

Daniel J. Szafir Curriculum Vitae

ASSISTANT PROFESSOR · UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

Department of Computer Science, 201 S. Columbia St. CB 3175, Chapel Hill, NC 27599

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Research Interests

Mission My goal is to advance knowledge regarding the design of new sensing, interface, and robotic technologies to improve user experience, productivity, and enjoyment

Interests Human-robot interaction (HRI); human-computer interaction (HCI); virtual, augmented, and mixed reality (VR/AR/MR); user-centered design; human-centered computing (HCC); aerial robotics; robotic technologies for space exploration; human-robot coordination and collaboration; educational technologies; robotic technologies for manufacturing

Employment

Assistant Professor

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
Department of Computer Science

2021 – Present

Chapel Hill, North Carolina

Assistant Professor

UNIVERSITY OF COLORADO BOULDER
Department of Computer Science & ATLAS Institute

2015 – 2021

Boulder, Colorado

Affiliate Appointments: Department of Aerospace Engineering; Department of Information Science; Institute of Cognitive Science; Research and Engineering Center for Unmanned Vehicles (RECUV); Center for Neuroscience; Culture, Language, and Social Practice (CLASP) Program

Research Intern

INTELLIGENT ROBOTICS GROUP, NASA AMES RESEARCH CENTER

Summer 2013 & Spring 2015

Mountain View, California

Graduate Research Fellow

DEPARTMENT OF COMPUTER SCIENCES, UNIVERSITY OF WISCONSIN–MADISON

2010 – 2015

Madison, WI

Education

Ph.D., Computer Science

UNIVERSITY OF WISCONSIN–MADISON

2012 – 2015

Madison, Wisconsin

Dissertation: “Human Interaction with Assistive Free-Flying Robots”

Committee: Bilge Mutlu (co-chair), Terrence Fong (co-chair), John Lee, Kevin Ponto, and Tom Ristenpart

NASA Space Technology Research Fellow

Master of Science, Computer Science

UNIVERSITY OF WISCONSIN–MADISON

2010 – 2012

Madison, Wisconsin

Bachelor of Arts, Computer Science

BOSTON COLLEGE

2006 – 2010

Chestnut Hill, Massachusetts

Honor's Thesis: “Non-Invasive BCI through EEG: An Exploration of the Utilization of Electroencephalography to Create Thought-Based Brain-Computer Interfaces”

Bachelor of Arts, History

BOSTON COLLEGE

2006 – 2010

Chestnut Hill, Massachusetts

Honors & Awards

- 2019 **Best Paper Award** (Top 1 in Virtual, Augmented, and Mixed Reality)
International Conference on Human-Computer Interaction (HCII 2019)
Szafir: Mediating Human-Robot Interactions with Virtual, Augmented, and Mixed Reality
- 2018 **Best Paper Award** (Top 4 of 217)
ACM/IEEE Human-Robot Interaction (HRI 2018)
Walker, Hedayati, Lee, & Szafir: *Communicating Robot Intent with Augmented Reality*
- 2018 **Best Paper Award Nominee** (Top 10 of 217)
ACM/IEEE Human-Robot Interaction (HRI 2018)
Hedayati, Walker, & Szafir: *Improving Collocated Robot Teleoperation with Augmented Reality*
- 2017 **Forbes 30 Under 30: Science**
Named to the Forbes 30 Under 30 list of top innovators
- 2016 **NASA Early Career Faculty Award**
- 2015 **NSF CISE Research Initiation Initiative (CRII) Award**
- 2014 **Doctoral Consortia**
ACM/IEEE International Conference on Human-Robot Interaction (HRI 2014)
ACM SIGCHI Conference on Human Factors in Computing Systems (CHI 2014)
- 2012 – 2015 **NASA Space Technology Research Fellow (NSTRF)**
- 2011 **Honored Instructor Award**
Awarded to recognize outstanding classroom instructors across UW-Madison
- 2011 **Outstanding Graduate Student Instructor Award**
Awarded to exceptional graduate student instructors within the CS department at UW-Madison
- 2010 **Boston College Computer Science Accenture Award**
Awarded to the top graduating student in Computer Science for outstanding performance
- 2010 **Order of the Cross and Crown**
Boston College Honor Society for demonstrating excellence in academics, service, and leadership
- 2010 **Phi Beta Kappa**
- 2010 **Graduated Summa Cum Laude**
Boston College

Publications

Major publications are listed below, with journal articles denoted by “J,” conference papers with “C,” short papers by “S,” workshop papers with “W,” demonstrations by “D,” theses with “T,” technical and other reports by “R,” and patents with “P.” For each publication, students under my supervision are denoted by ^(S), collaborators are indicated with ^(C), thesis advisors by ^(A), and students under the supervision of others with ^(O). Impact factors for journals and acceptance rates for conferences are provided where data is available. Note that conferences represent a primary publication venue in Computer Science.

JOURNAL ARTICLES

- J.5. Hooman Hedayati^(S), Ryo Suzuki^(C), Daniel Leithinger^(C), and **Daniel Szafir**. (2022). [Designing Expandable-Structure Robots for Human-Robot Interaction](#). *Frontiers in Robotics and AI*, 9. doi: [10.3389/frobt.2022.719639](#).
- J.4. Steve McGuire^(O), P. Michael Furlong^(C), Terrence Fong^(C), Christoffer Heckman^(C), **Daniel Szafir**, Simon Julier^(C), and Nisar Ahmed^(C). (2019). [Everybody Needs Somebody Sometimes: Validation of Adaptive Recovery in Robotic Space Operations](#). *IEEE Robotics and Automation Letters (RA-L)*, 4(2), 1216–1223. doi: [10.1109/LRA.2019.2894381](#). *Impact Factor: 3.6*

- J.3. **Daniel Szafir**. (2019). [Mediating Human-Robot Interactions with Virtual, Augmented, and Mixed Reality](#). In: Chen J., Fragomeni G. (eds) *Virtual, Augmented and Mixed Reality. Applications and Case Studies*. Presented at the International Conference on Human-Computer Interaction (HCI 2019). *Lecture Notes in Computer Science*, Volume 11575, pp. 124–149. doi: [10.1007/978-3-030-21565-1_9](#). **Best Paper Award (Top 1 in Virtual, Augmented, and Mixed Reality)** Impact Factor: 1.2
- J.2. Steve McGuire^(O), P. Michael Furlong^(C), Christoffer Heckman^(C), Simon Julier^(C), **Daniel Szafir**, and Nisar Ahmed^(C). (2018). [Failure is Not an Option: Policy Learning for Adaptive Recovery in Space Operations](#). *IEEE Robotics and Automation Letters (RA-L)*, 3(3), 1639–1646. doi: [10.1109/LRA.2018.2801468](#) Impact Factor: 3.6
- J.1. **Daniel Szafir**, Bilge Mutlu^(A), and Terrence Fong^(C). (2017). [Designing Planning and Control Interfaces to Support User Collaboration with Flying Robots](#). *International Journal of Robotics Research (IJRR)*, 36(5–7), 514–542. doi: [10.1177/0278364916688256](#) Impact Factor: 4.7

