

REUBEN M. ARONSON

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Research Overview

I build human-robot interaction algorithms for collaborative manipulation to improve assistive technologies. I develop complex robot autonomy to empower users.

Key words: Assistive robotics, human-robot interaction, collaborative manipulation, intent recognition, nonverbal behavior

Education

Ph.D. Robotics 2022	Robotics Institute, Carnegie Mellon University Advisor: Henny Admoni Thesis: <i>Control Input and Natural Gaze for Goal Prediction in Shared Control</i> Area of study: Human-Robot Interaction
M.S. Robotics 2018	Robotics Institute, Carnegie Mellon University Advisor: Henny Admoni Area of study: Human-Robot Interaction
B.S. Mechanical Engineering 2012	Massachusetts Institute of Technology Thesis: <i>Design of Clamping Mechanism for Securing Sections of Unmanned Submarine</i> Advisor: Douglas Hart

Work experience

Postdoctoral Scholar, Tufts University Advisor: Prof. Elaine Short Medford, MA	2022–
Mechanical Engineer, Naval Research Laboratory (Contractor with Exelis, Inc.) Washington, DC	2012–2015

Publications

Peer-Reviewed Journal Articles

- J3** Newman, B. A. , **Aronson, R. M.** , Kitani, K. , and Admoni, H. (2022). Helping People Through Space and Time: Assistance as a Perspective on Human-Robot Interaction. *Frontiers in Robotics and AI*, 8:410
- J2** Newman*, B. A. , **Aronson*, R. M.** , Srinivasa, S. S. , Kitani, K. , and Admoni, H. (2022). HAR-MONIC: A Multimodal Dataset of Assistive Human-Robot Collaboration. *The International Journal of Robotics Research*, 41(1):3–11

- J1** Jia, Z. , Bhatia, A. , **Aronson, R. M.** , Bourne, D. , and Mason, M. T. (2018). A survey of automated threaded fastening. In *IEEE Transactions on Automation Science and Engineering*, pages 1–13

Peer-Reviewed Conference Papers

- C17** Huang, J. , Sheidlower, I. S. , **Aronson, R. M.** , and Short, E. S. (In press). On the effect of robot errors on human teaching dynamics. In *12th International Conference on Human-Agent interaction (HAI)*
- C16** Cleaver, A. , **Aronson, R.** , and Sinapov, J. (2024). Enhancing users’ predictions of robotic pouring behaviors using augmented reality: A case study. In *2024 33rd IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*
- C15** Owens, H. , **Aronson, R.** , and Short, E. S. (2024). The limits of robot moderators: Evidence against robot personalization and participation equalization in a building task. In *2024 33rd IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*
- C14** Sheidlower, I. , Bethel, E. , Lilly, D. , **Aronson, R.** , and Short, E. S. (2024). Imagining in-distribution states: How predictable robot behavior can enable user control over learned policies. In *2024 33rd IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*
- C13** Yu, H. , Fang, Q. , Fang, S. , **Aronson, R.** , and Short, E. S. (2024). How much progress did I make? an unexplored human feedback signal for teaching robots. In *2024 33rd IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*
- C12** **Aronson, R. M.** and Short, E. S. (2024). Intentional user adaptation to shared control assistance. In *2024 ACM/IEEE International Conference on Human-Robot Interaction (HRI)*
- C11** Huang, J. , **Aronson, R. M.** , and Short, E. S. (2024). Modeling variation in human feedback with user inputs: An exploratory methodology. In *2024 ACM/IEEE International Conference on Human-Robot Interaction (HRI)*
- C10** Sheidlower, I. , Murdock, M. , Bethel, E. , **Aronson, R. M.** , and Short, E. S. (2024). Online behavior modification for expressive user control of rl-trained robots. In *2024 ACM/IEEE International Conference on Human-Robot Interaction (HRI)*
- C9** Allen, K. H. , Balaska, A. K. , **Aronson, R. M.** , Rogers, C. , and Short, E. S. (2023). Barriers and benefits: The path to accessible makerspaces. In *Proceedings of the 25th International ACM SIGACCESS Conference on Computers and Accessibility, ASSETS '23*, New York, NY, USA. Association for Computing Machinery
Best student paper nominee
- C8** Yu, H. , **Aronson, R.** , Allen, K. , and Short, E. (2023). From “thumbs up” to “10 out of 10”: Reconsidering scalar feedback in interactive reinforcement learning. In *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*
- C7** **Aronson, R. M.** and Admoni, H. (2022). Gaze Complements Control Input for Goal Prediction During Assisted Teleoperation. In *Robotics: Science and Systems*
- C6** **Aronson, R. M.** , Almutlak, N. , and Admoni, H. (2021). Inferring Goals with Gaze during Teleoperated Manipulation. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*
- C5** Luria, M. , Pusateri, J. , Oden Choi, J. , **Aronson, R.** , Yildirim, N. , and Steenson, M. W. (2020). Medieval robots: The role of historical automata in the design of future robots. In *Companion Publication of the 2020 ACM Designing Interactive Systems Conference, DIS' 20 Companion*, page 191–195, New York, NY, USA. Association for Computing Machinery
- C4** **Aronson, R. M.** and Admoni, H. (2019). Semantic gaze labeling for human-robot shared manipulation. In *ACM Symposium on Eye Tracking Research & Applications*

