# Milad Azizkhani

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## Education

**Georgia Institute of Technology** — *Atlanta, GA, USA*
Ph.D. in Robotics, Minor in Optimization — 2022–2026 est.

**Amirkabir University of Technology (AUT)** — *Tehran, Iran*
M.Sc. in Mechatronics Engineering, ***Ranked 2nd in program*** — 2017–2020

**Bu Ali Sina University** — *Hamedan, Iran*
B.Sc. in Mechanical Engineering, ***Ranked 3rd in program*** — 2013–2017

## Honors and Awards

- **Ph.D. Research Excellence Award** — *Spring 2025, Georgia Institute of Technology*
  Awarded by the Mechanical Engineering Department for outstanding doctoral research.
- **Flowers Family Topping Fellowship** — *Fall 2024, Georgia Institute of Technology*
  Awarded by the Mechanical Engineering Department for achieving the highest number of first-author citations.

## Research Interests

I design, build, model, control, and integrate robots for various applications. My primary objective is to develop innovative control methods that synergize model-based and learning approaches. My research, both current and past, revolves around **Adaptive Control, Control Theory, Learning-Based Control, Optimal Control, Trajectory Optimization, Model Predictive Control, Robot Learning, Imitation Learning, Reinforcement Learning, Deep Learning, Soft Robots, Continuum Robots**, and **Visual Servoing**.

## Skills

**Programming:**

MATLAB, Python, Julia, C++, C, Git & Github, Linux, LaTeX

**Technologies & Tools:**

ROS, CasADi, YALMIP, Gurobi, TensorFlow, PyTorch, StableBaseline3, Drake, MuJuCo, PyBullet, Isaac Gym, SurRoL, OpenCV, Arduino, Simulink, LabVIEW, Maple, Mathematica, SolidWorks, ABAQUS, ANSYS, FlowCode, MoCap

## Publications

### Journal Articles

- **[J8] M. Azizkhani**, S. Kousik, and Y. Chen, ”Dynamic Task Space Control of a Redundant Pneumatically Actuated Soft Robot,” *IEEE Robotics and Automation Letters*, 2025. [DOI]
- **[J7] M. Azizkhani**, J. Ha, A. L. Gunderman, and Y. Chen, ”Soft Robot Kinematic Control via Manipulability-Aware Redundancy Resolution,” *ASME Journal of Mechanisms and Robotics*, 2025. [DOI]
- **[J6]** A. L. Gunderman, Y. Wang, B. O. Gunderman, A. Qiu, **M. Azizkhani**, J. Sommer, and Y. Chen, ”Kinetostatics and Retention Force Analysis of Soft Robot Grippers with External Tendon Routing,” *IEEE Robotics and Automation Letters*, 2024. [DOI]
- **[J5]** A. L. Gunderman, **M. Azizkhani**, S. Sengupta, K. Cleary, and Y. Chen, ”Modeling and Control of an MR-Safe Pneumatic Radial Inflow Motor and Encoder (PRIME),” *IEEE/ASME Transactions on Mechatronics*, 2023. [DOI]
- **[J4]** J. Shen, Y. Wang, **M. Azizkhani**, D. Qiu, and Y. Chen, ”Concentric Tube Robot Redundancy Resolution via Velocity/Compliance Manipulability Optimization,” *IEEE Robotics and Automation Letters*, 2023. [DOI]
- **[J3] M. Azizkhani**, A. L. Gunderman, I. S. Godage, and Y. Chen, ”Dynamic Control of Soft Robotic Arm: An Experimental Study,” *IEEE Robotics and Automation Letters*, 2023. [DOI]
- **[J2] M. Azizkhani**, M. Zareinejad, and M. A. Khosravi, ”Model Reference Adaptive Control of a Soft Bending Actuator with Input Constraints and Parametric Uncertainties,” *Mechatronics*, 2022. [DOI]
- **[J1] M. Azizkhani**, I. S. Godage, and Y. Chen, ”Dynamic Control of Soft Robotic Arm: A Simulation Study,” *IEEE Robotics and Automation Letters*, 2022. [DOI]

