Shahab Bakhtiari, PhD

CONTACT INFORMATION

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Mila - Quebec AI Institute
Montreal,
QC, Canada

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EMPLOYMENT AND RESEARCH EXPERIENCE

- **Assistant Professor** - Dept. of Psychology - Université de Montréal - **from 2023**
- **Postdoctoral Researcher** - Mila (Quebec AI Institute) - **2019 to Present**
  Superviser: Dr. Blake A. Richards

EDUCATION

McGill University, Montreal, Canada

- PhD, Neuroscience – **2012 to 2019**
  - **Thesis Title:** *"On the neuronal mechanisms of visuomotor transformation in humans"*
    Supervisor: Dr. Christopher C. Pack
    Co-supervisor: Dr. Abbas F. Sadikot

University of Tehran, Tehran, Iran

- M.Sc., Electrical Engineering, Biomedical Engineering – **2009 to 2012**
  - **Thesis Title:** *"Identification and Estimation of Resting-state Brain Networks Using State-space Representation and fMRI data"*
    Supervisor: Dr. Gholam-Ali Hossein-Zadeh
- B.Sc., Electrical Engineering, Control – **2004 to 2009**
  - **Thesis Title:** *"Perceptual Image Quality Assessment"*
    Advisor: Dr. Alireza Nasiri Avanaki

PUBLICATIONS

Preprint articles:

- K. Nasiotis, S. Neupane, **S. Bakhtiari**, S. Baillet, C. C. Pack (2022) "Tracking the dynamics of perisaccadic visual signals with magnetoencephalography." *bioRxiv.*
- L. Y. Prince, **S. Bakhtiari**, C. J. Gillon, B. A. Richards (2021) "Parallel inference of hierarchical latent dynamics in two-photon calcium imaging of neuronal populations." *bioRxiv.*

Refereed articles:

- A. Awada, **S. Bakhtiari**, C. Legault, C. Odier, C. C. Pack, (2022) "Training with optic flow stimuli promotes recovery in cortical blindness." Restorative Neurology and Neuroscience Preprint: 1-16.

- ⇨ **S. Bakhtiari**, P. Mineault, T. Lillicrap, C. .C. Pack, B. A. Richards, (2021) "The functional specialization of visual cortex emerges from training parallel pathways with self-supervised predictive learning." **Spotlight presentation**, In Thirty-Fifth Conference on Neural Information Processing Systems.
- ⇨ P. J. Mineault, **S. Bhaktiari**, B. A. Richards, C. C. Pack (2021) "Your head is there to move you around: Goal-driven models of the primate dorsal pathway." **Spotlight presentation**, In Thirty-Fifth Conference on Neural Information Processing Systems.
- ⇨ A. Awada, **S. Bakhtiari**, C. C. Pack (2021) "Visual perceptual learning generalizes to untrained effectors." Journal of Vision, 21(3):10.
- ⇨ **S. Bakhtiari**, A. Awada, C. C. Pack (2020) "Influence of stimulus complexity on the specificity of visual perceptual learning." Journal of Vision, 20(6), 13-13.
- ⇨ **S. Bakhtiari**, A. Altinkaya, C. C. Pack, A. F. Sadikot (2020) "The role of subthalamic nucleus in inhibitory control of oculomotor behavior in Parkinson's disease", Scientific reports, 10(1), 1-11.
- ⇨ **S. Bakhtiari** (2019) "Can deep learning model perceptual learning?", *J Neurosci*, 39 (2). 194-196.
- ⇨ **S. Bakhtiari**, C. C. Pack (2018) "Functional specialization in area MT for smooth pursuit initiation", *MNI Open Res*, 2:6.
- ⇨ **S. Bakhtiari**, G. A. Hossein-Zadeh (2012) "Subspace-based Identification Algorithm for characterizing causal networks in resting brain", *Neuroimage*, vol. 60, pp. 1236-1249.
- ⇨ **S. Bakhtiari**, F. Mokhtari, A. Sojoudi, G. A. Hossein-Zadeh, D. Horn, M. Walter "Backward Edge Elimination Using Graph Kernels: Analysis of Abnormal Brain Connectivity in Resting-state," in *Proc.* 17^{th} *Annual Meeting of the Organization on Human Brain Mapping*, 2011.
- ⇨ F. Mokhtari, **S. Bakhtiari**, G. A. Hossein-Zadeh, H. Soltanian-Zadeh, "Discriminating Between Brain Rest and Attention States Using fMRI Connectivity Graph and Subtree SVM", in *Proc. SPIE 8314*, 2012. →Download here

