

Zhao Han, Ph.D.

Post-Doctoral Fellow, *Department of Computer Science, Colorado School of Mines*

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Research Interests

Mission: Develop capable robotic systems and understandable robot interactions with humans

Areas: Human-robot interaction (HRI), robotics, artificial intelligence (AI), augmented reality (AR)

Expertise: Explainable AI, robot explanation, mobile manipulation, references, projector-based/head-worn AR, robot competition, robot failures, handovers, behavior trees, robot ethics, workload, teleoperation, assistive robotics

Education

2016–2021 **Ph.D., Computer Science**, *University of Massachusetts Lowell, USA*

Dissertation: [Robot Explanations: Preferences, Generation, and Communication](#)

Committee: [Holly Yanco](#) (advisor), [Reza Ahmadzadeh](#), [Aaron Steinfeld](#) (**CMU**)

2014–2016 **M.S., Computer Science**, *University of Manitoba, Canada*

Thesis: [Delivering Scalable Frequent Pattern Mining for Non-Expert Data Miners](#)

Advisor: [Carson Leung](#), Lab: [Database and Data Mining Lab](#)

2009–2013 **B.S., Computer Science (Honours, three co-op terms)**, *University of Manitoba, Canada*

Area of specialization: Software Engineering, Databases and Data Mining, HCI, Computer Graphics

Employment

8/2021→ **Post-Doctoral Fellow**, *Department of Computer Science, Colorado School of Mines*

Advisor: [Tom Williams](#), Lab: [Mines Interactive Robotics Research Lab \(MIRRORLab\)](#)

Projects:

- Givenness Hierarchy Theoretic Natural Language Generation for Situated HRI
 - Augmented Reality and Physio-Enhanced Robotic Gesture (APERTURE)
 - Collaborators: [Leanne Hirshfield](#) (**Psychology**), [Christopher D. Wickens](#) (**Psychology**)
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8/2022–12/2022 **Adjunct Faculty**[†], *Department of Computer Science, Colorado School of Mines*

- Course: [Augmented Reality](#) (**4.72/5.0** in course evaluation)
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5/2018–4/2021 **Research Assistant**, *Department of Computer Science, University of Massachusetts Lowell*

Advisor: [Holly Yanco](#), Lab: [Human-Robot Interaction Lab](#)

Projects:

- Robotic Manipulation Assistance for Activities of Daily Living
 - [FetchIt Mobile Manipulation Challenge at ICRA 2019](#)
 - [Self-assessment & Understanding of Competence and Conditions to Ensure System Success](#)
 - Collaborators: [Aaron Steinfeld](#) (**CMU**), [Henny Admoni](#) (**CMU**), [Jacob Crandall](#) (**BYU**), [Michael Goodrich](#) (**BYU**), [Matthias Scheutz](#) (**Tufts**), [Reid Simmons](#) (**CMU**)
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9/2016–4/2018 **Teaching Assistant**[†], *Department of Computer Science, University of Massachusetts Lowell*

5/2015–4/2016 **Marker/Teaching Assistant**[†], *Department of Computer Science, University of Manitoba, Canada*

5/2013–8/2013 **Software Developer**[‡], *Payment Processing, iQmetrix (350+ employees), Winnipeg, Canada*

9/2012–12/2012 **App. Developer**[‡], *Twitter & Facebook, Blackberry (3500+ employees), Ottawa, Canada*

1/2012–4/2012 **App. Developer (Web, Co-op)**[‡], *Wawanesa Insurance (3000+ employees), Winnipeg, Canada*

[†]Teaching Experience is described in its own section.

[‡]Non-academia employment is detailed in the Industry Experience section.

Honors and Awards

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- 8/2022 **Mines Diversity, Inclusion & Access (DI&A) Award**, Creating a Culture of Inclusion (Faculty)
Colorado School of Mines
- Founded Mines Asian Community Alliance to foster an inclusive environment and sense of belonging
 - Centralized resources for the postdoc community as a founding officer of the postdoc program
 - Hosted an interactive workshop to raise awareness of the history and harm of the Model Minority myth
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- 7/2022 **Best Long-Paper Award**
2022 ACL 15th International Natural Language Generation Conference (INLG)
- Paper: [Evaluating Referring Form Selection Models In Partially-Known Environments](#)
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- 4/2022 **Elected Councilor** (7/2022–6/2025), [Mathematical, Computing, and Statistical Sciences Division \(MCS\)](#)
The Council on Undergraduate Research (CUR)
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- 3/2022 **Third Prize, Best Late Breaking Report (LBR) Award**
2022 ACM/IEEE International Conference on Human-Robot Interaction (HRI)
- Paper: [A Task Design for Studying Referring Behaviors for Linguistic HRI](#)
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- 6/2020 **Finalist (Proposal Writer & Team Lead)**
Analog Devices Real-Time Sensor Fusion Challenge, Analog Devices (ADI), FedEx, Mitsubishi Electric, SICK, SolidWorks, and MassRobotics
- Awarded \$2,500 in seed funding
 - Led 2 members (1 undergraduate) to develop tabletop projection mapping for robot intention
 - Competed with Brown University, Worcester Polytechnic Institute, and startups.
 - Led to a workshop paper and became part of my dissertation
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- 5/2020 **First Place (Proposal Writer & Team Lead)**
Panasonic Prototype 3D LiDAR Challenge, Panasonic, Harmonic Drive, SolidWorks, and MassRobotics
- Awarded \$10,000 plus \$2,500 seed funding
 - Competed with Boston University, Northeastern University, Olin College, et al.
 - Led 2 team members (1 engineer) to develop small object detection from sparse LiDAR data
 - Secured collaboration with Panasonic for the lab
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- 5/2019 **Second Place (Team Description Writer & Team Lead)**
FetchIt! Mobile Manipulation Challenge, IEEE International Conference on Robotics and Automation (ICRA), Fetch Robotics, EandM, SCHUNK, SICK, and The Construct
- Awarded \$5,000 & LiDARs (led 2 team members vs. 12 in the first-placed team)
 - Wrote team description paper and competed with Georgia Tech & Columbia University
 - Developed autonomous manipulation and navigation on Fetch for gearbox assembly kitting
 - Led to a top conference paper and formed the research platform for my dissertation
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- 9/2016 **Full Teaching Assistantship**, *University of Massachusetts*
- Awarded \$23,520 and a waiver of tuition and fees of \$33,132 in two years. Continued to RA.
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Publications

