

# Imagining Sustainable Futures: Expanding the Discussion on Sustainable HCI

## Authors' names & affiliations

<b>Eleonora Mencarini,</b>	<b>Christina Bremer,</b>	<b>Chiara Leonardi,</b>	<b>Jen Liu,</b>	<b>Valentina Nisi,</b>	<b>Nuno J. Nunes,</b>	<b>Robert Soden,</b>
Fondazione Bruno Kessler	Lancaster University	Fondazione Bruno Kessler	Cornell University	ITI/LARSyS, Instituto Superior Técnico, U. Lisbon	ITI/LARSyS, Instituto Superior Técnico, U. Lisbon	University of Toronto

## Introduction

In light of biodiversity loss, ocean acidification, droughts, floods, and threats to humans' and non-humans' health, life, and activities, for the last fifteen years, HCI researchers have been reflecting on the role their work can play in reducing the impact of climate change. Recently, the discourse in the discipline has expanded further and opened to policy design, incorporating the value of biodiversity, involving non-human actors, and engaging citizens through effective communication to pave the way for action.

During CHI 2023, we organised a workshop on “HCI for Climate Change: Imagining Sustainable Futures” [4] to map the various perspectives from which the CHI community currently addresses the problem of climate change. By bringing together these different perspectives, our intent was to find contact points among them and create synergies to imagine sustainable futures together.

The workshop was met with great interest, highlighting the need for discussion spaces on climate change in the CHI community. We received 46 submissions (of which 40 were accepted) and welcomed 53 participants (16 online and 37 in presence in Hamburg, Germany). Participants were primarily researchers working on data and science communication, more-than-human entanglements, behaviour change, and policy design. We created six discussion groups, each one addressing a theme that emerged from the participants' submissions: “From behaviour change to collective actions”, “Data-based speculative methods”, “Interacting with Climate data”, “Collaborations towards sustainable HCI”, “From awareness to climate activism”, and “More-than-human for citizen engagement”. A final plenary session examined concerns and linked similar positions.

Now, several months after the workshop, we have reflected on the event and our notes and come to realise that, despite the different foci within the six discussion groups, some issues recurred across the groups, signalling how crucial the community perceives them to be. Here, we articulate the recurring topics that have emerged from the discussions in the form of tensions and outline possible research directions and propositions for the HCI community to tackle them.

## Individual Change versus Collective Action

Since human activity primarily contributes to the rise of the world's temperature, mitigating or adapting to climate change requires rethinking human activity both in terms of production processes and people's

habits, behaviours, and lifestyles. HCI has been working on this topic for about 15 years, and its approach has evolved over time [3]. Initially, the research focused on encouraging individuals to change their high-carbon footprint behaviours, such as energy consumption or mobility habits, using persuasive technologies that generated awareness of the positive impact or the economic savings achieved with the new behaviours. With this approach, motivation to change was triggered through extrinsic devices such as peer pressure, competition, and rewards.

Conversely, the workshop revealed the need to re-frame individual actions in the broader perspective of collective change, where citizens feel part of a community with shared values and resources, such as air and water quality, and the future as well. Convincing individuals to act for something that does not bring immediate personal benefit may require a cultural shift, i.e., a shift away from the concepts of persuasion, personhood, and property to a perspective where resources are regarded as common goods to be collectively nurtured. According to this view, communities should not be intended only as a network of human beings but also as entanglements with fellow non-human beings, thus requiring a systemic understanding of climate change.

Currently, two opposite societal actors are working to foster collective action against climate change. On the one hand, grassroots activist movements raise their voices to draw the attention of the masses to the effects and causes of climate change, the need to find a balance between human and non-human life, and fairness and environmental justice for vulnerable groups. On the other hand, policymakers have the power to enable collective action in their communities based on decisions. In fact, climate action can have a broad impact and a lasting effect on people and the world only if supported by infrastructures, services, and incentives. For example, even if aware of the impact of traditional energy sources on the environment and the value of making an effort for the common good, using energy from renewable sources could be unaffordable for many. Still, it could be encouraged by public policies.

In light of this, rather than focusing on 'solutionist' digital tools, HCI researchers are called to work together with other disciplines [3] like climate science, sociology of grassroots movements, policy design, arts, etc., to contribute to a systemic perspective, frame the need for a collective endeavour, and trigger collective action.

