

DAVID PORFIRIO

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RESEARCH INTERESTS

My research intersects **robotics**, **human-computer interaction**, and **artificial intelligence**, in order to design and evaluate innovative technology that enables human-robot task communication. This is **important** because of the enormous potential that robots have to positively impact daily life. However, this is **difficult** because robots struggle to capture and understand human needs.

EDUCATION

PhD	University of Wisconsin–Madison (UW–Madison), Madison, WI, USA Computer Sciences	2018-2022
MSc	UW–Madison, Madison, WI, USA Computer Sciences	2016-2018
BS	University of Arizona, Tucson, AZ, USA Double degree (hon) in computer science and physiology Minor in mathematics Summa cum laude	2011-2016

RESEARCH POSITIONS

George Mason University

Assistant Professor (tenure track)
Computer Science Department
College of Engineering and Computing

2025-present

US Naval Research Laboratory

Computer Scientist
Adaptive Systems Section
Navy Center for Applied Research in Artificial Intelligence

2024-2025

NRC Postdoctoral Research Associate

Adaptive Systems Section
Navy Center for Applied Research in Artificial Intelligence
Advisor: Dr. Laura Hiatt

2022-2024

UW–Madison

Doctoral Student
People and Robots Laboratory
Computer Sciences Department
Advisors: Drs. Bilge Mutlu & Aws Albarghouthi
Thesis: *Authoring Social Interactions Between Humans and Robots*
Committee: Drs. Bilge Mutlu, Aws Albarghouthi, Maya Cakmak, & Kevin Ponto

2016-2022

Nokia Bell Labs

Research Intern
New Providence, NJ, USA (Virtual)
Mentors: Drs. Martin Carroll, Kedar Namjoshi, Itai Segall

Summer 2021

University of Arizona

Undergraduate Research Assistant
Department of Computer Science
Advisor: Dr. John Kececioglu

2015-2016

Student, Undergraduate Biology Research Program
Department of Ecology and Evolutionary Biology
Advisor: Dr. Joanna Masel

Summer 2014

Student, Undergraduate Biology Research Program
Department of Physiology
Advisor: Dr. E. Fiona Bailey

2013-2014

CONFERENCE PAPERS

I primarily publish in competitive venues in human-robot interaction, human-computer interaction, and artificial intelligence, including **HRI**, **CHI**, **UIST**, and **AAMAS**.

1. **Porfiro, D.**, Hsiao, V., Fine-Morris, M., Smith, L., & Hiatt, L. Bootstrapping Human-Like Planning via LLMs. In Proceedings of the 2025 International Conference on Robot and Human Interactive Communication.
2. **Porfiro, D.**, Roberts, M., & Hiatt, L. (2025, May). Uncertainty Expression for Human-Robot Task Communication. In Proceedings of the 24th International Conference on Autonomous Agents and Multi-agent Systems (pp. 1698-1707). Acceptance rate: 24.5%
3. Lee, C., **Porfiro, D.**, Wang, J., Zhao, K., & Mutlu, B. (2025, April). VeriPlan: Integrating Formal Verification and LLMs into End-User Planning. In Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (pp. 1-19). Acceptance rate: 25.1%
4. **Porfiro, D.**, Roberts, M., & Hiatt, L. M. (2025, March). An Interaction Specification Language for Robot Application Development. In 2025 ACM/IEEE International Conference on Human-Robot Interaction (HRI). **Best Short Contribution Award** Acceptance rate: 43.5%
5. Stegner, L., Hwang, Y., **Porfiro, D.**, & Mutlu, B. (2024, July). Understanding On-the-Fly End-User Robot Programming. In Proceedings of the 2024 ACM Designing Interactive Systems Conference (pp. 2468-2480). Acceptance rate: 25%
6. **Porfiro, D.**, Roberts, M., & Hiatt, L. (2024, March). Goal-Oriented End-User Programming of Robots. In Proceedings of the 2024 ACM/IEEE International Conference on Human-Robot Interaction (pp. 582-591). **NRC/ASEE Postdoctoral Research Publications Award** Acceptance rate: 25%
7. **Porfiro, D.**, Stegner, L., Cakmak, M., Sauppé, A., Albarghouthi, A., & Mutlu, B. (2023, March). Sketching Robot Programs On the Fly. In 2023 18th ACM/IEEE International Conference on Human-Robot Interaction (HRI). ACM/IEEE. Acceptance rate: 25%
8. **Porfiro, D.**, Stegner, L., Cakmak, M., Sauppé, A., Albarghouthi, A., & Mutlu, B. (2021, May). Figaro: A Tabletop Authoring Environment for Human-Robot Interaction. In Proceedings of the 2021 Conference on Human Factors in Computing Systems (CHI) (pp. 1-15). Acceptance rate: 26%
9. **Porfiro, D.**, Sauppé, A., Albarghouthi, A., & Mutlu, B. (2020, April). Transforming robot programs based on social context. In Proceedings of the 2020 conference on human factors in computing systems (CHI) (pp. 1-12). Acceptance rate: 24%
10. **Porfiro, D.**, Fisher, E., Sauppé, A., Albarghouthi, A., & Mutlu, B. (2019, October). Bodystorming human-robot interactions. In Proceedings of the 32nd Annual ACM Symposium on User Interface Software and Technology (UIST) (pp. 479-491). ACM. Acceptance rate: 24%

