Moral Agents for Sustainable Transitions: Ethics, Politics, Design

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ABSTRACT

Artificial moral agents – systems that engage in explicit moral reasoning on their own and with users – present a potential new paradigm for behavior and system change for social and environmental sustainability. Moral agents could replace current individualist, prescriptive, inflexible, and opaque interventions with systems that transparently state their values and then openly deliberate and contest these with users, or agents that represent human and non-human stakeholders such as future generations, species, or ecosystems. Indeed, moral agents could mark a genuine new form of more-than-human interactions and human-technology relation, where we relate to artificial systems as a counterpart. To jointly articulate key questions and possible futures around moral agents, this workshop convenes HCI, AI, behaviour change, and critical and speculative design researchers and practitioners.

CCS CONCEPTS

• **Human-centered computing** → **Collaborative interaction**; HCI theory, concepts and models; • **Computing methodologies** → *Artificial intelligence*; • **Social and professional topics** → *Sustainability*.

KEYWORDS

artificial moral agents, behaviour change, more-than-human, sustainable HCI

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1 BACKGROUND

Sustainable Interaction Design (SID [2]) or Sustainable HCI (SHCI [3, 19]) have become major thrusts in HCI. Maybe the main traditional sustainable transition pathway pursued in SHCI is behavior change – variously framed and pursued as persuasive technology [14], nudging [38], design with intent [31], design for behaviour change [35], pleasurable troublemakers [22], or gamification [17]. Following Fogg's early functional triad model [14], these interventions have in the main taken the form of either inert *tools and environments* affording and constraining action, or representational *media* conveying information and experiences.[1]

With the rapid commoditization and adoption of artificial intelligence (AI), we see behaviour change interventions potentially extending into Fogg's third vertex of *social actors*. While Fogg chiefly envisaged this as computers using social cues, current AI technologies allow for more full-fledged social actors or *moral agents* that can (1) actively deliberate and take choices and actions based on their own explicit inscribed values, (2) engage human others in

[1] Of course, *all* designed systems influence people's actions and are inscribed with (implicit or explicit) values. It is the *explicit design intent* to change behaviour that sets these approaches apart within HCI.

moral dialogue about their behavior, and (3) make active moral demands on human others on their own behalf or that of others. Such *artificial moral agents*, "artificial systems displaying varying degrees of moral reasoning" [34], are beginning to studied in HCI [41], and to move from fundamental work to real-life applications.

In engineering and philosophy, artificial moral agents have been chiefly discussed in terms of, e.g., normative conditions under which one may ascribe moral agency and responsibility to an autonomous system, the kinds of ethical frameworks embedded, or the necessity, benefit, or practicality of embedding moral calculi in autonomous systems [7, 15, 16, 34]. Yet for SHCI, and HCI more broadly, they present a potential new paradigm with rich new questions: When and why do humans attribute moral agency and worth to interactive systems? How do these attributions affect how we interact with such systems, and how do we design for that? What is 'second-order' ethical and just design: designing AI systems that themselves take ethical stances? In light of the climate crisis and polarization around it, we cannot afford *not* to inscribe pro-sustainable ends into our systems, and we cannot avoid that this will be in opposition to *some* user and stakeholder groups. Here, moral agents could advance ethical and political SHCI debates around individual autonomy versus collective goods and values in design. They could move us from the thesis of technology bluntly prescribing designer values and the antithesis of value-*sensitive* design re-presenting stakeholder values to a synthesis of values-*driven* artifacts taking a stance – that is then open to deliberation with users.

In this, moral agents could also address important critiques of traditional behaviour change SHCI, and answer to calls for more participatory, community-based, and deliberative approaches that facilitate collective and political action within complex systems [3, 4, 24]. Stepping beyond 'stealthy' and/or inflexibly prescriptive behavior change, moral agents could make the values inscribed in them transparent – literally explaining what they want and why – and open these values up to situational negotiation and contestation. More gently, moral agents could prompt and support people in reflecting on their values and goals and thus rethink their actions. Moral agents could also partake in community deliberation as representatives of other, non-present human or non-human stakeholders that don't easily figure in democratic and participatory processes. They could give a material, autonomous, and morally reasoning voice, face, and agency to devices (a form of materialized speculative metaphysics or carpentry [36]), but also future generations, species, ecosystems, or even Gaia, thus answering to calls for post-Anthropocentric, more-than-human politics, ethics, and design [8, 10, 18, 29].

