

# Mahdi Chalaki

ELECTRICAL ENGINEERING STUDENT · GRADUATE RESEARCH ASSISTANT

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## Education

### University of Alberta

M.Sc. IN ELECTRICAL ENGINEERING

Alberta, Canada

Oct. 2022 - Present

- Graduate research assistant at the Telerobotic and Biorobotic Systems Group (Supervisor: **Dr. Mahdi Tavakoli**)
- Cumulative GPA: **3.9/4**

### University of Tehran

B.Sc. IN MECHANICAL ENGINEERING

Tehran, Iran

Oct. 2017 - Sep. 2021

- Cumulative GPA: **18.65/20 (3.96/4)** - Ranked **4th** among 128 students
- Thesis Topic: Centrifugal Pump Health Monitoring Using Neural Networks - **(19.4/20)**

### University of Tehran

MINOR IN MANAGEMENT

Tehran, Iran

Oct. 2018 - Sep. 2021

- Cumulative GPA: **19.14/20 (4/4)**

## Research Interests

- Assistive Robotics
- Human-Robot Interaction
- Artificial Intelligence
- Autonomous Systems
- Dynamics / Control
- Motion Planning

## Research Experience

### TBS Lab

GRADUATE RESEARCH ASSISTANT

University of Alberta

Oct 2022 - Present

- Worked on a Smart Walker for Mobility Assistance
- Presented a real-time estimator and filter to remove gait-related components
- Designed a surface slope-responsive controller
- Implemented my code on a mobile manipulator (Kinova Gen3 + mobile base)
- Modelled and Impedance controlled a 6 DoF UR5 robot in Matlab/Simulink

### SEECs Lab

UNDERGRADUATE RESEARCH ASSISTANT

University of Tehran

Jan 2021 - Jul 2022

- Worked on Condition Monitoring of Centrifugal Pumps Using Neural Networks
- Designed a Convolutional Neural Network for centrifugal pumps fault detection
- Deployed my code on a Raspberry Pi Pico
- Engineered a space-efficient enclosure and assembled the device
- Achieved a classification accuracy of 99% across six different labels

### AIME Lab

UNDERGRADUATE RESEARCH ASSISTANT

University of Tehran

Jul 2020 - Dec 2020

- Studied basics of computer-vision
- Literature reviewed bone land marking

## Publications

- A. Mostafavi, M. Zakerzadeh, A. Sadighi, and **M.A. Chalaki**, "An Efficient Design of an Energy Harvesting Backpack for Remote Applications", Sustainable Energy Technologies and Assessments Journal
- **M.A. Chalaki**, D. Marofi, M. Robati, M. Karimi, and A. Sadighi, "An Intelligent Approach to Detecting Novel Fault Classes for Centrifugal Pumps Based on Deep CNNs and Unsupervised Methods", ICSPIS 2021

Published

Published

## Teaching Experiences

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Winter 2024	<b>ENGG 160</b> , David deJong	ECE Department
Fall 2023	<b>ENCMP 100</b> , Dr. Zemp	ECE Department
Fall 2021	<b>Design of Machine Elements I</b> , Dr. Shariat Panahi	ME Department
Fall 2021	<b>Finite Element Method</b> , Dr. Mahnama	ME Department
Spring 2020	<b>Design of Machine Elements II</b> , Dr. Abrinia	ME Department
Fall 2019	<b>Design of Machine Elements I</b> , Dr. Ataee	ME Department
Fall 2018	<b>General Physics I</b> , Dr. Zoghi	College of Engineering

## Selected Courses

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- Advanced Control: **18.4/20**
- Automatic Control of Linear Systems: **20/20**
- Mechatronics: **18.5 / 20**
- Robotics: Modelling, Planning and Control: **4/4**
- Intro to Machine Learning: **3.7/4**
- Non-linear Control Systems: **4/4**

## Skills

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- **Programming:** Python (proficient), MATLAB - Simulink (proficient), C++
- **CAD:** CATIA (proficient), SolidWorks, AutoCAD
- **Other Skills:** ROS, Git, Keras - TensorFlow, Arduino,  $\text{\LaTeX}$
- **Soft Skills:** Working in collaborative environments, Continuous Learning, Innovative Thinking, Event management

## Honors & Awards

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- Fully funded M.Sc. Admission Offer to the University of Alberta
- Excellent Student M.Sc. Admission Offer to the University of Tehran
- Scholarship of Pedagogy and Application of Research Knowledge in Engineering
- Supporter Foundation of University of Tehran Scholarship
- Gold Medal winner - PAYA International League (Physics contest for high school students)
- Ranked among top 0.5% of 148000 participants in the nationwide university entrance exam

## Online Courses & Certificates

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- Deep Learning Specialization (5 courses - Deeplearning.ai - Coursera)
- AI Programming with Python Nanodegree (Udacity)
- Machine Learning (Stanford University - Coursera)

## University & Community Service

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### SAM (Scientific Association of Mechatronics)

MEMBER

University of Tehran

Oct. 2020 - Jul. 2022

### SAME (Scientific Association of Mechanical Engineering)

MEMBER

University of Tehran

Jun. 2019 - Oct. 2020