

# EHSAN GANJIDOOST

COMPUTER SCIENTIST · NEURAL NETWORK & MACHINE LEARNING SCIENTIST

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## Education

### University of Waterloo

PH.D. IN COMPUTER SCIENCE

- Thesis: Predictive Estimators and Perceptual Feedback Networks

Waterloo, Canada

Sep. 2016 - present

### University of Waterloo

MMATH. IN COMPUTATIONAL MATHEMATICS

- Thesis: On Preconditioning the Linearized Conjugate Gradient method for Sparse Nonlinear Optimization.

Waterloo, Canada

Sep. 2014 - Aug. 2015

### Iran University of Science & Technology

M.SC. IN COMPUTER ENGINEERING

- Thesis: Study of Cache Structure and its Impact on the Performance of Network Processors

Tehran, Iran

Sep. 2002 - Mar. 2005

### Shahid Beheshti University

B.SC. IN COMPUTER ENGINEERING

- Thesis: Wireless Client/server System

Tehran, Iran

Sep. 1997 - Mar. 2002

## Certificates (short-listed)

**AI & Machine Learnin** Machine Learning, DeepLearning Specialization, NLP Specialization, Tensorflow

**Computer Science** Algorithm Design I & II, Intro to Databases, mongoDB

**Finance** WatRISQ, Corporate Finance, Finance, Financial Accounting

**Teaching** Fundamentals of University Teaching, Certificate in University Teaching

## Academic Activities

### PUBLICATIONS

2020	<b>Ganjidoost E.</b> , “Capturing Variations on Generative Predictive Coding”	pending NeurIPS
2019	<b>Ganjidoost E.</b> , “Notes on Neural Networks Part 3: Credit Assignment Problem”	under review
2019	<b>Ganjidoost E.</b> , “Notes on Neural Networks Part 2: Biological Adaptive Neural Networks”	under review
2019	<b>Ganjidoost E.</b> , “Notes on Neural Networks Part 1: Artificial Neural Networks”	under review
2017	<b>Ganjidoost E.</b> , Orchard J., “Non-linear mapping in a neural network using predictive coding” (research paper)	UofW
2017	<b>Ganjidoost E.</b> , Orchard J., “Predictive coding framed with neuron engineering framework” (research paper)	UofW
2005	<b>Ganjidoost E.</b> , Akbari A., “Impact of cache structure on network processor performance” (oral)	CESC
2004	<b>Ganjidoost E.</b> , Gharegouzi A., Akbari A., “Improvement speech quality by noise detection and elimination using averaged algorithm” (research paper)	IUST
2003	<b>Ganjidoost E.</b> , Fathy M., “Computer Architecture, A Quantitative Aproach - Memory Hierarchy Design” (translation)	IUST

### PRESENTATION

Win 2020	<b>“Pandas’ Essential Tutorial”</b> , @ Neurocomgnitive Computing Lab	Waterloo, ON
Win. 2020	<b>“On Predictive Coding”</b> , @ Neurocomgnitive Computing Lab	Waterloo, ON
Spr. 2019	<b>“Generative Neural Networks”</b> , @ The 12th Annual Ottawa Mathematics Conference (OMC)	Waterloo, ON
Apr. 2005	<b>“Impact of Cache Structure on Network Processor Performance”</b> , @ The 7th Computer Engineering Student Conference (CESC)	Tehran, Iran
Apr. 2004	<b>“Ad-hoc Network Architecture”</b> , @ IUST, Grad Seminar Series	Tehran, Iran
Apr. 2003	<b>“Rollback Recovery Policy in Operating System”</b> , @ IUST, Grad Seminar Series	Tehran, Iran
Dec. 2003	<b>“Computer Networks Performance Modeling”</b> , @ IUST, Grad Seminar Series	Tehran, Iran

## Awards & Recognitions

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### INSTITUTIONAL, ACADEMIC

2016-20	<b>Receipient</b> , Math Domestic Graduate Student Award (\$20,000)	Waterloo, ON
2017-18	<b>Receipient</b> , Walter Metzger Memorial Award (\$5,250)	Waterloo, ON
2016-17	<b>Receipient</b> , University of Waterloo Graduate Scholarship (\$5,000)	Waterloo, ON
2015-20	<b>Receipient</b> , UW Graduate Research Studentship (\$26,500)	Waterloo, ON
2014-15	<b>Receipient</b> , UW Math Faculty Graduate Award (\$6,000)	Waterloo, ON
2014-15	<b>Receipient</b> , UW Mathematics Graduate Experience Award (\$3,000)	Waterloo, ON

### PROVINSIONAL, LEADERSHIP

2007	<b>Receipient</b> , Tehran City Council Award (Gold prize)	Tehran, Iran
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### NATIONAL, ACADEMIC