REFEREED FULL CONFERENCE PAPERS

- C.31. Connor Brooks^(S) and **Daniel Szafir**. (2022). [The Predictive Kinematic Control Tree: Enhancing Teleoperation of Redundant Robots through Probabilistic User Models](#). To appear in the *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2022)*. Kyoto, Japan. Acceptance Rate: 48%
- C.30. Nicholas Conlon^(S), **Daniel Szafir**, and Nisar Ahmed^(C). (2022). [“I’m Confident This Will End Poorly:” Robot Proficiency Self-Assessment in Human-Robot Teaming](#). To appear in the *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2022)*. Kyoto, Japan. Acceptance Rate: 48%
- C.29. Bryce Ikeda^(S) and **Daniel Szafir**. (2022). [Advancing the Design of Visual Debugging Tools for Roboticians](#). In the *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction (HRI 2022)*, pp. 195–204. Sapporo, Japan. Acceptance Rate: 24.8%
- C.28. Hooman Hedayati^(S) and **Daniel Szafir**. (2022). [Predicting Positions of People in Human-Robot Conversational Groups](#). In the *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction (HRI 2022)*, pp. 402–411. Sapporo, Japan. Acceptance Rate: 24.8%
- C.27. Matthew B. Luebbers^(O), Connor Brooks^(S), Carl L. Mueller^(O), **Daniel Szafir**, and Bradley Hayes^(C). (2021). [ARC-LfD: Using Augmented Reality for Interactive Long-Term Robot Skill Maintenance via Constrained Learning from Demonstration](#). In the *IEEE International Conference on Robotics and Automation (ICRA 2021)*, pp. 3794–3800. Xi’an, China. Acceptance Rate: 48%
- C.26. Michael Walker^(S), Zhaozhong Chen^(O), Matthew Whitlock^(O), David Blair^(O), Danielle Albers Szafir^(C), Christoffer Heckman^(C), and **Daniel Szafir**. (2021). [A Mixed Reality Supervision and Telepresence Interface for Outdoor Field Robotics](#). In the *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2021)*, pp. 2345–2352. Prague, Czech Republic. doi: [10.1109/IROS51168.2021.9636090](#) Acceptance Rate: 45%
- C.25. Hooman Hedayati^(S) and **Daniel Szafir**. (2021). [What Information Should a Robot Convey?](#) In the *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2021)*, pp. 6232–6239. Prague, Czech Republic. doi: [10.1109/IROS51168.2021.9635999](#) Acceptance Rate: 45%
- C.24. **Daniel Szafir** and Danielle Albers Szafir^(C). (2021). [Connecting Human-Robot Interaction and Data Visualization](#). In the *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction (HRI 2021)*, pp. 281–292. Boulder, Colorado. doi: [10.1145/3434073.3444683](#) Acceptance Rate: 23%
- C.23. Connor Brooks^(S) and **Daniel Szafir**. (2020). [Visualization of Intended Assistance for Acceptance of Shared Control](#). In the *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2020)*, pp. 11425–11430. Las Vegas, Nevada. doi: [10.1109/IROS45743.2020.9340964](#) Acceptance Rate: 47%
- C.22. Hooman Hedayati^(S), Ryo Suzuki^(O), Daniel Leithinger^(C), and **Daniel Szafir**. (2020). [PufferBot: Actuated Expandable Structures for Aerial Robots](#). In the *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2020)*, pp. 1338–1343. Las Vegas, Nevada. doi: [10.1109/IROS45743.2020.9341088](#) Acceptance Rate: 47%

- C.21. Hooman Hedayati^(S), Annika Muehlbradt^(O), **Daniel Szafir**, and Sean Andrist^(C). (2020). [REFORM: Recognizing F-formations for Social Robots](#). In the *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2020)*, pp. 11181–11188. Las Vegas, Nevada. doi: [10.1109/IROS45743.2020.9340708](#) Acceptance Rate: 47%
- C.20. Ryo Suzuki^(O), Hooman Hedayati^(S), Clement Zheng^(O), James Bohn^(O), **Daniel Szafir**, Ellen Do^(C), Mark Gross^(C), and Daniel Leithinger^(C). (2020). [RoomShift: Room-scale Dynamic Haptics for VR with Furniture-moving Swarm Robots](#). In the *Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems (CHI 2020)*, pp. 1–11. Honolulu, Hawaii. doi: [10.1145/3313831.3376523](#) Acceptance Rate: 24%
- C.19. Jamie Voros^(O), Jamison McGinley^(O), Steven McGuire^(O), Michael Walker^(S), Priyanka Karki^(S), Nisar Ahmed^(C), **Daniel Szafir**, and Torin Clark^(C). (2020). [Trust in an Autonomous Guidance System for a Planetary Rover Task](#). In the *IEEE Aerospace Conference (AeroConf 2020)*, pp. 1–8. Big Sky, Montana. doi: [10.1109/AERO47225.2020.9172290](#)
- C.18. Darren Guinness^(O), Annika Muehlbradt^(O), **Daniel Szafir**, and Shaun Kane^(C). (2019). [RoboGraphics: Dynamic Tactile Graphics Powered by Mobile Robots](#). In the *Proceedings of the International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS 2019)*, pp. 318–328. Pittsburgh, Pennsylvania. doi: [10.1145/3308561.3353804](#) Acceptance Rate: 26%
- C.17. Michael Walker^(S), **Daniel Szafir**, and Irene Rae^(C). (2019). [The Influence of Size in Augmented Reality Telepresence Avatars](#). In the *Proceedings of the IEEE Conference on Virtual Reality and 3D User Interfaces (VR 2019)*, pp. 538–546. Osaka, Japan. doi: [10.1109/VR.2019.8798152](#) Acceptance Rate: 22%
- C.16. Michael Walker^(S), Hooman Hedayati^(S), and **Daniel Szafir**. (2019). [Augmented Reality Teleoperation using Virtual Surrogate Robots](#). In the *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction (HRI 2019)*, pp. 202–210. Daegu, South Korea. doi: [10.1109/HRI.2019.8673306](#) Acceptance Rate: 24%
- C.15. Connor Brooks^(S) and **Daniel Szafir**. (2019). [Balanced Information Gathering and Goal-Oriented Actions in Shared Autonomy](#). In the *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction (HRI 2019)*, pp. 85–94. Daegu, South Korea. doi: [10.1109/HRI.2019.8673192](#) Acceptance Rate: 24%
- C.14. Darren Guinness^(O), **Daniel Szafir**, and Shaun Kane^(C). (2018). [The Haptic Video Player: Using Mobile Robots to Create Tangible Video Annotations](#). In the *Proceedings of the ACM International Conference on Interactive Surfaces and Spaces (ISS 2018)*, pp. 203–211. Tokyo, Japan. doi: [10.1145/3279778.3279805](#) Acceptance Rate: 27%
- C.13. Daniel Prendergast^(S), and **Daniel Szafir**. (2018). [Improving Object Disambiguation from Natural Language using Empirical Models](#). In the *Proceedings of the ACM International Conference on Multimodal Interaction (ICMI 2018)*, pp. 477–485. Boulder, Colorado. doi: [10.1145/3242969.3243025](#) Acceptance Rate: 31%
- C.12. Michael Walker^(S), Hooman Hedayati^(S), Jennifer Lee^(O), and **Daniel Szafir**. (2018). [Communicating Robot Intent with Augmented Reality](#). In the *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction (HRI 2018)*, pp. 316–324. Chicago, Illinois. doi: [10.1145/3171221.3171253](#) Acceptance Rate: 23%
Best Paper Award (Top 4 in 217 submissions)
- C.11. Hooman Hedayati^(S), Michael Walker^(S), and **Daniel Szafir**. (2018). [Improving Collocated Robot Teleoperation with Augmented Reality](#). In the *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction (HRI 2018)*, pp. 78–86. Chicago, Illinois. doi: [10.1145/3171221.3171251](#) Acceptance Rate: 23%
Best Paper Award Nominee (Top 10 in 217 submissions)
- C.10. Connor Brooks^(S), Madhur Atreya^(S), and **Daniel Szafir**. (2018). [Proactive Robot Assistants for Freeform Collaborative Tasks through Multimodal Recognition of Generic Subtasks](#). In the *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2018)*, pp. 8567–8573. Madrid, Spain. doi: [10.1109/IROS.2018.8594180](#) Acceptance Rate: 47%
- C.9. Michael Iuzzolino^(S), Michael Walker^(S), and **Daniel Szafir**. (2018). [Virtual-to-Real-World Transfer Learning for Robots on Wilderness Trails](#). In the *Proceedings of the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2018)*, pp. 576–582. Madrid, Spain. doi: [10.1109/IROS.2018.8593883](#) Acceptance Rate: 47%

