

ATOOSA AYAZBAKHS ZIYABARI

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Master's student in Mechanical Engineering at the University of Alberta, with a B.Sc. in Electrical Engineering. Passionate about robotics and artificial intelligence, with strong technical and interpersonal skills and the ability to collaborate in teams and deliver projects successfully.

EDUCATION

University of Alberta

Edmonton, AB, Canada

Master of Science (M.Sc.) in Mechanical Engineering | GPA: 3.9/4.0

2025 – Present

- **Thesis:** Dynamic Difficulty Adjustment in Robotic Rehabilitation and Motor Learning
- **Relevant Coursework:** Assessment and Analysis of Biomechanical Motion (MEC E 686, A+), Machine Learning for Biomedical Applications (BME 677, A+), Applied Computational Intelligence for Engineers (MEC E 694, A+), Signal Processing of Time and Spectral Series (MEC E 653, A)

K. N. Toosi University of Technology (K. N. T. U.)

Tehran, Iran

Bachelor of Science (B.Sc.) in Electrical Engineering | GPA: 3.3/4.0

2017 – 2022

- **Thesis:** Design of a digital blood pressure monitor and oscillometric signal processing

HONOURS & AWARDS

- **RWTH Aachen – University of Alberta Junior Research Fellowship** | Upcoming thesis research stay in Aachen, Germany 2026
- **Graduate Student Travel Award**, University of Alberta | Research travel to RWTH Aachen for the fellowship 2026
- **University of Alberta Graduate Recruitment Scholarship** | Merit-based award for incoming graduate students Jan 2025

PUBLICATIONS

- [1] **A. Ayazbakhsh Ziyabari**, R. Behbahani Nejad, A. Afkhami Ardekani, A. H. Vette, and M. Nazarahari, "Stay in the Zone: Intelligent Two-Layered Dynamic Difficulty Adjustment for Upper-Limb Exergame," *IEEE RAS/EMBS Int. Conf. on Biomedical Robotics and Biomechatronics (BioRob)*, 2026. DOI: [10.1109/BioRob66782.2026.11681391](https://doi.org/10.1109/BioRob66782.2026.11681391)
- [2] A. Afkhami Ardekani, A. Salemi, R. Behbahani Nejad, **A. Ayazbakhsh Ziyabari**, A. H. Vette, and M. Nazarahari, "Beyond the Score: Assessing Motor Learning via Inverse Reinforcement Learning from Suboptimal Human-in-the-Loop Gameplay," *IEEE RAS/EMBS Int. Conf. on Biomedical Robotics and Biomechatronics (BioRob)*, 2026. DOI: [10.1109/BioRob66782.2026.11681014](https://doi.org/10.1109/BioRob66782.2026.11681014)

RESEARCH & WORK EXPERIENCE

University of Alberta

Edmonton, AB, Canada

Research Assistant, *IDEA Lab – Dynamic Difficulty Adjustment in Robotic Rehabilitation and Motor Learning*

Jan 2025 – Present

- Under the supervision of Dr. Milad Nazarahari and Prof. Albert H. Vette, designing control strategies and data-driven algorithms to optimize robotic rehabilitation systems.
- Applying Gaussian Process models and a bandit-based scheduling system, core components of the dynamic difficulty adjustment system, to a rehabilitation game environment designed in Unity, using Python and C#.
- Focused on enhancing motor learning and personalizing therapy through adaptive difficulty adjustment and real-time performance analytics.

Teaching Assistant – MEC E 694: Applied Computational Intelligence for Engineers

Sep 2026 – Present

- Managed and lectured a 3-hour class session of the course; hold office hours and mark course assignments.

Teaching Assistant – MEC E 420: Feedback Control Design of Dynamic Systems

Jan 2026 – Apr 2026

- Served as lab instructor and teaching assistant for an undergraduate feedback control course, leading weekly lab sessions on the design and analysis of dynamic control systems.
- Guided students through MATLAB/Simulink modelling and controller-design exercises and held office hours to support students.

ATP Co.

Tehran, Iran

IT Manager

Sep 2017 – Nov 2024

- Oversaw and maintained the company's IT infrastructure, including systems and network administration, website management, and troubleshooting critical issues.
- Delivered reliable technical support and implemented solutions to ensure seamless operations.

Neuromatch Academy

Remote

Summer Intern – Exploring Memory and Storytelling: NLP Analysis of Narrative Types

Jun 2023 – Aug 2023

- Investigated the relationship between memory and storytelling by analysing cognitive processes such as imagination, recollection, and retelling using the Hippocampus dataset of English narratives.
- Built and evaluated deep learning models in Python to identify patterns in how stories evolve under these conditions, covering data preprocessing, feature extraction, training, and performance assessment. Available as a Google Colab Notebook.

Zistel Company / FPGA Laboratory, K. N. T. U.

Tehran, Iran

Research Assistant – Blood Pressure Estimation Algorithm and Monitor Circuit Design

Feb 2021 – May 2022

- Under the supervision of Dr. Danial Katoozian and Dr. Hossein Hosseini-Nezhad, developed an algorithm for blood pressure estimation.
- Compared Model-Based, Maximum Amplitude, Derivative Oscillometry, and Feedforward Neural Network algorithms.
- Designed a cost-efficient circuit to extract the oscillometric signal using a Sallen-Key active filter.

