Pouya Bashivan, PhD

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Education

2012–2016	**Ph.D. - Computer Engineering**

Ph.D. - Computer Engineering

the University of Memphis, Memphis, TN
Thesis: "Commonality and Singularity in Working Memory Network Predicting Performance and Individual Differences"
Advisors: Mohammed Yeasin and Gavin M Bidelman

2006–2009   **Master of Science - Electrical and Control Engineering**

Khaje Nasir Toosi University of Technology, Tehran, Iran
Thesis: "Designing Multiple-Model Controllers Using Self-Organizing Maps"
Advisor: Alireza Fatehi

2001–2006   **Bachelor of Science - Electrical and Control Engineering**

Khaje Nasir Toosi University of Technology, Tehran, Iran
Thesis: "A Parallel to USB Interface with High Speed Control Applications"
Advisor: Jafar Nobari

Professional Experiences

Aug 2020–   ***Assistant Professor***
McGill University, Montreal, QC, Canada

Department of Physiology

Mar–Aug2020   ***Postdoctoral Fellow***
Université de Montréal, Montreal, QC, Canada

Quebec Artificial Intelligence Institute (MILA)
Mentored by Drs. Irina Rish and Blake Richards

2016–2020   ***Postdoctoral Associate***
Massachusetts Institute of Technology, Cambridge, MA

McGovern Institute for Brain Research, Dep. of Brain and Cognitive Sciences
Laboratory of Dr. James J DiCarlo

2012–2016   ***Graduate Research Assistant***
University of Memphis, Memphis, TN
Laboratory of Dr. Mohammed Yeasin

June–Oct 2015   ***Summer Intern***
IBM T.J. Watson Research Center, Yorktown Heights, NY
Mentor: Irina Rish

2010–2012	**_Senior Control Systems Engineer_**
	PIMA Engineering Co. Tehran, Iran
	Role: Datacenter Control/Monitoring Systems Design

2009–2010	**_Electrical & Control Engineer_**
	Middle East Petro Gas Co., Tehran, Iran
	Role: Industrial Control Systems Design

2007–2009	**_Electrical & Control Engineer_**
	Borna Petro Payab Co., Tehran, Iran
	Role: Industrial Electrical and Control Systems Design

Successful Grant Applications

2021-2026	William Dawson Scholar Award ($50k)
2021-2026	(PI) NSERC-Discovery Grant ($152.5) – Developing and validating computational models of working memory in the human prefrontal cortex
2021-2022	(PI) Compute Canada Resource for Research Groups Competition ($54k in access fees to computational resources) – _Learning to use working-memory with multi-task reinforcement learning_
2020-2023	(PI) HBHL start up supplement ($200k) – Computational modeling of visual perception and working memory in primates
2019-2020	(Co-PI) JARVE 1-year ($127k) - Non-invasive modulation of emotion-related brain states
2018-2019	(Co-PI) MIT-IBM 1-year exploratory grant ($150k) - Pinpointing the Internal Functional Differences between Biological and Artificial Neural Networks
2017-2018	(Co-PI) MIT-IBM 1-year exploratory grant ($150k) - Non-Stationary AI: Neural Networks with Synaptic Weights and Circuit Designs that Never Stop Adapting

Honors and Awards

2021	William Dawson Scholar Award
2020-2021	UNIQUE Excellence Scholarship (postdoctoral level)
2018	Computational Cognitive Neuroscience Conference (CCN) best paper award
2016	Kavli Summer Institute in Cognitive Neuroscience Fellowship
2015	Summer institute in Cognitive Neuroscience Fellowship
2013–2016	Herff Fellowship, University of Memphis
2006	Top 0.4% in the nationwide University Entrance Exam among more than 30,000 participants in Iran (M.Sc. Degree)
2001	Top 0.1% in the nationwide University Entrance Exam among more than 1,500,000 participants in Iran (B.Sc. Degree)

Presentations and Lectures

- (invited) CognoGap weekly seminars – Sharif University - Iran (January 2021)
- (invited) Montreal AI Neuroscience Conference (December 2020)
- (invited) Cognitive Neuroscience Competition (October 2020)
- (invited) University of Montreal – MILA (July 2020)
- (invited) McGill university CAMBAM seminar series (May 2020)
- COSYNE workshop - scrutinizing models of brain function, Breckenridge CO (Mar 2020)
- Cognition Lunch, BCS, MIT (Apr 2019)