- C.8. Catherine Diaz^(S), Michael Walker^(S), Danielle Albers Szafir^(C), and **Daniel Szafir**. (2017). [Designing for Depth Perceptions in Augmented Reality](#). In the *Proceedings of the IEEE International Symposium on Mixed and Augmented Reality (ISMAR 2017)*, pp. 111–122. Nantes, France. doi: [10.1109/ISMAR.2017.28](https://doi.org/10.1109/ISMAR.2017.28) Acceptance Rate: 26%
- C.7. Darren Guinness^(O), **Daniel Szafir**, and Shaun Kane^(C). (2017). [GUI Robots: Using Off-the-Shelf Robots as Tangible Input and Output Devices for Unmodified GUI Applications](#). In the *Proceedings of the ACM Conference on Designing Interactive Systems (DIS 2017)*, pp. 767–778. Edinburgh, United Kingdom. doi: [10.1145/3064663.3064706](https://doi.org/10.1145/3064663.3064706) Acceptance Rate: 24%
- C.6. **Daniel Szafir**, Bilge Mutlu^(A), and Terrence Fong^(C). (2015). [Communicating Directionality in Flying Robots](#). In the *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction (HRI 2015)*, pp. 19–26. Portland, Oregon. doi: [10.1145/2696454.2696475](https://doi.org/10.1145/2696454.2696475) Acceptance Rate: 25%
- C.5. Allison Sauppé^(C), **Daniel Szafir**, Chien-Ming Huang^(C), and Bilge Mutlu^(A). (2015). [From 9 to 90: Engaging Learners of All Ages](#). In the *Proceedings of the ACM Technical Symposium on Computer Science Education (SIGCSE 2015)*, pp. 575–580. Kansas City, Missouri. doi: [10.1145/2676723.2677248](https://doi.org/10.1145/2676723.2677248) Acceptance Rate: 36%
- C.4. **Daniel Szafir**, Bilge Mutlu^(A), and Terrence Fong^(C). (2014). [Communication of Intent in Assistive Free Flyers](#). In the *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction (HRI 2014)*, pp. 358–365. Bielefeld, Germany. doi: [10.1145/2559636.2559672](https://doi.org/10.1145/2559636.2559672) Acceptance Rate: 24%
- C.3. **Daniel Szafir** and Bilge Mutlu^(A). (2013). [ARTful: Adaptive Review Technology for Flipped Learning](#). In the *Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems (CHI 2013)*, pp. 1001–1010. Paris, France. doi: [10.1145/2470654.2466128](https://doi.org/10.1145/2470654.2466128) Acceptance Rate: 20%
- C.2. **Daniel Szafir** and Bilge Mutlu^(A). (2012). [Pay Attention! Designing Adaptive Agents that Monitor and Improve User Engagement](#). In the *Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems (CHI 2012)*, pp. 11–20. Austin, Texas. doi: [10.1145/2207676.2207679](https://doi.org/10.1145/2207676.2207679) Acceptance Rate: 23%
- C.1. **Daniel Szafir** and Robert Signorile^(A). (2011). [An Exploration of the Utilization of Electroencephalography and Neural Nets to Control Robots](#). In the *Proceedings of the IFIP TC.13 International Conference on Human-Computer Interaction (INTERACT 2011)*, pp. 186–194. Lisbon, Portugal. doi: [10.5555/2042283.2042303](https://doi.org/10.5555/2042283.2042303) Acceptance Rate: 22%

REFEREED SHORT CONFERENCE PAPERS AND ABSTRACTS

- S.8. Angelos Angelopoulos^(O), Austin Bryan Hale^(O), Husam Shaik^(O), Akshay Paruchuri^(O), Ken Liu^(O), Randal Tuggle^(O), and **Daniel Szafir**. (2022). [Drone Brush: Mixed Reality Drone Path Planning](#). In *Late-Breaking Reports at the IEEE/ACM International Conference on Human-Robot Interaction (HRI 2022)*, pp. 678–682. Sapporo, Japan.
- S.7. Hooman Hedayati^(S), **Daniel Szafir**, and James Kennedy^(C). (2020). [Comparing F-Formations Between Humans and On-Screen Agents](#). In *Extended Abstracts of the ACM SIGCHI Conference on Human Factors in Computing Systems (CHI 2020)*, pp. 1–9. Honolulu, Hawaii. doi: [10.1145/3334480.3383015](https://doi.org/10.1145/3334480.3383015)
- S.6. Hooman Hedayati^(S), Srinjita Bhaduri^(O), Tamara Sumner^(C), **Daniel Szafir**, and Mark Gross^(C). (2019). [HugBot: A Soft Robot Designed to Give Human-like Hugs](#). In *Works-In-Progress at the ACM International Conference on Interaction Design and Children (IDC 2019)*, pp. 556–561. Boise, ID. doi: [10.1145/3311927.3325332](https://doi.org/10.1145/3311927.3325332)
- S.5. Tom Williams^(C), **Daniel Szafir**, and Tathagata Chakraborti^(C). (2019). [The Reality-Virtuality Interaction Cube: A Framework for Conceptualizing Mixed-Reality Interaction Design Elements for HRI](#). In *Late-Breaking Reports at the IEEE/ACM International Conference on Human-Robot Interaction (HRI 2019)*, pp. 520–521. Daegu, Korea. doi: [10.1109/HRI.2019.8673071](https://doi.org/10.1109/HRI.2019.8673071)
- S.4. Hooman Hedayati^(S), **Daniel Szafir**, and Sean Andrist^(C). (2019). [Recognizing F-Formations in the Open World](#). In *Late-Breaking Reports at the IEEE/ACM International Conference on Human-Robot Interaction (HRI 2019)*, pp. 558–559. Daegu, Korea. doi: [10.1109/HRI.2019.8673233](https://doi.org/10.1109/HRI.2019.8673233)

- S.3. **Daniel Szafer**. (2014). [Human Interaction with Assistive Free-Flyers](#). In *Doctoral Consortium Extended Abstracts of the ACM SIGCHI Conference on Human Factors in Computing Systems (CHI 2014)*, pp. 347–350. Toronto, Canada. doi: [10.1145/2559206.2559965](#) Acceptance Rate: 25%
- S.2. Kevin Ponto^(C), Ross Tredinnick^(C), Aaron Bartholomew^(C), Carrie Roy^(C), **Daniel Szafer**, Daniel Greenheck^(C), and Joe Kohlmann^(C). (2013). [SculptUp: A Rapid, Immersive 3D Modeling Environment](#). In the *Proceedings of the IEEE Symposium on 3D User Interfaces (3DUI 2013)*, pp. 199–200. Orlando, Florida. doi: [10.1109/3DUI.2013.6550247](#) Acceptance Rate: 27%
- S.1. **Daniel Szafer** and Robert Signorile^(A). (2010). Non-Invasive BCI through EEG. In the *New England Undergraduate Computing Symposium (NEUCS 2010)*, Boston, Massachusetts.

