

# Mehrab Hamidi

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## EDUCATION

**UNIVERSITÉ DE MONTRÉAL**  
PHD IN COMPUTER SCIENCE  
Since 2024

**MCGILL UNIVERSITY**  
MS.C. IN COMPUTER SCIENCE  
2022-2024

**SHARIF UNIVERSITY OF TECHNOLOGY**  
B.SC. IN COMPUTER SCIENCE  
2017-2022  
MINOR IN MATHEMATICS  
2019-2022

## INTERESTS

Deep Learning theory  
Energy based World Models  
Interpretability and Explainability  
Reinforcement Learning  
Mechanistic Interpretability  
Optimal Transport

## COURSEWORK

### GRADUATE

Theory of Deep Learning  
Probabilistic Graphical Models  
Bayesian Method in Statistics and Learning  
Mathematical Methods

### TEACHING ASSISTANT

Mathematical Tools for CS  
Statistical Machine Learning

## SKILLS

### PROGRAMMING

Java • C++ • Swift • Matlab  
Jax • Python • R •  $\text{\LaTeX}$

### FRAMEWORKS

Pytorch • Numpy • Networkx

## HONORS

AWARDED INTER-MATH-AI  
SCHOLARSHIP IMA 2024  
RANKED 130 AMONG ONE HUNDRED  
THOUSAND STUDENT ATTENDANCE  
IN UNIVERSITY ENTRANCE EXAM  
(KONKOUR) 2017

## EXPERIENCE

**STUDY NEURAL COLLAPSE IN THE LENS OF GEOMETRY** | 2024  
I worked on exploring architectural symmetries and geometrical causes related to neural collapse and lossless compression.

**SYNTHETIC BENCHMARK OF TGL METHODS** | 2024  
This project focuses on proposing a collection of synthetic tasks specifically designed to benchmark the ability of current TGL methods to capture and model archetypal sequential structures and patterns in dynamic graphs.

**REVERSE-ENGINEERING DEEP RELU NETWORKS** | 2023  
This project involved the development of techniques to deduce the weights, biases, and architecture of deep ReLU networks solely from input-output queries, without prior assumptions about their structure.

**RA INTERN** | 2021 | MCGILL  
I worked on variational likelihood-free methods for causal discovery in biological data

**MACHINE LEARNING ENGINEER** | 2020-2021 | AIMED, IRAN  
Developed and Deployed models for complex medical-related problems (mostly image type data) such as detecting disease from CT images during COVID

**MACHINE LEARNING ENGINEER** | 2019-2020 | FANAP, IRAN  
Deployed framework for Farsi Automatic Speech Recognition using cnn-based model to capture time dependent features.

## PUBLICATIONS

**INTERPRETABILITY IN ACTION: EXPLORATORY ANALYSIS OF VPT, A MINECRAFT AGENT** | ICML2024 MI WORKSHOP  
We performed exploratory analysis on the Video PreTraining (VPT) Minecraft playing agent, one of the largest open-source vision-based agents. We aimed to illuminate its reasoning mechanisms by applying various interpretability techniques.

**SOMATIC POINT MUTATIONS ARE ENRICHED IN NON-CODING RNAs WITH POSSIBLE REGULATORY FUNCTION IN BREAST CANCER** | NATURE COMMUNICATIONS BIOLOGY 2022  
This pioneering study introduced an integrative pipeline to analyze the mutational load across non-coding RNA genes in six cancer types, identifying significant cancer-specific mutations.

**PREDICTING SURVIVAL OF IRANIAN COVID-19 PATIENTS INFECTED BY VARIOUS VARIANTS INCLUDING OMICRON FROM CT SCAN IMAGES AND CLINICAL DATA USING DEEP NEURAL NETWORKS** | ELSEVIER, HELIYON 2023  
We proposed a deep neural network architecture for predicting survival based on simple clinical features, blood tests, CT scan images of lungs, and the patients' planned treatment. The model was trained on patients data from the some local hospitals.