Refereed Journals

- J5. **Zhao Han**, Holly A. Yanco. "[Communicating Missing Causal Information to Explain a Robot's Past Behavior.](#)" *ACM Transactions on Human-Robot Interaction (THRI)*, 2022. **Top HRI journal. Just accepted.**
- J4. **Landon Brown***, **Jared Hamilton***, **Zhao Han***, **Albert Phan***, **Thao Phung***, Eric Hansen, Nhan Tran, and Tom Williams. "[Best of Both Worlds? Combining Different Forms of Mixed Reality Deictic Gestures.](#)" *ACM Transactions on Human-Robot Interaction (THRI)*, 2022. ***Equal contribution. Top HRI Journal. Just accepted.**
- J3. **Zhao Han**, Elizabeth Phillips (**GMU, Psychology**), and Holly Yanco. "[The Need for Verbal Robot Explanations and How People Would Like a Robot to Explain Itself.](#)" *ACM Transactions on Human-Robot Interaction (THRI)*, 10(4), 2021. **Top HRI journal.**

- J2. Alexander Wilkinson, Michael Gonzales, Patrick Hoey, David Kontak, Dian Wang, Noah Tornare, Sam Laderoute, **Zhao Han**, Jordan Allspaw, Robert Platt, and Holly Yanco. "Design guidelines for human–robot interaction with assistive robot manipulation systems." *Paladyn, Journal of Behavioral Robotics*, 12(1), 2021. **Open access.**
- J1. **Zhao Han**, Daniel Giger, Jordan Allspaw, Michael S. Lee (**CMU**), Henny Admoni (**CMU**), and Holly A. Yanco. "Building The Foundation of Robot Explanation Generation Using Behavior Trees." *ACM Transactions on Human-Robot Interaction (THRI)*, 10(3), 2021. **Invited talk at Georgia Tech. Top HRI journal.**

Refereed Conference Proceedings

- C13. **Zhao Han***, **Yifei Zhu***, Albert Phan, Fernando Sandoval Garza, Amia Castro, and Tom Williams. "Crossing Reality: Comparing Physical and Virtual Robot Deixis," *2023 ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, 2023. *Equal contribution. **Top HRI conference. 25.2% acceptance rate.**
- C12. Ruchen Wen, Alyssa Hanson, **Zhao Han**, and Tom Williams. "Fresh Start: Encouraging Politeness in Wakeword-Driven Human-Robot Interaction," *2023 ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, 2023. **Top HRI conference. 25.2% acceptance rate.**
- C11. **Kevin Spevak***, **Zhao Han***, Tom Williams, and Neil T. Dantam. "Givenness Hierarchy Informed Optimal Document Planning for Situated Human-Robot Interaction," *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022. ***Equal contribution. Top Robotics conference. 48% acceptance rate (1,740/3,579).**
- C10. **Zhao Han**, Polina Rygina and Tom Williams. "Evaluating Referring Form Selection Models in Partially-Known Environments," *The 15th International Conference on Natural Language Generation (INLG)*, 2022. **Best Long-Paper Award. Top NLG conference.**
- C9. **Zhao Han**, Jenna Parrillo, Alexander Wilkinson, Holly A. Yanco, and Tom Williams. "Projecting Robot Navigation Paths: Hardware and Software for Projected AR," *2022 ACM/IEEE International Conference on Human-Robot Interaction (HRI), Short Contributions (Open Science – Code Sharing)*, 2022. **Top HRI conference. 24% acceptance rate.**
- C8. Ruchen Wen, **Zhao Han** and Tom Williams. "Teacher, Teammate, Subordinate, Friend: Generating Norm Violation Responses Grounded in Role-based Relational Norms," *2022 ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, 2022. **Top HRI conference. 24% acceptance rate.**
- C7. **Zhao Han**, Adam Norton, Eric McCann, Lisa Baraniecki, Will Ober, Dave Shane, Anna Skinner, and Holly A. Yanco. "Investigation of Multiple Resource Theory Design Principles on Robot Teleoperation and Workload Management." *2021 IEEE International Conference on Robotics and Automation (ICRA)*, 2021. **Top Robotics conference. 49% acceptance rate (1,946/4,005).**
- C6. **Tyler Frasca* (Tufts)**, **Zhao Han***, Jordan Allspaw, Holly Yanco, and Matthias Scheutz (**Tufts**). "Going Cognitive: A Demonstration of the Utility of Task-General Cognitive Architecture for Adaptive Robotic Task Performance." *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2020. ***Equal contribution. Top Robotics conference. 47% acceptance rate (1,409/2,996).**
- C5. **Zhao Han**, Jordan Allspaw, Gregory LeMasurier, Jenna Parrillo, Daniel Giger, S. Reza Ahmadzadeh, and Holly A. Yanco. "Towards Mobile Multi-Task Manipulation in a Confined and Integrated Environment with Irregular Objects." *2020 IEEE International Conference on Robotics and Automation (ICRA)*, 2020. **Top Robotics conference. 42% acceptance rate (1,483/3,512).**
- C4. **Zhao Han** and Holly Yanco. "The Effects of Proactive Release Behaviors During Human-Robot Handovers." *2019 14th ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, 2019. **Top HRI conference. 28% acceptance rate.**
- C3. Patrick M. J. Dubois, **Zhao Han**, Fan Jiang, and Carson K. Leung. "An Interactive Circular Visual Analytic Tool for Visualization of Web Data." *IEEE/WIC/ACM International Conference on Web Intelligence (WI)*, 2016.
- C2. **Zhao Han** and Carson K. Leung. "FIMaaS: Scalable Frequent Itemset Mining-as-a-Service on Cloud for Non-Expert Miners." *International Conference on Big Data Applications and Services (BigDAS)*, ACM, 2015.
- C1. Alfredo Cuzzocrea, **Zhao Han**, Fan Jiang, Carson K. Leung and Hao Zhang. "Edge-based Mining of Frequent Subgraphs from Graph Streams." *Procedia Computer Science 60, special issue of KES 2015*, 2015.