REFEREED WORKSHOP & SYMPOSIUM PAPERS

- W.23. Nicholas Conlon^(S), **Daniel Szafer**, and Nisar Ahmed^(C). (2022). [Investigating the Effects of Robot Proficiency Self-Assessment on Trust and Performance](#). In the *AAAI Spring Symposium Series on Closing the Assessment Loop: Communicating Proficiency and Intent in Human-Robot Teaming (AAAI-SSS 2022)*, Stanford, CA.
- W.22. Bryce Ikeda^(S) and **Daniel Szafer**. (2021). [An AR Debugging Tool for Robotics Programmers](#). In the *Proceedings of the Workshop on Virtual, Augmented and Mixed Reality for Human-Robot Interaction (VAM-HRI) held at the IEEE/ACM International Conference on Human-Robot Interaction (HRI 2021)*, Boulder, Colorado.
- W.21. Connor Brooks^(S) and **Daniel Szafer**. (2020). [Perspective Taking for Shared Control](#). In the *Workshop on Shared Autonomy: Learning and Control held at the International Conference on Robotics and Automation (ICRA 2020)*, Paris, France.
- W.20. Michael Walker^(S), Jack Burns^(C), and **Daniel Szafer**. (2020). [Mixed Reality Interfaces for the Moon and Beyond: Advancing Surface Telerobotic Interfaces in the NASA Artemis Program](#). In the *Proceedings of the NASA Exploration Science Forum*, NASA Ames, Mountain View, California.
- W.19. Midhun Menon^(S), **Daniel Szafer**, and Jack Burns^(C). (2020). [Enabling ARTEMIS and the FARSIDE Low Frequency Radio Telescope Missions with URSSA - a Testbed for Extra-Planetary Surface Telerobotics Research](#). In the *Proceedings of the NASA Exploration Science Forum*, NASA Ames, Mountain View, California.
- W.18. Michael Walker^(S), Jack Burns^(C), and **Daniel Szafer**. (2020). [Mixed Reality Interfaces for the Moon and Beyond: Advancing Surface Telerobotic Interfaces in the NASA Artemis Program](#). In the *Lunar Surface Science Workshop (LSSW 2020)*, Denver, Colorado.
- W.17. Midhun Menon^(S), Michael Walker^(S), Daniel Koris^(S), **Daniel Szafer**, and Jack Burns^(C). (2020). [Virtual Reality Simulator for Telerobotics Research to Enable Artemis and the FARSIDE Low Frequency Radio Telescope](#). In the *Lunar Surface Science Workshop (LSSW 2020)*, Denver, Colorado.
- W.16. Matthew Whitlock^(O), Daniel Leithinger^(C), **Daniel Szafer**, and Danielle Albers Szafer^(C). (2020). [Toward Effective Multimodal Interaction in Augmented Reality](#). In the *Workshop on Immersive Analytics held at the ACM SIGCHI Conference on Human Factors in Computing Systems (CHI 2020)*, Honolulu, Hawaii.
- W.15. Connor Brooks^(S) and **Daniel Szafer**. (2019). [Building Second-Order Mental Models for Human-Robot Interaction](#). In the *AAAI Fall Symposium on Artificial Intelligence for Human-Robot Interaction (AI-HRI 2019)*, Washington, DC.
- W.14. Michael Walker^(S), Jack Burns^(C), and **Daniel Szafer**. (2019). [Virtual Reality Interfaces for Surface Telerobotics from the Lunar Gateway](#). In the *Proceedings of the NASA Exploration Science Forum*, NASA Ames, Mountain View, California.
- W.13. Midhun S. Menon^(S), Michael Walker^(S), **Daniel Szafer**, Terrence Fong^(C), and Jack Burns^(C). (2019). [Computationally Efficient Morphological and Photometric Models of the Lunar Terrain](#). In the *Proceedings of the NASA Exploration Science Forum*, NASA Ames, Mountain View, California.

- W.12. Matthew Luebbers^(O), Connor Brooks^(S), Minjae John Kim,^(O) **Daniel Szafir**, and Bradley Hayes^(C). (2019). Augmented Reality Interface for Constrained Learning from Demonstration. In the *Proceedings of the Workshop on Virtual, Augmented and Mixed Reality for Human-Robot Interaction (VAM-HRI) held at the IEEE/ACM International Conference on Human-Robot Interaction (HRI 2019)*, Daegu, Korea.
- W.11. Hooman Hedayati^(S), Akriti Kaput^(O), Bradley Hayes^(C), and **Daniel Szafir**. (2018). Robot Navigation for Space Station Environments. In the *Proceedings of the Workshop on Autonomous Space Robotics held at the Robotics: Science & Systems Conference (RSS 2018)*, Pittsburgh, Pennsylvania.
- W.10. Steve McGuire^(O), Michael Walker^(S), Jamison McGinley^(O), Nisar Ahmed^(C), Torin Clark^(C), and **Daniel Szafir**. (2018). TRAADRE: TRust in Autonomous ADvisors for Robotic Exploration. In the *Proceedings of the Workshop on Autonomous Space Robotics held at the Robotics: Science & Systems Conference (RSS 2018)*, Pittsburgh, Pennsylvania.
- W.9. Connor Brooks^(S), Madhur Atreya^(S), and **Daniel Szafir**. (2018). Proactive Robot Assistants for Freeform Collaborative Tasks through Multimodal Recognition of Generic Subtasks. In the *Proceedings of the Workshop on Longitudinal Human-Robot Teaming held at the IEEE/ACM International Conference on Human-Robot Interaction (HRI 2018)*, Chicago, Illinois.
- W.8. Michael Iuzzolino^(S), Michael Walker^(S), and **Daniel Szafir**. (2018). Virtual-to-Real-World Transfer Learning for Robot Navigation. In the *Proceedings of the Workshop on Virtual, Augmented and Mixed Reality for Human-Robot Interaction held at the IEEE/ACM International Conference on Human-Robot Interaction (HRI 2018)*, Chicago, Illinois.
- W.7. Michael Walker^(S), Jack Burns^(C), and **Daniel Szafir**. (2018). [VR Simulation Testbed: Improving Surface Telerobotics for the Deep Space Gateway](#). In the *Proceedings of the NASA Exploration Science Forum*, NASA Ames, Mountain View, California.
- W.6. Michael Walker^(S), Jack Burns^(C), and **Daniel Szafir**. (2018). VR Simulation Testbed: Improving Surface Telerobotics for the Deep Space Gateway. In the *Proceedings of the Deep Space Gateway Concept Science Science Workshop*, Denver, Colorado.
- W.5. **Daniel Szafir**. (2016). A Cognitive Basis for Human Interaction with Aerial Robots. In the *Proceedings of the Workshop on Human-Robot Interaction for Small and Personal Unmanned Aerial Vehicles held at the Robotics: Science and Systems Conference (RSS 2016)*, Ann Arbor, Michigan.
- W.4. Steve McGuire^(O), P. Michael Furlong^(C), Christoffer Heckman^(C), Simon Julier^(C), **Daniel Szafir**, and Nisar Ahmed^(C). (2016). Teamwork Across the Stars: Machine Learning to Overcome the Brittleness of Autonomy. In the *Proceedings of the Workshop on Human-Robot Collaboration: Towards Co-Adaptive Learning Through Semi-Autonomy and Shared Control held at the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2016)*, Daejeon, Korea.
- W.3. Danielle Albers Szafir^(C) and **Daniel Szafir**. (2016). Cognitive Load in Visualization: Myths and Misconceptions. In the *Proceedings of the Creation, Curation, Critique and Conditioning of Principles and Guidelines in Visualization (C4PGV 2016) held at IEEE VIS*, Baltimore, Maryland.
- W.2. **Daniel Szafir**. (2014). Human Interaction with Assistive Free-Flyers. In the *Proceedings of the Human-Robot Interaction Pioneers Workshop held at the ACM/IEEE International Conference on Human-Robot Interaction (HRI 2014)*, Bielefeld, Germany.
- W.1. **Daniel Szafir** and Kevin Ponto^(C). (2012). Panoramic Imagery of Physical Locations Inside Immersive Environments. In the *Proceedings of the Midwest Graphics Conference (Midgraph 2012)*, Chicago, Illinois.

CONFERENCE DEMONSTRATIONS

- D.2. Darren Guinness^(O), Annika Muehlbradt^(O), **Daniel Szafir**, and Shaun Kane^(C). (2019). [RoboGraphics: Using Mobile Robots to Create Dynamic Tactile Graphics](#). In the *International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS 2019)*, pp. 673–675. Pittsburgh, Pennsylvania.

- D.1. Kevin Ponto^(C), Ross Tredinnick^(C), Aaron Bartholomew^(C), Carrie Roy^(C), **Daniel Szafir**, Daniel Greenheck^(C), and Joe Kohlmann^(C). (2013). SculptUp: A Rapid, Immersive 3D Modeling Environment. In the *IEEE Symposium on 3D User Interfaces (3DUI 2013) Contest*, Orlando, Florida.

