

ANDRE CLEAVER

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[\[Website\]](#) [\[Github\]](#) [\[LinkedIn\]](#)

OBJECTIVE

[\[Resume\]](#)

As a Ph.D. candidate in Mechanical Engineering and Computer Science specializing in Human-Robot Interaction (HRI) with Augmented Reality (AR), I bring 4 years of hands-on experience in robotics research and surgical operations. Adept in developing cutting-edge AR applications for various platforms, with a proven track record of publications at the International Workshop on Virtual, Augmented, and Mixed-Reality for HRI. Seeking to apply my expertise in Unity3D and Robot Operating System (ROS) to enable individuals to seamlessly engage with emerging smart technology.

EDUCATION

Ph.D. Candidate: Mechanical Engineering: Human-Robot Interaction **Anticipated Spring 2024**

Tufts University *Medford, MA*

- GPA: 3.50 Thesis Advisor: Dr. Jivko Sinapov
- Dissertation Topic: Augmented Reality for Enhanced Human-Robot Interaction: Empowering Users in Varied Robotic Contexts

Master of Science: Mechanical Engineering: Material Science **2018**

Tufts University *Medford, MA*

- GPA: 3.67 Thesis Advisor: Dr. Douglas M. Matson
- Thesis: “*Characterization of the Influence of Thermal Profile on Microstructural Development in a Eutectic Cobalt Silicon Alloy*”

Bachelor of Science: Biomedical Engineering: Tissue Mechanics **2016**

The University of Texas at San Antonio *San Antonio, TX*

- GPA: 3.70 Cum Laude, with Highest Honors. Thesis Advisor: Dr. Matthew Reilly
- Thesis: “*Inverse Finite Element Analysis of Compressed Mouse Lenses for Mechanical Insights into Presbyopia*”
- The Global Undergraduate Awards (UA)-Regional Winner in Engineering

FELLOWSHIPS AND AWARDS

ACM/IEEE Human Robot Interaction (HRI) 2023 Best Video Award [\[Video\]](#) **Mar. 2023**

Verizon 5G EdTech Challenge **Jan. 2019**

GEM Full Fellowship **Mar. 2018**

The Global Undergraduate Awards – Regional Winner for U.S. & Canada **Nov. 2016**

UTSA Center for Innovation, Technology, and Entrepreneurship (CITE Competition) 3rd Place **May 2016**

SKILLS

Computer Python, C++, C#, Unity3D, ROS, Arduino, Illustrator, SOLIDWORKS, MySQL, LabVIEW

Other Hardware Architecture, Control Systems, Technical Drawing, Graphic Design, Autonomous Robots

PUBLICATIONS

1. A. Cleaver, R. Aronson, and J. Sinapov, “Helping people predict the outcome of robotic pouring behaviors with augmented reality,” in *ACM/IEEE Conference on Human-Robot Interaction (HRI), Workshop on Virtual, Augmented and MixedReality for Human-Robot Interaction (VAM-HRI), Boulder, Colorado, USA, 2024*
2. A. Cleaver and J. Sinapov, “Demonstrating trainar: An augmented reality tool that helps humans teach robots,” in *ACM/IEEE International Conference on Human-Robot Interaction (HRI) Video, Stockholm, Sweden, 2023*
3. A. Cleaver, V. Chen, and J. Sinapov, “First encounters with a robot: The value of augmented reality when learning about mobile robots,” in *ACM/IEEE Conference on Human-Robot Interaction (HRI), Workshop on Virtual, Augmented and MixedReality for Human-Robot Interaction (VAM-HRI), Stockholm, Sweden, 2023*
4. A. Cleaver, D. Tang, V. Chen, *et al.*, “Dynamic path visualization for human-robot collaboration,” in *ACM/IEEE International Conference on Human-Robot Interaction (HRI) Late-Breaking Report, 2021*
5. A. Cleaver, F. Muhammad, A. Hassan, *et al.*, “Sensor: A visual tool for intelligent robots for collaborative human-robot interaction,” *arXiv preprint arXiv:2011.04515*, 2020
6. A. Cleaver, D. Tang, V. Chen, *et al.*, “Haven: A unity-based virtual robot environment to showcase hri-based augmented reality,” *arXiv preprint arXiv:2011.03464*, 2020
7. A. Cleaver, E. Short, and J. Sinapov, “Rain: A vision calibration tool using augmented reality,” in *ACM/IEEE Conference on Human-Robot Interaction (HRI), Workshop on Virtual, Augmented and MixedReality for Human-Robot Interaction (VAM-HRI), Cambridge, UK, 2020*

8. F. Muhammad, A. Hassan, A. Cleaver, *et al.*, "Creating a shared reality with robots," in *2019 14th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, IEEE, 2019, pp. 614–615
9. S. Jeon, M. Kolbe, V. Kaban, *et al.*, "Metastable solidification pathways of undercooled eutectic CoSi-CoSi_2 alloys," *Acta Materialia*, vol. 176, pp. 43–52, 2019
10. A. V. Cleaver, *Characterization of the Influence of Thermal Profile on Microstructural Development in a Eutectic Cobalt Silicon Alloy*, eng. 2018, ISBN: 9780438020696
11. M. A. Reilly and A. Cleaver, "Inverse elastographic method for analyzing the ocular lens compression test," *Journal of Innovative Optical Health Sciences*, vol. 10, no. 06, p. 1 742 009, 2017
12. A. Cleaver, L. Rodriguez, and M. A. Reilly, "Inverse finite element analysis of mouse lens compression for determining elastic moduli," *Investigative Ophthalmology & Visual Science*, vol. 57, no. 12, pp. 5743–5743, 2016