Refereed Symposium, Workshop, and Late-Breaking Report Papers

- W10. Shelly Bagchi, Patrick Holthaus, Gloria Beraldo, Emmanuel Senft, Daniel Hernández García, **Zhao Han**, Suresh Kumar Jayaraman, Alessandra Rossi, Connor Esterwood, Antonio Andriella, Paul Pridham. "[Towards Improved Replicability of Human Studies in Human-Robot Interaction: Recommendations for Formalized Reporting.](#)" *2023 ACM/IEEE International Conference on Human-Robot Interaction (HRI), Late-Breaking Report (LBR)*, 2023.
- W9. **Zhao Han**, Tom Williams, Holly A. Yanco. "[Mixed-Reality Robot Behavior Replay: A System Implementation.](#)" *2022 AAAI Fall Symposium on The Artificial Intelligence for Human-Robot Interaction (AI-HRI)*, 2022.
- W8. **Zhao Han** and Tom Williams. "[Towards Formalizing HRI Data Collection Processes.](#)" *The 4th Annual Workshop on Novel and Emerging Test Methods & Metrics for Effective HRI at HRI 2022*, 2022.
- W7. **Zhao Han***, **Albert Phan***, **Amia Castro***, **Fernando Sandoval Garza*** and Tom Williams. "[Towards an Understanding of Physical vs Virtual Robot Appendage Design.](#)" *2022 International Workshop on Virtual, Augmented, and Mixed-Reality for Human-Robot Interactions at HRI 2022 (VAM-HRI)*, 2022. *** Equal contribution**
- W6. Gregory LeMasurier, Alvika Gautam (**BYU**), **Zhao Han**, Jacob W. Crandall (**BYU**), Holly A. Yanco. "[Why Didn't I Do It? A Study Design to Evaluate Robot Explanations.](#)" *HRI 2022 Workshop YOUR study design! Participatory critique and refinement of participants' studies*, 2022.
- W5. **Zhao Han**, Boyoung Kim (**GMU, Psychology**), Holly A. Yanco, and Tom Williams. "[Causal Robot Communication Inspired by Observational Learning Insights.](#)" *2022 AAAI Spring Symposium on Closing the Assessment Loop: Communicating Proficiency and Intent in Human-Robot Teaming*, 2022.
- W4. **Zhao Han** and Tom Williams. "[A Task Design for Studying Referring Behaviors for Linguistic HRI.](#)" *2022 ACM/IEEE International Conference on Human-Robot Interaction (HRI), Late-Breaking Report (LBR)*, 2022. **Third Prize, Best Late Breaking Report (LBR) Award (3/103).**
- W3. **Zhao Han**, Alexander Wilkinson, Jenna Parrillo, Jordan Allspaw, and Holly A. Yanco. "[Projection Mapping Implementation: Enabling Direct Externalization of Perception Results and Action Intent to Improve Robot Explainability.](#)" *2020 AAAI Symposium on Artificial Intelligence for Human-Robot Interaction (AI-HRI)*, 2020. **Full-length talk. Open science – code.**
- W2. **Zhao Han** and Holly A. Yanco. "[Reasons People Want Explanations After Unrecoverable Pre-Handover Failures.](#)" *2020 IEEE ICRA Workshop on Human-Robot Handovers*, 2020. **Handover community engagement.**
- W1. **Zhao Han**, Jordan Allspaw, Adam Norton, and Holly Yanco. "[Towards A Robot Explanation System: A Survey and Our Approach to State Summarization, Storage and Querying, and Human Interface.](#)" *2019 AAAI Symposium on Artificial Intelligence for Human-Robot Interaction (AI-HRI)*, 2019. **Full paper, 8 pages.**

Theses

- T2. **Zhao Han**. "[Robot Explanations: Preferences, Generation, and Communication](#)". *Ph.D. Dissertation, University of Massachusetts Lowell, Lowell, MA*. 2021.
- T1. **Zhao Han**. "[Delivering Scalable Frequent Pattern Mining for Non-Expert Data Miners](#)". *M.S. Thesis, University of Manitoba, Winnipeg, MB, Canada*. 2016.

Other Publications

- O4. **Zhao Han**, Emmanuel Senft, Muneeb I. Ahmad, Shelly Bagchi, Amir Yazdani, Jason R. Wilson, Boyoung Kim, Ruchen Wen, Justin W. Hart, Daniel Hernández García, Matteo Leonetti, Ross Mead, Reuth Mirsky, Ahalya Prabhakar, Megan L. Zimmerman "[Proceedings of the AI-HRI Symposium at AAAI-FSS 2022.](#)" 2022.
- O3. Reuth Mirsky, Megan Zimmerman, Muneed Ahmad, Shelly Bagchi, Felix Gervits, **Zhao Han**, Justin Hart, Daniel Hernández García, Matteo Leonetti, Ross Mead, Emmanuel Senft, Jivko Sinapov, Jason Wilson "[Proceedings of the AI-HRI Symposium at AAAI-FSS 2021.](#)" 2021.
- O2. Shelly Bagchi, Jason R. Wilson, Muneeb I. Ahmad, Christian Dondrup, **Zhao Han**, Justin W. Hart, Matteo Leonetti, Katrin Lohan, Ross Mead, Emmanuel Senft, Jivko Sinapov, and Megan L. Zimmerman. "[Proceedings of the AI-HRI Symposium at AAAI-FSS 2020.](#)" 2020.
- O1. **Zhao Han** and Holly Yanco. "[Investigating Human-Robot Handover Release Behaviors.](#)" *2018 New England Manipulation Symposium*, 2018. Poster.

