

# SOHEIL HABIBIAN

Curriculum Vitae

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## Research Interests

Robot learning, human-robot teams, and artificial intelligence.

## Education

May 2024 **Virginia Polytechnic Institute and State University**  
(expected) Ph.D. Student, Mechanical Engineering

January **Bucknell University**  
2020 M.Sc. Mechanical Engineering  
Thesis: “Analysis and Control of Fiber-Reinforced Elastomeric Enclosures (FREEs)”

June 2015 **Qazvin Azad University (QIAU)\***  
B.Sc. Mechanical Engineering  
Honors Thesis: “Design and Implementation of a Tele-operative Response Robot”

\* QIAU organizes the International IranOpen RoboCup competition and has established the Mechatronics Research Laboratory (MRL) as one of the outstanding independent robotics research centers in Iran.

## Research Experience

2020-  
Present **Collaborative Robotics Lab, Virginia Tech**  
Advisor: Dylan P. Losey

- Created a communicative supervised learning framework to help novice robot users to enhance teaching tasks through kinesthetic demonstrations
- Implemented a representation learning approach using recurrent neural networks to enable robots robustly influence new human partners
- Developed a Bayesian-based optimization approach for encouraging human participation in robot teams by incorporating fairness and legibility of subtask allocations
- Developed an active preference-based learning algorithm for transparent robot teaching

2017-  
2020 **Integrated Design Manufacturing Robotics Lab, Bucknell University**  
Advisor: Keith W. Buffinton

- Developed a dynamic lumped-parameter model and a finite element model to study the practicability of a fiber-reinforced soft robotic actuator for use in robotic arms
- Developed a controller-based trajectory following algorithm for the soft actuator
- Conducted workspace analysis for a module of multiple soft actuators using FEA

2011-2017 **Advanced Mobile Robotics Lab, Qazvin Azad University**  
Advisor: Prof. Farshid Najafi

- Managed projects and led an engineering team of 10+ to design and develop mobile response robots for real-life rescue missions.
- Designed and implemented a compact 7-DoF robot arm for dexterous mobile manipulation
- Designed and implemented a tele-operative response robot for hazardous environments
- Developed a lightweight throwable two-wheeled robot for reconnaissance missions

## Publications and Presentations

### Papers

Antonio Alvarez Valdivia, **Soheil Habibian**, Carly A. Mendenhall, Francesco Fuentes, Ritish Shailly, Dylan P. Losey, and Laura H. Blumenschein, "Wrapping Haptic Displays Around Robot Arms to Communicate Learning," *arXiv preprint*: <https://doi.org/10.48550/arXiv.2207.03315>.

S. Parekh, **S. Habibian**, D. P. Losey, "RILI: Robustly influencing latent intent," *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022. [just accepted]

**S. Habibian**, D. P. Losey, "Encouraging Human Interaction with Robot Teams: Legible and Fair Subtask Allocations," *IEEE Robotics and Automation Letters*, 2022.

**S. Habibian**, A. Jonnavittula, D. P. Losey, "Here's What I've Learned: Asking Questions that Reveal Reward Learning," *ACM Transactions on Human-Robot Interaction*, 2022.

M. Dadvar, **S. Habibian**, "Contemporary Research Trends in Response Robotics," *ROBOMECH Journal*, 2022.

**S. Habibian**, B. B. Wheatley, S. Bae, J. Shin, K. W. Buffinton, "Evaluation of Two Complementary Modeling Approaches for Fiber-Reinforced Soft Actuators," *ROBOMECH Journal*, 2022.

**S. Habibian**, M. Dadvar, "Design and Implementation of a Maxi-Sized Rescue Robot (Karo) for Rescue Missions," *ROBOMECH Journal*, 2021.

K.W. Buffinton, B. B. Wheatley, **S. Habibian**, J. Shin, Brielle H. Cenci, and A. E. Christy, "Investigating the Mechanics of Human-Centered Soft Robotic Actuators with Finite Element Analysis," *IEEE International Conference on Soft Robotics (RoboSoft)*, 2020.