More than that, following recent post-phenomenological analyses [39, 40], moral agents could mark a different kind of human-technology relation or way of materialising morality, where technology relates to us as a second-person *You* or counterpart [21, 28] – a moral agent with its own values, intentions, agency, and potentially even moral worth. Imagine the difference – in experience, moral deliberations, action – between dealing with an inert key holder making it more effortful to take the car rather than bike (tool), a smart watch interface displaying how much extra CO2 your transport choice will produce (medium) – and your car or an AI spokesperson of the pedestrians exposed to traffic exhaust debating with you about how wrong they think it is to drive on such a nice day out (moral agent).

Thus, moral agents for sustainable HCI bring together current HCI discourses around human-AI interaction design, critical computing, behaviour and system change, more-than-human design, and design ethics and politics with recent philosophical debates about technological mediation, AI ethics, and artificial moral agents. They open at least three important threads of HCI research:

(1) **Social-psychological mechanisms**: Understanding how people interact with moral agents, when and why they ascribe moral status and agency to systems, and how moral agents can further sustainable transitions, building on affective computing, HRI, and socially interactive agents [33]
(2) **Design**: How to design acceptable, effective, responsible systems that people attribute moral agency to
(3) **Ethics and politics**: How to ethically move from value-sensitive to value-driven design, and from interactive systems as passive embodiments or mediators of human moral agency and values to systems as independent moral agents or moral representatives of other actors

1.1 Workshop Goals

To initiate a research community that can answer these questions and explore moral agents a new design material and SHCI approach, we propose a hybrid, one-day CHI workshop inviting HCI and AI researchers and practitioners across human-AI interaction, behaviour change and transition design, speculative and critical design, and design ethics and politics communities to:

- articulate important issues and open questions around moral agents in HCI and Sustainable HCI
- gather existing philosophical, theoretical, and empirical approaches and evidence relevant to moral agent interaction, design, and ethics
- collect a library of existing moral agent applications and creative works to ground future work
- create a community of researchers and practitioners around moral agents for SHCI

2 ORGANIZERS

Our organizing committee combines expertise in speculative and critical design, sustainable HCI and behaviour change across academia and practice, more-than-human interaction, and human-AI collaboration. All organizers have a rich network and experience in running CHI and similar workshops.

Matthias Laschke heads a research group on interaction design for transformation and sustainability at the University of Siegen. His work on behavior change using counterpart technologies within the Sustainable HCI community has been presented at CHI [27]. He led a workshop on counterpart technologies at NordiCHI 2020 [28].

Sebastian Deterding is Professor of Design Engineering at Imperial College London. In addition to his extensive work on gamification for behaviour change [11], his recent work explores new scripts and patterns for human-AI collaboration [12], and play with non-human species. He has led or co-led 6 CHI workshops.

Amy Bucher is Chief Behavioral Officer at Lirio, a company that uses artificial intelligence and behavioral science to personalize communications about health behaviors. She is the author of the book *Engaged: Designing for Behavior Change* [5] and has spent her career designing digital interventions to support improved health and well-being.

Paul Coulton is the Chair of Speculative and Game Design in the School of Design at Lancaster University. He practices a research through design approach to create more-than-human experiential futures that combine real and fictional artefacts based on emerging technologies in future worlds where the technology has become mundane [9]. He is currently working on EPSRC funded project Experiencing the Future Mundane and Fixing the Future.

Marc Hassenzahl is professor for Ubiquitous Design/Experience & Interaction at the University of Siegen. He combines his training in psychology with a passion for interaction design. With his group of designers and psychologists, he explores the theory and practice of designing pleasurable [22], meaningful and transforming interactive technologies [20].

Lenneke Kuijer is Assistant Professor in the Department of Industrial Design at Eindhoven University of Technology. She translates sociological knowledge on the longer term, unintended effects of technology on everyday life into design methodologies that anticipate and shape these effects towards sustainability [25]. She has led many workshops on designing alternative practices through role-play [26].

Carine Lallemand is an Assistant Professor in the Industrial Design Department at the Eindhoven University of Technology and the University of Luxembourg. Her research focuses on user experience design and evaluation methods, as well as designerly ways to trigger behavior change for healthier lifestyles [37]. Her recent work investigates how people negotiate with moral agents in the context of exercising motivation and office vitality [6].