THESES

- T.2. **Daniel Szafir**. (2015). [Human Interaction with Assistive Free-Flying Robots](#). *Doctoral Dissertation*, University of Wisconsin–Madison, Madison, WI, USA.
- T.1. **Daniel Szafir**. (2010). [Non-Invasive BCI through EEG: An Exploration of the Utilization of Electroencephalography to Create Thought-Based Brain-Computer Interfaces](#). *Bachelor Honors Thesis*, Boston College, Chestnut Hill, MA, USA.

TECHNICAL / POLICY REPORTS, EDITORIALS, AND OTHER PUBLICATIONS

- R.3. **Daniel Szafir**, Krzysztof Skonieczny^(C), and Mark Woods^(C). (2020). [Editorial: Special Issue on Space Robotics](#). In the *Journal of Field Robotics (JFR)*, 37(5), pp. 697–698. doi: <https://doi.org/10.1002/rob.21954>.
- R.2. Tom Williams^(C), **Daniel Szafir**, Tathagata Chakraborti^(C), and Heni Ben Amor^(C). (2018). [Report on the 1st International Workshop on Virtual, Augmented, and Mixed Reality for Human-Robot Interaction \(VAM-HRI\)](#). In *AI Magazine*, 39(4), 64–66. doi: <https://doi.org/10.1609/aimag.v39i4.2822>.
- R.1. **Enhanced User Interface Working Group**. (2017). Public Safety Enhanced User Interface R&D Roadmap. *National Institute of Standards and Technology's (NIST) Public Safety Communications Research (PSCR) Program*.

PATENTS

- P.2. **Daniel Szafir**, Michael Walker^(S), and Hooman Hedayati^(S). (2018). [Augmented Reality Coordination of Human-Robot Interaction](#). U.S. Patent Pending, Application # US 16/978,480, Publication #US20210094180 A1.
- P.1. Bilge Mutlu^(A) and **Daniel Szafir**. (2015). [Teaching System for Improving Information Retention Based on Brain-State Monitoring](#). U.S. Patent No. 9,224,309, issued December 29, 2015.

Research Grants & Gifts

Total Funded: \$5,941,282

Federal Grants

National Science Foundation Future of Work at the Human-Technology Frontier (NSF FW-HTF) Award #2222952/2953

ROBOCHEMISTRY: HUMAN-ROBOT COLLABORATION FOR THE FUTURE OF ORGANIC SYNTHESIS
Investigators: Daniel Szafir (PI, UNC), Carson Bruns (PI, CU Boulder), and Alessandro Roncone (Co-I)

Amount: \$1,222,182
UNC Portion: \$602,006
Period: 2023 – 2026

National Institutes of Health Smart Health and Biomedical Research in the Era of Artificial Intelligence and Advanced Data Science (NIH: SCH) Award #1R01HD111074-01

SCH: AN AUGMENTED REALITY NEUROREHABILITATION SYSTEM FOR MONITORING AND MANAGEMENT OF MOTOR SYMPTOMS OF PARKINSONS DISEASE
Investigators: Henry Fuchs (PI), Gediminas Bertasius (Co-I), Nina Browner (Co-I), Michael Lewek (Co-I), Danielle Szafir (Co-I), and Daniel Szafir (Co-I)

Amount: \$1,186,393
Period: 2022 – 2026

National Aeronautics and Space Administration Human Research Program (NASA HRP MATRIKS VNSCOR Award #80NSSC21K1140)

MULTI-ENVIRONMENT VIRTUAL TRAINING FOR LONG DURATION EXPLORATION MISSIONS
Investigators: Allison Anderson (PI), Torin Clark (Co-I), Stephen Robinson (Co-I), Eric Vance (Co-I), and Daniel Szafir (Co-I)

Amount: \$1,380,000
Period: 2021 – 2025

National Science Foundation Cyber-Human Systems (NSF IIS: CHS: Medium)

Award #1764092

DATA-MEDIATED COMMUNICATION WITH PROXIMAL ROBOTS FOR EMERGENCY RESPONSE

Investigators: Daniel Szafer (PI), Danielle Szafer (Co-I), and Christoffer Heckman (Co-I)

Amount: \$1,218,056

Period: 2018 – 2023

National Aeronautics and Space Administration Early Career Faculty (NASA ECF)

Award #NNX16AR58G

DEVELOPING PRINCIPLES FOR EFFECTIVE HUMAN COLLABORATION WITH FREE-FLYING ROBOTS

Investigator: Daniel Szafer (PI)

Amount: \$359,389

Period: 2016 – 2020

National Science Foundation Research Initiation Initiative (NSF CISE CRII)

Award #1566612

LEVERAGING IMPLICIT HUMAN CUES TO DESIGN EFFECTIVE BEHAVIORS FOR COLLABORATIVE ROBOTS

Investigator: Daniel Szafer (PI)

Amount: \$174,300

Period: 2016 – 2019

Corporate and Foundation Gifts & Grants

Kairos Ventures Research Award

AUGMENTED REALITY AND AUTONOMOUS SYSTEMS

Investigator: Daniel Szafer (PI)

Amount: \$123,379

Period: 2018 – 2019

Ericsson Research Award

3D CAPTURE FOR REMOTE AR COLLABORATION

Investigators: Daniel Leithinger (PI), Ellen Yi-Luen Do (Co-I), Daniel Szafer (Co-I), and Mark Gross (Co-I)

Amount: \$57,950

Period: 2018 – 2019

Lockheed Martin Research Award

VIRTUAL REALITY SIMULATION FOR LUNAR SURFACE OPERATIONS

Investigator: Jack Burns (PI) and Daniel Szafer (Co-I)

Amount: \$25,858

Period: 2017 – 2018

Intel Research Award #1553595

FUSING ROBOTICS AND CONSUMER DEVICES FOR NEW MULTIMEDIA

Investigator: Daniel Szafer (PI)

Amount: \$126,993

Period: 2016 – 2017

University Grants

University of Colorado Boulder Autonomous Systems Interdisciplinary Research Thread Seed Grant

ROBOTIC CHEMISTS: AUTOMATING THE SYNTHESIS OF MULTIFUNCTIONAL MATERIALS

Investigators: Daniel Szafer (PI) and Carson Bruns (Co-I)

Amount: \$15,000

Period: 2018

University of Colorado Boulder Multifunctional Materials Interdisciplinary Research Thread Seed Grant

ROBOTIC CHEMISTS: AUTOMATING THE SYNTHESIS OF MULTIFUNCTIONAL MATERIALS

Investigators: Carson Bruns (PI) and Daniel Szafer (Co-I)

Amount: \$15,000

Period: 2018

University of Colorado Boulder Autonomous Systems Interdisciplinary Research Thread Seed Grant

AUTONOMOUS VIRTUAL ASSISTANT FOR CREWED SPACE MISSIONS

Investigators: Torin Clark (PI), Nisar Ahmed (Co-I), and Daniel Szafer (Co-I)

Amount: \$6,782

Period: 2018

University of Colorado Boulder Innovative Seed Grant Program

FIELDVIEW: USING MOBILE DEVICES TO BLEND DATA COLLECTION AND ANALYSIS FOR FIELD RESEARCH

Investigators: Danielle Szafer (PI) and Daniel Szafer (Co-I)