F. Najafi, M. Dadvar, **S. Habibian**, et al., "RoboCup Rescue 2018 Team Description Paper MRL," *RoboCup Rescue Robot League Team Description Papers Collection*, 2018.

### Thesis

**S. Habibian**, "Analysis and Control of Fiber-Reinforced Elastomeric Enclosures (FREEs)," *Master's thesis submitted to the Department of Mechanical Engineering - Bucknell University*, 2019.

### Conference

"Leveraging Roles in Robot Teams to Encourage Human Participation" *Southeast Controls Conference*, 2021.

### Poster

"Finite Element Analysis of Fiber Reinforced Elastomeric Enclosures (FREEs)," *3rd Toyota Research Institute Workshop*, 2019.

## Awards and Fellowships

2017-9     Granted **Full Scholarship**, M.Sc. Mechanical Engineering, Bucknell University.

2018       Granted **Graduate Summer Research Fellowship**, Graduate Studies, Bucknell University.

2018       **2<sup>nd</sup> Place** & Best-in-Class Dexterity, Rescue Robot League, RoboCup Competition, Canada.

2017       **3<sup>rd</sup> Place**, Rescue Robot League, RoboCup Competition, Japan.

2013-7     **1st Places**, Rescue Robot League, IranOpen Competitions.

2013-7     Best-In-Class Mobility, Autonomy, Dexterity, Rescue Robot League, IranOpen Competitions.

2016       **2<sup>nd</sup> Place** & Best-in-Class Exploration, Rescue Robot League, RoboCup Competition, Germany.

- 2015      **1st Place**, Rescue Robot League, RoboCup Competition, China.
- 2014      **2nd Place** and Best-in-Class Mobility, Rescue Robot League, RoboCup Competition, Brazil.
- 2012      **1st Place**, Rescue Robot League, World RoboCup Competition, Mexico.

## **Professional Services**

- 2020 - 2021    **Committee Member, ASTM Subcommittee E54.09**  
Established terminologies for standard test methods and guides for evaluating response robots
- 2015-2017    **Technical Committee Member, IranOpen RoboCup Competitions**  
Co-organized competitions for objective performance evaluations of rescue robot teams
- 2014-2017    **Group Leader, Advanced Mobile Robotics Lab**  
Organized projects and supervised trainee students to design and implement mobile robots
- Reviewer**
- ROBOMECH Journal
  - Journal of Field Robotics
  - Journal of Intelligent & Robotic Systems
  - International Journal of Advanced Robotic Systems
  - IEEE RAS International Conference on Soft Robotics (RoboSoft)
  - IEEE International Conference on Intelligent Robots and Systems (IROS)

## **Industrial Training Courses**

- 2012      Introduction to Hydraulics-H511, FESTO Co., Iran, October 7th -10th.
- 2012      Modern Industrial Pneumatics-PN111, FESTO Co., Iran, October 21st-24th.
- 2010      Lathe Machine Operation, Vocational Training Organization, Iran, December 5th.

## **Skills**

Python, PyTorch, TensorFlow, PyBullet, ROS, SPSS, MATLAB, SolidWorks, ABAQUS, MasterCam, LabVIEW, LaTeX

## **Teaching Experience**

- Fall 2020,      **Mechanical Engineering Dept., Virginia Tech**  
Spring 2021    Graduate Student Instructor, Mechanical Design Lab
- Fall 2017,      **Mechanical Engineering Dept., Bucknell University**  
Spring 2019    Graduate Student Instructor, Mechanical Design  
Graduate Student Instructor, Manufacturing Processes  
Graduate Student Instructor, Renewable Energy Conversion

## **Campus Involvements**

- 2019      **Engineering Camp Counselor**, Summer Engineering Camp Program, Bucknell University
- 2018      **International Orientation Assistant**, International Student Orientation, Bucknell University
- 2018      **Journal Organizing Project Assistant**, Bertrand Library, Bucknell University