Dan Lockton is Assistant Professor at Eindhoven University of Technology and runs the Imaginaries Lab, a design research platform creating tools to support people's imagining—new ways to understand, and new ways to live—for more sustainable and equitable futures in an age of crises [30]. He is creator of the Design with Intent and New Metaphors toolkits [32].

Geke Ludden is Professor of Interaction Design at the University of Twente. She is co-editor of the book *Design for Behaviour Change* [35], and recently co-edited a research topic on Responsible Digital Health for *Frontiers in Digital Health*. She studies how the design of products and services influences people's behaviour and motivation.

3 WEBSITE AND PRE-WORKSHOP PLANS

By mid-December 2022, we will launch the website `moralagents.org` with workshop topic and structure, organizers, call for participation (CFP), and instructions for submissions. Given the early and speculative topic area, we invite potential attendees to submit one of two things: either a short position paper outlining one challenge, opportunity, or perspective on moral agents in (Sustainable) HCI, or a relevant annotated creative artifact such as an existing or speculative design (in images or video). To facilitate organization, participants should indicate at the time of submission whether they wish to participate online or onsite. We will share the CFP via SIGCHI and other relevant mailing lists as well as social media, the organizers' institutes, and direct e-mail to other colleagues. To reach potential practitioners, we will also share it on relevant LinkedIn pages.

The organizing committee will review submissions and select up to a maximum of 55 participants – up to 25 onsite and 30 online. Selection criteria are (a) variety of topics and perspectives, (b) quality, (c) expected enhancement to the workshop, and (d) contribution to the HCI community. Accepted participants will be asked to post their submissions (with a chance for revisions based on review feedback) to the workshop website, familiarize themselves with all accepted contributions, and register for the workshop. In preparation for the workshop, all accepted participants will be tasked to (a) provide case studies of moral agents that go into a public online library at `moralagents.org` and (b) reflect on an opportunity of sustainability moral agents in an everyday situation. The participants should record the situations arising from their reflections as short videos, which will be accessible to participants in advance of the workshop.

4 HYBRID FORMAT AND ASYNCHRONOUS ENGAGEMENT

Based on the success of this format in a previous CHI workshop [1], we will conduct a hybrid split workshop, with cross-cutting asynchronous interaction, a synchronous fully onsite session and one or more fully separate synchronous online sessions for those who don't attend onsite. All accepted attendees are invited to a single shared Discord server where they can access all preparatory and recorded materials of all sessions (onsite and online) and communicate with all attendees before and after sessions. All workshop notes will be taken in a single Miro board across sessions, and video vignettes of Experience Utopias (see below) shared with all participants, provided consent.

We will run a one day, 7.5-hour (5.5 working hours) onsite session in Hamburg, which we limit to 25 participants to allow for meaningful group work and interaction. The number and timing of online sessions will depend on the number of online participants and their time zones; they will be held via Zoom and Miro in early May and last no longer than 5 hours (3.8 working hours) each. We will offer up to three online sessions to fit different time zones (North America, Europe, and Asia Pacific), with at least two organizers at each session. To offer a session in a given time zone, we set a minimum of 5 and maximum of 10 participants registered for that time zone. If a time zone session doesn't reach critical mass, we will ask participants to switch to the most convenient alternative session. If a time zone is over-subscribed, we will split it into two back-to-back sessions. Online and onsite sessions do not differ in aims or structure. The main difference is that we shorten synchronous online sessions to reduce Zoom fatigue by (a) offloading keynote speeches and similar into pre-recorded material to be consumed in advance, and by (b) reducing participant numbers per session.

Table 1: Workshop Structure

Activity	Time (On-site)	Time (On-line)	Description
Introduction	15	15	Organisers welcome and walk through workshop setup
Lightning round	50	20	Each participant gives a 2-minute presentation introducing themselves and summarising their position piece
Keynote 1	15	-	Pre-recorded impulse lecture by Marc Hassenzahl
Keynote 1 Q&A	15	-	Participants can pose questions about the keynote and their position pieces to Marc Hassenzahl
Coffee	20	-	Break time
Experiencing Utopia I	45	45	Participants envision, role-play and enquire future moral agent interactions
Keynote 2 / break	15	15	Pre-recorded impulse lecture by Peter-Paul Verbeek / break for onsite
Experiencing Utopia II	45	45	Participants envision, role-play and enquire future moral agent interactions
Lunch	90	45	Break time
Plenum	30	15	Groups present back select scenes to whole session
Mini-barcamp I	45	40	Small groups work out a chosen topic, recorded on Miro
Coffee	15	15	Break time
Mini-barcamp II	30	30	Small groups work out a chosen topic, recorded on Miro
Wrap-up	20	20	Groups present their fleshed out themes, organisers collect feedback and guide next steps

