NICK WALKER

Ph.D. Candidate in Computer Science

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Research Interests

My research focuses on improving human-robot communication by uncovering and formalizing design knowledge. Specific topics have included interactions with service robots as well as assistive teleoperation and natural language interfaces.

Education

2018— **University of Washington** – *Seattle, WA*
- Ph.D. Computer Science
- Advisor: Maya Cakmak
- Thesis: "Making Robot Behaviors Automatically Transparent"

2014–18 **The University of Texas** – *Austin, TX*
- B.S.A. Computer Science
- Advisors: Peter Stone, Matteo Leonetti, Jivko Sinapov, Justin Hart
- Polymathic Scholar (Interdisciplinary Honors)

Conference

[c10] **"Using 3D Mice to Control Robot Manipulators."** V. Dhat, N. Walker, M. Cakmak. *ACM/IEEE Int. Conf. Human-Robot Interaction*. Boulder, CO, USA, Mar. 2024

[c9] **"Not All Who Wander Are Lost: A Localization-Free System for In-the-Wild Mobile Robot Deployments."** A. Nanavati*, N. Walker*, L. Taber, C. Mavrogiannis, L. Takayama, M. Cakmak, S. Srinivasa. *Proc. 2022 ACM/IEEE Int. Conf. Human-Robot Interaction*. Sapporo, Hokkaido, Japan, Mar. 2022

[c8] **"Influencing Behavioral Attributions to Robot Motion During Task Execution."** N. Walker, C. Mavrogiannis, S. Srinivasa, M. Cakmak. *Conf. Robot Learning*. London, UK, Nov. 2021

[c7] **"Learning Backchanneling Behaviors for a Social Robot via Data Augmentation from Human-Human Conversations."** M. Murray, N. Walker, A. Nanavati, P. Alves-Oliveira, N. Filippov, A. Sauppe, B. Mutlu, M. Cakmak. *Conf. Robot Learning*. London, UK, Nov. 2021

[c6] **"Human Perceptions of a Curious Robot that Performs Off-Task Actions."** N. Walker, K. Weatherwax, J. Alchin, L. Takayama, M. Cakmak. *Proc. 2020 ACM/IEEE Int. Conf. Human-Robot Interaction*. Oxford, UK, Mar. 2020

[c5] **"Open-World Reasoning for Service Robots."** Y. Jiang*, N. Walker*, J. Hart, P. Stone. *Proc. 29th Int. Conf. Automated Planning Scheduling*. Berkeley, Jul. 2019

[c4] **"Improving Grounded Natural Language Understanding through Human-Robot Dialog."** J. Thomason, A. Padmakumar, J. Sinapov, N. Walker, Y. Jiang, H. Yedidsion, J. Hart, P. Stone, R. J. Mooney. *Int. Conf. Robotics Automation*. Montreal, May 2019

[c3] **"PRISM: Pose Registration for Integrated Semantic Mapping."** J. W. Hart, R. Shah, S. Kirmani, N. Walker, K. Baldauf, N. John, P. Stone. *2018 IEEE/RSJ Int. Conf. Intelligent Robots Systems*. Madrid, Spain, Oct. 2018

[c2] **"Automatic Curriculum Graph Generation for Reinforcement Learning Agents."** M. Svetlik, M. Leonetti, J. Sinapov, R. Shah, N. Walker, P. Stone. *Proc. Thirty-First AAAI Conf. Artificial Intelligence*. San Francisco, Feb. 2017

[c1] "Wearable ear EEG for brain interfacing." E. D. Schroeder, N. Walker, A. S. Danko. *Proc. of SPIE 10051, Neural Imaging Sensing*. San Francisco, Feb. 2017

Preprint

[p2] "Fast Explicit-Input Assistance for Teleoperation in Clutter." N. Walker, X. Yang, A. Garg, M. Cakmak, D. Fox, C. Pérez-D'Arpino. *arXiv*:2402.02612, Mar. 2024

[p1] "An Architecture for Person-Following using Active Target Search." M. Kim, M. Arduengo, N. Walker, Y. Jiang, J. W. Hart, P. Stone, L. Sentis. *arXiv*:1809.08793, Sept. 2019

Journal

[j1] "Jointly Improving Parsing and Perception for Natural Language Commands through Human-Robot Dialog." J. Thomason, A. Padmakumar, J. Sinapov, N. Walker, Y. Jiang, H. Yedidsion, J. Hart, P. Stone, R. J. Mooney. *Journal of Artificial Intelligence Research*. Feb. 2020

Refereed Symposium, Workshop

[w6] "Towards robustly picking unseen objects from densely packed shelves." M. Grotz, J. Lowry, S. Atar, Y. Li, P. Torrado, B. Yang, N. Walker, M. Murray, D. Fox, M. Cakmak, J. R. Smith. *Proc. RSS Workshop Perception Manipulation Challenges for Warehouse Automation*. Daegu, Republic of Korea, Jul. 2023

[w5] "Influencing Behavioral Attributions to Robot Motion During Task Execution." N. Walker, C. Mavrogiannis, S. Srinivasa, M. Cakmak. *Proc. 2021 ICRA Workshop Modern Approaches for Intrinsically-Motivated Intelligent Behavior*. Xi'an, China, Jun. 2021

[w4] "Desiderata for Planning Systems in General-Purpose Service Robots." N. Walker*, Y. Jiang*, M. Cakmak, P. Stone. *Proc. of 2019 ICAPS Workshop Planning Robotics*. Berkeley, Jul. 2019