Research Grants

Corporate Grants

-
- 2019–2020 **Human-Aware Projection Mapping for Robot Intention**
ADI Real-Time Sensor Fusion Challenge, MassRobotics
 Source: Analog Devices (ADI), MassRobotics, FedEx, Mitsubishi Electric, SICK, and SolidWorks
 Investigators: **Zhao Han (PI)**, Holly Yanco (Faculty Advisor), Alexander Wilkinson, Jordan Allspaw
 Amount: \$2,500
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- 2019–2020 **Detecting and Removing Small Ground Object Hazards with 3D LiDAR on a Mobile Manipulator**
Panasonic Prototype 3D LiDAR Challenge, MassRobotics
 Source: Panasonic, Harmonic Drive, SolidWorks, and MassRobotics
 Investigators: **Zhao Han (PI)**, Holly Yanco (Faculty Advisor), Jordan Allspaw, Brian Flynn
 Amount: \$12,500
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- 2018–2019 **Mobile Multi-Task Manipulation in a Confined and Integrated Environment with Irregular Objects**
FetchIt! Mobile Manipulation Challenge, 2019 IEEE Int'l Conference on Robotics and Automation (ICRA)
 Source: Fetch Robotics, EandM, SCHUNK, SICK, and The Construct
 Investigators: **Zhao Han (PI)**, Holly Yanco (Faculty Advisor), Jordan Allspaw
 Amount: \$5000
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Institutional Grants

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- 2021–2022 **Open Access Pilot Mini-Grant**
 Source: Colorado School of Mines, Arthur Lakes Library
 Investigators: **Zhao Han (PI)**, Tom Williams (Faculty Advisor)
 Amount: \$750
-

Professional Development for Grant Writers

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- 9/28/2022 Promoting DI&A and Creating Broader Impacts Plans for NSF Proposals
Research and Technology Transfer, Colorado School of Mines
-
- 6/2/2022 NSF Webinar: Sunset of the National Robotics Initiative: Guidance for Researchers
-
- 3/23/2022 NSF Webinar: Pathways to Enable Open-Source Ecosystems Program
-
- 2/25/2022 NSF Webinar: Future Manufacturing
-
- 2/15/2022 NSF National Robotics Initiative (NRI) 3.0 Office Hours
-
- 2/4/2022 NSF CAREER Proposal Writing Intro Panel
Research and Technology Transfer, Colorado School of Mines
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Teaching

Instructor for 1 course and 3 labs, Teaching Assistant for 10 courses (**4 guest lectures**).

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- 8/2022–**Instructor, Augmented Reality (4th year and graduate**, 30 students), Colorado School of Mines
 12/2022
- Achieved a high rating of **4.72/5.0** in course evaluation
 - Designed course description and developed learning outcomes for essential knowledge and skills
 - Developed homework to better assess learning outcomes
 - Developed evaluation and experiment design course material
-
- 9/2018– Teaching Assistant, **Artificial Intelligence (4th year)**, University of Massachusetts Lowell
 12/2018
- **Lectured on uninformed search algorithms**
 - Went through practical questions in class, provided answer keys for midterm exam questions
-
- 1/2018– Teaching Assistant, **Mobile Robotics I (4th year)**, University of Massachusetts Lowell
 4/2018
- Graded robot demonstrations and answered questions on the [KIPR Wallaby robot controller](#)
-
- 9/2017– Instructor/Teaching Assistant, **Computing I Lab (1st year)**, University of Massachusetts Lowell
 12/2017
- Led labs, answered C questions, and helped students debug
-

1/2017–5/2017 Instructor/Teaching Assistant, **Computing II Lab (1st year)**, University of Massachusetts Lowell

- Led labs, answered C++ questions, and helped students debug memory-related bugs
- Coordinated with a grader to grade assignments

9/2016–12/2016 Teaching Assistant, **Software Architecture (3rd year)**, University of Massachusetts Lowell

- Graded assignments written in assembly language

1/2016–4/2016 Marker, **Object-Orientation (2nd year)**, University of Manitoba

- Same as 5/2015 – 8/2015 except marked one Ruby assignment
- The instructor said: “**Thanks so much for being prompt this term and a good grader.**”

Teaching Assistant/Marker, **Advanced Artificial Intelligence (4th year)**, University of Manitoba

- **Lectured:** Bayesian Reasoning, Markov Chains, and Rapidly Exploring Random Trees.
- Graded assignments (written in Python, Java, C++), midterm and final exams

Instructor/Teaching Assistant, **Programming Practices Lab (2nd year)**, University of Manitoba

- Taught 70 students for around 15 minutes in five 75-minute lab sections
- Prepared lab material from the famous Programming Pearls book (Columns 2, 3, 5, 10)
- Assigned lab marks based on their Unix (OS X), C (lldb, Xcode) knowledge
- Provided feedback to the instructor after lab

9/2015–12/2015 Marker, **Databases: Concepts and Usage (3rd year)**, University of Manitoba

- Provided rubrics for **100+ students’** SQL and Relational Algebra assignments

5/2015–8/2015 Marker, **Object-Orientation (2nd year)**, University of Manitoba

- Provided timely and tailored feedback to 40 students who programmed in Java and C++

Teaching Professional Development

9/2022–12/2022 **Course: Foundations of Course Design**, Colorado School of Mines

- Synthesize your course vision, purpose, relevance, and key impacts in a course description
- Develop course learning outcomes consistent with course key impacts and course description
- Plan summative assessments that align with CLOs
- Outline Pathways to Mastery that support students in mastering the learning outcomes

Mentoring

Three graduates. 22 undergraduates (12 **underrepresented**, 13 females), 6 led to 7 refereed publications.

Graduate Students

8/2022–12/2022 Mark Higger, (1st year M.S. student). Gesturing in referring form selection.

5/2022→ **Yifei (Rena) Zhu**[♀], (1st year Ph.D. student, 1 paper). Comparing AR robot arm with physical robot arm.