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Invited Talks

- ➢ "Specialized parallel pathways in brains and artificial neural networks," JULAIN Talk, Forschungszentrum Julich, Germany, March 2022.
- ➢ "Learning brain-like, specialized parallel pathways in artificial neural networks," brAIn seminar series, Carnegie-Mellon University, October 2021.
- ➢ "The functionalspecialization of visual cortex emerges from training parallel pathways with self-supervisedpredictive learning," the BigBrain Workshop, September 2021.
- ➢ "Modeling the dual stream of mouse visual cortex," AccelNet meeting, August 2021.
- ➢ "Learning to predict: A self-supervised learning framework for modeling mouse visual cortex," Neuroprosthetics, July 2020.
- ➢ "Learning to predict: A self-supervised learning framework for modeling mouse visual cortex," Canadian Computational Neuroscience spotlight, July 2020.

- "Targeted plasticity for visual perceptual learning," IPN Retreat, October 2018.
- "The Effect of Levodopa on eye movements in Parkinsons disease patients," Montreal Neurological Institute, Neurosurgery day, November 2017.

Honors and Awards

- AccelNet Exchange Grant. $10,000 - October 2021.
- HIBALL postoctoral fellowship. $50,000 - September 2021.
- CIFAR Deep Learning and Reinforcement Learning Travel Award. $700 - August 2019.
- Montreal Neurological Institutes Jeanne Timmins Costello (JTC) award. $10,000 - September 2013 to August 2014.
- **Ranked 1st** out of 20+ M.Sc. students in Biomedical Engineering major of Electrical and Computer Engineering Department class of 2010, University of Tehran.
- **Ranked 63th** out of 10000+ participants in the Nation-wide Universities Entrance Exam for Master of Science in Electrical Engineering in Iran – **Summer 2009**.
- **Ranked 163th** out of 500000+ participants in the Nation-wide Universities Entrance Exam in Iran (Konkoor) – **Summer 2004**.
- College of Engineering Scholarship as an Exceptional Talent – **Summer 2004**

Teaching Experience

- Digital Image Processing – **Fall 2011**
- Biological System Modeling – **Fall 2011**
- System Identification – **Spring 2011**
- Probability and Statistics – **Fall 2010**
- Digital Image Processing – **Fall 2010**
- Probability and Statistics – **Spring 2010**
- Probability and Statistics – **Fall 2009**

Professional Activities

- Mentoring in Neuromatch Academy 2021: As part of the Neuromatch Academy training, a group of 6 students were assigned with a project at the intersection of vision neurosceince and deep learning. I provided feedback, supervision, and advice during the project.
- Reviewer for the following journals: Science, Cell, PLOS Computational Biology, Nature Scientific Reports, Frontiers in Computational Neuroscience, Patterns

➢ Reviewer for the following conferences: NeurIPS (2022), Cosyne (2020-2021), Shared Visual Representations in Human Machine Intelligence (SVRHM - 2020-2021), annual meeting of Organization on Human Brain Mapping

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References

References are available upon request

NOS GUBERNATORES PRINCEPS SOCII

UNIVERSITATIS MCGILL

AD MONTEM REGIUM IN CANADA SITAE OMNIBUS AD QUOS HAE LITTERAE PERVENERINT SALUTEM.

NOS UNIVERSITATIS GUBERNATORES PRINCEPS SOCII TESTAMUR NOS

Shahab Kadkhodaeian Bakhtiari

CUM CURRICULUM STUDIORUM PRAESCRIPTUM CUM INDUSTRIA

CONFECERIT ET OMNES EXERCITATIONES QUAE EI SINT INIUNCTAE RITE PEREGERIT, CREAVISSE

DOCTOREM PHILOSOPHIAE

ATQUE EI OMNES HONORES IURA BENEFICIA QUAE AD ILLUM GRADUM PERTINEANT CONCESSISSE. QUOD AD CONFIRMANDUM HAS LITTERAS SIGILLO UNIVERSITATIS CONSIGNANDAS ET NOMINA EORUM QUI RES ADMINISTRANT SUBSCRIBENDA CURAVIMUS. DATAE DIE XXXI MENSIS MAII ANNI DOMINI MMXIX

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TABULARIUS

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