

# HAMID KAMKARI

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<https://hamidrezakmk.github.io/>

## EDUCATION

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### University of Toronto

2022 - 2024

Master of Science in Applied Computing (MScAC)

Department of Computer Science

Ongoing Courses: (CSC2541) Topics in Machine Learning: Introduction to Causality (A+), (CSC2240) Graphs, Matrices, and Continuous Optimization, (CSC2701) Communication for Computer Scientists, (CSC2541) Advanced Topics in ML: Causal-aware Representation Learning, (CSC2130) Empirical Research Methods in Software Engineering

### Sharif University of Technology

2018 - 2022

Bachelor of Science

Overall GPA 19.22/20

Department of Computer Engineering

Ranked Among the Top 10

Courses: (CE695) Stochastic Processes, (CE417) Artificial Intelligence, (CE494) Introduction to Computational Biology, (CE282) Linear Algebra, (CE181) Fundamentals of Probability and Statistics, (CE354) Algorithm Design, (CE415) Theory of Formal Languages and Automata, (MAT034) Differential Equations

## RESEARCH AND PUBLICATION

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### Vector Institute

Toronto, Canada

Causal Discovery based on Normalizing Flows

November 2022 - Ongoing

- (Preparing manuscript)
- Used foundations in graph theory to come up with a new method of learning structures on directed acyclic graphs. Implemented a normalizing flow-based causal discovery and inference structure under the supervision of Rahul Krishnan, used the
- Pytorch Lightning framework for reproducibility, and within 3 months came up with an ICML2023 submission.

### Sharif University of Technology

Tehran, Iran

Predicting Drug Combination Effects by Utilizing Multi-Omics Data

January 2022 - September 2022

- Used Graph Neural Networks and Attention mechanisms to create a general state-of-the-art framework, named DeepDDR, for predicting drug dose response using SMILES representation of drugs.

### Maxplanck Institute of Informatics (MPI-INF)

Saarbrücken, Germany

Convex Optimization - Algorithmic Perspective of Training Neural Networks

August 2020 - February 2022

- Using foundations in linear algebra, curated ideas that led to a creative dynamic system for a set of convex optimization problems. This led to a paper under review (STACS) on novel algorithms for tackling Semi-Definite programs using nature-inspired dynamics.
- Undertook a second internship on the fundamentals of fine-grained bounds for fine-tuning simple overparameterized perceptrons. Using reduction from core algorithmic problems, proved fine-tuning problem on perceptrons is exponential w.r.t the dimension of the hidden units.

### Aalto University

Espoo, Finland

RNA sequence design using Graph Neural Networks

July 2021 - September 2021

- Created a data-driven method to find RNA sequences that can fold into a certain secondary structure.
- Modeled the problem as a Markov decision process and used Monte-Carlo Tree Search to speed up the search.

- Helped improve the rollout phase using GNNs. Inspired by notions of connectivity in graph theory, obtained a suitable GNN with smart skip connections that autoregressively assigns molecules to nodes and obtains state-of-the-art results on a class of RNA structures.

## WORK EXPERIENCE

### Fanap IT Company

January 2022 - August 2022

- Research and development on deep learning methods to help restore poorly taken photos of dental panoramic images that prevents reshooting and additional x-ray exposure, and additionally, help with the tooth disease detection pipeline of dentists.
- Implemented a novel U-Net for dynamic range unification using Pytorch that can help panoramic image restoration.
- Detectron2 Mask-RCNN for instance segmentation of teeth and treatments that can help computer-aided disease detection. Created Demo using Docker and FastAPI for proof of concept and sold MVP to a client with three active radiology clinics in Tehran; all in approximately three months.

### National Olympiad in Informatics Committee

September 2020 - December 2021

- Curated and organized nation-wide competitive contests for talented students all across Iran; helped with the technical infrastructure of the online code judging system using CMS online judge.

## TEACHING

### Academic Teaching Assistance

University of Toronto - Sharif University of technology

- Introduction to Artificial Intelligence (CSC236) Alice Gao January 2023 - Ongoing
- Introduction to the theory of Computation (CSC236) François Pitt September 2022 - December 2022
- Artificial Intelligence course (CE40417) Mohammad Hossein Rohban September 2021 - January 2022
- **Head** of Data Structure and Algorithms course (CE40254) - Mohammad Ghodsi January 2021 - June 2021
- Artificial Intelligence course (CE40417) Mohammad Hossein Rohban January 2021 - June 2021
- Probability and Statistics course (CE40181) Ali Sharifi-Zarchi September 2020 - January 2021
- Discrete Structures course (CE40115) Mohammad Ali Abam January 2020 - June 2020
- Advanced Algorithm design course (CE40354) Ali Sharifi-Zarchi January 2020 - June 2020
- Data structure and Algorithms course (CE40254)

### Mentor-ship

Worked as Computer Olympiad Teacher in well-known Iranian high schools as well as a mentor at International Olympiad in Informatics (IOI) preparation camp for International Olympiad in Informatics held in Baku, Azarbaijan.

January 2019  
February 2019

## HONORS AND AWARDS

### ACM-ICPC

Regional gold medal  
team ranked 3rd  
December 2018

### APIO

Asia-Pacific Informatics  
bronze medal  
May 2018

### INFO-Cup

World-wide contests  
gold medal  
March 2018

### Computer Olympiad

Ranked 5th in  
national contests  
September of 2016 & 2017

## SKILLS

### Programming Skills:

Python, Pytorch, Sklearn, Docker, C++ (for competitive programming), Java, MATLAB, L<sup>A</sup>T<sub>E</sub>X.

### Languages:

Persian (Native) - English (Fluent) TOEFL iBT 116/120  
Speaking: 28/30 - Writing: 29/30 - Reading: 30/30 - Listening: 29/30