

Ehsan Sharafian

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PROFESSIONAL SUMMARY

Mechanical Engineering PhD candidate seeking an internship in wearable technology. Experienced in developing integrated wearable systems for gait analysis and rehabilitation using IMU sensing, embedded hardware, smartphone applications, machine learning, and haptic feedback. Proficient in Python, MATLAB, Java, and PyTorch, with six peer-reviewed journal publications.

EDUCATION

Ph.D. in Mechanical Engineering University of Maine, Orono, ME	Expected Dec 2027
GPA: 4.00/4.00 Dissertation: Smart Real-Time Gait Training System	
M.S. in Mechanical Engineering Amirkabir University of Technology (Tehran Polytechnic)	Feb 2020
GPA: 3.65/4.00 Thesis: Trajectory optimization of a robot arm in joint and Cartesian spaces	
B.S. in Mechanical Engineering University of Tehran	Jul 2017

TECHNICAL SKILLS

Programming & Data Analysis	Python, Java, C/C++, NumPy, Scikit-learn, PyTorch, SPSS
Mobile & Software	MATLAB, Simulink, TwinCAT, Android Studio, Unity, Git
Wearable & Embedded Systems	IMU sensors, Arduino IDE, SparkFun modules, PCB modules
Biomechanics & Signal Processing	Gait analysis, Human activity recognition, Feature extraction, OpenSim
Robotics	Surgical robotics, Parallel manipulators, Inverse kinematics, Dynamics, Control systems
CAD	SolidWorks

RESEARCH & ENGINEERING EXPERIENCE

Graduate Research Assistant Biorobotics and Biomechanics Lab, University of Maine Orono, ME	Sep 2023 - Present
- Development of real-time wearable sensing systems and Android-based applications for gait analysis, activity recognition, and home-based rehabilitation. - Designed a smartphone-deployed system using a foot-mounted IMU to reconstruct foot trajectories and classify level walking, stairs, and ramps, achieving 96% accuracy, <1.1 cm error, and 112 ms latency. - Development a lightweight human activity recognition system using two IMUs, and classifier, achieving 99% accuracy for normal locomotion and 93% accuracy for atypical stair-negotiation pattern in older adults. - Architected a home-based haptic feedback gait-training system integrating IMUs, vibrotactile motors, custom Android applications, SparkFun modules, and PCB circuitry for adults aged 65+. - Demonstrated up to 30% improvement in walking speed using the haptic feedback system, with minimal cognitive demand. - Human-subject validation studies with 85+ participants across gait analysis. - Implemented real-time algorithms in Java, Python, and MATLAB for signal processing, sensor fusion, biomechanical modeling, and machine learning in mobile health applications.	
Mechanical and Control Systems Engineer Sina Robotics and Medical Innovators Co.	Dec 2022 - Sep 2023
- Developed PLC-based control logic for a telesurgical laparoscopic robotic platform using Beckhoff TwinCAT, with Simulink validation of inverse kinematics. - Built a Python graphical user interface on Raspberry Pi for surgeon-facing robot control, system guidance, warnings, and improved human-robot interaction during testing and demonstrations. - Coordinated hands-on validation sessions with 6 experienced surgeons, using training, troubleshooting, and usability feedback to refine surgeon-facing robotic system workflows.	

- Designed and assembled robotics and mechatronics setups for student research projects, integrating hardware, CAD, MATLAB workflows, and technical documentation.
- Mentored 6 undergraduate students across 5 research teams, guiding equipment use, troubleshooting, documentation, and project execution.

SELECTED HONORS

Flagship Fellowship Award, University of Maine	Sep 2024 - Sep 2025
Graduate Student Government Award for conference proposal	Mar 2025

LEADERSHIP & SERVICE

Graduate Senator , Department of Mechanical Engineering, University of Maine	Sep 2025 - Present
• Represent graduate student concerns in senate meetings and support academic programs.	
President , Persian Graduate Student Association, University of Maine	Sep 2024 - Apr 2026
• Organized Persian cultural and community events, including Nowruz celebrations with 150+ attendees to introduce Persian traditions and strengthen students engagement.	

PUBLICATIONS

6 peer-reviewed (5 first-author) journal articles in wearable sensing, biomechanics, rehabilitation engineering, and robotics.	
• Ehsan Sharafian, Babak Hejrati. "Real-Time Foot Height Estimation and Activity Classification Using a Foot-Mounted IMU Implemented on a Smartphone." <i>Sensors</i> (2026). • Ehsan Sharafian, Colby Ellis, Babak Hejrati. "Real-Time Activity Recognition Using Minimal Biomechanical Features: A Lightweight IMU-Based Classifier for Older Adults." <i>IEEE Access</i> (2025). • Ehsan Sharafian, Colby Ellis, Ben Sidaway, Marie Hayes, Babak Hejrati. "The Effects of Real-Time Haptic Feedback on Gait and Cognitive Load in Older Adults." <i>IEEE Transactions on Neural Systems and Rehabilitation Engineering</i> (2025). • Mohsen Noghani, Ehsan Sharafian, Ben Sidaway, Babak Hejrati. "Increasing Thigh Extension with Haptic Feedback Affects Leg Coordination in Young and Older Adult Walkers." <i>Journal of Biomechanics</i> (2025). • Ehsan Sharafian, Maryam Ghassabzadeh, Afshin Taghvaeipour. "Trajectory Optimization of a Spot-Welding Robot in the Joint and Cartesian Spaces." <i>International Journal of Robotics and Automation</i> (2023). • Ehsan Sharafian, Afshin Taghvaeipour, Maryam Ghassabzadeh. "Revisiting Screw Theory-Based Approaches in the Constraint Wrench Analysis of Robotic Systems." <i>Robotica</i> (2022).	