



# SHUBHAM SONAWANI

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Interactive Robotics Laboratory  
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## SUMMARY

As a Ph.D. candidate, my work resides at the intersection of Mixed Reality, Computer Vision, and Large Language Models, with a strong emphasis on advancing human-robot interaction. This interdisciplinary focus is reflected in my contributions to international conferences like IROS, ICRA, and CoRL. I am passionate about bringing my academic insights into practical applications and am seeking opportunities to join a team that tackles real-world robotics and AI challenges.

## SKILLS

**Languages:** Python, C++, C, C#, Java, R.

**Frameworks:** Unity, Pytorch, Tensorflow, ROS, ROS2, Gazebo, Docker, Linux.

## EDUCATION

08/19 - Present	<b>Ph.D. in Electrical Engineering</b> Specialization in AI and Robotics	Arizona State University
08/16 - 05/19	<b>M.S. in Electrical Engineering</b> Thesis: Towards Next-Generation Mobile Manipulation and Grasping	Arizona State University
08/12 - 05/16	<b>B.Tech. in Electrical Engineering</b> Thesis: Passive localization and path planning for ackermann drive robot	Veermata Jijabai Technological Institute

## PROFESSIONAL EXPERIENCE

06/23 - 08/23	<b>R&amp;D Intern in AI and Robotics</b> Erthos Implemented robot docking method using Vision and GPS at production level. (Pytorch, ROS, ROS2, Gazebo, Python, C++ and C#)
08/20 - 12/20	<b>Visiting Student Researcher</b> NASA-JPL Investigated and developed pose estimation methods for Mars-Sample-Return-Tubes, (ROS, Gazebo, C++, Python, Tensorflow)

## ACADEMIC EXPERIENCE

08/23 - Present	<b>Research Associate: Robotic Solutions for Earth-Mounted Solar</b> ASU and Erthos <ul style="list-style-type: none"><li>Developed a ROS-Gazebo simulation environment for the testing and verification of robotic systems.</li><li>Implemented semantic segmentation and lane detection models to improve robot navigation stack.</li></ul>
01/19 - 12/19	<b>Research Assistant: Autonomous In-Space Assembly using Arm Augmented CubeSATS</b> ASU and NASA-JPL <ul style="list-style-type: none"><li>Implemented an optimized monocular vision-based tracking algorithm for object detection and tracking.</li><li>Demonstrated a successful real-world assembly task using the developed robotic system.</li></ul>
07/18 - 12/18	<b>Research Assistant: Realtime robotic inventory system for intelligent planograms in retail</b> ASU and Intel <ul style="list-style-type: none"><li>Developed a software stack enabling seamless communication between the custom-made robotic arm and the Jackal mobile robotic platform.</li><li>Refined the 2D mapping algorithm (gmapping) to enhance the localization accuracy of the mobile base.</li></ul>
07/17 - 06/18	<b>Teaching Assistant: Circuits I and Circuits II</b> ASU <ul style="list-style-type: none"><li>Delivered lectures on key topics including operational amplifiers (Op-Amps), PN junction diodes and metal-oxide-semiconductor field-effect transistors (MOSFETs).</li><li>Employed LTspice as a teaching tool to introduce students to circuit design and simulation techniques.</li></ul>

## PUBLICATIONS

### JOURNALS

J1. Learning Modular Language-Conditioned Robot Policies through Attention, *Autonomous Robots Journal*, 2023  
Y. Zhou, **S. Sonawani**, M Phielipp, et al.

## CONFERENCE PAPERS

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- C10. SiSCo: Signal Synthesis for Effective Human-Robot Communication via Large Language Models, *IROS, 2024 (Submitted)*  
**S. Sonawani**, F. Weigend and H. B. Amor
- C9. Diff-Control: A Stateful Diffusion-based Policy for Imitation Learning, *IROS, 2024 (Submitted)*  
X. Liu, Y. Zhou, F. Weigend, **S. Sonawani**, et al.
- C8. iRoCo: Intuitive Robot Control from Anywhere using a Smartwatch, *ICRA, 2024*  
F. Weigend, X. Liu, **S. Sonawani**, et al.
- C7. Open X-Embodiment: Robotic Learning Datasets and RT-X Models, *ICRA, 2024*  
Open X-Embodiment Collaboration, Quan Vuong, ..., **S. Sonawani**, et al.
- C6. Projecting Robot Intentions Through Visual Cues: Static vs. Dynamic Signaling, *IROS, 2023*  
**S. Sonawani**, Y. Zhou and H. B. Amor
- C5. Anytime, Anywhere: Human Arm Pose from Smartwatch Data for Ubiquitous Robot Control and Teleoperation, *IROS, 2023*  
F. Weigend, **S. Sonawani**, M. Drolet, H. B. Amor  
**(Best Robocup Paper Award Finalist)**
- C4. Modularity through Attention: Efficient Training and Transfer of Language-Conditioned Policies for Robot Manipulation, *CoRL, 2022*  
Y. Zhou, **S. Sonawani**, et al.
- C3. Assistive Relative Pose Estimation for On-orbit Assembly using Convolutional Neural Networks, *AIAA, 2020*  
**S. Sonawani**, R. Alimo, R. Detry, et al.
- C2. Modeling, Design, and Control of Low-cost Differential-drive Robotic Ground Vehicles: Part I—Single Vehicle Study, *CCTA, 2017*  
A. Rodriguez, K. Puttannaiah, ..., **S. Sonawani**, et al.
- C1. Modeling, Design, and Control of Low-cost Differential-drive Robotic Ground Vehicles: Part II—Multiple Vehicle Study, *CCTA, 2017*  
A. Rodriguez, K. Puttannaiah, ..., **S. Sonawani**, et al.

## WORKSHOP PAPERS

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- W6. IMMRSY: Immersive Mixed Reality System for Bidirectional Human Robot Interaction, *IROS 2023, XR-ROB Workshop*  
**S. Sonawani**, Y. Zhou and H. B. Amor
- W5. Comparing Static and Dynamic Signals for Effective Human-Robot Collaboration, *IROS 2023, XR-ROB Workshop (Best Poster Award)*  
**S. Sonawani**, Y. Zhou and H. B. Amor
- W4. Imitation Learning based Auto-Correction of Extrinsic Parameters for A Mixed-Reality Setup, *IROS 2022, XR-ROB Workshop*  
**S. Sonawani**, Y. Zhou and H. B. Amor
- W3. When and Where Are You Going? A Mixed-Reality Framework for Human Robot Collaboration, *VAM-HRI 2022*  
**S. Sonawani** and H. B. Amor
- W2. Multimodal Data Fusion for Power-On-and-Go Robotic Systems in Retail, *RSS 2020, Power On and Go Workshop*  
**S. Sonawani**, K. Maneparambil and H. B. Amor
- W1. Robotic In-Space Assembly with Arm-Augmented Cubesats, *ICRA 2020, Opportunities and Challenges in Space Robotics Workshop (Best Poster Award)*  
**S. Sonawani**, S. Kailas, R. Detry, et al.

## ACADEMIC SERVICES

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- Reviewer for ICRA 2024 Workshop Proposal
- Reviewer for IROS 2022 Conference Paper
- Student Organizer for ICRA 2021 workshop on Curiosity in Robots

## AWARDS AND HONORS

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- Best Robocup Paper Award Finalist at IROS 2023
- Best Poster Award at IROS 2023, 2<sup>nd</sup> workshop on Horizon of An Extended Robotics Reality (\$500)
- Best Poster Award at ICRA 2020, Workshop on Opportunities and Challenges in Space Robotics (\$100)
- Keen Research Grant (\$3500)