



# Sam Rahnemayan

MSc Robotics Candidate @ EPFL



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[Portfolio](#) | [LinkedIn](#) | [GitHub](#)

EPFL MSc Robotics candidate specializing in rehabilitation robotics, biomechanical systems, embedded systems, autonomous control, and human-machine interaction. Experienced in translating research concepts into deployable robotic and medical technology systems.

## Education

### École Polytechnique Fédérale de Lausanne (EPFL)

*Master in Robotics*

Minor in Management, Technology and Entrepreneurship

Master Thesis: *Neuromuscular Adaptation to Exoskeleton Assistance*

Lausanne, Switzerland

Feb 2023 – Apr 2026

### École Polytechnique Fédérale de Lausanne (EPFL)

*Bachelor in Microengineering*

Core focus: mechanics, electronics, control systems, and manufacturing

Lausanne, Switzerland

Sep 2019 – Jul 2022

## Selected Projects

### Neuromuscular Adaptation to Exoskeleton Assistance

*EPFL & UTS | 2025–2026*

Developed a multimodal research framework combining EMG signal processing, Vicon motion capture, and biomechanical modeling to quantify adaptation under upper-limb exoskeleton assistance.

Applied muscle synergy analysis (NNMF) and biomechanical modeling to characterize neuromuscular adaptation mechanisms during robotic rehabilitation within an international collaboration between EPFL BioRob and the UTS Robotics Institute.

### Rehabilitation Game & Instrumented Soles

*Autonomyo (Intern) | 2024–2025*

Engineered a rehabilitation platform integrating custom pressure-sensing insoles, ESP32-based wireless telemetry, Bluetooth Low Energy communication, and a Unity biofeedback application.

Contributed across hardware design, embedded software, and system integration to support real-time gait monitoring and rehabilitation.

### Autonomous Drone Navigation (Crazyflie)

*EPFL | 2025*

Designed and implemented a simulation-to-real autonomous flight pipeline using OpenCV-based gate detection, state estimation, and cascaded PID control.

Successfully deployed the system on physical Crazyflie hardware, enabling autonomous gate traversal in real-world flight experiments.

### Autonomous Navigation for a Wheeled Robot

*EPFL | 2023*

Developed a complete perception, planning, and control stack for autonomous navigation in cluttered environments.

Integrated computer vision localization, A\* planning, Kalman filtering, and reactive obstacle avoidance within a closed-loop autonomous navigation system.

## Technical Skills

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### **Programming**

Python • C • C++ • C# • MATLAB • Git

### **Robotics & Control**

Model Predictive Control (MPC) • PID Control • State Estimation • Kalman Filtering • Sensor Fusion • Computer Vision • Motion Planning (A\*, Dijkstra)

### **Simulation & Biomechanics**

MuJoCo • Webots • OpenSim • SCONE • Unity • EMG Signal Processing • Vicon Motion Capture

### **Embedded Systems & Electronics**

ESP32 • STM32 • Bluetooth Low Energy (BLE) • Sensors & Actuators • PCB Design (KiCad)

### **Mechanical Design**

Fusion 360 • SolidWorks • CATIA • Onshape • Rapid Prototyping

### **Optimization**

CasADi • Gurobi • YALMIP

### **Software Engineering**

Terraform • React • TypeScript • SQLite • Kivy

## Languages

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French (Native) • Persian (Native) • English (Professional Working Proficiency) • German (Basic)

## Leadership

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### **General Coaching Program, EPFL**

Coordinated 50+ coaches across 13 EPFL departments, supporting large-scale student mentoring and integration initiatives.

### **Microengineering Coaching, EPFL**

Mentored first-year Microengineering students to support academic integration and success.

## Interests

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Strength Training & Calisthenics • Mountain Hiking (20+ km treks, 1000m+ elevation gain) • Literature & Philosophy (Camus, contemporary novels)