David Porfirio

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Google Scholar

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) 2025-present
Computer Science Department
College of Engineering and Computing

US Naval Research Laboratory
Computer Scientist 2024-2025
Adaptive Systems Section
Navy Center for Applied Research in Artificial Intelligence

NRC Postdoctoral Research Associate 2022-2024
Adaptive Systems Section
Navy Center for Applied Research in Artificial Intelligence
Advisor: Dr. Laura Hiatt

UW–Madison
Doctoral Student 2016-2022
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

Nokia Bell Labs
Research Intern Summer 2021
New Providence, NJ, USA (Virtual)
Mentors: Drs. Martin Carroll, Kedar Namjoshi, Itai Segall

University of Arizona
Undergraduate Research Assistant 2015-2016
Department of Computer Science
Advisor: Dr. John Kececioglu

Student, Undergraduate Biology Research Program Summer 2014
Department of Ecology and Evolutionary Biology
Advisor: Dr. Joanna Masel

Student, Undergraduate Biology Research Program 2013-2014
Department of Physiology
Advisor: Dr. E. Fiona Bailey

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. **Porfirio, 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. **Porfirio, 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 Multiagent Systems (pp. 1698-1707). Acceptance rate: 24.5%
3. Lee, C., **Porfirio, 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. **Porfirio, 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., **Porfirio, 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. **Porfirio, 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. **Porfirio, 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. **Porfirio, 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. **Porfirio, 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. **Porfirio, 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%

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%

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 2018
Co-authored a winning proposal that secured a robot donation for UW–Madison.

Galileo Circle Scholar 2015
Gifted $1,000 from UA donors for research accomplishments

Fellowships

Jerome and Isabella Karle Distinguished Scholar 2024-2025
Supports a full-time appointment at the U.S. Naval Research Laboratory

NRC Postdoctoral Research Fellowship 2022-2024
Stipend with travel support at the U.S. Naval Research Laboratory

Cisco Graduate Student Fellowship 2021-2022
Selected by the UW–Madison Computer Sciences Department

NSF Graduate Research Fellowship 2017-2022
Stipend at the UW–Madison Computer Sciences Department

Advanced Opportunity Fellowship 2016, 2020
Selected by the UW–Madison Computer Sciences Department

Honors and Awards

NRC/ASEE Postdoctoral Research Publications Award 2025
For my HRI '24 paper on *Goal-Oriented End-User Programming of Robots*

Best Paper Award 2025
HRI '25, *Short Contributions*

Best Paper Nominee 2023
2023 AAAI Spring Symposium, *HRI in Academia and Industry: Bridging the Gap*

Robotics Perception and Learning Summer School, KTH Royal Institute of Technology 2022
Invited to attend

Microsoft Research AI Breakthroughs 2020
Invited to participate as a young researcher

Heidelberg Laureate Forum 2019
Invited to attend as a young researcher

HRI Pioneers 2019
Invited to participate as a young researcher

Best Paper Award 2018
UIST '18

Excellence in Undergraduate Research Award 2016
Selected by the UA Department of Computer Science

Galileo Circle Scholar 2015
Selected by the UA Department of Computer Science

National Hispanic Scholar 2011
Selected by the National Hispanic Recognition Program

Dean's List with Distinction 2011-2016
Awarded during six semesters at UA

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) 2024-2025
Program committee (PC) member

Unifying Representations for Robot Application Development (AAAI Fall Symposium Series) 2023-2025
Chair (2023-2024) and Co-Chair (2025)

Designing Human-Robot Interactions: A StEER Tutorial (NordiCHI Tutorial) 2024
Co-organizer

End-User Development for Human-Robot Interaction (HRI Workshop) 2024
Co-lead organizer

Participatory Design and End-User Programming for Human-Robot Interaction (HRI Workshop) 2021
Co-organizer

Referee Service

AAAI	-	Annual AAAI Conference on Artificial Intelligence	2026
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