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| 11. Porfirio, D. , Sauppé, A., Albarghouthi, A., & Mutlu, B. (2018, October). Authoring and verifying human-robot interactions. In The 31st Annual ACM Symposium on User Interface Software and Technology (UIST) (pp. 75-86). ACM. Best Paper Award | Acceptance rate: 21% |
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JOURNAL PAPERS

1. Hwang, Y., Lee, C., **Porfirio, D.**, Hiatt, L. M., and Mutlu, B., “Formal Methods in Robot End-User Development: Progress, Gaps, and Opportunities”. **Under review.**
2. Xiong, K., McEntee, J. P., **Porfirio, D. J.**, & Masel, J. (2017). Drift barriers to quality control when genes are expressed at different levels. *Genetics*, 205(1), 397-407.
3. Shumway, K. R., **Porfirio, D. J.**, & Bailey, E. F. (2015). Phonation-related rate coding and recruitment in the genioglossus muscle. *Experimental brain research*, 233(7), 2133-2140.

WORKSHOP AND SPECIAL SESSION PAPERS

1. Praveena, P., Schoen, A., Gleicher, M., **Porfirio, D.**, & Mutlu, B. (2023, October). Petri Nets for the Iterative Development of Interactive Robotic Systems. In 2023 AAAI Fall Symposium Series on *Unifying Representations for Robot Application Development* (UR-RAD).
2. Stegner, L., **Porfirio, D.**, Roberts, M., & Hiatt, L. (2023, October). Considerations for End-User Development in the Caregiving Domain. In 2023 AAAI Fall Symposium Series on *Unifying Representations for Robot Application Development* (UR-RAD).
3. **Porfirio, D.**, Roberts, M., & Hiatt, L. (2023, August). Guidelines for a Human-Robot Interaction Specification Language. In 2023 IEEE International Symposium on Robot and Human Interactive Communication Special Session on *HRI in Academia and Industry: Bridging the Gap*. IEEE.
4. **Porfirio, D.**, Roberts, M., & Hiatt, L. (2023, March). On a Standardized Logical Representation for Human-Robot Interaction. In 2023 AAAI Spring Symposium, *HRI in Academia and Industry: Bridging the Gap*. **Best Paper Nominee**
5. **Porfirio, D.**, Sauppé, A., Cakmak, M., Albarghouthi, A., & Mutlu, B. (2023, March). Crowdsourcing Task Traces for Service Robotics. In 2023 18th ACM/IEEE International Conference on Human-Robot Interaction (HRI).
6. Pelikan, H., **Porfirio, D.**, Winkle, K. (2023, March). Designing Better Human-Robot Interactions through Enactment, Engagement, and Reflection. In 2023 18th ACM/IEEE International Conference on Human-Robot Interaction Workshop on *Human-Robot Conversational Interaction* (CUI@HRI).
7. **Porfirio, D.**, Cakmak, M., Sauppé, A., Albarghouthi, A., & Mutlu, B. (2021, May). Interaction Templates: A Data-Driven Approach for Authoring Robot Programs. In 2021 12th Annual Workshop on Evaluation and Usability of Programming Languages and Tools (PLATEAU).
8. **Porfirio, D.**, Sauppé, A., Albarghouthi, A., & Mutlu, B. (2019, March). Computational Tools for Human-Robot Interaction Design. In 2019 14th ACM/IEEE International Conference on Human-Robot Interaction (HRI) (pp. 733-735). IEEE.

