David Porfirio

Computer Scientist
US Naval Research Lab
Washington, D.C. 20375

Email: david.j.porfirio@gmail.com
Website: https://dporfirio.github.io/
Google Scholar

RESEARCH INTERESTS

My research intersects ***user experience***, ***robotics***, 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 (UA), Tucson, AZ, USA Double degree (hon) in computer science and physiology Minor in mathematics Summa cum laude	2011-2016

WORK & RESEARCH EXPERIENCE

Computer Scientist — 2024-Present
Adaptive Systems Section
Navy Center for Applied Research in Artificial Intelligence
United States Naval Research Laboratory

NRC RAP Postdoctoral Fellow — 2022-2024
Adaptive Systems Section
Navy Center for Applied Research in Artificial Intelligence
United States Naval Research Laboratory
Advisor: Dr. Laura Hiatt

Doctoral Research — 2016-2022
People and Robots Laboratory
UW–Madison Computer Sciences Department
Advisors: Drs. Bilge Mutlu & Aws Albarghouthi
Committee: Drs. Bilge Mutlu, Aws Albarghouthi, Maya Cakmak, & Kevin Ponto
Thesis: *Authoring Social Interactions Between Humans and Robots*

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

Undergraduate Senior Thesis — 2015-2016
UA Department of Computer Science
Advisor: Dr. John Kececioglu

Undergraduate Research — 2013-2014
UA Department of Computer Science
Advisors: Drs. E. Fiona Bailey and Joanna Masel

Full Papers

13. **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.***

12. 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 Conference on Human Factors in Computing Systems (CHI) (in press).
Acceptance rate: 25.1%

11. **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 (AAMAS) (in press).
Acceptance rate: 24.5%

10. 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%

9. **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%

8. **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.

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%

6. **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%

5. **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%

4. **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%

3. **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%

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.
Impact factor: 3.564

1. 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.
Impact factor: 2.395

Refereed Workshop and Short Papers

8. **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 Paper Award**
Acceptance rate: 54.5%

7. 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).

6. 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).

5. **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).

3. 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).

2. **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).

1. **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-present
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

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

Guest Lecturer, University of Maryland, College Park   Fall 2024
 - *CMSC 722, AI Planning. Fall 2024.*

Grandparents University Instructor, UW   Summers 2018-2019
Duties: designing and teaching two-day lecture and lab sessions for UW alumni families.
 - *Social Robotics. July 2019.*
 - *Social Robotics. July 2018.*

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.*

Invited Talks

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*

Mentorship

Ph.D. Committee Member for the Following Students
Saad Elbeleidy (2024)—*Colorado School of Mines*

Mentor for the Following Students
Nhi Tran (2023-Present)—*US Naval Research Laboratory*
Evan Conway (2024)—*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

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) 2023-2024
Lead Organizer

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

HRI	-	ACM/IEEE International Conference on Human-Robot Interaction (including alt.HRI)	2020, 2022-2023
HRI	-	ACM/IEEE International Conference on Human-Robot Interaction (LBR & Pioneers)	2021, 2023-2025
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
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

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