5 WORKSHOP STRUCTURE

Table 1 outlines the planned structure for the workshop. An initial **lightning round** gives each participant 2 minutes to present their position piece or artifact in any way they choose. Two pre-recorded 15-minute **keynotes** intersperse the workshop to help frame and contextualize the topic:

- **Peter-Paul Verbeek**, one of the foremost contemporary technology ethicists, will discuss moral agents as a new form of human-technology relation from the perspective of his theory of technological mediation [39, 40].
- **Marc Hassenzahl** (confirmed), a leading HCI researcher on user experience and wellbeing-driven design, will frame moral agents in the context of his current work on value-driven design, coexisting with robots, and "otherware" – people treating artificial agents as counterparts [21, 23].

Hassenzahl is confirmed to attend in person and do a live Q and A accessible to both online and onsite audiences. As we want to explore desirable futures and emergent issues of moral agents, the workshop backbone is formed by a modified **"Experiencing Utopia" design fiction** format, blending service staging or role-play with anticipatory ethnography [13]. In groups of 4-5 each, participants will be prompted to (1) *imagine utopias with moral agents* for ecological and social sustainability (incl. health, equity, etc.), free-listing and then prioritizing desirable outcomes. Participants then (2) *call moral agents into being with contextualized enactments*, role-playing a concrete everyday encounter that realizes a chosen idea, with one participant playing the moral agent and the other(s) human and/or other interactants. Positive and negative scenarios of the same idea, with different forms of moral agents as prompts, are played through. Finally, participants (3) *evaluate and reflect* on the enactments, interviewing participants on their in-role experiences and impressions, as well as analyzing and recording emergent issues, constraints, and insights. With participant consent, we will video-record both role-play and follow-up interviewing (with on-site cameras or online via Zoom) and share these as video vignettes among all participants. Groups then reconvene to restage select scenes including commentary to the **plenum**, where organizers will record emerging themes and patterns on a single Miro board. Participants are then invited to propose and subsequently self-select into topical breakout groups for two consecutive 30 minute slots in the form of a **mini-barcamp**, where topics can but need not be starting points of future chapter ideas. As a **wrap-up**, each breakout group gives another 2-minute lightning presentation of their results, and organizers will talk through the post-workshop plans.

6 POST-WORKSHOP PLANS

Participants can continue to engage with each other and all workshop materials and recordings on Discord. Based on the generated

topics, ideas and perspectives, the organizers will develop a piece for *ACM interactions*, turning video vignettes into sketched storyboards as illustrations, and populate the lasting online library of real and speculative exemplars at `moralagents.org`, which will form the backdrop to other outputs. We will also turn the workshop outcomes into an edited book proposal with Open Humanities Press, a diamond open access publisher with respected book series on critical climate change or new metaphysics. Participants will be invited to contribute (co-authored) chapters based on their submissions, and we will open the book to further co-authors depending on workshop outcomes.

7 CALL FOR PARTICIPATION: MORAL AGENTS FOR SUSTAINABLE TRANSITIONS: ETHICS, POLITICS, DESIGN

What if our devices start talking back at us, taking a stance? As contemporary AI techniques commoditize, artificial moral agents – systems that engage in explicit moral reasoning on their own and with users – are moving into real-world applications. One particularly promising application is behavior change for sustainable and healthy transitions: moral agents could replace current individualist, prescriptive, inflexible, and opaque interventions with systems that transparently state their values and then open these to situated deliberation and contestation with users, or agents that represent human and non-human stakeholders such as future generations, species, or ecosystems in public and participatory processes. Thus, moral agents could mark an important new form of more-than-human, post-Anthropocentric interactions and a different kind of human-technology relation, where we relate to artificial systems as a second-person counterpart or You.

Interested researchers should submit either a short (up to 1,500 words excluding references) position piece presenting an issue, opportunity, or perspective around moral agents, or an annotated creative artefact (speculative or realized). Accepted participants can join either a remote 5-hour session in May 2023, or an in-person one-day session in Hamburg. Please note that all participants must register for both the workshop at and least one day of the CHI 2023 conference.

Important information

- **Website and submission instructions**: moralagents.org
- **Submissions due**: February 23, 2023 (AOE)
- **Notification of acceptance**: March 1, 2023

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