8/2021→ **Ruchen (Puck) Wen**[♀] (3rd year Ph.D. student). *Research and career advice.*

Undergraduate Researchers

8/2022→ **Annie Huang**[♀]. Comparing deictic and non-deictic spatial gestures.
Keenan Schott[♀]. —.

8/2022–12/2022 Aly Ranucci[♀]. Comparing deictic and non-deictic gestures.
Sander Schott. Gesturing in referring form selection.
Nelson Valencia. —.
Gazi Md Iftakher Morshed. —.

8/2021→ **Gabriel Del Castillo**. Givenness Hierarchy-informed theoretic referential choice for linguistic robots.

8/2021– 7/2022	Fernando Sandoval Garza (2 papers). Comparing AR robot arm with physical robot arm.
8/2021– 5/2022	Grace Clark [♀] . Givenness Hierarchy-informed theoretic referential choice for linguistic robots. Amia Castro [♀] (2 papers). Eye tracking implementation in augmented reality. Albert Phan (2 papers). Comparing virtual robot arm in augmented reality with physical robot arm. Polina Rygina (1 paper) [♀] . Referring forms corpus collection for situated human-robot interaction. Katherine Deal [♀] . —.
8/2021– 12/2021	Aly Ranucci [♀] . Category transitions between deictic and non-deictic spatial gestures. Adam Stogsdill. —.
2020	Alexander Wilkinson (3 papers – 1 journal). Projection mapping for tabletop manipulation intent. Vittoria Santoro [♀] . Investigating physical replay to Fetch robot using MongoDB. Yash Patel . Converting robot policy programmed in C++ to behavior trees.
5/2019– 7/2021	Jenna Parrillo [♀] (3 papers). Near-table navigation. Projection mapping for navigation intent. Daniel Giger (2 papers). Robot simulation. Visualize perceived & learned policies using behavior tree.
2019	Gregory LeMasurier (1 paper; Started Ph.D. in 2021). Door handle manipulation and robotics simulation. John DeNyse. Enforcing gripper constrain in probabilistic manipulation planning. Sanskriti Sharma [♀] . Extracting common code in the FetchIt mobile manipulation codebase.

Mentoring Service and Professional Development

11/2022→	Program Committee Member AAAI 2023 Undergraduate Consortium
10/28/2022	Poster Presentation Judge, 2022 Fall Undergraduate Research Symposium <i>Colorado School of Mines</i> <ul style="list-style-type: none"> Rated three posters on visual organization, verbal delivery, and individual sections Gave feedback and encouragement to undergraduate researchers
10/26/2022	Workshop, “Mentorship: The Key to Success in the Academic Workspace”
4/18/2022	Workshop: “Centering Equity and Inclusion in Undergraduate Research Mentoring.”
4/18/2022	Poster Presentation Judge, 2022 Spring Undergraduate Research Symposium <i>Colorado School of Mines</i> <ul style="list-style-type: none"> Rated five posters on visual organization, verbal delivery, and individual sections Gave feedback and encouragement to undergraduate researchers

Professional Service and Leadership

11/2022→	Publications Chair <i>2024 & 2025 ACM/IEEE International Conference on Human-Robot Interaction (HRI)</i>	Organization
9/2022– 11/2022	Program Committee (PC) Member (Main Track, Technical Theme → Studies Theme) 2023 ACM/IEEE International Conference on Human-Robot Interaction (HRI) <ul style="list-style-type: none"> Attended 3-day PC meeting discussing over 40 papers with 13 top HRI researchers Recruited 16 expert reviewers, meta-reviewed for 5 papers, and grand-reviewed 4 papers 	Program Committee
10/2022	Session Co-Chair , Special Session: Computational Advances in Human-Robot Interaction 1 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)	Organization
4/2022– 11/2022	General Co-Chair 2022 AAAI Fall Symposium on Artificial Intelligence for Human-Robot Interaction (AI-HRI) <ul style="list-style-type: none"> Led symposium application and discussion with 14 co-organizers on theme, topic, format, etc. Promoted diversity by initiating DEI Chair negotiating five complimentary registrations 	Organizer

	<ul style="list-style-type: none"> Initiated a Blue Sky Ideas track and attracted over 20 submissions Co-led PC meeting and hosted the 2.5-day hybrid symposium in Washington, D.C., USA 	
3/2022– 10/2022	Co-Organizer 2022 Workshop on Affective Human-Robot Interaction, 10th International Conference on Affective Computing & Intelligent Interaction (ACII 2022) <ul style="list-style-type: none"> Attracted 10 submissions and participated in all aspects of workshop organization Contacted and invited one of the speakers and hosted the early morning session 	Organizer
4/2022– 6/2022	Area Chair, Program Committee 2022 ACM International Conf. on Automotive UI and Interactive Vehicular Applications (AutomotiveUI) <ul style="list-style-type: none"> Recruited multiple reviewers for manuscripts in autonomous vehicles 	Program Committee
4/2022→	Elected Councilor (7/2022–6/2025), Mathematical, Computing, & Statistical Sciences Division Council on Undergraduate Research (CUR) <ul style="list-style-type: none"> Design and implement initiatives to support and promote high-quality mentored undergraduate research, scholarship, and creative inquiry Attend the ConnectUR conference for career development to learn, study, and master approaches to undergraduate research 	Education
2/2022– 10/2022	Lead Principal Co-Organizer , Special Session on Computational Advances in HRI 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2022) <ul style="list-style-type: none"> Proposed & drafted an application explaining goal and themes of submitted papers Accepted to the top-tier robotics conference with five other organizers Attracted over 20 IROS and RA-L submissions and expanded two special sessions Led to two papers nominated as IROS best paper awards, one per session 	Editorial Organizer
1/2022→	Standards Voting Member , P3107 – Standard Terminology for Human-Robot Interaction IEEE Standards Association (IEEE SA)	Policy Standards
12/2021→	Subgroup Co-Chair & Standards Voting Member , P3108 – Recommended Practice for HRI Design of Human Subject Studies IEEE Standards Association (IEEE SA) <ul style="list-style-type: none"> Contributed topic coverage for HRI human-subjects study recommendations Co-chairing subgroup 4 on Data Reporting/Release, Replicability (eight members) 	Policy Standards
12/2021→	Guest Editor , Special Issue on Artificial Intelligence for Human-Robot Interaction ACM Transactions on Human-Robot Interaction (THRI) <ul style="list-style-type: none"> Drafted special issue application and Call for Paper (CFP) Communicated with journal editors to announce the CFP Sought and assigned reviewers for submitted manuscripts 	Editorial Organizer
4/2020– 11/2021	Co-Organizer, Program Co-Chair, Session Chair 2020 and 2021 AAAI Fall Symposium on Artificial Intelligence for Human-Robot Interaction (AI-HRI) <ul style="list-style-type: none"> Reviewed symposium application submitted to AAAI Helped determine program for virtual conference: breakout rooms Chaired a paper session (Ethics/Trust) Wrote meta-reviews, assigned reviewers, maintained website, publicized on Twitter 	Organizer
2019→	Professional Society Member <ul style="list-style-type: none"> Association for Computing Machinery (ACM) — SIGCHI, SIGAI Institute of Electrical and Electronics Engineers (IEEE) — Robotics and Automation Society (RAS) Association for the Advancement of Artificial Intelligence (AAAI) Council on Undergraduate Research (CUR) Research Data Alliance (RDA) National Postdoctoral Association (NPA) 	Membership

