Parsa Delavari

Doctoral Student, UBC

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Education

2022–Now **The Univesity of British Columbia (UBC)**, Vancouver, Canada.
PhD in Neuroscience

2020–2022 **The Univesity of British Columbia (UBC)**, Vancouver, Canada.
Master of Science in Neuroscience
- **CGPA: 4/4**

2015–2020 **Sharif University of Technology (SUT)**, Tehran, Iran.
Bachelor of Science in Electrical Engineering
- **CGPA: 17.02/20 (3.49/4)**

Fields of Interest

- Neural Coding
- Computational Neuroscience
- Vision
- Deep Learning

Honors and Awards

2024 **Recipient**, *NSF AccelNet Award*, USD 10,000.

2023 **Recipient**, of the Faculty of Medicine Entrance Award.

2022–Now **Recipient**, of the President's Academic Excellence Initiative PhD Award.

2021 **Recipient**, of the George Wayne King Sr. and Beverley King- Dorsey Scholarship in Neuroscience.

2020 **Recipient**, of the Faculty of Medicine Entrance Award.

2020–Now **Recipient**, of the International Tuition Award.

2015 **Ranked 90th**, among more than 180,000 students in the National University Entrance Exam.

2015 **Member**, of the National Elites Foundation.

2015–2020 **Recipient**, of the grant for undergraduate students, from the National Elite Foundation.

2014 **Ranked 9th**, in the Iran's National Astronomy Exam.

2013 **Ranked 2nd**, in the 2^{nd} Hashtroodi Mathematics Contest.

2011 **Admitted**, to NODET (National Organization for the Development of Exceptional Talents).

Research Experience

Sep 2023 – Now **Representational learning on mouse visual responses**, Supervisors: **Dr. Timothy Murphy**.
- Designed a graph neural network (GNN) to model neural population dynamics using Allen Institute Neuropixels and Ca imaging datasets
- Classified cell classes (excitatory/inhibitory) using the learned latent representations of the neurons

Aug 2022 – June 2023 **CNNs as models of the Brain's Visual Cortex**, Supervisors: **Dr.Leonid Sigal** & **Dr.Ipek Oruc**.

- Used BOLD5000 fMRI dataset to predict brain responses to visual stimuli based on extracted features from a CNN model
- Demonstrated a hierarchical correspondence between CNN layers and the visual areas of the brain
- Proposed an objective criterion for evaluating CNNs in modelling the brain: comparing the performance of predicting brain responses to the presented images when CNN features are used to when the brain responses of other subjects are used

2020–2022 **Explainable Classification of Fundus Images Using Deep Learning: Uncovering Sex Differences in The Retina**, *Master's Thesis*, Supervisor: **Dr.Ipek Oruc**, NOVA Lab, UBC.

- Successfully classified patient sex based on retinal fundus images, a trait which is not visible to the expert human eye
- Utilized deep learning interpretation techniques (saliency maps and feature visualization) to uncover sex differences in the retina which were previously unknown
- Segmented anatomical parts of fundus images (e.g. optic disc, vessels) to statistically test and confirm the hypothesized sex differences in the retina
- Designed a methodology for explainable and automated diagnosis of neurodegenerative diseases such as Alzheimer's based on retinal fundus images using deep learning.

2018-2019 **Mechanisms Underlying The Propagation of Alpa-Band Traveling Waves**, *Bachelor's Project*, Supervisor: **Dr.Ali Ghazizadeh**, Brain-Center for Research in Artificial Intelligence and Neuroscience, SUT.

- Studied causality in the propagation of traveling waves by detecting spatial disturbances and analyzing the behavior of waves after these disturbances
- Devised a new method for measuring phase gradient consistency in traveling waves with higher performance

Summer 2019 **Precision of Time Perception in Human**, *Internship*, Supervisor: **Dr.Mir-Shahram Safari**, Neuroscience Research Center, Shahid Beheshti University.

- Designed psychophysical experiments using Psychtoolbox to measure precision of time perception in humans through presenting visual and auditory stimuli

Publications (Google Scholar profile)

- **Parsa Delavari**. "Explainable diagnosis using deep-learning: classification of fundus images as a promising tool for early detection of Alzheimer's disease." MSc diss., University of British Columbia, 2022. [PDF]
- Aaron Berk, Gulcenur Ozturan, **Parsa Delavari**, David Maberley, Özgür Yılmaz, Ipek Oruc. "Learning from few examples: Classifying sex from retinal images via deep learning." ***Plos one*** 18, no. 8 (2023): e0289211.
- **Parsa Delavari**, Gulcenur Ozturan, Lei Yuan, Özgür Yilmaz, Ipek Oruc. "Artificial intelligence, explainability, and the scientific method: A proof-of-concept study on novel retinal biomarker discovery". ***PNAS nexus*** 2, no. 9 (2023): pgad290.
- Ali Behrouz, **Parsa Delavari**, Farnoosh Hashemi. "Unsupervised representation learning of brain activity via bridging voxel activity and functional connectivity." ***NeurIPS 2023 AI for Science Workshop*** [PDF]

Poster Presentations

- **Parsa Delavari**, Leonid Sigal, Ipek Oruc. "CNN features generate synthetic fMRI responses to unseen images." ***NeuroAI 2023***

- **Parsa Delavari**, Ipek Oruc, Timothy H. Murphy. "SynapsNet: Enhancing Neuronal Population Dynamics Modeling via Learning Functional Connectivity." ***NeurIPS 2024 NeuroAI Workshop*** [PDF]

Professional Experience

2016–2017 **Advanced Tech Company**, *Electrical Engineer*.

- Designed a solar tracker panel with 2 methods:
  - Using light sensors to detect the position of the sun
  - Utilizing spherical astronomy to compute the position of the sun
- Learned how to drive servo motors using PLC and servo drive

Teaching Experience

Teaching Assistant

Fall 2023	Behavioural and Neuroscientific Research Methods	*UBC*
Fall 2022	Behavioural and Neuroscientific Research Methods	*UBC*
Winter 2022	Elementary Statistics	*UBC*
Fall 2021	Behavioural and Neuroscientific Research Methods	*UBC*
Summer 2021	Computational Neuroscience	*The Neuromatch Academy (NMA)*
Fall 2019	Data Networks	*SUT*
Fall 2018	Communication Systems	*SUT*

Related Courses

UBC	Learning to Move (Reinforcement Learning)	*87/100*
UBC	Advanced Topics in Visual Sciences	*93/100*
UBC	Machine Learning and Data Mining	*100/100*
SUT	Foundations of Systems and Computational Neuroscience	*18.5/20*
SUT	Machine Vision and Learning Lab	*18.3/20*

Technical Skills

Programming	Machine Learning	Neural-Behavioral
Python	PyTorch	EEGLAB
MATLAB	TensorFlow	Psychtoolbox
C/C++/C#	Scikit-Learn	FSL

Other Interests

- **Astrophotography** Click here to see some of my photos
- **Santoor (an Iranian musical instrument), Piano, and Ukulele**
- **Poetry**