SOROUSH ZARE

PhD Candidate | University of Virginia | Mechanical and Aerospace Engineering

(434)466-7536 soroush@virginia.edu Soroush Zare Soroush Zare

PROFESSIONAL INTERESTS

Experienced Mechanical Engineer specializing in the design and control of robotic systems and soft exoskeletons. Expertise in Brain-Computer Interface (BCI) technologies, particularly in EEG-based motor imagery classification for rehabilitation applications. Proficient in mechanical design, rapid prototyping, and integrating mechanical systems with AI-driven controls. Committed to advancing the capabilities of robotics and AI through multidisciplinary collaboration.

EDUCATION

University of Virginia | GPA: 4 out of 4 *Charlottesville, VA*
Ph.D. Candidate in Mechanical and Aerospace Engineering *Jan. 2023-Present*

- National Science Foundation (NSF) Project
  BRITE Synergy: Programmable Wearable Textile Robotics for Ubiquitous Assistance
  Principal Investigator: Ye (Sarah) Sun
  - Contributed to NSF-funded project aimed at developing innovative wearable textile robotics, focusing on enhancing accessibility and usability in everyday life applications.
  - Developed an EEG-based approach for motor imagery classification to aid disabled individuals in controlling rehabilitative devices using their minds.

University of Tehran | GPA: 3.9 out of 4 *Tehran, Iran*
Master of Science Degree in Mechanical Engineering *Sept. 2018-July 2021*

- Thesis: Deep Reinforcement Learning Control of Suspended Under-Constrained Cable-Driven Robot Creating 3D Graphical Model of Objects (Experimental Project).

Shiraz University | GPA: 3.6 out of 4 *Shiraz, Iran*
Bachelor of Science Degree in Mechanical Engineering *Sept. 2014-July 2018*

- Thesis: Build and analysis a model of a bladeless wind turbine (Experimental Project).

PUBLICATION

- **Soroush Zare**, and Ye Sun, "NeuroMotion: EEG-Based Motor Imagery Control of a Wearable Soft Active Upper Limb Exoskeleton for Rehabilitation". (In preparation)
- **Soroush Zare**, and Ye Sun, "NeuroFlex: EEG-Based Motor Imagery Control of a Soft Glove for Hand Rehabilitation, Sensors ". (Under review)
- **Soroush Zare**, and Ye Sun, "Understanding Human Motion Intention from Motor Imagery EEG based on Convolutional Neural Network", Smart Health. (Under review)
- Aref Amiri, **Soroush Zare**, and Mojtaba Sharifi, "Robust Underactuated Point-feet Bipedal Locomotion Using DRL and a Balance Recovery System", IEEE International Conference on Robotics and Automation (ICRA) 2025. (Under review)
- **Soroush Zare**, and Ye Sun, "EEG Motor Imagery Classification using Integrated Transformer-CNN for Assistive Technology Control", IEEE/ACM Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE) (2024).
- Kayla Blalack, Leo Wang, Maximus Maldonado, Lauren Marbury, **Soroush Zare**, and Ye Sun, "A Low-Cost Wearable Exoskeleton for Sitting and Standing Assistance", IEEE-EMBS 21st International Conference on Body Sensor Networks (BSN) (2024). (Accepted)

- Chukwuemeka Ochieze, **Soroush Zare**, and Ye Sun, "Wearable upper limb robotics for pervasive health: A review", Progress in Biomedical Engineering (2023).
- **Soroush Zare**, Mohammad Reza Hairi Yazdi, Mehdi Tale Masouleh, Dan Zhang, Sahand Ajami, and Amirhossein Afkhami, "Experimental Study on the Control of a Suspended Cable-driven Parallel Robot for Object Tracking Purpose", Robotica 40.11 (2022): 3863–3877.
- **Soroush Zare**, Morteza Shahamiri Haghighi, Mohammad Reza Hairi Yazdi, Ahmad Kalhor, and Mehdi Tale Masouleh, "Kinematic Analysis of an Under-constrained Cable-driven Robot Using Neural Networks", (2020) 28^{th} Iranian Conference on Electrical Engineering (ICEE).
- **Soroush Zare**, Mohammad Ghanatian, Mohammad Reza Hairi Yazdi, and Mehdi Tale Masouleh, "Reconstructing 3-D Graphical Model Using an Under-Constrained Cable-Driven Parallel Robot", (2020) 6^{th} Iranian Conference on Signal Processing and Intelligent Systems (ICSPIS).
- Mohammad ghanatian, **Soroush Zare**, Mohammad Reza Hairi Yazdi, and Mehdi Tale Masouleh, "MIMO Dynamic Control of a Suspended Underactuated Cable Robot Using Genetic Algorithm", (2020) 10^{th} Annual National and Student Conference of The Iranian Society of Mechanical Engineers (ISME).

