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# Responsible Outcomes and Operational Tools for Sustainability in HRI (ROOTS-HRI)

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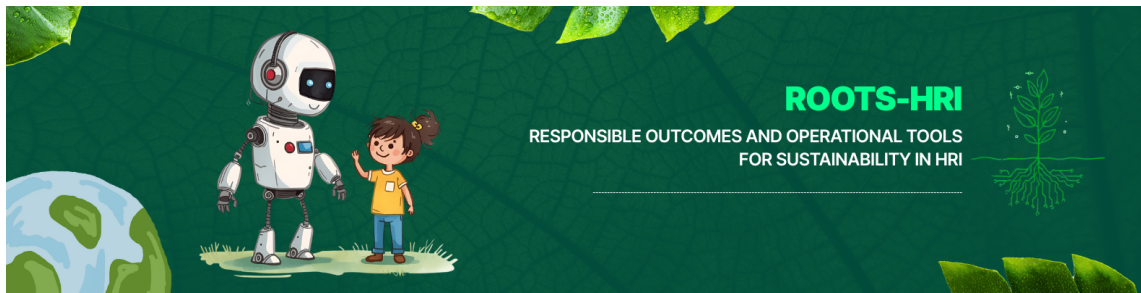


Figure 1: ROOTS-HRI at HRI 2026. Workshop website [here](#).

## Abstract

**From Concepts to Action:** Building on the foundational work of our 2025 workshop, this second edition shifts from exploring what sustainability means in HRI to producing actionable outcomes for the community. Last year, we identified strong but often unacknowledged engagement with social and environmental sustainability, alongside gaps in shared language and practical frameworks. This year, we focus on concrete deliverables: guidelines for comprehensively integrating sustainability in HRI research. The morning features external speakers who integrate sustainable development in their research, and whole room discussions. The afternoon centers on collaborative development of guidelines and standards that

researchers could adopt. We welcome HRI researchers at any career stage interested in operationalizing sustainability – whether through addressing the carbon footprint of computational models, ensuring equitable access to robotic technologies, or embedding SDG principles into research practices. Outcomes will include practical tools for sustainable HRI research and a roadmap for continued community action beyond the workshop.

## CCS Concepts

• **Human-centered computing** → **Human computer interaction (HCI); HCI design and evaluation methods; Systems and tools for interaction design.**

## Keywords

sustainability; SGDs; human-robot interaction; tools

## ACM Reference Format:

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## 1 Introduction

Sustainability is emerging as a critical concern for the HRI community, yet its practical integration into research practices remains fragmented. At HRI 2025, our first “Sustainability-4-HRI, HRI-4-Sustainability” workshop [5] brought together researchers to explore what sustainability means in the context of human-robot interaction. Through a pre-workshop survey of 38 HRI researchers and participatory speculative futures activities, we identified *significant but often unacknowledged* engagement with social and environmental dimensions of sustainability. The workshop revealed six key themes in how HRI researchers conceptualize sustainability:

- Interconnected responsibilities (linking environmental, social, and economic aspects)
- Environmental impact and resource use
- Social sustainability and community impact
- Sustainability of HRI research practices
- Purpose-driven design over novelty
- Avoiding known harms from other AI domains

These findings were further explored in a special session on Social Robotics and Sustainability at the International Conference on Social Robotics 2025 [1, 4], demonstrating growing momentum around these issues across the robotics community.

However, the workshop also exposed critical gaps, for example, little focus or understanding of sustainability in its economic sphere. While researchers demonstrated concern for sustainable development, they lacked shared frameworks and practical tools to operationalize these concerns in their work. The rapid proliferation of generative AI in HRI systems has intensified the urgency of these questions, with computational models carrying substantial environmental costs that often go unexamined [2, 3].

This second edition responds to these findings by shifting from conceptual exploration to practical action. Rather than asking “what does sustainability mean in HRI?”, we now ask “*how do we integrate sustainability principles into our research design, development, and deployment processes?*” The workshop aims to produce concrete deliverables that HRI researchers can immediately apply: guidelines for assessing and reducing environmental impacts, frameworks for responsible use of generative AI that balance capability with ecological cost, and tools for embedding UN Sustainable Development Goals [6] (SDGs) into research practice.

We structure this workshop to build directly on last year’s foundation while advancing toward actionable outcomes. The morning session will synthesize progress and feature external speakers who have successfully integrated sustainable development principles into their research. The afternoon session will engage participants in collaborative development of practical guidelines and standards. Our goal is not merely to continue the conversation about sustainability in HRI, but to equip the community with concrete tools for sustainable research practice.

## 2 Tentative Program

We propose a full-day workshop, featuring knowledge exchange and hands-on activities. Tentative schedule:

- 9:00-9:30. Meet and greet, summary of last year’s progress and introduction to SGDs
- 09:30-10:30. Flash talks from invited speakers
- 10:30-11:00. Panel and Q&A with speakers
- 11:00-11:30. Coffee break
- 11:30-12:30. Whole room discussion
- 12:30-13:30. Lunch break
- 13:30-15:30. Deliverable write-up (thematic groups)
- 15:30-16:00. Coffee break
- 16:00-16:30. Whole room discussion
- 16:30-17:00. Wrap up and future work

### 2.1 Invited Speakers’ Profiles

To provide diverse perspectives on sustainability in HRI, we will invite four speakers for 15-minute flash talks. In line with our commitment to fostering local expertise and reducing travel-related carbon footprints, we will prioritize UK-based speakers for these roles. The speaker profiles will cover the following key areas:

- (1) **Social Justice and Farming.** *Confirmed Speaker: Dr. Sebastian Prost, City St George’s, University of London.*
- (2) **Digital Informatics and Design Interventions.** *Confirmed Speaker: Dr. Susan Lechelt, University of Edinburgh.*
- (3) **Clinical Epidemiology and Oral Health.** *Confirmed Speaker: Prof. Mona Nasser, University of Plymouth.*

### 2.2 Before the Workshop

We will promote the workshop through our established HRI networks and mailing lists (e.g., LinkedIn, SIGCHI, RAS communities, robotics-worldwide) as well as networks focused on sustainability (e.g., Climate Robotics Network, Climate Salad). Building on the momentum of the first workshop, we will highlight the ongoing nature of this series to encourage both new and returning participants. Before the event, we will clearly communicate what attendees can expect from the workshop, share resources and explain the anticipated outcomes (see below) so participants can decide the extent and focus of their engagement. We will be transparent about any paper authorship opportunities and ensure ethical usage of ideas and solutions that may emerge during collaborative activities.

### 2.3 During the workshop

Participants will be introduced to the SDG framework and findings from last year’s workshop [5] and special session [4]. After a discussion panel with invited speakers, we will engage on a whole room discussion about the expected deliverables, wherein attendees can share ideas on all the expected deliverables before splitting into groups, in the afternoon, for hands-on development. We will resume whole room discussions to decide on the next steps and desired future work.

### 3 Expected Outcomes

This workshop is designed to produce tangible, immediately applicable resources for the HRI community. We anticipate the following concrete outcomes:

- **Sustainability Integration Guidelines:** Specific guidelines for incorporating sustainability considerations into HRI research design, from initial conception through deployment. This will include checklists for evaluating environmental, social, and economic impacts at each research stage.
- **Generative AI Responsible Use Framework:** A practical framework addressing the environmental costs of large language models and generative AI in HRI systems, including criteria for when to use computationally intensive models versus lighter alternatives, and best practices for model selection and responsible, ethical use.
- **Sustainability Statement Template:** A standardized format for sustainability statements to accompany HRI publications, similar to existing ethics or funding disclosure statements. This template will prompt researchers to reflect on and document the sustainability implications of their work.
- **(tentative) SDG Mapping Tool:** A resource helping HRI researchers identify which UN Sustainable Development Goals their work addresses, both positively and potentially negatively, enabling more intentional alignment with global sustainability objectives.
- **(tentative) Community Resource Repository:** A curated collection of references and tools demonstrating sustainable practices in HRI research, hosted on a publicly accessible website that will continue to grow beyond the workshop.
- **(tentative) Workshop Proceedings Paper:** A comprehensive paper documenting the workshop activities, synthesizing outcomes, and reporting on progress. Participants will be invited to contribute as co-authors.

All outcomes will be made freely available to the HRI community through open-access channels, with the goal of lowering barriers to sustainable research practice and fostering continued community engagement beyond the workshop itself.

### 4 Organizers

- **Maria Teresa Parreira** is a PhD candidate in HRI at Cornell University, studying social competence in interaction ruptures for artificial agents. She is the Sustainability co-chair for HRI 2026, a European Climate Pact Ambassador and the Technology Focal Point for the Major Group of Children and Youth, a UN-mandated stakeholder.
- **Ilaria Torre** is an assistant professor in Human-Robot Interaction at Chalmers University of Technology. Her research broadly covers verbal and nonverbal communication for HRI, and she is interested in developing HRI-specific sustainable research practices. She has served as local co-chair for HRI 2023, sustainability co-chair for HRI 2025, and program co-chair for HRI 2026.
- **Sarah Schömb**s is a PhD student at the University of Melbourne, researching human-centred risk communication in Human-Robot Interaction and works as a research assistant on integrating sustainability into the IT Masters program.

She was a sustainability co-chair for HRI 2025 and a Wattle Fellow at the University of Melbourne.

- **Erik Lagerstedt** is a postdoctoral researcher at the University of Gothenburg, Sweden. He is particularly interested in the mundane situations and aspects of interaction with robots, including consequences of robot design and deployment in terms of ethics and sustainability.
- **Laetitia Tanqueray** is a PhD Candidate at Lund University, Sweden. Her research focuses on informal caregivers and HRI in the domestic setting from a social scientific lens collaborating with engineers. She is also Board Member of The Research Institute for Sustainable AI, in Sweden.
- **Karla Bransky** is a PhD candidate at the Australian National University, researching identity and embodiment in HRI. She is interested in advancing inclusive, socially responsible, and environmentally sustainable approaches to the design of emerging technologies.
- **Carolin Straßmann** is a professor at the University of Applied Sciences Ruhr West. Her research focuses on the design and impact of virtual agents and social robots. In her current projects, she explores the use of social robots in public services and in fields that support the circular economy and foster circular citizenship.
- **Benjamin Lebrun** is a PhD candidate in Psychology at the University of Canterbury, New Zealand. His research explores how people perceive robots that deviate from social norms, examining the social and cognitive mechanisms that lead to the perception of ulterior motives. He was the Student Volunteer Chair at HRI 2024 and 2025.
- **Samantha Stedtler** is a PhD candidate in Cognitive Science at Lund University (Sweden). Her research investigates expectations, norms and temporal dynamics in human–robot interaction. She is also interested in critical theory and AI ethics, with a current focus on how robots reshape working environments and affect human labor.

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