- C3** Cheng, X. , Jia, Z. , Bhatia, A. , **Aronson, R. M.** , and Mason, M. T. (2018). Sensor selection and stage & result classifications for automated miniature screwdriving. In *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*
- C2** **Aronson, R. M.** , Santini, T. , Kübler, T. C. , Kasneci, E. , Srinivasa, S. S. , and Admoni, H. (2018). Eye-hand behavior in human-robot shared manipulation. In *ACM/IEEE International Conference on Human-Robot Interaction (HRI)*
Acceptance rate: 23%
- C1** **Aronson, R. M.** , Bhatia, A. , Jia, Z. , Guillame-Bert, M. , Bourne, D. , Dubrawski, A. , and Mason, M. T. (2016). Data-driven classification of screwdriving operations. In *International Symposium on Experimental Robotics*

Peer-Reviewed Workshop Papers

- W7** **Aronson, R. M.** and Short, E. S. (2024). Control-theoretic analysis of shared control systems. In *Variable Autonomy for Human-Robot Teaming (VAT) workshop at RO-MAN 2024*
- W6** Sheidlower, I. , **Aronson, R. M.** , and Short, E. S. (2024). Towards interpretable foundation models of robot behavior: A task specific policy generation approach. In *Training Agents with Foundation Models workshop at RLC 2024*
- W5** Cleaver, A. , **Aronson, R. M.** , and Sinapov, J. (2024). Helping people predict the outcome of robotic pouring behaviors with augmented reality. In *7th International Workshop on Virtual, Augmented, and Mixed-Reality for Human-Robot Interactions at HRI 2024*
- W4** Sheidlower, I. , **Aronson, R.** , and Short, E. (2023). Modifying rl policies with imagined actions: How predictable policies can enable users to perform novel tasks. In *AAAI Fall Symposium on Artificial Intelligence for Human-Robot Interaction (AI-HRI)*
- W3** **Aronson, R. M.** and Admoni, H. (2020). Eye gaze for assistive manipulation. HRI '20, page 552–554, New York, NY, USA. Association for Computing Machinery
- W2** **Aronson, R. M.** and Admoni, H. (2018). Gaze for error detection during human-robot shared manipulation. In *Towards a Framework for Joint Action workshop at RSS 2018*
- W1** **Aronson, R. M.** , Bhatia, A. , Jia, Z. , and Mason, M. T. (2017). Data collection for screwdriving. In *RSS Workshop on (Empirically) Data-Driven Manipulation*

Patents

- P1** Ao, X. S. , Doria, S. L. , Xu, J. C. , and **Aronson, R. M.** (2013). Fluid density stratification location system, device and method. *U. S. Patent No. 9,343,055*

Teaching Experience

Mechanics of Manipulation (graduate), Teaching Assistant Carnegie Mellon University	2016
Calculus 1 and 2, Differential Equations, Physics 2, Linear Algebra (undergraduate), Teaching Assistant MIT Experimental Studies Group (ESG)	2009–2012

Mentoring

PhD students (as postdoc)

Isaac Sheidlower, <i>Publications</i> : C14, C10, W6, W4	2022–
Andre Cleaver, <i>Publications</i> : C16, W5	2022–2023
Hang Yu, <i>Publications</i> : C13, C11	2022–
Jindan Huang, <i>Publications</i> : C17, C11	2022–
Katherine Allen, <i>Publications</i> : C9	2022–
Hayley Owens, <i>Publications</i> : C15	2022–
Mavis Murdock	2022–

Undergraduate Students (as Ph. D. candidate)

Karen Zhang, CMU Undergrad Research	2019-2021
Nadia AlMutlak, RI Summer Scholars Program (<i>Publications</i> : C6)	2019-2020
Krish Vaswani, CMU Summer Undergrad Research Apprenticeship	2019
Maggie Collier, RI Summer Scholars Program	2018
<i>Now a PhD Student at Robotics Institute, Carnegie Mellon University</i>	

Invited Talks

Workshop on Emerging Test Methods & Metrics for Accessible HRI at HRI 2023	Mar 2023
Tufts Computer Science Department Colloquium	Oct 2022

Awards

Participant, HRI Pioneers Workshop	2020
Uber Presidential Fellowship	2016–2017
Fiekowsky Excellence in Teaching Award (ESG)	2012
Member, Burchard Scholars (MIT humanities honor society)	2011

Service

Reviewer for AAMAS 2023–2024, AURO 2018, HRI 2018–2024, HUMANOIDS 2016–2017, 2019, ICRA 2021–2022, 2024, IEEE VR 2019, IROS 2018, 2023, RA-L 2021, ROMAN 2021, RSS 2019, 2022-2023, THRI 2020–2022, UIST 2019, US National Science Foundation (Panel Member)	
General Chair, Assistive Applications, Accessibility, and Disability Ethics (A3DE) workshop at HRI 2024 https://a3de-hri.github.io/	2024

Organizer, All Things Attention workshop at NeurIPS 2022 http://attention-learning-workshop.github.io	2022
Co-founder and organizer, Tufts HRI Colloquium (weekly series)	2022-2023
Co-founder and organizer of the CMU HRI Reading Group http://harp.ri.cmu.edu/reading-group/ <i>Organize weekly presentations, regularly present papers and facilitate discussions</i>	2018–2021
Ph. D. qualifier committee member for Eric Huang, Ankit Bhatia	
Founding member of the SCS4All PhD Initiative , which advocates for and supports PhD students at the CMU School of Computer Science	2017–2019
Founding member of CMU Tech4Society (https://tech4society.group), which provides technical support to local nonprofit and activist groups in the Pittsburgh area	2016–2019