

ALIREZA AMJADI

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Education

- 2023 – 2027 **Sharif University of Technology** Tehran, Iran
B.Sc. in Mechanical Engineering · expected Jul 2027
- ▶ **GPA 18.69/20**, ranked **11th of 126** in the Mechanical Engineering cohort (top 9%).
 - ▶ GPA over the last two years: **19.27/20**.
 - ▶ **Key courses (out of 20)**: Dynamics of Machinery (20), Measurement and Control Systems (19.6), Vibrations (19.3), Dynamics (18.8), Automatic Control (18.5), Engineering Mathematics (20), Differential Equations (19.8), Fundamentals of Electrical Engineering I and II (20, 20), Heat Transfer I (20).

Research Interests

Biomechatronics · Wearable Robotics and Exoskeletons ·
Active Orthoses and Rehabilitation Robotics · Musculoskeletal Modelling and Simulation ·
Gait Biomechanics · Dynamics and Control of Robotic Systems · Physics-Informed Machine Learning

Research

- 2026 – now **B.Sc. Project: Active Ankle–Foot Orthoses for Post-Stroke Drop Foot** (*ongoing*)
Sharif University of Technology · Supervisor: Prof. Farzam Farahmand
- ▶ **Aim**: active ankle–foot orthoses that assist stroke survivors with drop foot, the inability to lift the forefoot during the swing phase of gait.
 - ▶ **My role**: musculoskeletal modelling and simulation of the human–orthosis system in OpenSim.
 - ▶ **Current stage**: reviewing the literature on modelling active and passive assistive devices in OpenSim 4.6.
 - ▶ **Related coursework**: Musculoskeletal Biomechanics, a graduate course taught by Prof. Farzam Farahmand (Fall 2026).

Technical Skills

Biomechanics & dynamics: OpenSim, Simscape Multibody, Simulink, multibody dynamics, control design
Computational mechanics: ANSYS Fluent, ANSYS Mechanical, finite-volume methods, verification and validation
Programming & ML: Python (NumPy, SciPy, PyTorch), MATLAB, physics-informed neural networks
CAD & design: SolidWorks, CATIA, FEA, fatigue design of gears, shafts and bearings
Tools: LaTeX, Git, EES
Languages: Persian (native), Azerbaijani Turkish (native), English (official test score pending), Turkish (intermediate)

Selected Course Projects

- Spring 2026 **Pump Mechanism and Flywheel: Multibody Dynamics** [source]
Dynamics of Machinery · Prof. Hassan Sayyaadi · individual project
- ▶ Built a Simscape Multibody model of an oscillating-cylinder pump and found the drive torque at 100 and 300 rpm.
 - ▶ Sized a flywheel in MATLAB and verified it in simulation: speed fluctuation cut to 5.7% (target: below 10%).
- Spring 2026 **Hybrid Liquid–Air Cooling of Power Electronics** [source]
Heat Transfer I · Prof. Mohamad Ali Bijarchi · team of 2; I wrote the solver and the full report
- ▶ Wrote a transient finite-volume conduction solver from scratch in MATLAB; explicit and implicit schemes agree.
 - ▶ Grid and time-step independence shown ($GCI \approx 0.41\%$); agreement with ANSYS Mechanical within 0.57%.

- Spring 2026* **DC Motor Modelling and PI Speed Control** [source]
Fundamentals of Electrical Engineering II · team of 3; I contributed to the technical report
- ▶ Simulink model of a separately excited DC motor from its equations, matching the analytical steady state.
 - ▶ P and PI speed controllers with armature-voltage saturation, tested under a 1.5 N m load.
- Fall 2025* **Airfoil Flow with CFD, PINNs and a Source–Sink Method** [source]
Fluid Mechanics II · Prof. Mohamad Sadeq Karimi · individual project
- ▶ Cambered NACA 4421: ANSYS Fluent (RANS) with a five-mesh grid study (C_L within 0.1%) and a Navier–Stokes PINN in PyTorch.
 - ▶ Symmetric NACA 16-006: potential-flow PINN, plus a source–sink method in MATLAB for five airfoil thicknesses.
- Spring 2025* **3D Physics-Informed Neural Network for Pipe Flow** [source]
Fluid Mechanics I · Prof. Mohamad Sadeq Karimi · individual project
- ▶ Wrote a 3D Navier–Stokes PINN from scratch in NumPy, including its own automatic differentiation.
 - ▶ Recovered the Hagen–Poiseuille solution within 0.2% and the entrance length within 4.6% of published data.
- Also:* Machine design projects (2025): a two-stage gearbox, a mine haulage winch and a fork-mounted jib crane, in SolidWorks with FEA; reports and drawings on the [portfolio](#).

Industrial Experience

- Summer 2026* **Industrial Intern, Ahan Panjeh Industrial Group** Tabriz, Iran
Perforated sheet and expanded metal manufacturer · 240 hours, graded Excellent
- ▶ Set up CNC punch presses with the die-making team: power train, table feed, servo drives and encoders.
 - ▶ Selected punches and dies for orders, checked tool-steel quality and estimated the shear force each order needs.
 - ▶ Documented the machine’s stored G/M-code programs and compared its control with the hydraulic press line.

Teaching Experience

- Spring 2026* **Grader, Statics** Sharif University of Technology
Instructor: Prof. Somaye Mohammadi
- Nov 2025* **Instructor, Differential Equations Problem-Solving Workshop** Sharif University of Technology
Organised by the Mehvar Scientific Association, Department of Mechanical Engineering
- ▶ Led a 90-minute session of exercises, sample midterm problems and Q&A (own course grade: 19.8/20).

Leadership and Service

- 2025 – 2026* **Peer Mentor (“Hamyar”), Incoming Mechanical Engineering Cohort**
Sharif University of Technology · department mentoring programme in which senior students support new students under their faculty advisor
- ▶ Responsible for the 18 students advised by Prof. Farzam Farahmand, in a cohort of 120; also supported the others.
 - ▶ Acted as the link between the faculty advisor and the students, carrying out the tasks he assigned; helped new students settle into university life, answered their questions and followed up on their academic needs.
 - ▶ Encouraged healthy relationships among classmates and helped run the department’s orientation programme.
- 2024 – 2026* **Mehvar Scientific Association** Sharif University of Technology
Student scientific association of the Department of Mechanical Engineering
- ▶ Member of the General Council, 33rd term (2025 – 2026).
 - ▶ Executive team for the department’s Yalda Night (Dec 2024) and Nowruz (Mar 2025) events.

Honors

- 2023* **Ranked 590th among 147,317 participants (top 0.4%)**
Iranian National University Entrance Exam (Konkur), Mathematics and Physics