Manuscript Referee Service

Journal

- ACM Transactions on Human-Robot Interaction (**THRI**) – '21 (1), '22 (2), '23 (1)
- IEEE Robotics and Automation Letters (**RA-L**) – '21 (2), '22 (2)
- Frontiers in Robotics and AI – '22 (1)

Conference

HRI, Robotics, AI

- ACM/IEEE International Conference on Human-Robot Interaction (**HRI**) – '21 (6)
- IEEE International Conference on Robotics and Automation (**ICRA**) – '18 (1), '19 (2), '20 (1), '21 (1), '23 (2)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**) – '22 (1)
- **AAAI** Conference on Artificial Intelligence – '23 (1)
- IEEE International Conference on Robot and Human Interactive Communication (**RO-MAN**) – '22 (2)
- ACM International Conference on Human-Agent Interaction (**HAI**) – '22 (1)
- International Conference on Ubiquitous Robots (**UR**) – '21 (1)
- ACM/IEEE International Conference on Human-Robot Interaction (**HRI**), **Short Contributions** – '21 (1)

HCI, AR/VR, Cognitive Science

- ACM Conference on Human Factors in Computing Systems (**CHI**) – '23 (1)
- ACM Conference on Human Factors in Computing Systems (**CHI**), **alt.chi** – '22 (2), '23 (1)
- IEEE International Symposium on Mixed and Augmented Reality (**ISMAR**) – '22 (1)
- IEEE Conference on Virtual Reality and 3D User Interfaces (**IEEE VR**) – '23 (2)
- ACM International Conference on Automotive UI and Interactive Vehicular Applications (**AutomotiveUI**) – '22 (2)
- Annual Conference of the Cognitive Science Society (**CogSci**) – '22 (1)

Symposium, Workshop, and Late-Breaking Report

- AAAI Fall Symposium on Artificial Intelligence for Human-Robot Interaction (**AI-HRI**) – '20 (5), '21 (4), '22 (2)
- ACM/IEEE International Conference on Human-Robot Interaction (**HRI**), **Late-Breaking Report** – '22 (1)
- ACM Conference on Human Factors in Computing Systems (**CHI**), **Late-Breaking Work** – '22 (5)
- Robotics: Science and Systems Conference (**RSS**), **Pioneers Workshop** – '20 (2)
- IEEE International Conference on Data Science and Advanced Analytics (**DSAA**) – '15 (1)

Diversity, Equity, and Inclusion (DEI) Service and Leadership

11/2022→	Co-Organizer <i>Inclusive HRI II: Equity and Diversity in Design, Application, Methods, and Community, HRI 2023</i> <ul style="list-style-type: none">• Co-authored the workshop application for the 2023 edition	Professional
8/2022- 10/2022	Planning Committee Member <i>Front Range Industry & Postdoc Summit (FRIPS)</i> <ul style="list-style-type: none">• Approached sponsors and secured one corporate sponsor• Recruited Robotics companies to attract Computer Science and Engineering postdocs	Regional Postdoc
3/2022-	Program Committee Member <i>Inclusive HRI Workshop: Equity and Diversity in Design, Application, Methods, and Community, HRI 2022</i>	Professional
3/2022→	Committee Member , Public Policy Subcommittee, <i>NPA Advocacy Committee</i> <i>National Postdoctoral Association</i> <ul style="list-style-type: none">• Helping to improve postdoc policies in NSF documents• Advocating improving benefits and increasing salary range of postdocs	National Postdoc
2/15/2022	Workshop Presenter , Interactive Workshop “Solidarity, Not Model Minority” <i>Celebration of DI&A Symposium, Colorado School of Mines</i> <ul style="list-style-type: none">• Raised awareness of the history and harm of the Model Minority myth• Broke the “Not Your Model Minority” film into three digestible interactive sessions with discussions• Attracted 25+ attendees, promoting Stop Asian Hate movement as solidarity opportunity	University