### Conference Proceedings

- **[C3]** A. L. Gunderman, **M. Azizkhani**, S. Sengupta, K. Cleary, and Y. Chen, ”Open Source MR-Safe Pneumatic Radial Inflow Motor and Encoder (PRIME): Design and Manufacturing Guidelines,” *2023 International Symposium on Medical Robotics (ISMR)* [DOI]
- **[C2]** A. Qiu, C. Young, A. L. Gunderman, **M. Azizkhani**, Y. Chen, and A.-P. Hu, ”Tendon-Driven Soft Robotic Gripper with Integrated Ripeness Sensing for Blackberry Harvesting,” *2023 IEEE International Conference on Robotics and Automation (ICRA)* [DOI]
- **[C1] M. Azizkhani** and Y. Chen, ”Supervised Adaptive Fuzzy Control of LVAD with Pulsatility Ratio Modulation,” *2022*

*IEEE 18th International Conference on Automation Science and Engineering (CASE)* [DOI]

# Experience

**Georgia Institute of Technology, Atlanta, GA, USA** 2022 - Present

***Senior Graduate Research Assistant, BioMedical Mechatronics (BM2) Lab***

- **Research:**
  - Synergizing Model-Based and Learning Approaches for Sample-Efficient Adaptive Algorithms
  - Safe Dexterous Manipulation with Adaptive Learning for Uncertainty Mitigation
  - Planning Through Contact via Trajectory Optimization
  - Reachability Analysis for Contact in Robotic Systems
  - Dynamic Task Space and Joint Space Control of Redundant Pneumatically Soft Robotic Arm
  - Gain Scheduled Redundancy Resolution Resolved Rate Kinematic Control for a Redundant Pneumatically Soft Robotic Arm
  - Control of MR-SAFE Pneumatic Radial Inflow Motor
  - Supervised Adaptive Fuzzy Control of Left Ventricular Assistive Devices
- **Teaching and Supervision Responsibilities:**
  - TA for VIP course, Soft Elbow Rehabilitation Device Development.
  - Senior Mentor for Graduate Students
    - Locomotion + Manipulation control of Cassie+Soft Arm using Reinforcement Learning (Kanishk Kanishk)
    - Soft Underwater Robot with Shape Memory Alloy Actuation (Thanapol Tantagunninat)
    - Tendon Driven Continuum Robot (Man Wo Lui)
  - Senior Mentor for Undergraduate Students
    - Soft Robot Control with Reinforcement Learning (Aaditya Dhar)
    - Perception and Control of Bi-Manual Surgey with dVRK system (Satya Abihith Velumuri)
    - Soft Gripper (Alex S. Qiu)
    - Design rotary encoder for soft robot elongation measurement (Nyah M. Ebanks)
    - Solving forward and inverse kinematic with machine learning (Benjamin Gunderman)

**University of Arkansas, AR, USA** 2021 - 2022

***Senior Graduate Research Assistant, Medical Robotics Lab***

- Projects: Dynamic Control of Soft Robotic Arm, Left Ventricular Assistive Devices, Redundancy Resolution.

**New Technologies Research Center, Amirkabir University of Technology, Tehran, Iran** 2017 - 2020

***Research Assistant, Soft Robotics Lab***

- Control of a Soft Longitudinal Actuator Using MPC-NN Approach.
- Design and Build Longitudinal and Bending Soft Actuator Experimental Setups.
- Robust Model Reference Adaptive Control of a Soft Bending Actuator with Input Constraints.
- Adaptive Control of Soft Bending Actuator Using Modified Adaptive + RISE Control.

**Amirkabir University of Technology, Tehran, Iran** 2018 - 2019

***Mechatronics Engineer of a research team working on MotoGP Simulator***

- Control of a simulator using Arduino and AVR.

**Bu Ali Sina University, Hamedan, Iran** 2016

***Instructor***

- Introduction on SolidWorks

# Professional Service

**Technical Reviews:**

IEEE Robotics and Automation Letters (RA-L), IEEE Access, IEEE Transaction on Haptics, IEEE Transaction on Automation Science and Engineering, Nonlinear Dynamics, Journal of Field Robotics, Scientific Reports, Multibody System Dynamics, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), IEEE International Conference on Robotics and Automation (ICRA), IEEE International Symposium on Medical Robotics (ISMR).