Amin Mirzaee

Webpage: aminmirzaee.com

Education

University of Illinois at Urbana-Champaign, IL, US — Aug 2023 - Present
Ph.D. in Electrical and Electronics Engineering; GPA: 4/4
Robotics, Vision, and Artificial Intelligence

University of Tehran, Tehran, Iran
M.Sc. in Mechanical Engineering; *GPA: 3.88/4 (18.01/20)* — Sep 2020 - Aug 2023
B.Sc. in Mechanical Engineering; *GPA: 3.75/4 (17.62/20), Last 2yrs: 3.93/4* — Sep 2016 - Aug 2020

Publications

- Agarwal, A.*, **Mirzaee, M. A.***, Sun, X., Yuan, W. "A Modularized Design Approach for Vision-based Tactile Sensors." *Sage, The International Journal of Robotics Research (IJRR), 2025* [Under review]
- **Mirzaee, M. A.**, Huang, H., Yuan, W. "GelBelt: A Vision-based Tactile Sensor for Continuous Sensing of Large Surfaces." *IEEE Robotics and Automation Letters (RA-L), 2025* [Paper, Webpage, Video]
- **Mirzaee, M. A.**, Sadighi, A. "Multiphysics simulation and design framework for developing a vision-based tactile sensor with force estimation and slip detection capabilities." *Elsevier, Sensors and Actuators A: Physical, 2024* [Paper]
- **Mirzaee, M. A.**, Sadighi, A. "Design and Fabrication of a Vision-based Tactile Sensor." *IEEE International Conference on Robotics and Mechatronics (ICRoM), 2023* [Paper]
- Rabbani, M., **Mirzaee, M. A.**, Robati, M., Sadighi, A. "Design and Fabrication of a Soft Magnetic Tactile Sensor." *IEEE International Conference on Robotics and Mechatronics (ICRoM), 2022* [Paper]

Research Experience

RoboTouch Lab, *UIUC, IL, US* — Aug 2023 – Present
Director: Wenzhen Yuan, Assistant Professor, CS

- **Vision-based tactile sensor (VBTS) design for robotic manipulation and surface inspection applications.**
  - CAD, optical simulation, FDM/SLA printing, molding, casting, PCB design, data collection, image processing.
- **Physics-based optical simulation toolbox for interactive design of optical sensors.**
  - CAD, optical simulation, fabrication, Python scripting, data collection, sim2real comparison.

Smart Electromechanical Energy Conversion Systems Lab, *UT, Tehran, Iran* — Nov 2020 – Aug 2023
Director: Ali Sadighi, Assistant Professor, ME

- **Development of a marker-based VBTS for force estimation and slip detection.**
  - CAD, coupled FEM-optical simulation, printing, molding, casting, machining, PCB design, Raspberry Pi, data collection, Python image processing.
- **Development of a soft magnetic tactile sensor based on a 3D Hall-effect sensor.**
  - CAD, viscoelasticity study, material characterization, dynamic response modeling, data collection, calibration.
- **Development of a customized two-axis force application mechanism using voice coil actuators.**
  - CAD, machining, control and conditioning PCB design, synchronized data collection, CubeIDE, test.

Robotics Engineering Center, *UT, Tehran, Iran* — Sep 2019 – May 2021
Director: Farshid Najafi, Assistant Professor, Simon Fraser University

- **Design of a Rescue Robot for Crawler Machines.**
  - CAD, kinematic calculation, FEA, power consumption, electronic circuit design.
- **STEM education and educational robotics (Lego-compatible) for children, DIY kits.**
  - Content production, graphic design, marketing, photography, filmmaking.

Projects

Design of a suction cup gripper with embedded vision-based tactile sensing Fall 2023
"Physics-based Rendering for Designing Optical-based Sensors" Final Project

- CAD, mechanical and optical simulation, and optimization of the gripper model.

Nonlinear System Identification and control of Soft Robot Dynamics Spring 2021
"Advanced Control" Final Project

- Implemented a dynamic model based on Koopman Operator Theory for a soft arm and compared the results with an LSTM model.

Design and prototype of a hexapod robot Spring 2020
"Mechatronics" Final Project

- Designed a hexopod mechanism operated by Arduino, ultrasound and IMU sensors, and DC motors. Implemented PI controllers for obstacle avoidance.

Simulation of a piezoelectrically actuated diaphragm for check valve micropump Fall 2019
"Smart Structures" Final Project

- Simulated coupled solid mechanics-piezoelectric-electrical physics simulation in COMSOL.

Finite element analysis of gear system Fall 2019
"Applied Finite Element Method" Final Project

- Three-dimensional dynamic model analysis of a helical gear drive and calculated the failure torque.

Skills

Programming: Python, Matlab, C++, LaTeX, Embedded systems.

Languages: Persian: Native, English: Professional Working Proficiency.

Operating Systems: Windows, Linux: Ubuntu|Raspbian.

Design: SolidWorks, Onshape, Fusion 360, Catia, AutoCAD, Altium Designer.

Simulation: Abaqus, COMSOL, NI Multisim, Mujoco, Blender, Simulink, Zemax, ADAMS, Artas SAM.

Fabrication: Printing: FDM|SLA, Machining: Turnning|Milling|Drilling|Sanding, Molding/Casting.

Media & Graphics: Photography, Filmmaking, Adobe: Ps|Lr|Ai|Pr|Ae, Painting, Drawing.

Honors and Awards

- Best paper finalist, ICROM 2022 — Fall 2022
- Honorable Student Reward, Supporter Foundation of University of Tehran (UT) — Fall 2017 & 2019
- Outstanding teaching assistant in "Physics I", School of Engineering Science, UT — Fall 2018
- Excellent students' M.Sc. admission (Top 15%), School of Mechanical Engineering, UT — Spring 2020
- Full Scholarship for M.Sc. Program, School of Mechanical Engineering, UT — Sep. 2020 - Aug. 2023
- Full Scholarship for B.Sc. Program, School of Mechanical Engineering, UT — Sep. 2016 - Aug. 2020
- Certificate of Photography (GPA 4/4), Iranian Youth Cinema Society — 2016
- Certificate of Filmmaking (GPA 4/4), Iranian Youth Cinema Society — 2016
- Ranked 1st in a regional photography competition in Gilan, Iran. — 2014
- Ranked 2nd in a regional caricature drawing competition in Gilan, Iran. — 2014

Teaching Experience

Lab Teaching Assistant

- "Mechatronics Lab", *by Dr. A. Sadighi, ME, UT* — Fall 2022

Course Teaching Assistant

- "Measurement Systems & Instrumentation", *by Dr. A. Sadighi, ME, UT* — Fall 2021 & Spring 2022
- "Applied Finite Element Method" *by Dr. M. Mahnama, ME, UT* — Fall 2020
- "Physics I" *School of Engineering Science, UT* — Fall 2018
- "Engineering Mathematics" *by Dr. M. Karimpour, ME, UT* — Fall 2018