[w3] "Neural Semantic Parsing with Anonymization for Command Understanding in General-Purpose Service Robots." N. Walker, Y.-T. Peng, M. Cakmak. *RoboCup 2019: Robot Soccer World Cup XXIII*. Sydney, Jul. 2019

[w2] "LAAIR: A Layered Architecture for Autonomous Interactive Robots." Y. Jiang*, N. Walker*, M. Kim, N. Brissonneau, D. S. Brown, J. W. Hart, S. Niekum, L. Sentis, P. Stone. *AAAI Fall Symp. Reasoning Learning in Real-World Systems for Long-Term Autonomy*. Arlington, Oct. 2018

[w1] "Interaction and Autonomy in RoboCup@Home and Building-Wide Intelligence." J. Hart, H. Yedidsion, Y. Jiang, N. Walker, R. Shah, J. Thomason, A. Padmakumar, R. Fernandez, J. Sinapov, R. Mooney, P. Stone. *AAAI Fall Symp. Artificial Intelligence Human-Robot Interaction*. Arlington, Oct. 2018

Periodical Feature

[f2] "A Guide to Transit-Oriented Running in Seattle." N. Walker. *The Urbanist*, Nov. 2023

[f1] "Wandering Robots in the Wild." N. Walker, A. Nanavati. *IEEE Spectrum*, Jul. 2022

Recognition

2024 Best Short Paper – *ACM/IEEE International Conference on Human-Robot Interaction*

2020— Graduate Research Fellowship – *National Science Foundation*

2018–19 Computer Science & Engineering Research Fellowship – *Allen School, UW*

2018 Best Poster, with UT Austin Villa – *RoboCup@Home DSPL*

2018 Commencement Student Speaker – *College of Natural Sciences, UT*

2018 GRFP Honorable Mention – *National Science Foundation*
2018 Dean's Honored Graduate – *College of Natural Sciences, UT*
2018 Outstanding Undergraduate Researcher Award Honorable Mention – *Computing Research Association*
2017 TIDES Fellowship – *Texas Institute for Discovery Education in Science, UT*
2014–18 College of Natural Sciences Scholarship – *College of Natural Sciences, UT*

Research Experience

2018— **Graduate Research Assistant** – *University of Washington*
- Making robot behaviors automatically transparent
- Generating communicative actions during task execution
- Perceptions of intrinsically motivated robot behaviors

2022 Su. **Research Intern** – *NVIDIA*
- Assistive teleoperation for manipulation in cluttered environments

2016 Su. **Research Engineer Intern** – *USAA*
- Ear-worn brain-computer interface software and hardware for biometric authentication

2016–18 **Peer Mentor** – *University of Texas*
- Long-term autonomy for service robots
- Mobile manipulation in homes and offices
- Grounded natural language understanding
- Automated curriculum learning for reinforcement learning agents

2015 Su. **Research Engineer Intern** – *USAA*
- Evaluation of automated speech transcription vendors

Outreach

2019 **Demo Assistant** – *UW Engineering Discovery Days*
- Organized and helped run an exhibit demonstrating our lab's research

2019 **Program Assistant** – *UTCS Robotics Camp*
- Helped high school students assemble robot kit, program intelligent behaviors

2017, 2018 **Demo Assistant** – *Explore UT*
- Ran demos on our robots and explained lab's research to community members

2017, 2018 **Workshop Assistant** – *UT Introduce a Girl to Engineering Day*
- Taught grade school girls about electricity using Play-Doh and LEDs

2017, 2018 **Workshop Instructor** – *UT Computer Science, Code Longhorn & First Bytes Camps*
- Taught high school students from underrepresented groups about web technologies

2016–18 **Peer Mentor** – *Freshman Research Initiative*
- Helped first- and second-year students formulate their research projects

Service

2022— Organizer – *Drumheller Marathon & Half Marathon*
2021— Organizer – *Light Rail Relay*
2022 Organizer – *Northwest Robotics Symposium*
2020 NSF GRFP Seminar Coordinator – *Allen School Graduate Student Committee, UW*
2020 Organizer – *Practical Service Robots Workshop, RSS*
2020 Organizer – *Imitation Learning Workshop, RSS*

2019–20 Technical Committee – *RoboCup@Home*
2019–21 Peer Mentor – *Allen School First Year Graduate Student Mentoring, UW*
2018 Reader – *Allen School Ph.D. Admissions Committee, UW*

Reviewing

HRI	'24, '23, '22	IJSR	'23, '22	SSRR	'21
ICRA	'24, '23, '21, '19	THRI	'23, '20	Sci. Rob.	'21
IROS	'24, '21	TAFFC	'22, '21	TCDS	'20
T-RO	'24	RA-L	'21		
CoRL	'23, '22	RSS	'21		

Teaching Experience

2021 Sp. **Teaching Assistant** – *UW CSE 478 (Robotics)*
- Updated assignments based on an autonomous race-car platform

2019 Wi. **Teaching Assistant** – *UW CSE 481C (Robotics Capstone)*
- Developed assignments and supported undergraduates using the Kuri robot

Skills

Robotics software – *ROS, ROS 2, Python, C++, Isaac Sim*
Robotics platforms – *Stretch, Fetch, Kuri, HSR*
User research – *Mixed Methods, Study Design, Hypothesis Testing*
Data tools – *PyTorch, Numpy, Pandas*
Planning and scheduling – *Answer Set Programming*
Web technologies – *Typescript, Javascript, HTML, CSS*
Digital media – *Premiere, Photoshop, Illustrator, InDesign*

Personal

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