Acceptance rate: 31%

GRANTS AND GIFTS

Jerome and Isabella Karle Distinguished Scholar

2024-2025

Awarded \$25,000 for equipment and travel at the U.S. Naval Research Laboratory

Microsoft Dissertation Grant

2021

Awarded \$21,148 for dissertation research

Quori Robot Program Co-authored a winning proposal that secured a robot donation for UW–Madison.	2018
Galileo Circle Scholar Gifted \$1,000 from UA donors for research accomplishments	2015

FELLOWSHIPS

Jerome and Isabella Karle Distinguished Scholar Supports a full-time appointment at the U.S. Naval Research Laboratory	2024-2025
NRC Postdoctoral Research Fellowship Stipend with travel support at the U.S. Naval Research Laboratory	2022-2024
Cisco Graduate Student Fellowship Selected by the UW–Madison Computer Sciences Department	2021-2022
NSF Graduate Research Fellowship Stipend at the UW–Madison Computer Sciences Department	2017-2022
Advanced Opportunity Fellowship Selected by the UW–Madison Computer Sciences Department	2016, 2020

HONORS AND AWARDS

NRC/ASEE Postdoctoral Research Publications Award For my HRI '24 paper on <i>Goal-Oriented End-User Programming of Robots</i>	2025
Best Paper Award HRI '25, <i>Short Contributions</i>	2025
Best Paper Nominee 2023 AAAI Spring Symposium, <i>HRI in Academia and Industry: Bridging the Gap</i>	2023
Robotics Perception and Learning Summer School, KTH Royal Institute of Technology Invited to attend	2022
Microsoft Research AI Breakthroughs Invited to participate as a young researcher	2020
Heidelberg Laureate Forum Invited to attend as a young researcher	2019
HRI Pioneers Invited to participate as a young researcher	2019
Best Paper Award UIST '18	2018
Excellence in Undergraduate Research Award Selected by the UA Department of Computer Science	2016
Galileo Circle Scholar Selected by the UA Department of Computer Science	2015
National Hispanic Scholar Selected by the National Hispanic Recognition Program	2011
Dean's List with Distinction Awarded during six semesters at UA	2011-2016

TEACHING EXPERIENCE

George Mason University

CS 690-007, *Evaluating Generative AI Systems*. Fall 2025. (course I am designing)

Fall 2025

Description: An empirical look at systems that use generative artificial intelligence.

Guest Lecturer

CMSC 722, *AI Planning*. University of Maryland, College Park.

December 2024

Grandparents University Instructor, UW

Social Robotics (lab sessions I co-designed)

Summers 2018-2019

Description: two-day lecture and lab sessions for UW alumni families.

Teaching Assistant, UA

CSC 352, *Systems Programming and Unix*. Summer 2015.

Summer 2015

Section Leader, UA

CSC 127B, *Introduction to Computer Science II*.

Spring 2015

CSC 245, *Introduction to Discrete Structures*.

Fall 2015

CSC 227, *Program Design and Development*.

Fall 2014.

Student Preceptor, UA

CHEM 151, *Chemical Thinking I*. Spring 2012.

