Arash Mahmoudian Bidgoli (Undergraduate Researcher) - Sharif Uni. **6/2018 - 6/2019**

Awards

Neural Control of Movement (NCM) Conference Travel Scholarship **2023**

Western University Neuroscience Research Day (NRD) Top Presentation Award **2023**

Western University Neuroscience Conference Travel Award **2022**

BrainsCAN Scholarship for Graduate Students - $50,000 **2021-2023**

Iran's National Elites Foundation Scholarship for Academic Excellence **2016-2020**

Top 0.06% ranking out of +250,000 undergraduate applicants in the National Universities Entrance Exam **2016**

Publications

** Shared first authorship.*

Love, K., ..., **Shahbazi, M.**, Smoulder, A., 2023. Highlights from the 32nd Annual Meeting of the Society for the Neural Control of Movement. *Journal of neurophysiology.*

*Ariani, G., *__Shahbazi, M.__, Diedrichsen, J., 2023. Cortical areas for planning sequences before and during movement. *bioRxiv.*

Shahbazi, M., Ariani, G., Kashefi, M., Pruszynski, J., Diedrichsen, J., 2023. Neural correlates of online action preparation. *bioRxiv.*

Kashefi, M., Reschechtko, S., Ariani, G., **Shahbazi, M.**, Diedrichsen, J., Pruszynski, J., 2023.Interaction of multiple future movement plans in sequential reaching. *bioRxiv*.

*__Shahbazi, M.__, *Shirali, A., Aghajan, H. and Nili, H., 2021. Using distance on the Riemannian manifold to compare representations in brain and in models. *NeuroImage*.

Diedrichsen, J., Berlot, E., Mur, M., Schütt, H.H., **Shahbazi, M.** and Kriegeskorte, N., 2021. Comparing representational geometries using whitened unbiased-distance-matrix similarity. *Neurons, Behavior, Data analysis, and Theory*.

Manuscript in preparation

Shahbazi, M., Pruszynski, J., Diedrichsen, J., 2023. Repeating movement sequences facilitates both effector-dependent and -independent processes.

Shahbazi, M., Lin, L., Diedrichsen, J., 2023. Anatomically-informed spatial noise models improve inference for multi-voxel pattern analysis.

Conference presentations

Shahbazi, M., Ariani, G., Pruszynski, A. and Diedrichsen, J., 2023. Neural correlates of online movement preparation. Neural Control of Movement, Victoria, Canada.

Conference posters

Shahbazi, M., Lin, L., Diedrichsen, J., 2023. Anatomically-informed spatial noise models improve inference for multi-voxel pattern analysis. The Organization for Human Brain Mapping, Montreal, Canada.

Diedrichsen, J., **Shahbazi, M.**, Ariani, G., Berlot, E., 2023. Determining the true correlation between two activity patterns in the presence of measurement noise. The Organization for Human Brain Mapping, Montreal, Canada.

Shahbazi, M., Ariani, G., Pruszynski, A. and Diedrichsen, J., 2023. Using repetition effects to study the building blocks of motor sequence learning. Neural Control of Movement, Victoria, Canada.

Shahbazi, M., Ariani, G., Pruszynski, A. and Diedrichsen, J., 2022. Repetition effects in extrinsic and intrinsic coordinates reveal shared representations of movement sequences across the two hands. Neural Control of Movement, Dublin, Ireland.

Ariani, G., **Shahbazi, M.** and Diedrichsen, J., 2022. Distinct cortical areas for planning sequences before and during movement. Neural Control of Movement, Dublin, Ireland.

Outreach & Service

- Sensorimotor Superlab weekly reading list (`https://superlab.ca/`) **2021 - Present**
  Contributor
- Western Brainhack event (`brainhackwestern.github.io`) **2022**
  Co-Organizer
- Member of CausalAI reading group (`http://ee.sharif.ir/~causalai`) **2019 - 2021**
  Presented cutting-edge causal inference findings biweekly
- IEEE Student Branch Committee **2018**
  Committee Member

Skills

Programming Languages

- **Programming Languages:**
  Python (including PyTorch, SciPy, scikit-learn, matplotlib, seaborn, pandas), C/C++, R, Bash

- **Related Softwares:**
  MATLAB (SPM), Connectome Workbench, FreeSurfer, FSL, Simulink
- **Languages:**
  Farsi (native), English (TOEFL: reading 24 / listening 29 / speaking 26 / writing 24)
- **Music:**
  Early advanced pianist (15 years), Late intermediate Santoor player (7 years)