HONORS & AWARDS

- **NSF Student Travel Award**, IEEE/ACM CHASE 2024 *Apr. 2024*
- **GRADESTAR Fellowship** *Aug. 2023, Jan. 2024*
- **Chairperson's Fellowship** *Jan. 2023*
  - Awarded to the Entrance Ph.D. Student
- **York Graduate Scholarship** *Oct. 2023*
  - Awarded to the Top Incoming Graduate Student
- Ranked 2^{nd} among solid design Bachelor of Science students of School of Mechanical Engineering, Shiraz University
- Offered Direct Entrance to Master of Science Program in School of Mechanical Engineering, Shiraz University for Exceptional Talents

PROFESSIONAL LEADERSHIP & SERVICES

- **Vice President**, Graduate Student Board, Mechanical and Aerospace Engineering, UVA, 2024
  - Spearheading initiatives to enhance community engagement and academic support among graduate students.
  - Facilitating the integration of innovative academic programs and technologies to enhance student learning and research capabilities.
  - Collaborating with department heads and faculty to address student concerns and improve graduate student life.
  - Leading strategic planning sessions to identify and implement improvements within the department.
  - Promoting a culture of excellence and inclusivity within the graduate student community.
- **Recruitment Chair**, Gradaute Student Board, Mechanical and Aerospace Engineering, UVA, 2023
  - Organized and executed comprehensive three-day visits for prospective students, including tours of key research facilities such as Link Lab.
  - Coordinated bi-weekly meetings to discuss and plan recruitment strategies and student engagement activities.
  - Managed poster demonstrations that highlighted current research projects and student achievements to visitors and faculty.

  - Developed effective communication strategies to ensure smooth logistics, fostering a welcoming and informative environment for all attendees.
  - Addressed immediate logistical challenges during events, ensuring all planned activities proceeded without interruption.
- Student Member of Institute of Electrical and Electronics Engineers (IEEE)
- **Reviewer** of Journal of Neural Engineering
- **Reviewer** of Mechanism and Machine Theory
- **Reviewer** of IEEE BSN 2024 Conference
- **Reviewer** of IEEE/ACM CHASE 2024 Conference
- **Reviewer** of ACM Transactions on Computing for Healthcare
- **Reviewer** of Smart Health
- **Reviewer** of The 2023 ASEE Annual Conference & Exposition, Baltimore, MD
- **Reviewer** of Journal of Biomedical Physics & Engineering Express
- **Reviewer** of Journal of Vibration and Control
- **Reviewer** of The Third International Conference on Artificial Intelligence, Information Processing and Cloud Computing (AIIPCC 2022)
- **Reviewer** of The 5^{th} International Conference on Mechanical, Electric, and Industrial Engineering (MEIE 2022)
- Member of Iranian Society of Engineering Education (ISEE)

RESEARCH EXPERIENCE

- **Research Assistant** at University of Virginia (Charlottesville, VA) *Jan. 2023 — Present*
  - Designing and developing soft upper limb rehabilitation exoskeleton.
  - Contributed to the design and control of wearable soft rehabilitation robots using soft materials and 3D printing techniques.
  - Implementing reinforcement learning frameworks to enable intuitive control of soft wearable robots via EEG signals.
  - Collaborating in interdisciplinary teams to integrate high-resolution EEG technologies with real-time motor function support systems.
  - Innovating non-invasive EEG sensor technology to reduce setup complexity and enhance user comfort in real-world applications.
  - Contributing to the development of deep learning models for early detection of neurodegenerative diseases, aiming to revolutionize preventative healthcare.
- **Research Assistant** at York University (Toronto, Canada) *Sept. 2022 — Jan. 2023*
  - Lead Project (Smart Grasping Using Deep Reinforcement Learning)
  - Developed and simulated robotic grasping mechanisms using UR5 robotic arm in ROS (Robot Operating System).
  - Utilized Gazebo for real-time simulation and testing of robotic control algorithms.
- **Research Assistant** at University of Tehran (Tehran, Iran) *Sept. 2018 — Sept. 2022*
  - **Member** of Human and Robot Interaction Laboratory (TaarLab)
  - Control Cable-Driven Paralle Robot (CDPR) Using Deep Reinforcement Learning

- Construct 3-D model of Objects Using CDPR
- AI-based Object Tracking Using CDPR

TEACHING ASSISTANT

- Gradaute Course
  - **Advanced Control** *Four Semesters 2019–2022*
    Department of Mechanical Engineering, University of Tehran, Tehran, Iran
  - **Game Theory** *Fall 2020*
    Department of Economics,University of Tehran, Tehran, Iran
  - **Advanced Mathematics** *Fall 2019*
    Department of Mechanical Engineering, University of Tehran Tehran, Iran
- Undergradaute Course
  - **Dynamics** *Fall 2022*
    Department of Mechanical Engineering, York University, Toronto, Canada
  - **Game Theory** *Fall 2020*
    Department of Economics, University of Tehran, Tehran, Iran
  - **Automatic Control** *Fall 2020*
    Department of Mechanical Engineering, University of Tehran, Tehran, Iran
  - **Dynamics of Machinery and Vibration Lab** *Fall 2018*
    Department of Mechanical Engineering, University of Tehran Tehran, Iran
  - **Engineering Mathematics** *Fall 2017*
    Department of Mechanical Engineering, Shiraz University, Shiraz, Iran

CERTIFICATES

- 2023 Peer Review Excellence Online Training Graduate | IOP Publishing
- Human Research IRB-HSR Researcher Basic Course | University of Virginia
- Human Research IRB-SBS Researcher Basic Course-NO PRISONERS | University of Virginia
- Reinforcement Learning Specialization | University of Alberta (Coursera)
- Introduction to Machine Learning in Production | DeepLearning.AI (Coursera)
- Neural Networks and Deep Learning | DeepLearning.AI (Coursera)
- Machine Learning | Stanford University (Coursera)
- Getting started with TensorFlow 2 | Imperial College London (Coursera)