Amount: \$30,000

Period: 2016 – 2017

Selected Press Coverage

- 2022 **Tech Xplore (US)**
Research featured in [“A new approach that could improve how robots interact in conversational groups”](#)
- 2020 **Tech Xplore (US)**
Research featured in [“PufferBot: A Flying Robot with an Expandable Body”](#)
- 2018 **IEEE Spectrum (US)**
Research covered in [“Video Friday”](#)
- 2018 **Bloomberg Television (US)**
Research covered in [“Beyond Innovation”](#)
- 2018 **IEEE Spectrum (US)**
Quoted and research covered in [“Augmented Reality Makes Robots Better Co-Workers”](#)
- 2018 **Motherboard / VICE (US)**
Quoted in [“We Asked 105 Experts What Scares and Inspires Them Most About the Future”](#)
- 2018 **NASA Technology Innovation (US)**
Quoted and research covered in [“University Expertise Advancing NASA Robotics”](#) in Issue 18.1
- 2018 **CU Boulder Today (US)**
Quoted and research covered in [“A robotic helping hand”](#)
- 2017 **Forbes (US)**
Research highlighted as part of inclusion in the *Forbes 30 Under 30* list of top innovators
- 2017 **CU Engineering Magazine (US)**
Research featured in [“Getting to Know Your Robot”](#)
- 2016 **Daily Camera (US)**
Research featured in [“CU Student Meredith Burgess brings Tech to Pole Dance”](#)
- 2013 **Wisconsin State Journal (US)**
Research featured in [“Science Festival Mixes Learning, Fun”](#)
- 2012 **New Scientist (UK)**
Research featured in [“Mind-reading Robot Teachers Keep Students Focused”](#)
- 2012 **Discovery News (US)**
Research featured in [“Mind-reading Robot Teachers Head to Class”](#)
- 2012 **Engadget (US)**
Research featured in [“Mind-reading Robotic Teachers Are More... Anyone? Anyone? Attention-grabbing”](#)
- 2012 **La Repubblica (Italy)**
Research featured in [“U.S.: Robot Teacher Seeks Out Distracted Students”](#)

Talks

Invited Talks and Panels

- 2021 **Robotics Seminar Speaker**
University of Washington, Seattle, Washington
[“Robots that Reason and Communicate”](#)
- 2021 **Colloquium Speaker**
University of North Carolina at Chapel Hill, Chapel Hill, North Carolina
[“Towards Effective Human-Robot Interaction”](#)
- 2020 **Colloquium Speaker**
University of Nebraska—Lincoln, Lincoln, Nebraska
[“Towards Effective Human-Robot Interaction”](#)

- 2018 **Panelist**
Workshop on Virtual, Augmented, and Mixed Reality for Human-Robot Interaction at HRI 2018, Chicago, Illinois
“Virtual, Augmented and Mixed Reality in Robotics: Progress, Opportunities, Challenges”
- 2017 **Invited Presentation**
Coalition for National Science Funding (CNSF) Capitol Hill Exhibition, Washington, DC
“Effective Behaviors for Collaborative Robots”
- 2017 **Panelist**
Computing Research Association New Computing Faculty Workshop, San Diego, California
“Successes and Challenges as a New Assistant Professor”
- 2017 **Seminar Speaker**
NASA Ames Research Center, Intelligent Robotics Group, Mountain View, California
“Developing Principles for Effective Human Collaboration with Free-Flying Robots”
- 2017 **Workshop Opening Speaker**
Bridging the Gap in Space Robotics Workshop, RSS Conference, Boston, Massachusetts
“Bridging the Gap in Space Robotics”
- 2016 **Seminar Speaker**
NASA Ames Research Center, Intelligent Robotics Group, Mountain View, California
“Human-Robot Interaction at CU Boulder”
- 2016 **Invited Speaker**
Aerospace Ventures (ASV) Day, Boulder, Colorado
“Design Principles for Effective Human-Robot Collaboration”
- 2015 **Invited Speaker**
University of Iowa, Iowa City, Iowa
“Unlocking the Assistive Potential of Emerging Technologies”
- 2015 **Colloquium Speaker**
Arizona State University, Tempe, Arizona
“Unlocking the Assistive Potential of Emerging Technologies”
- 2015 **Colloquium Speaker**
University of Colorado Boulder, Boulder, Colorado
“Unlocking the Assistive Potential of Emerging Technologies”

Intramural Seminars

- 2016 **Seminar Speaker**
Aerospace Engineering Sciences, University of Colorado Boulder
“Leveraging Cognitive Engineering for Human-Robot Interaction”
- 2016 **Colloquium Speaker**
Institute of Cognitive Science (ICS), University of Colorado Boulder
“Leveraging Cognitive Engineering for Human-Robot Interaction”
- 2016 **Seminar Speaker**
Human-Centered Computing (HCC) Seminar, University of Colorado Boulder
“Human Interaction with Small Flying Robots”
- 2015 **Seminar Speaker**
Robotics, Controls, and Dynamic Systems (RCDS) Seminar, University of Colorado Boulder
“Human Interaction with Small Flying Robots”

Teaching

Note: Independent studies are not included in this list.

University of North Carolina at Chapel Hill

Comp 590/790: Human-Robot Interaction

Fall 2021–2022
Enrollment: 5–20

I designed and taught a graduate-level course that introduces students to the field of human-robot interaction (HRI). The course involves three key components: (1) a principles component that develops an understanding of the fundamental concepts of HRI through lectures and discussions of seminal and modern HRI research, (2) a methods component that helps students build a “toolbox” of essential qualitative and quantitative research methods, and (3) a project component in which students use their knowledge of HRI principles and methods to conduct a complete research inquiry, which encompasses posing a novel HRI research question, designing an empirical experiment, collecting and analyzing data, and writing a report of their findings that matches the standards of academic research papers. 2021 **class project led to graduate student Late-Breaking Report publication** *Drone Brush: Mixed Reality Drone Path Planning* at HRI 2022. Revised course to enable combined undergraduate/graduate enrollment for Fall 2022.

Comp 790: Virtual Reality and Game Development

Spring 2022
Enrollment: 10–25

I designed and taught a graduate course to introduce students to the field of virtual reality. The course involves two key components: (1) developing an understanding of the fundamental principles of virtual reality such as presence, immersion, and engagement and (2) building technical skills for developing virtual reality applications using modern methods and tools, including WebGL and Unity. The course offers students an entry-level introduction to computer graphics and virtual reality using a combination of lectures, hands-on exercises, and team project assignments.

University of Colorado Boulder

ATLS 2519 Computational Foundations II: Data Structures and Algorithms

OVERALL INSTRUCTOR EVALUATION: N/A (UNIVERSITY STOPPED COLLECTING OVERALL INSTRUCTOR EVALUATION DATA FROM ALL FACULTY COURSE QUESTIONNAIRES)

Spring 2020–2021
Enrollment: 40–50

The ATLAS Institute’s undergraduate program in Creative Technologies and Design has a two-course sequence in building programming skills: ATLS 1300: Computational Foundations I and ATLS 2519: Computational Foundations II. These courses are analogous to common sequences at most universities, where ATLS 1300 covers basic programming concepts (variables, conditionals, logical and relational operators, loops, functions, and arrays) and ATLS 2519 covers data structures (lists, stacks, queues, trees, graphs, etc.) and aspects related to algorithms (complexity analysis, sorting, etc.). However, ATLS 2519 had historically received poor course ratings and was falling short of its goals in student outcomes and achieving learning objectives. As a result, I took over the course in Spring 2020 and undertook a complete, ground-up redesign of the course (i.e., all new syllabus, lectures, assignments, textbook, laboratory activities, etc.), with the aim of fostering a love, excitement, and mastery of programming among our students. Due to the Covid-19 pandemic, the University altered its standard practices regarding collecting data to evaluate courses and instructors, making it difficult to quantitatively assess the benefits of my course redesign. However, student qualitative feedback was positive, with comments including: *For the first time in this course I really felt like I understood coding; Overall, really learned a lot and really appreciated how you taught the course; and I loved the way the class was structured, and all the assignments were practical and effective ways of teaching concepts learned in class.*

I designed and taught a graduate-level course that introduces students to the field of human-robot interaction (HRI). The course involves three key components: (1) a principles component that develops an understanding of the fundamental concepts of HRI through lectures and discussions of seminal and modern HRI research, (2) a methods component that helps students build a “toolbox” of essential qualitative and quantitative research methods, and (3) a project component in which students use their knowledge of HRI principles and methods to conduct a complete research inquiry, which encompasses posing a novel HRI research question, designing an empirical experiment, collecting and analyzing data, and writing a report of their findings that matches the standards of academic research papers.