1/2022- 10/2022	Planning Committee Member <i>Second Mines Community Alliances Professional Development Conference, Colorado School of Mines</i>	University
	<ul style="list-style-type: none"> Proposed invited talks to attract the previously underrepresented faculty members, postdocs, and graduate students, ensuring all university communities are welcomed at the event 	
11/2021→	Founding Chair <i>Mines Asian Community Alliance, Colorado School of Mines</i>	University
	<ul style="list-style-type: none"> Established the organization to foster inclusive environment for Asian staff and faculty at Mines Coordinated with other 4 community alliances & university president to issue 3 support statements Recruited members, officers as well as exclusive sponsor from university leadership team Created a survey on the needs and interests of the membership and the university community 	
10/2021→	Founding Officer <i>Postdoctoral Affairs and Professional Development, Colorado School of Mines</i>	University Postdoc
	<ul style="list-style-type: none"> Promoted an inclusive environment for the underrepresented postdocs as research faculty Developed resources in benefits, housing, professional development, mental health, DE&I, et al. Helped develop website with on- & off-campus resources to support incoming & current postdocs 	
9/2016- 9/2019	Vice President (2017 – 2019) & Member (2016) <i>Chinese Students & Scholars Association, University of Massachusetts Lowell</i>	University
	<ul style="list-style-type: none"> Promoted an inclusive environment for Asians & raised awareness of Chinese culture Wrote, presented, and voted on funding proposals with the Office of Multicultural Affairs monthly Coordinated and organized events for traditional Chinese & East Asian festivals (200+ attendees) Recruited new members, maintained website & online forum 	

Outreach and Engagement

10/12/2022	Co-Presenter to Toyota Research Institute <i>Department of Computer Science, Colorado School of Mines</i>	Department
	<ul style="list-style-type: none"> Introduced 20 Toyota Research Institute employees to the lab's research in referring form selection 	
6/24/2022	Lecturer for 6-10th Grade Students (1 hour) <i>Department of Computer Science, Colorado School of Mines</i>	K-10 Department
	<ul style="list-style-type: none"> Explained the mathematical representation of robot arms Lectured the underlying math of forward and inverse kinematics to 25+ 6-10 grade students Presented a demo showing an JavaScript implementation in browser 	
5/17/2022	Co-Presenter to External Advisory Board <i>Department of Computer Science, Colorado School of Mines</i>	Department Advisory Board
	<ul style="list-style-type: none"> Introduced 10+ board members to the lab's research in AR and referring form selection 	
2/26/2022	Interactive Activity Presenter <i>"Girls Lead the Way" Conference, Colorado School of Mines</i>	K-12
	<ul style="list-style-type: none"> Introduced 30+ high school girls to math concepts & algorithms of motion planning with demo 	
11/16/2021	STEM Fair Presenter <i>Shelton Elementary Math & Science Night STEM Fair, Golden, CO</i>	K-6 STEM Fair
	<ul style="list-style-type: none"> Proposed & presented a robot arm activity for 50+ elementary students to control the arm with rviz Explained to parents about motion planning, rapidly-exploring random trees, & inverse kinematics 	
10/27/2019	Department Tour Guide <i>Department of Computer Science, University of Massachusetts Lowell</i>	K-12 Department
	<ul style="list-style-type: none"> Presented the FetchIt collaborative mobile manipulation kitting demo Explained to 80+ prospective students and their parents about this lab research platform 	
8/9/2018	Research Center Tour Guide <i>New England Robotics Validation and Experimentation (NERVE) Center, University of Massachusetts Lowell</i>	K-12 University

- Presented a robot-to-human handover demo (HRI'19 paper) to 50+ junior high school students

4/28/2018	Judge <i>Botball Educational Robotics Program</i>	K-12 Judging
	<ul style="list-style-type: none"> • Enforced scoring rules and recorded scores of robot performance at competition tables 	
1/17/2018– 1/18/2018	Technical Workshop Assistant <i>Botball Educator Workshops</i>	Teacher Workshop
	<ul style="list-style-type: none"> • Answer 20+ middle school teachers' questions on the KIPR Wallaby robot controller and C language 	

Miscellaneous

2011	Contributor , Translator, <i>KDE UserBase Wiki</i>
2009-10	Photographer , <i>The Manitoban Newspaper</i> (University student newspaper)
6/2009	Organizer Assistant , <i>Manitoba Marathon</i>

Talks

Excluding presentations of papers listed in the publications section above

3/2022	Invited Panelist . Explainability Panel, 2022 AAAI Spring Symposium on Closing the Assessment Loop: Communicating Proficiency and Intent in Human-Robot Teaming , Stanford, CA.
11/2021	Invited Talk . "State Summarization With Behavior Trees for Explanation Generation & Communicating Causal Information of Past Actions", ONR MURI Grant Annual Review, Virtual.
10/2021	Elevator Pitch . "Application of Projection-Based Augmented Reality for Autonomous Driving," Front Range Industry & Postdoc Summit (FRIPS) , Golden, CO.
5/2021	Invited Talk . "Robot Explanation Generation Using Behavior Trees", Georgia Tech, Virtual.
4/2021	Invited Talk . "Robot Explanation, AR, and Multiple Resource Theory", Colorado School of Mines, Virtual.
2/2021	Lighting Talk . "Communicating Missing Information of Robots' Past Actions", Office of Naval Research (ONR) Multidisciplinary University Research Initiatives (MURI) Grant Student Meeting , Virtual.
8/2020	Integration Talk . Zhao Han and Michael Lee (CMU). "Using Behavior Trees to Improve Human's Understanding of Agent Behavior", ONR MURI Grant Annual Review, Lowell, MA.
8/2020	Integration Talk and Demo . Zhao Han and Tyler Frasca (Tufts). "Going Cognitive: A Demonstration of the Utility of Task-General Cognitive Architectures for Adaptive Robotic Task Performance", ONR MURI Grant Annual Review, Lowell, MA.
11/2019	Grant Progress Talk . "Towards Explainable Robots: Realizing A Robot Explanation System, Investigating Preferred Robot Explanations", ONR MURI Grant Annual Review, Lowell, MA.
9/2018	Invited Guest Lecturer . "Informed Search Algorithms", Artificial Intelligence , UMass Lowell, Lowell, MA.
6/2018	Lighting Talk . "Investigating Human-Robot Handover Release Behaviors", 2018 New England Manipulation Symposium , Yale University, New Haven, CT.
2/2016	Guest Lecturer . "Bayesian Reasoning", "Markov Chains", and "Rapidly Exploring Random Trees", University of Manitoba, Winnipeg, MB, Canada.

