# Borna Barahimi

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## Education

**M.Sc. Computer Science** Sep 2022 – Aug 2024
*York University* *GPA:A+*

**B.Sc. Computer Science** Sep 2018 – Jun 2022
*University of Tehran* *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 Management Systems (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

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

## Professional Experience

**Algorithm Designer** Aug 2024 – Present
*Cognitive Systems Corp.* *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.

**Research Assistant** Sep 2022 – Present
*York University* *Toronto, ON, Canada*

- **Focus:** Self-supervised Learning, Representation Learning, WiFi Sensing, Time-series.
- Supervisor: Dr. Hina Tabassum
- Using **self-supervised learning** frameworks such as **Siamese** and **Barlow Twins** for Human activity recognition (HAR) WiFi sensing.
- 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 conference and IEEE journals and magazines including TCOM, IEEE Communications Letters, IEEE IoTM, and IEEE Communications Magazine.
- Nominated for Best Thesis Award of York University
- **Skills:** Pytorch, Self-supervised learning, Weights & Biases, Slurm, Multinode Training

**Research Assistant** Sep 2021 – Jan 2022
*University of Tehran*

- **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** Jul 2019 – Jul 2021
*VClinic*

- **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 ExpressJS, and frontend Modules with ReactJS from scratch.
- Maintained servers, databases, Docker containers and CI/CD pipelines.
- Managed Cybersecurity attacks by restoring databases, maintaining backups, and risk assessment.
- Created a web-based virtual visit system using WebRTC and ReactJS.
- 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.
- **Skills:** ExpressJS, ReactJS, WebRTC, Docker, MongoDB, PostgreSQL, Redis, CI/CD, Agile, Leadership, Software Development.

**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.
- **Skills:** C++, Algorithm Design, Teaching, Technical Writing

## Teaching Experience

**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 sessionsand tuturials for mathematics, ensuring an engaging learning environment.
- Evaluated and graded student assignments and projects, providing constructive feedback to enhance learning outcomes.
- **Skills:** Teaching, Python Programming, Theory of Computation

## Technical Skills

**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