CSCI 4616/5616 / ATLS 4519/5519 Introduction to Virtual Reality

OVERALL INSTRUCTOR EVALUATION: 5.8/6.0

Fall 2015–2018

Enrollment: 30–50

I designed and taught a combined undergraduate/graduate course to introduce students to the field of virtual reality. The course involves two key components: (1) developing an understanding of the fundamental principles of virtual reality such as presence, immersion, and engagement and (2) building technical skills for developing virtual reality applications using modern methods and tools, including WebGL and Unity. The course offers students an entry-level introduction to computer graphics and virtual reality using a combination of lectures, hands-on exercises, and team project assignments.

University of Wisconsin–Madison

CS302 Introduction to Programming

OVERALL INSTRUCTOR EVALUATION: 4.19/5.00 (47 RESPONSES)

Summer 2011

Enrollment: 88

I taught a summer section of an introductory programming course in Java. I was responsible for all aspects of the course including developing and delivering lectures, exams, and assignments and supervising TA graders.

CS302 Introduction to Programming

OVERALL INSTRUCTOR EVALUATION: 4.84/5.00 (65 RESPONSES)

Fall & Spring 2010 – 2012

Enrollment: 20 – 25

I taught four semester-long sections (~23 students/section) of an introductory programming course in Java. I was responsible for preparing and presenting lectures, grading, and shared development of assignments and exams with other section instructors. I received **two awards for Excellence in Undergraduate Education** for my work in this course.

Advising & Mentoring

Ph.D. Student Advisees

- 2022 – Present **Spyridon Tsalikis**
Department of Computer Science, University of North Carolina at Chapel Hill
Co-advised with Ron Alterovitz
- 2020 – Present **Bryce Ikeda**
Department of Computer Science, University of North Carolina at Chapel Hill
- 2020 – Present **Nicholas Conlon**
Department of Computer Science, University of Colorado Boulder
Co-advised with Nisar Ahmed (CU Aerospace Engineering).
- 2020 – Present **Wyatt Rees**
Department of Computer Science, University of Colorado Boulder
- 2016 – Present **Michael Walker**
Department of Computer Science, University of North Carolina at Chapel Hill

M.S. Student Advisees

- 2022 – Present **Maitrey Gramopadhye**
Department of Computer Science, University of North Carolina at Chapel Hill
- 2022 – Present **Yiyuan Li**
Department of Computer Science, University of North Carolina at Chapel Hill

Graduated and Past Advisees

- 2017 – 2022 **Connor Brooks**
Ph.D., Department of Computer Science, University of Colorado Boulder
Dissertation Title: *Predictive Coordination in Goal-Oriented Shared Autonomy for Robotic Manipulators*
Now at Google X (Everyday Robotics Team)
- 2015 – 2022 **Darren Guinness**
Ph.D., Department of Computer Science, University of Colorado Boulder
Dissertation Title: *Accessible Off-the-Shelf: Lowering the Barriers to Accessible Spatial Display Interaction*
Co-advised with Shaun Kane (CU Computer Science)
Now at Apple
- 2016 – 2021 **Hooman Hedayati**
Ph.D., Department of Computer Science, University of Colorado Boulder
Dissertation Title: *Improving Human-Robot Conversational Groups*
Now at Post Doc with Dr. Takayuki Kanda
- 2019 – 2020 **Midhun Menon, Ph.D.**
Postdoctoral Researcher supported by the NASA Postdoctoral Program
Co-advised with Jack Burns (CU Astrophysical and Planetary Sciences).
- 2017 – 2020 **Daniel Prendergast**
M.S., Department of Computer Science, University of Colorado Boulder
- 2019 – 2020 **Corbin Peters**
B.S., Creative Technologies and Design, ATLAS Institute, University of Colorado Boulder
Now a XR Engineer at Ethereal Matter Corp.
- 2018 – 2020 **Arth Beladiya**
M.S., Department of Computer Science, University of Colorado Boulder
Now a Robot Deployment Engineer at Dexterity, Inc.
- 2018 – 2020 **Ashwin Vasan**
M.S., Department of Computer Science, University of Colorado Boulder
- 2018 – 2020 **Sky Johnson**
B.S., Creative Technologies and Design, ATLAS Institute, University of Colorado Boulder
Now working as a freelance software developer and data engineer.
- 2018 – 2019 **Alec Leeseberg**
M.S., Creative Technologies and Design, ATLAS Institute, University of Colorado Boulder
Master's Thesis: *Folsom Fast VR Trainer*
Now at GoFire Inc.
- 2015 – 2019 **Catherine Diaz**
B.S., Department of Computer Science, University of Colorado Boulder
Lead author of ISMAR 2017 publication while an undergraduate.
Senior Thesis: *The Effects of Occlusion and Shadows on Depth Perception in Augmented Reality*
Now at Microsoft on the HoloLens team.
- 2018 **Jennifer Lee**
M.S., Information and Communication Technology for Development (ICTD), ATLAS Institute, University of Colorado Boulder
Now at Activision.

- 2017 – 2018 **Brian Sullivan**
 B.S., Department of Computer Science, University of Colorado Boulder
 Senior Thesis: *Formality of Speech for Robots and Humans in Lecture-Style Teaching Situations*
- 2016 – 2018 **Bo “Bryan” Cao**
 M.S., Department of Computer Science, University of Colorado Boulder
 Master’s Thesis: *DiffFrameNet: A Deep Learning Method for Intuitive Robot Navigation*
 Now at the Ph.D. program at Stony Brook University
- 2016 – 2018 **Meredith Burgess**
 B.S., Department of Computer Science, University of Colorado Boulder
 Senior Thesis: *Graphic Impulse 2.0: Constructing an improvised call and response dance system with unsupervised cluster analysis*
 Now a Software Engineer at NGINX, Inc.
- 2016 – 2018 **Michael Iuzzolino**
 M.S., Department of Computer Science, University of Colorado Boulder
 Co-advised with Danielle Albers Szafir (Information Science).
 Now at Microsoft Research.
- 2016 – 2017 **Madhur Atreya**
 Ph.D., ATLAS Institute, University of Colorado Boulder
 Co-advised with Mark Gross (CS/ATLAS).
 Transferred to Mechanical Engineering, now advised by Gregory Whiting.

Ph.D. Thesis Committee Member

- 2019 – 2021 **Matthew Whitlock**
 Department of Computer Science, University of Colorado Boulder
 Adviser: Danielle Szafir
 Dissertation Title: *Immersive Augmented Reality for Data-Driven Workflows*
- 2018 – 2019 **John Stechschulte**
 Department of Computer Science, University of Colorado Boulder
 Adviser: Christoffer Heckman
 Dissertation Title: *Information Theory and Probabilistic Modeling for Robot Localization*
- 2017 – 2019 **Brett Israelsen**
 Department of Aerospace Engineering Sciences, University of Colorado Boulder
 Adviser: Nisar Ahmed
 Dissertation Title: *Algorithmic Assurances and Self-Assessment of Competency Boundaries in Autonomous Systems*
- 2015 – 2019 **Stephen McGuire**
 Department of Aerospace Engineering Sciences, University of Colorado Boulder
 Adviser: Nisar Ahmed
 Dissertation Title: *Autonomous On-Line Learning of Assistant Selection Policies for Fault Recovery*
- 2016 **Christine Fanchiang**
 Department of Aerospace Engineering Sciences, University of Colorado Boulder
 Adviser: David M. Klaus
 Dissertation Title: *A Quantitative Human Spacecraft Design Evaluation Model for Assessing Crew Accommodation and Utilization*

M.S. Thesis Committee Member

- 2020 **Alexander Baughman**
 Aerospace Engineering, University of Colorado Boulder
 Adviser: Allison Anderson
 Dissertation Title: *Evaluation of Virtual and Hybrid Reality Systems for Astronaut Training*

- 2017 **Rebecca Cox**
 Department of Computer Science, University of Colorado Boulder
 Adviser: Nikolaus Correll
 Dissertation Title: *Merging Local and Global 3D Perception for Robotic Grasping and Manipulation*
- 2017 **John Lammie**
 Department of Computer Science, University of Colorado Boulder
 Adviser: Nikolaus Correll
 Dissertation Title: *Gesture Recognition in Robotic Skin with Pressure and Proximity Information*