WORK EXPERIENCE

- Research Assistant - Tufts University Medford, MA** **2018 - Present**
- Develop and conduct HRI studies. Tools: Ground-Mobile Robots, ROS, Vuforia, HoloLens. Studies investigate how different AR visuals improve a humans experience with a robot.
- Engineering Co-Op Student - Draper Laboratory Cambridge, MA** **Summer 2021**
- Created 3D assets and animated transitions for interactive Mixed-Reality content using MRTK features.
- Research Intern - MIT Lincoln Laboratory Lexington, MA** **Summer 2018, 2019**
- Developed an image processing tool for UAVs to detect and classify the structural and health state of roads and humans to eliminate risks in rescue efforts in natural disaster scenarios.
 - Developed a navigation and velocity control system for small UAVs.
 - Designed a rescue operation plan using quadcopters for the Intern Innovative Idea Challenge.(I3C).
- Research Assistant - Tufts University Medford, MA** **2017, 2018**
- Developed an image processing technique to isolate structures of undercooled metallic alloys.
 - Conducted metallic alloy testing at NASA Marshall Space Flight Center Electrostatic Levitation Lab.
- Teaching Assistant - Tufts University Medford, MA** **2016, 2017**
- Lectured and graded homework, exams, and projects for Mechanics of Materials class size of 30.

PROJECTS

Research

Future Robot Path Projections Determine the appropriate amount of time ahead of a robot's path trajectory to show a user to convey motion intent in varying path complexities. Developed a public online virtual environment to evaluate user actions through a game of object collecting **Tools:** Unity, MySQL/php, Amazon Cloud Relational database [\[Demo\]](#)

Robotic Education in AR Evaluate AR's role in teaching Intro to Robotics for kids online. Developed a robot platform to visualize sensor and cognitive data through live video. Students can collaborate in controlling a robot remotely to achieve learning objectives **Tools:** Unity, Vuforia, EV3 Robot, Python, MQTT [\[Demo\]](#)

Hackathons

Harvard i-lab Venture in Metaverse Hackathon - Role: App developer for mixed-reality teaching application. Goal: AR-based application as a new form of interaction towards core grade school subjects as compared to traditional classroom environments. **Tools:** Unity, Smartphone **Apr. 2022**

MIT Reality Hack 2022 - Role: App developer for mixed-reality interactive application. Goal: Create an immersive interactive experience to raise awareness of coral reef destruction or coral bleaching. **Tools:** Unity, Hololens2 [\[Project\]](#) **Mar. 2022**

PTC Hackathon 2021 - Role: Application developer for mixed reality object recognition. Goal: Identify mechanical parts using a depth camera and provide part information in AR. **Tools:** Unity, TensorFlow, Depth sensor, Vuforia Engine, Blender [\[Certificate\]](#) **Feb. 2021**

MIT XR Hackathon 2020 - Role: App developer for mixed-reality speech training application. Goal: Users get visual feedback from projected animated audience using machine learning techniques that analyze utterances during practice talks. **Tools:** Unity, Nreal Glasses **Jan. 2020**

MIT RealityHack 2019 – Role: Animator for mixed-reality storyline experience. Goal: Users must learn how to communicate with a creature using only hand gestures. **Tools:** Unity, Blender, Maya, Magic Leap **Jan. 2019**

PROFESSIONAL SERVICE AND MEMBERSHIPS

Professional Society Memberships

Black in Robotics (**BiR**)
National Society of Black Engineers (**NSBE**)
Association for Computing Machinery (**ACM**)
Society for Experimental Biology and Medicine (**SEBM**)

Reviewer for Professional Conferences and Symposiums

ACM Transactions on Human Robotics Interaction (**THRI**)
Int. Workshop on Virtual, Augmented and Mixed Reality for Human-Robot Interaction (**VAM-HRI**)
Artificial Intelligence for Human-Robot Interaction (**AI-HRI**) AAAI 2020 Fall Symposium Series
ACM/IEEE International Conference on Human-Robot Interaction (**HRI**)

VOLUNTEER & COMMUNITY OUTREACH

Northeast Robotics Colloquium 2023 - Presented research poster to northeast robotics community	Nov. 2023
Massrobotics-RoboBoston Block Party - Talked with the community about projects within my lab and helped run robotic demos	2022-2023
Medford High school Reverse Science Fair - Talked with students about my research to help inspire next generation of scientists.	Nov. 2021
HRI 2021 Accessibility - Provided assistance to the accessibility chair in making HRI 2021 the first year of the conference to add accessibility features to all main-track papers	Jan 2021
Medford HS Virtual Science Fair - Served as Judge	May 2020
BEST Talk with Dr. Elaine Short. - Q & A session for incoming Undergraduate Students	July 2020
Medford High school Reverse Science Fair - Talked with students about my research to help inspire next generation of scientists.	Oct. 2019
Community Cambridge Charter School Tuft's "Professors on the road" - Talked with students about my research to inspire kids from under-represented groups into science.	Oct. 2018

FUN AR VIDEOS

[\[Tufts Box Link to AR Videos\]](#)