- MIT-IBM Research Week: workshop on Lifelong Learning, Stability vs. Plasticity, Catastrophic Interference (Oct 2018)
- **(Best Paper Award)** Computational Cognitive Neuroscience Conference (Sep 2018)
- MIT Center for Brains, Minds and Machines summer school, Woodshole, MA (Aug 2018)
- The IEEE Signal Processing in Medicine and Biology Symposium (Dec 2015)
- IBM T.J. Watson Research Center (Sep 2015)
- University of Memphis CS research day (Nov 2013)

Teaching Experience

Graduate Level

Summer 2019 CBMM Summer School – Computational Models of Vision, Woodshole MA
Summer 2018 CBMM Summer School – Computational Models of Vision, Woodshole MA
2015–2016   Teaching assistant, Machine Learning, Memphis TN

Undergraduate Level

Fall 2020   Analyzing Physiological Systems (PHGY425) – Neural network models of visual perception
Fall 2015   IEEE HKN - Undergraduate mentoring program, Memphis TN
2014–2015   Teaching assistant, Machine Learning, Memphis TN
2014–2015   Teaching assistant, Signals and Systems I and II, Memphis TN
Summer 2014 Circuits I lab supervisor, Memphis TN

Memberships

2020-Present   Member - Unifying AI and Neuroscience – Quebec (UNIQUE)
2020-Present   Member - Centre for Applied Mathematics in Bioscience and Medicine (CAMBAM)
2020-Present   Member - Integrative Program in Neuroscience (IPN-McGill)
2020-Present   Associate member - Quebec Artificial Intelligence Institute (MILA)
2017–2020   Center for Brains, Minds, and Machines
2015–Present   Member of IEEE Eta-Kappa-Nu (HKN)
2013–2016   Student member of Cognitive Neuroscience Society (CNS)
2012–2016   Institute for Intelligent Systems (IIS)

Services

2020   Organizing 2-day COSYNE workshop "Scrutinizing models of brain function"
2013, 2014   Volunteer instructor - K-12 STEM campus tours
2013–2014   Vice President, Persian Student Association, the University of Memphis
2012–2013   Treasurer, Persian Student Association, the University of Memphis

Ad Hoc Journal Reviewer

Trends in Cognitive Sciences, Proceedings of the National Academy of Sciences (PNAS), Nature Communications Biology, PLOS Computational Biology, European Journal of Neuroscience, Neural Computation, Neural Information Processing Systems (NeurIPS), Conference on Computer Vision and Pattern Recognition (CVPR), Auditory Cognitive Neuroscience (Frontiers), Frontiers in Computational Neuroscience, International Conference on Representation Learning (ICLR) Neuroimage, IEEE Journal of Biomedical and Health Informatics, Entropy, IEEE Transactions on Biomedical Engineering, Artificial Intelligence Review (AIRE), Neural Networks.