2016-17	<b>Selected</b> , University of Waterloo's NSERC nominee	Waterloo, ON
2002	<b>Top 0.1%</b> , National Entrance Exam for Grad School	Tehran, Iran
1997	<b>Top 0.1%</b> , National Entrance Exam	Tehran, Iran
1996	<b>2<sup>nd</sup> round</b> , National Computer & Mathematic Olympiad	Tehran, Iran

## Professional Technical Skills

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<b>Advanced Programming</b>	Python, MATLAB, R, C/C++, Java, JavaScript, Node.js, Processing, Gephi, OWL, HTML, LaTeX, Jekyll,
<b>Most Used Packages</b>	Numpy, Scikit-learn, Pandas, PyViz, PyTorch, Tensorflow, Keras, Jax, Matplotlib
<b>Database</b>	SQL, DTD, XML, XSD, XQuery, XSLT, UML, OLAP, JSON, mongoDB
<b>IDE, Editor</b>	PyCharm, IPython, Colab, Sublime, Atom, CodeVisionAVR

## Projects (short-listed)

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<b>Unsupervised Models</b>	AE, VAE, GAN, Predictive Coding, Recommender system
<b>Supervised Models</b>	<b>CNNs</b> (LeNet, AlexNet, VGGNet, ResNet, Inception)
<b>Sequence Models</b>	<b>RNNs</b> (LSTM, GRU), Time Series
<b>Optimization</b>	fleet scheduling
<b>Finance</b>	portfolio optimizer package

## Research Experience

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### Neurocognitive Computing Lab

GRADUATE RESEARCHER

Waterloo, ON  
Sep. 2016 - present

- Generative Predictive Coding.
- Portfolio optimizer
- Neural Network Platform with Spiking Neurons.
- Neural Network based on real-time, Dynamical System.

### University of Waterloo

RESEARCH ASSISTANT & DEVELOPER

Waterloo, ON  
May. 2014 - Sep. 2016

- Nonlinear optimization solver.
- Large-scale continuous optimization solver.
- TSP heuristic using edge elimination techniques.

### Cayuga Research

RESEARCHER

Waterloo, ON  
May. 2014 - Sep. 2014

- Logistic & Transportation Allocation.

### ITRC

RESEARCH ASSISTANT

Tehran, Iran  
Mar. 2004 - Mar. 2005

- Network processor architecture.

## Educational Activities

### University of Waterloo

#### TEACHING ASSISTANT

CS 486/686: Introduction to AI  
CS 475/675: Computational Linear Algebra  
CS 489/689: Neural Networks  
CS 370: Numerical Computation  
CS 240: Data Structure & Data Management  
CS 136: Algorithm Design & Data Abstraction  
CS 135: Designing Functional Programs

Waterloo, Canada

Sep. 2016 - present

W19, S19, F19, W20, S20

S18

W18

F17, F18

S17

W17

F16

### University of Waterloo

#### TUTORIAL

Math 127: Calculus I for Science  
Math 115: Linear Algebra for Engineering  
Math 135: Algebra for Honor Math

Waterloo, Canada

Sep. 2014 - May 2015

W15

F14

F14

## R&D Experience

### Marsuscom co.

#### COMPUTER ENGINEER

- System & Code Developer.
- Smart Home Control System Developer.

Tehran, Iran

Nov. 2009 - Sep. 2011

### PARMAN

#### TECHNICAL PROGRAMM

- Fiber Optic Network TX/RX STM-1 test and verification engineer.

Tehran, Iran

Jun. 2009 - Nov. 2009

### PARSTEL Telecom co.

#### COMPUTER ENGINEER

- Code Developer for STN-10K Switch.
- Hardware designer and embedded programmer for line card.

Tehran, Iran

Jun. 2007 - Jun. 2009

### VESAL co. ISP

#### COMPUTER ENGINEER INTERN

- Computer Networking.
- Design, Implement and troubleshooting network.

Tehran, Iran

Jun. 2000 - Sep. 2000

## Extracurricular Activity

### NAMA co. - startup

#### CO-FOUNDER & VIDEO EDITOR

- Documentary producer, video editor.
- Teaser producer for Advertisement.

Tehran, Iran

Jun. 2003 - Sep. 2007

### Imam Hadi Charity.

#### VOLUNTEER VIDEO EDITOR

- Video production process using special effects, video editing, and producing documentary.

Tehran, Iran

Jun. 2003 - Sep. 2003

### Soroush High School.

#### INSTRUCTOR AND TRAINER

- Teaching Fundamental of Computer Programming.
- Teaching Video Editing in Summer School.

Tehran, Iran

Sep. 1997 - Sep. 2003

## Hobbies

**Sport Activities** swimming, soccer, ping-pong, biking, and hiking

**Usual Habit** listening traditional/country music, watching (documentary/adventure/romance) movies.

**To-Do list** photography, astronomy, traveling (specially road trip), driving Race cars