Professional Activities & Service

Program Committee and Editorial Work

- 2021 – Present **Steering Committee Member**
 ACM/IEEE International Conference on Human-Robot Interaction (HRI)
- 2021 – Present **Associate Editor**
 ACM Transactions on Human-Robot Interaction (THRI)
- 2020 – 2021 **Program Chair**
 ACM/IEEE International Conference on Human-Robot Interaction (HRI 2021)
- 2019 – 2020 **Late-Breaking Reports (LBR) Chair**
 ACM/IEEE International Conference on Human-Robot Interaction (HRI 2020)
- 2018 – 2020 **Guest Editor**
[Journal of Field Robotics \(JFR\) Special Issue on Space Robotics](#)
[Volume 37, Issue 5](#)
- 2016 – 2017 **Videos and Demonstrations Chair**
 ACM/IEEE International Conference on Human-Robot Interaction (HRI 2017)
- 2016 – Present **Program Committee and Program Board Member**
 ACM/IEEE International Conference on Human-Robot Interaction (HRI), 2018 & 2019
 HCII International Conference on Virtual, Augmented, & Mixed Reality (VAMR), 2019
 Robotics: Science and Systems (RSS), 2017, 2018, & 2020
 ACM SIGCHI Conference on Human Factors in Computing Systems (CHI), 2017
 IEEE Symposium on Robot and Human Interactive Communication (RO-MAN), 2016 & 2017
 IEEE International Workshop on Advanced Robotics and its Social Impacts (ARSO), 2016

Workshop Organization

- 2021 – Present **Workshop Steering Committee Member**
 HRI Workshop on [Virtual, Augmented, and Mixed Reality for Human-Robot Interaction](#), 2021, 2022
- 2017 – Present **Workshop & Symposia Organizer**
 AAI Symposia on [Lessons Learned for Autonomous Assessment of Machine Abilities \(LLAAMA\)](#), 2022
 IROS Workshop on [Horizons of an Extended Robotics Reality](#), 2022
 IEEE VR Workshop on [Distributed Interactive Systems for Collaboration Experiences \(DISCE\)](#), 2021
 HRI Workshop on [Virtual, Augmented, and Mixed Reality for Human-Robot Interaction \(VAM-HRI\)](#), 2018–2020
 ICSR Workshop on [Human Robot Interaction for Space Robotics](#), 2020
 RSS Workshop on [Space Robotics](#), 2017–2019
- 2014 – 2016 **Workshop Program Committee Member**
 RSS Workshop on [HRI for Small and Personal Unmanned Aerial Vehicles](#), 2016
 HRI [Pioneers Workshop](#), 2015
 AAI ITS Workshop on [Utilizing EEG Input in Intelligent Tutoring Systems](#), 2014

2015 **Panel Chair**
HRI Pioneers at the ACM/IEEE International Conference on Human-Robot Interaction (HRI 2015)

Referee Service

- 2016 & 2018 **Funding Agency Panelist**
National Science Foundation (NSF)
- 2016 **Funding Agency Panelist**
National Aeronautics and Space Administration (NASA)
- 2016, 2017,
& 2019 **Funding Agency External Reviewer**
National Science Foundation (NSF)
- 2019 **Funding Agency External Reviewer**
National Aeronautics and Space Administration (NASA)
- 2012 – Present **Referee for Journal Articles**
ACM Transactions on Human-Robot Interaction (THRI)
International Journal of Robotics Research (IJRR)
ACM Transactions on Computer-Human Interaction (TOCHI)
IEEE Transactions on Visualization and Computer Graphics (TVCG)
ACM Transactions on Interactive Intelligent Systems (TiiS)
IEEE Transactions on Human-Machine Systems (THMS)
IEEE Transactions on Affective Computing (TAC)
IEEE Robotics and Automation Magazine (RAM)
- 2012 – Present **Referee for Conference Proceedings**
ACM/IEEE International Conference on Human-Robot Interaction (HRI)
ACM SIGCHI Conference on Human Factors in Computing Systems (CHI)
ACM SIGCHI Symposium on User Interface and Software Technology (UIST)
ACM SIGCHI Conference on Designing Interactive Systems (DIS)
IEEE International Conference on Robotics and Automation (ICRA)
IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)
Robotics: Science and Systems Conference (RSS)
IEEE International Symposium on Mixed and Augmented Reality (ISMAR)
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
IEEE Conference on Virtual Reality and 3D User Interfaces (IEEE VR)
International Symposium on Robotics Research (ISRR)
5 Special Recognitions for outstanding reviews: CHI 2018, CHI 2016 (2 reviews), DIS 2016, UIST 2016

University Service

- 2021 – Present **Graduate Program Committee**
Department of Computer Science, University of North Carolina at Chapel Hill
- 2016 – Present **CU Boulder Human-Computer Interaction Consortium (HCIC) Committee**
University of Colorado Boulder
- 2016 – Present **Faculty Adviser**
Virtual Reality Club, University of Colorado Boulder
- 2015 – 2021 **Graduate Program Committee**
ATLAS Institute, University of Colorado Boulder
Committee Chair: 2018 – 2021
- 2018 – 2019 **Faculty Search Committee**
Autonomous Systems Interdisciplinary Faculty Search Committee for the College of Engineering,
University of Colorado Boulder

- 2017 – 2018 **Executive Committee**
ATLAS Institute, University of Colorado Boulder
- 2016 – 2017 **Faculty Search Committee**
Department of Computer Science, University of Colorado Boulder
- 2016 – 2017 **Faculty Search Committee**
& 2021
ATLAS Institute, University of Colorado Boulder
- 2016 – 2017 **Faculty Inclusive Excellence Team**
BOLD Center, University of Colorado Boulder
- 2016 – 2017 **Undergraduate Program Committee**
Department of Computer Science, University of Colorado Boulder
- 2015 – 2016 **Graduate Program Committee**
Department of Computer Science, University of Colorado Boulder

Other External Research Service

- 2022 – Present **Resource Center Subcommittee Member, IEEE Telepresence Project**
IEEE Future Directions Initiative
- 2016 **Public Safety Communications Research (PSCR) User Interface R&D Working Group**
National Institute of Standards and Technology (NIST) and the National Telecommunications and Information Administration (NTIA)
- 2014 **Student Volunteer**
ACM/IEEE International Conference on Human-Robot Interaction (HRI)

Volunteering & Outreach

- 2018–2019 **High School Outreach & Mentoring**
Worked with three high school students from Peak to Peak High School as part of the Boulder Valley School District’s Science Research Seminar (SRS), enabling students to gain research experience while completing a senior project as lab interns
- 2017 **High School Outreach & Mentoring**
Worked with a high school student from the Dawson School, enabling the student to gain research experience while completing a senior project as a lab intern
- 2017 **Middle School Outreach**
Worked with teachers from the Logan School to create program for 11 middle school students to visit university research labs as part of STEM enrichment program
- 2016 – 2017 **Hosted Lab Visits**
Hosted open lab event for the public as part of National Robotics Week
Hosted open lab events for the public as part of annual ATLAS Expo
- 2015 – 2017 **Recruitment Representative**
Hosted “Robotics” table for graduate recruiting at CS Recruitment Day event
- 2016 **Computer Science Promotional Material Development**
Led creation of promotional video highlighting the University of Colorado Boulder Computer Science Department for use in graduate recruiting and department advertising.
- 2013 – 2014 **Grandparents University Instructor**
University of Wisconsin-Madison
Taught two sessions (~20 students/session) of a “Social Robotics” major to grandparents and grandchildren. Course used hands-on activities, multi-media presentations, and Lego Mindstorms robots to teach programming and robotics to young and senior students.

Professional and Academic Memberships

Association for Computing
Machinery (ACM)

Alpha Sigma Nu Jesuit
Honor Society

Institute of Electrical and
Electronics Engineers (IEEE)

Phi Alpha Theta National
Historical Honor Society

Phi Beta Kappa Honor
Society

Golden Key International
Honor Society