

# BORNA BARAHIMI

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## EDUCATION

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### M.Sc. Computer Science

York University

Sep 2022 – Aug 2024

GPA:A+

### B.Sc. Computer Science

University of Tehran

Sep 2018 – Jun 2022

GPA:3.62/4

**University Courses:** Deep Learning (A+), Mobile Communications (A+), Machine Learning Theory (A+), Data Mining (A), Artificial Intelligence (A+), Statistical Methods (A), Convex Optimization (A), Database (A+)

**Summer School:** The 2024 CIFAR Deep Learning Reinforcement Learning (DLRL) Summer School

**Online Courses:** Generative AI with Diffusion Models (NVIDIA), Learning SOLID Programming Principles (LinkedIn), Biology Meets Programming: Bioinformatics for Beginners (Coursera)

## PUBLICATION

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- **Borna Barahimi**, H. Tabassum, M. Omer and O. Waqar, "Context-Aware Predictive Coding: A Representation Learning Framework for WiFi Sensing" in **IEEE OJ-COMS** [paper][code] and **NeurIPS 2024 Workshop on SSL**
- **Borna Barahimi**, H. Singh, H. Tabassum, O. Waqar and M. Omer, "RSCNet: Dynamic CSI Compression for Cloud-Based WiFi Sensing," **ICC 2024** [top-tier conference in communication][paper][code]

## PROFESSIONAL EXPERIENCE

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### Algorithm Designer

Cognitive Systems Corp.

Aug 2024 – Present

Waterloo, Ontario, Canada

- **Focus:** Self-supervised Learning, Quantization, WiFi Sensing, Time-series.
- Dr. Mohammad Omer
- Using unsupervised learning methods like VQ-VAE to create tokenization frameworks for multivariate time-series data and capture meaningful representations.

### Research Assistant

York University

Sep 2022 – Present

Toronto, ON, Canada

- **Focus:** Self-supervised Learning, Representation Learning, WiFi Sensing, Time-series.
- Supervisor: Dr. Hina Tabassum
- Implementing a novel **self-supervised** framework for human activity recognition (HAR) of **time-series** WiFi data by integrating **Barlow Twins** and **Contrastive Predictive Coding**.
- Improving SOTA accuracy by **6%** and outperforming supervised methods by **30%** in few-shot learning setting.
- Joint HAR WiFi sensing **classification** and **compression** using dilated CNNs and autoencoders for cloud-based sensing applications.
- Reducing the edge device computational requirements by **99%** without significant loss in accuracy.
- Served as peer-reviewer for NeurIPS and IEEE journals and magazines including TCOM, IoTM, IEEE Communications Letters, and IEEE Communications Magazine.
- Nominated for Best Thesis Award of York University

### Research Assistant

University of Tehran

Sep 2021 – Jan 2022

- **Focus:** Semi-supervised Learning for Parkinson's Disease (PD) Detection
- Supervisor: Dr. Bagher BabaAli
- Employed a pre-trained self-supervised model on online handwriting records (time series) with Part of Stroke Masking (POSM) for transfer learning to diagnose PD using handwriting records.

### Fullstack Developer

VClinic

Jul 2019 – Jul 2021

- **Focus:** Development of an all-in-One platform for doctors and patients.

- Developed services: appointment scheduling, virtual visits, electronic health records (EHR), and prescriptions.
- Built APIs using **NodeJS (ExpressJS)**, and frontend Modules with **ReactJS** from scratch.
- Maintained servers, **Docker** containers and CI/CD pipelines.
- Managed and integrated various databases including MongoDB, PostgreSQL, and Redis.
- Managed Cybersecurity attacks by restoring databases, maintaining backups, and risk assessment.
- Created a web-based virtual visit system using **WebRTC**.
- Collaborated with HR for interviewing and hiring and onboarding **three** talents.
- Promoted to tech team lead and utilized agile practices.
- Engaged effectively with executives and business stakeholders, leveraging expertise in software development and governmental insurance services.

### Robotics Programmer

Oct 2016 – Jul 2019

*AE High School*

- **Focus:** Building Algorithms for RoboCup 2D Soccer Simulation League
- Designed algorithms for simulated multi-agents soccer simulations in C++.
- Taught programming to high school students.
- Attended international RoboCup competitions in Germany and Japan.
- Contributed to technical papers for RoboCup Symposium.

### TEACHING EXPERIENCE

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#### Computer Programming Instructor

Jan 2024 – Aug 2024

*Niagara College - Toronto*

*Toronto, ON, Canada*

- **Focus:** Delivering lectures on Mathematics and Statistics for Computer Studies.
- Preparing teaching and evaluation materials

#### Teaching Assistant

Toronto, Canada

*York University*

*Sep 2022 – Present*

- **Courses:** Python Programming, Intro. to the Theory of Computation, Discrete Mathematics for Computer Science
- Holding Python programming lab sessions and tutorials for mathematics, ensuring an engaging learning environment.
- Evaluated and graded student assignments and projects, providing constructive feedback to enhance learning outcomes.

#### Head of Teaching Assistants

*Karyar College*

*Aug 2020 – Sep 2023*

- **Focus:** Volunteer Teaching and Mentorship for unprivileged students in Computer Science
- Trained and onboarded new faculty members.
- Involved in training program planning and executions.
- Hold programming workshops for Python, HTML, CSS, and Javascript.
- Designed course projects and assess students' performance.

### TECHNICAL SKILLS

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**Core Languages:** Python, C++, JavaScript (NodeJS), SQL, MATLAB, R, Bash

**Machine Learning tools:** PyTorch, Tensorflow, Keras, JAX, NumPy, Pandas, Scikit-Learn, SciPy, Slurm

**Generative AI:** Diffusion Models, VQ-VAE, GAN

**Web Technologies:** ExpressJS, ReactJS, DevOps, WebRTC, Django

**Data Visualization Tools:** Seaborn, Matplotlib, RStudio

**Industry Knowledge:** Backend and Frontend Web Development, Software Engineering, DevOps, Agile, Object-Oriented Programming (OOP), Model-View-Controller (MVC), REST API, Design Thinking

**Miscellaneous:** Git, Linux, Shell (Bash/Zsh), MS Office 365, GSuite, Docker, MongoDB, PostgreSQL, Redis,  $\LaTeX$