

## DAVID PORFIRIO

Computer Scientist  
Navy Center for Applied Research in Artificial Intelligence  
US Naval Research Laboratory  
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## RESEARCH INTERESTS

My research intersects **robotics**, **user experience**, and **artificial intelligence**, in order to design and evaluate innovative user interfaces that enable seamless 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 humans struggle to articulate their 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

### US Naval Research Laboratory

*Computer Scientist* 2024-Present  
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  
 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

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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. **Under review.**
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 Multi-agent Systems (AAMAS). **In press.** 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). Acceptance rate: 25%
7. **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 (RO-MAN) IEEE.
8. **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%
9. **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%
10. **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%
11. **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%
12. **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

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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 PAPERS

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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, 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***
4. **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).
5. 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).
6. **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).
7. **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

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<b>Jerome and Isabella Karle Distinguished Scholar</b> Awarded \$25,000 for equipment and travel at the U.S. Naval Research Laboratory	2024-2025
<b>Microsoft Dissertation Grant</b> Awarded \$21,148 for dissertation research	2021
<b>Quori Robot Program</b> Co-authored a winning proposal that secured a robot donation for UW–Madison.	2018
<b>Galileo Circle Scholar</b> Gifted \$1,000 from UA donors for research accomplishments	2015

## FELLOWSHIPS

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

## HONORS AND AWARDS

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

## TEACHING EXPERIENCE

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<b>Guest Lecturer, University of Maryland, College Park</b> - CMSC 722, <i>AI Planning</i> . Fall 2024.	Fall 2024
<b>Grandparents University Instructor, UW</b> Duties: designing and teaching two-day lecture and lab sessions for UW alumni families. - <i>Social Robotics</i> . July 2019. - <i>Social Robotics</i> . July 2018.	Summers 2018-2019

**Teaching Assistant, UA**

Summer 2015

Duties: holding office hours and grading assignments  
- CSC 352, *Systems Programming and Unix*. Summer 2015.

**Section Leader, UA**

Fall 2014 - Spring 2015

Duties: teaching lab sessions, holding office hours, and grading assignments  
- CSC 245, *Introduction to Discrete Structures*. Fall 2015.  
- CSC 127B, *Introduction to Computer Science II*. Spring 2015.  
- CSC 227, *Program Design and Development*. Fall 2014.

**Student Preceptor, UA**

Spring 2012

Duties: assisting the professor during lectures and holding office hours  
- CHEM 151, *Chemical Thinking I*. Spring 2012.

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**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*

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**MENTORSHIP****Ph.D. Committee Member for the Following Students**

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

**Mentor for the Following Students**

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

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

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

Kyle Wang (2019-2022)—*UW Madison*

Linda Wu (2019-2020)—*UW Madison*

Mikayla Buford (2019-2020)—*UW Madison*

Laik Ruetten (2020)—*UW Madison*

Ezra Boley (2019)—*UW Madison*

Evan Fisher (2018)—*UW Madison*

## ACADEMIC SERVICE

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### 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>Lead Organizer</i>	2023-2024
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
RSS	- Robotics: Science and Systems	2025
THRI	- ACM Transactions on Human-Robot Interaction	2020, 2024
SORO	- International Journal of Social Robotics	2022, 2024
UIST	- ACM Symposium on User Interface Software and Technology	2021, 2025
CSCW	- ACM SIGCHI Conference on Computer-Supported Cooperative Work	2022
HAI	- International Conference on Human-Agent Interaction	2023
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

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### 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