

Education

- Sept2022–present **Ph.D. in Electrical & Computer Engineering**, *University of Toronto*, Canada, Biometrics Security Lab
Supervisor: Prof. Dimitrios Hatzinakos
Thesis: Developing an Efficient, Robust, and Secure FL Framework
- Sept2018–Oct2020 **Master of Science in Electrical Engineering**, *Sharif University of Technology*, Iran
Thesis: Temporal Analysis of Functional Brain Connectivity for EEG-based Emotion Recognition
- Sept2014–Aug2018 **Bachelor of Science in Electrical Engineering**, *Sharif University of Technology*, Iran
Thesis: Analysis of EEG Signals as a Multi-Dimensional System (Blind Source Separation Techniques)

Publications

- [1] **E. Khazaei**, A. Esmailzahi, B. Taha, D. Hatzinakos, "CDFL: Efficient Federated Human Activity Recognition using Contrastive Learning and Deep Learning," *Arxiv*, submitted.
- [2] A. Esmailzahi, **E. Khazaei**, D. Hatzinakos, "ASSRFormer: Auditory Steady State Response Signal Authentication using Transformer-based Neural Networks," *IEEE Transactions on information forensics and security*, submitted.
- [3] A. Esmailzahi*, **E. Khazaei***, K. Wang*, N. Kaur Kalsi, D. Hatzinakos, K. Plataniotis, "HARWE: A Multi-modal Large-scale Dataset for Context-aware Human Activity Recognition in Smart Working Environments," *Pattern Recognition Letters*, 2024.
- [4] **E. Khazaei**, H. Mohammadzade, "Temporal Analysis of Functional Brain Connectivity for EEG-based Emotion Recognition," *Scientia Iranica*, 2024.
- [5] **E. Khazaei**, A. Emrani, M. Tavassolipour, S.A. Motahari, "Automated Analysis of Karyotype Images," *Journal of Bioinformatics and Computational Biology*, 2022.
- [6] M. Mozafari, **E. Khazaei**, S. Bagheri, N. Hasanzadeh, B. Taghibeyglou and F. Ghassemi, "Mental Stress Level Detection using Physiological Signals and Evolutionary Algorithm," in *26th National and 4th International Iranian Conference on Biomedical Engineering (ICBME)*, Tehran, Iran, 2019.
- [7] M. Saidi, S. Rezaei, **E. Khazaei**, B. Taghibeyglou, S. Hashemi, R. Kaveh, V. Abootalebi, "Mental Arousal Level Recognition Competition on the Shared Database," *27th Iranian Conference on Electrical Engineering (ICEE)*, Yazd, Iran, 2019.

Research Experiences

- Jan2023–present **Developing an Efficient, Robust, and Secure FL Framework**, *Supervised by Prof. Dimitrios Hatzinakos*, ECE Department, University of Toronto
Objective: Developed a novel FL framework to overcome the data heterogeneity, communication overhead, and privacy threats in typical FL frameworks for human activity recognition.
Research Areas: ML Privacy, Federated Learning, Contrastive Learning, Knowledge Distillation, Deep Clustering.
- Sept2023–present **Brain Biometrics under Auditory Stimulation for Human Identification**, *Supervised by Prof. Dimitrios Hatzinakos*, ECE Department, University of Toronto
Objective: Developed a biometrics system for human identification and verification using a special class of brainwaves known as Auditory Evoked Potentials (AEP).
Research Areas: Deep Learning, Neuroscience, and Biometrics.
- Mar2021–Jul2022 **Persian Optical Character Recognition (OCR)**, *Supervised by Prof. Reshad Hosseini*, ECE Department, University of Tehran
Objective: Detecting texts in an official document and subsequently recognizing the content of text boxes.
Research Areas: Object Detection, NLP, and Image Processing.

- Jul2019–**Temporal Analysis of Functional Brain Connectivity using EEG signals**, *Supervised by Prof. Hoda Mohammadzade*, EE Department, Sharif University of Technology
 Oct2020 **Objective:** Investigating temporal patterns of functional brain connectivity in EEG-based emotion recognition using RNNs and Transformers.
Research Areas: Deep Learning, Signal Processing, and Neuroscience.
- Jan2019–**Analysis of Karyotype Images**, *Supervised by Prof. Seyed Abolfazl Motahari*, CE Department, Sharif University of Technology
 Jan2020 **Objective:** Developed an algorithm to separate overlapped chromosomes and a deep neural network for chromosome classification.
Research Areas: Deep Learning, Image Processing, and Bioinformatics.
- Mar2020–**Analysis of Microarray Images**, *Supervised by Prof. Seyed Abolfazl Motahari*, CE Department, Sharif University of Technology
 Jun2020 **Objective:** Analysis of microarray images to extract gene expression levels using image processing methods, including contrast enhancement, denoising, gridding, clustering, and intensity extraction.
Research Areas: Image Processing and Bioinformatics.
- Mar2018–**Artificial Intelligence Recommendation System for Patients with Cancer**, *Supervised by Prof. Seyed Abolfazl Motahari*, CE Department, Sharif University of Technology
 Mar2019 **Objective:** Developing software that analyzes the mutations in single-cell sequencing and presents its bioinformatics analysis as a report to the patients.
Research Areas: Bioinformatics and Software Engineering.
- Nov2017–**Analysis of EEG Signals as a Multi-Dimensional System**, *Supervised by Prof. Vosoughi Vahdat and Dr. Taghizadeh*, EE Department, Sharif University of Technology
 May2018 **Objective:** Brain source localization using decomposition of EEG signals.
Research Areas: Blind Source Separation and Neuroscience.

Honors and Awards

- 2022-2026 Received **Research Fellowship** (\$ 16,000/year), University of Toronto.
- 2022-2026 Received **Edward S. Rogers Sr. Graduate Scholarships** (\$ 10,000/year), University of Toronto.
- 2021 Received **Ph.D.** offers from the University of Toronto, McGill University, University of Alberta, York University, and Western University.
- 2020 Ranked **3rd** among graduated Master students based on overall GPA, Sharif University of Technology.
- 2019 Received **first team award** in "Mental Arousal Level Recognition Competition", at the 27th Iranian Conference on Electrical Engineering.
- 2018 Received **Merit-based admission** to MSc program in both Communication Systems at EE department and Bioinformatics at CE department, Sharif University of Technology.
- 2014 Ranked **101st** in the nationwide university entrance exam, among more than 220,000 students.
- 2014–present Member of Iranian National Elites Foundation.

Technical Skills

Programming Languages	Python, MATLAB, C, C++
Libraries	PyTorch, Tensorflow, Keras, Scikit-Learn, Numpy, Matplotlib, OpenCV
Circuits and Simulation	PSPICE, Proteus, Quartus, Modelsim, Codevision, Altium
Others	L ^A T _E X, Office, ...

Selected Teaching Assistants

- Winter'20, Fall'23 **Machine Learning & Computer Vision**
- Fall'21, Summer'24 **Applied Fundamentals of Deep Learning**

Winter'21, **Intorduction to Machine Learning**

Winter'24

Fall2020 **Artificial Intelligence**

Winter'24 **Mathematical Expression and Reasoning for Computer Science**