Publications

- Murty AR*, **Bashivan P***, Bates A, DiCarlo JJ, Kanwisher N. "Computational models of category-selective brain regions enable high-throughput tests of selectivity" (under review).
- Bidelman, G, Brown J A, and **Bashivan P** "Auditory cortex supports verbal working memory capacity." *NeuroReport,* 32.2, 163-168 (2021).
- **Bashivan, P**, Richards B, and Rish I "Adversarial Feature Desensitization." *arXiv preprint arXiv:2006.04621*(2020).
- **Bashivan P***, Kar K*, DiCarlo J J (2019), Neural Population Control via Deep Image Synthesis, *Science.*
- **Bashivan P**, Tensen M, DiCarlo J J (2019), Teacher Guided Architecture Search*, International Conference on Computer Vision (ICCV).*
- Schrimpf M, Kubilius J, Hong H, Majaj N J, Rajalingham R, Issa E B, Kar K, **Bashivan P**, Prescott-Roy J, Schmidt K, Yamins DLK, DiCarlo J J (2019), Brain-like object recognition with high-performing shallow recurrent ANNs, *NeurIPS.*
- Jozwik KM, Lee M, Marques T, Schrimpf M, **Bashivan P** (2019) Large-scale hyperparameter search for predicting human brain responses in the Algonauts challenge, *Algonauts workshop.*
- N Blanchard, J Kinnison, BR Webster, **P Bashivan**, WJ Scheirer (2019), A Neurobiological Evaluation Metric for Neural Network Model Search, *Computer Vision and Pattern Recognition (CVPR).*
- Schrimpf M, Kubilius J, Hong H, Majaj N J, Rajalingham R, Issa E B, Kar K, **Bashivan P**, Prescott-Roy J, Schmidt K, Yamins DLK, DiCarlo J J (2018), Brain-score: Which artificial neural network for object recognition is most brain-like?, *BioRxiv.*
- **Bashivan P**, Schrimpf M, Ajemian R, Rish I, Riemer M, Tu Y (2018) Continual Learning with Self-Organizing Maps, *NIPS Workshop on Continual Learning.*
- Arend L, Han Y, Schrimpf M, **Bashivan P**, Kar K, Poggio T, DiCarlo JJ, Boix X. (2018) Single units in a deep neural network functionally correspond with neurons in the brain: preliminary results. *Center for Brains, Minds and Machines (CBMM).*
- **(Best Paper) Bashivan P**, Kar K, DiCarlo J J (2018), Neural Population Control via Deep ANN Image Synthesis, *Computational Cognitive Neuroscience Conference (CCN).*
- Rajalingham R, Issa EB, **Bashivan P**, Kar K, Schmidt K, DiCarlo JJ (2018), Large-scale, High-resolution Comparison of the core visual object recognition behavior of humans, monkeys, and state-of-the-art deep artificial neural networks*, Journal of Neuroscience.*
- Dakka J, **Bashivan P**, Gheiratmand M, Rish I, Jha S, Greiner R (2017), Learning Neural Markers of Schizophrenia Disorder Using Recurrent Neural Networks, *NIPS workshop on Machine Learning for Health.*
- Gheiratmand M, Rish I, Cecchi G, Brown M, Greiner R, Polosecki P, **Bashivan P**, Greenshaw A, Ramasubbu R, and Dursun R (2017), Learning Stable and Predictive Network-based Patterns of Schizophrenia and its Clinical Symptoms (2017), *Nature Schizophrenia.*
- Mina Gheiratmand, Irina Rish, Guillermo Cecchi, Matthew Brown, Russell Greiner, **Pouya Bashivan**, Pablo Polosecki, Serdar Dursun (2017), Learning Discriminative Functional Network Features of Schizophrenia*, SPIE Medical Imaging.*
- **Bashivan P**, Yeasin M, Bidelman GM (2017), Temporal Progression in Functional Connectivity Determines Individual Differences in Working Memory Capacity, *International Joint Conference on Neural Networks (IJCNN).*
- **Bashivan P**, Rish I, Yeasin M, Codella NC (2016), Learning Representations from EEG with Deep Recurrent-Convolutional Neural Networks, *International Conference on Learning Representations (ICLR).*
- Rish I, **Bashivan P**, Cecchi GA, Goldstein RZ (2016), Evaluating Effects of Methylphenidate on Brain Activity in Cocaine Addiction: A Machine-Learning Approach*, SPIE Medical Imaging.*

- **Bashivan P**, Rish I, Heisig S (2015), Mental State Recognition via Wearable EEG, *Proceedings of NIPS workshop on Machine Learning and Interpretation in Neuroimaging (MLINI15)*.
- **Bashivan P**, Yeasin M, Bidelman GM (2015), Single trial prediction of normal and excessive cognitive load through EEG feature fusion, *Proceedings of IEEE Signal Processing in Medicine and Biology (SPMB)*.
- **Bashivan P**, Bidelman GM, Yeasin M (2014), Modulation of Brain Connectivity by Memory Load in a Working Memory Network*, Proceedings of IEEE Symposium Series on Computational Intelligence (SSCI)*.
- **Bashivan P**, Bidelman GM, Yeasin M (2014), Spectrotemporal dynamics of the EEG during working memory encoding and maintenance predicts individual behavioral capacity*, Eur. Journal of Neuroscience*.
- **Bashivan P**, Bidelman GM, Yeasin M (2013), Neural correlates of visual working memory load through unsupervised spatial filtering of EEG, *Proceedings of NIPS workshop on Machine Learning and Interpretation in Neuroimaging (MLINI13)*.
- **Bashivan P,** Fatehi A (2012), Improved Switching for Multiple Model Adaptive Controller in Noisy Environment*, Journal of Process Control*.
- **Bashivan P,** Fatehi A (2009), Design of Multiple Model Controller Using SOM Neural Network, *ISICE Journal of Control*.
- **Bashivan P**, Fatehi A, Peymani E (2008), Multiple-model control of pH neutralization plant using the SOM neural networks, *Proceedings of IEEE Conference on Control, Communication and Automation (INDICON)*.
- Peymani E, Fatehi A, **Bashivan P**, and Khaki–Sedigh A (2008), An Experimental Comparison of Adaptive Controllers on a pH Neutralization Pilot Plant, *Proceedings of IEEE Conference on Control, Communication and Automation (INDICON)*.