Media Exposure

2021	ROS Discourse, " ROS News for the Week of 12/13/2021 (Projecting Robot Navigation Paths)", December 2021.
2020	MassRobotics, " Analog Devices Sensor Fusion Challenge ", June 2020.
2020	MassRobotics, " Panasonic Prototype 3D LiDAR Challenge ", May 2020.
2019	ONR MURI SUCCESS Project, " Annual Review Meeting 2019 ", December 2019.

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- 2019 ONR MURI SUCCESS Project, "[Summer 2019 Hacking and Integration](#)", August 2019.
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- 2019 UMass Lowell, "[UML 125 Years Proud](#)", August, 2019
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- 2019 Inside Logistics (Canada), "[Fetch rewards university team in manipulation challenge](#)", May 2019.
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- 2019 Bloomberg, The Associated Press, Robotics Tomorrow, Business Wire, "[Winner of Fetch Robotics FetchIt! Challenge Executes Complex Manufacturing Tasks Using Autonomous Mobile Robotic Arm](#)", May 2019.
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- 2019 Today's Medical Developments, "[Fetch Robotics FetchIt! Mobile Manipulation Challenge winners](#)", May 2019.
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Industry Experience

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- 5/2013–**Software Developer**, [iQmetrix](#), *Winnipeg, Canada*
- 8/2013
- Involved in designing and implementing payment gateway API by integrating multiple payment providers (e.g., Avalon, Chase), consumed by retail management applications connected to POS machines
 - Communicated with payment providers, such as Avalon, to clarify issues that existed in their payment gateway documentation
 - Introduced the concept of aspect-oriented programming and reduced boilerplate code (cross-cutting concerns) for each API endpoint
 - Mastered Scrum process with daily meetings, sprint planning, and story sizing
 - Used C#, Visual Studio, Team Foundation Server (Agile project management, revision control, and code review)
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- 9/2012–**Blackberry Software Developer**, [Research in Motion](#), *Ottawa, Canada*
- 12/2012
- Worked on Twitter & Blackberry Messenger apps on Blackberry OS)
 - Designed and implemented Model and Controller for compose screen. Collaborated with another co-op student who was working on UI.
 - Investigated Push SDK on BBOS for registration & messages.
 - Practiced multi-threaded programming to achieve faster list loading featured with auto more loading and list image loading.
 - Prioritized and fixed defects, worked with the server team to clarify API issues.
 - Involved in the Scrum process with daily meetings, sprint planning, and story sizing.
 - Collaborated with SV&V (Software Verification & Validation) team to verify fixes.
 - Used Java, Eclipse, Rally (Agile Project Management), Perforce (Revision Control), Code Collaborator (Code Review), MKS Integrity (Defect Tracking), and Jenkins (Continuous Integration).
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- 1/2012–**Application Developer (Co-op)**, [Wawanesa Insurance](#), *Winnipeg, Canada*
- 4/2012
- Assigned to design and develop an AJAX-based web application in an insurance broker application, allowing insurance business people to manage files and content for insurance broker portal
 - Contributed to a 12-people scrum team who rewrote and enhanced the insurance broker portal
 - Collaborated with BA (Business Analyst) to help gather and clarify business requirements and document them on SharePoint, Web Designer to help make user interface decisions, other developers to deliver shippable product increments on spring basis, and QA (Quality Assurance) to fix defects reported on a bug tracking web appl – JIRA
 - Reported status updates and provided feedback in a daily Scrum stand-up meeting
 - Used Java, Eclipse, JQuery, HTML, CSS, Struts 2 (web framework), Apache Jackrabbit (Database), Subversion (Revision Control), Spring framework (Inversion of Control), Hibernate(Object Relational Mapping), and Selenium (Browser Automation)
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Technical Background

Programming

- Proficient in: **Languages** (C++/C, Ruby, Java, Python, Scala, JavaScript, PHP, C#, R), **Robotics** (ROS, navigation, manipulation, MoveIt, perception, PCL), **Machine Learning/Deep Learning** (scikit-learn, PyTorch, WEKA), **Augmented Reality** (Unity, Vuforia), **Data Science/Data Analysis** (R, ggplot2, Frequentist/Bayesian inferential statistics), **Web** (Rack – Ruby on Rails, WordPress, HTML – Slim, CSS – Sass, ASP.NET, Struts2, web2py, Nginx, Apache HTTP Server), **Mobile** (Android, iOS – React.js, Blackberry QT), **GUI/Computer Graphics** (OpenGL, Swing, Visual C#), **Object-Oriented** Programming and Design Patterns, Test-Driven Development (JUnit, Ruby), **Multi-Threaded** Programming (Java, C++, Ruby, Python, Scala)
- Extensive knowledge of: BASH, Prolog (Logic programming)
- Course knowledge of: Perl, Assembly Language (LC-3)
- Familiar with: Spring, Hibernate, Selenium, Qt GUI framework (Blackberry 10 OS)

Databases

- Proficient in: MySQL, MongoDB, Redis, SQLite, Apache Jackrabbit
- Course knowledge of: IBM DB2, Microsoft Access, HSQLDB

Tools

- Proficient in: Operating System (Ubuntu/OS X/Linux/GNOME, Windows, iOS, Android, Blackberry OS), IDE (CLion, Eclipse, RubyMine, IntelliJ IDEA, PyCharm, Visual Studio, Netbeans, Geany RStudio,), Code Review (Code Collaborator), Revision control (Git, Perforce, CVS, SVN), Defect Tracking (MKS Integrity, JIRA), Continuous Integration (Jenkins), Text editor (Sublime, VIM, gedit, notepad++), Microsoft Office, LibreOffice, Nikon Capture NX 2, Adobe Photoshop, Adobe Dreamweaver
- Hobby knowledge of: FreeCAD, KiCAD (PCB design)

References

1. **Dr. Tom Williams** (Postdoc Advisor)
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2. **Dr. Holly Yanco** (Ph.D. Advisor)
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