K. N. Toosi University of Technology**Tehran, Iran***Teaching Assistant – C Programming Course (M. Zamanian)**Feb 2022 – May 2022*

- Assisted in teaching an undergraduate C programming course, guiding students through core concepts such as data types, control flow, functions, pointers, and memory management.
- Supported students during lab sessions and office hours and graded assignments and projects.

*Teaching Assistant – Design of Digital Systems (FPGA, ASIC) Course (Dr. Hossein Hosseini-Nezhad)**Oct 2021 – May 2022*

- Assisted in teaching a digital system design course covering FPGA and ASIC design flows, guiding students through HDL (VHDL/Verilog) coding, simulation, synthesis, and timing analysis.
- Supported lab sessions and projects and evaluated student designs and assignments.

LEADERSHIP & VOLUNTEER EXPERIENCE**Faculty of Engineering Graduate Research Symposium (FEGRS) 2026, University of Alberta** | *Volunteer**Aug 2026*

- Recognized with a Certificate of Appreciation from the Associate Dean, Research Programs & Development.

Design Conference, University of Alberta | *Conference Volunteer**Nov 2025*

- Helped organize and run conference sessions, registration, and on-site coordination to keep everything on track.

Biomedical Conference, University of Alberta | *Conference Volunteer**May 2025*

- Helped run sessions, registration, and on-site logistics, and provided technical support so the day ran smoothly for attendees.

SELECTED PROJECTS**Lung Cancer Image Classification with Deep Learning** | *BME 677 Course Project, University of Alberta**Fall 2025*

- Developed and compared PyTorch models (ResNet50, DenseNet121, and a CNN-Transformer hybrid) to classify lung images into normal, benign, and malignant classes, and ran an ablation study.
- Evaluated performance using ROC-AUC, F1/precision/recall, Cohen's kappa, and confusion matrices, with training dashboards and attention visualizations for model interpretability.

Affective State (Stress) Classification Using Physiological Signals (WESAD) | *MEC E 694 Course Project**Fall 2025*

- Built an end-to-end Python/Jupyter pipeline for stress detection using the WESAD wearable dataset, including signal preprocessing, feature extraction across time/frequency/phase domains, and dimensionality reduction/representation learning (PCA, autoencoder features).
- Trained and compared global vs. personalized models and explored unsupervised clustering plus continuous stress/arousal estimation with temporal smoothing for more realistic monitoring.

SLAM and Boundary Detection Using 3D-LiDAR | *Autonomous Drive and Navigation (MEC E 652)**Winter 2025*

- Built and evaluated a ROS (C++) 3D LiDAR SLAM + road-boundary/curb detection pipeline, combining LOAM/LeGO-LOAM feature-based odometry/mapping with road segmentation, RANSAC curve fitting, and Gaussian Process refinement.
- Validated on the KITTI dataset using RViz visualization and EVO trajectory/APE error analysis.

Bioinformatic Feature Analysis and Machine Learning | *Self-Directed Project**Spring 2023*

- Used Jupyter Notebook to code in Python, finding features associated with the "type" and selecting the top 50 features most highly associated with the "Tumour" or "Normal" label.
- Trained a logistic regression model and predicted a label for each sample in the test file. Available on GitHub.

PPG-Based Biosensing: PCB Design + Blood Glucose Estimation | *Zistel Company, K. N. T. U.**Summer 2022*

- Under the supervision of Dr. Danial Katoozian, designed and fabricated a PPG signal acquisition PCB in Altium Designer and developed a classic ML/feature-based pipeline to estimate blood glucose from PPG signals.
- Focused on signal preprocessing and vital feature extraction, then evaluated candidate features/algorithms under limited-data constraints to improve estimation accuracy.

Space Invaders Game | *Advanced Programming Course, K. N. T. U.**Winter 2022*

- Wrote the game in Java using an object-oriented approach, with encapsulation, polymorphism, composition, nested classes, and the JavaFX library. Available on GitHub.

CERTIFICATIONS

- **Reinforcement Learning Specialization** | University of Alberta – Coursera | Jul 2025
- **Deep Learning – Tutorial and Project Certificate** | Neuromatch Academy | Jul 2023
- **IELTS – Academic Module** | CEFR Level: C1 | Band Score: 7 (S: 7, W: 6.5, R: 7.5, L: 7.5) | Apr 2023
- **Neural Networks and Deep Learning** | DeepLearning.AI – Coursera | Grade: 95.62/100 | Mar 2022
- **Python Data Structures** | University of Michigan – Coursera | Grade: 93.6/100 | Mar 2022
- **Machine Learning** | Stanford University – Coursera | Grade: 93.21/100 | Jan 2022

SKILLS & LANGUAGES**Programming Languages:** MATLAB, Python, C, C++, C#, Java, VHDL, Assembly**Machine Learning & AI:** PyTorch, scikit-learn, Deep Learning (CNNs, Transformers, Autoencoders), Computer Vision, NLP, Reinforcement Learning, LLMs**Other Skills:** ROS (Robot Operating System), Unity, PCB Design, Analogue and Digital Signal Processing, ARM (nRF), Git, Graphic Design (Photoshop, Illustrator), Windows Server, WordPress, Power BI, Tableau, Python visualization libraries**Languages:** Persian (Native), English (Advanced), French (Basic)