Spring 2012

INVITED TALKS

George Mason University

April 2025

Title: *End-User Development for Human Robot Interaction: A Shifting Paradigm*

HRI Workshop on *The Road to Reliable Robots*

March 2025

Title: *Evaluating Systems for Robot Application Development*

Johns Hopkins University

April 2024

Title: *Robot Application Development: A Shifting Paradigm*

Colorado School of Mines

March 2022

Title: *Authoring Social Interactions Between Humans and Robots*

University at Buffalo

February 2022

Title: *Authoring Social Interactions Between Humans and Robots*

Montana State University

February 2022

Title: *Authoring Social Interactions Between Humans and Robots*

Talking Robotics

December 2020

Title: *Authoring Social Interactions Between Humans and Robots*

UW-Madison, CS Student Research Symposium

April 2019

Title: *Applying Formal Methods to Human-Robot Interaction*

MENTORSHIP

Ph.D. Committee Member for the Following Students

Saad Elbeleidy (2024)—*Colorado School of Mines*

Mentor for the Following Students

Evan Conway (2024-2025)—*US Naval Research Laboratory*

Nhi Tran (2023-2025)—*US Naval Research Laboratory*

Madeline Forsythe (2024)—*US Naval Research Laboratory*

Kyle Wang (2019-2022)—*UW Madison*
 Ali Zaidi (2017-2020)—*UW Madison*
 Linda Wu (2019-2020)—*UW Madison*
 Mikayla Buford (2019-2020)—*UW Madison*
 Laik Ruetten (2020)—*UW Madison*
 Akshat Khanna (2018-2019)—*UW Madison*
 Zhechun Zhou (2019)—*UW Madison*
 Arabella Yao (2019)—*UW Madison*
 Ezra Boley (2019)—*UW Madison*
 Evan Fisher (2018)—*UW Madison*
 Pranav Rajiv (2017-2018)—*UW Madison*
 Yue Sun (2017)—*UW Madison*
 Raghav Bagwat (2017)—*UW Madison*
 Sherine Zhang (2017)—*UW Madison*
 Jack Weissburg (2017)—*UW Madison*

ACADEMIC SERVICE

Event Organization

ACM/IEEE International Conference on Human-Robot Interaction (HRI) <i>Program committee (PC) member</i>	2024-2025
Unifying Representations for Robot Application Development (AAAI Fall Symposium Series) <i>Chair (2023-2024) and Co-Chair (2025)</i>	2023-2025
Designing Human-Robot Interactions: A StEER Tutorial (NordiCHI Tutorial) <i>Co-organizer</i>	2024
End-User Development for Human-Robot Interaction (HRI Workshop) <i>Co-lead organizer</i>	2024
Participatory Design and End-User Programming for Human-Robot Interaction (HRI Workshop) <i>Co-organizer</i>	2021

Referee Service

HRI	- ACM/IEEE International Conference on Human-Robot Interaction	2020-2025
CHI	- ACM Conference on Human Factors in Computing Systems	2022, 2024-2025
AAMAS	- International Conference on Autonomous Agents and Multiagent Systems	2024-2025
CogSci	- Annual Meeting of the Cognitive Science Society	2024-2025
ICRA	- IEEE International Conference on Robotics and Automation	2024-2025
THRI	- ACM Transactions on Human-Robot Interaction	2020, 2024-2025
HAI	- International Conference on Human-Agent Interaction	2023, 2025
UIST	- ACM Symposium on User Interface Software and Technology	2021, 2025
RAL	- Robotics and Automation Letters	2025
RSS	- Robotics: Science and Systems	2025
ECAI	- European Conference on Artificial Intelligence	2025
SORO	- International Journal of Social Robotics	2022, 2024
CSCW	- ACM SIGCHI Conference on Computer-Supported Cooperative Work	2022
TAHRI	- International Symposium on Technological Advances in Human-Robot Interaction	2024
AI-HRI	- AAAI Fall Symposium on Artificial Intelligence for Human-Robot Interaction	2021

TECHNICAL SKILLS

Programming Languages

Python, Golang, Java, Javascript, HTML, CSS, C#, C, PDDL, GDScript

Robotics Tools, Libraries, and Frameworks

ROS1, ROS2, Gazebo Simulator, OpenCV, Unity Game Engine

Robot Platforms

Hello-Robot Stretch 2, Softbank Pepper, Softbank Nao, Temi, iRobot Create 2

Design

Adobe Illustrator, Premiere, & Photoshop. Affinity Designer

AI Planning and Formal Methods

Unified Planning, Z3 Theorem Prover, PRISM Model Checker, NuSMV Model Checker

Data Visualization

Matplotlib, D3.js