## Humanised Data Against Denialism and Eco-anxiety

A crucial challenge for scientists is to communicate the complexity of climate change effectively to non-specialists. The climate change phenomenon is complex to disseminate because it has multiple causes and impacts at different geographical and temporal scales. The data describing it may appear abstract and detached from the local experiences, and the impacts over the coming years that the predictions try to trace are quite uncertain; the more they are far away in time, the more they become vague. Furthermore, there is not just one audience. In fact, there are multiple audiences, each with a different level of expertise on climate change and various possibilities for action. Policy and decision-makers need climate services, i.e., systems providing climate and climate-related information [5] based on actual local and global data to predict trends and make decisions for their territories. In contrast, citizens need primarily to understand the relationships between the weather-related anomalies they experience (such as heavy rainfalls, heatwaves, and droughts) and the global and slower phenomenon of climate change and what is in their power to contrast or adapt to it.

HCI could contribute to conveying knowledge about climate change to raise awareness and beyond, calling for action by exploiting its skillset to i) transform communication into experience, for example, by exploiting the potential of technology to create immersive environments through extended reality (XR); ii) translate

data into concepts that are understandable to the broader public through the development of visualisations, physicalisations, and sonification that relate events and places and help to understand the relationship between causes and effects; iii) humanise data, i.e., help bridge data with the local knowledge and lived experience of climate change, for example, through digital collaborative storytelling or citizen science campaigns that enable first-hand experiences of environmental issues.

Furthermore, those already open to engaging with the topic are willing to listen and learn more about climate change. But how can we reach climate change deniers or sceptics? It is essential not to fall into the error of making news sensational, which could cause several adverse effects, such as the polarisation of audiences or ecological anxiety. Making information more accessible and understandable for a broader audience while avoiding oversimplification that may strip away essential details and nuances is a prerequisite for effective communication. In this regard, transdisciplinary collaborations would strengthen the power of dissemination. For example, psychology could be used within a collective, social, and cultural change frame to create constructive and action-oriented paths forward. Rather than apocalyptic representations that may generate eco-anxiety and action paralysis, HCI could create more joyful and hopeful visions of the future, helping users understand what future they would like to live in. HCI researchers could also “prototype” these futures by simulating different scenarios and communicating the impact of, e.g., environmental policies.

## Centering the margins

Data have a rhetorical power; that is, the way they are collected bears a specific vision of reality and what is deemed relevant in describing a phenomenon and its solution. Therefore, besides making data digestible for different audiences, HCI could have a more significant impact earlier on, at the collection stage. To understand, frame, and predict climate change, data are often collected and reported globally, and not all perspectives are equally considered. Many living beings and entities who experience the effects of climate change first-hand have no say in the matter. This condition concerns specific human groups (such as low-income or indigenous citizens) and non-humans (the natural world). Reasons for this exclusion were explored in the workshop. They can be ascribed to a lack of shared language, different experiences (more-than-human entities often have different life spans than humans), and, most of all, the difference in power. Even if marginalised and natural communities are the most vulnerable to climate change, they are not recognised expertise on it and, thus, are excluded from the discussions and decision-making about it. Once again, environmental and social justice are intertwined [1].

To advocate for these groups, HCI strives to find new ways of engaging with those actors whose reasons typically are not at the heart of the general discussions. Besides ethical, the challenge is methodological. How do we bring marginalised stories to the table? How to give voice to non-humans? To get those at the margins under the focus of attention and empower them, HCI could join forces with post-humanist design and anthropology and engage with the following lines of research and practice: i) Fostering new solutions to less hierarchical relationships, including human and non-human, such as Indigenous Knowledge Systems (INKS), which are often significantly linked to the territory and other more-than-human elements of the land, by leveraging storytelling as a practice to give voice, listen, and share; ii) Speculations and fabulations, which may help imagine different alternative futures and chose the preferable ones; iii) Noticing and indexing [6]; iv) Familiarising the population and policymakers with the systemic perspective, including the more-than-human entities' needs. This could be done by collaborating with natural world scientists like biologists, ethologists, and ecologists who could help us, HCI researchers, interpret nature's language.

## Conclusions

The need for a shift in framing what HCI can do to tackle climate change emerged from the workshop. A change in people's lifestyle is needed, but rather than framing it as bringing individual benefits, it should be seen as a form of collective action for the common good. The motivation to change must be a vision of a shared and common future in which unity is strength rather than personal benefit. The collectivity must include indigenous groups and more-than-human beings, which are the most vulnerable.

The authors align with these efforts to untangle the tensions currently populating the HCI discourse on climate change and foster new solutions to less hierarchical relationships, including human and non-human. Thus, we advocate for a systemic perspective, which should be disseminated to citizens and policymakers, particularly outside academia, to act on individual behaviours channelled through policies into collective action. To achieve this, we are aware of the limited impact of negatively highlighting the effect of the Anthropocene-induced climate change crisis on our world without giving actionable insights and hope for change. Designers are acting towards new design philosophies and practices by thinking and designing more promising futures for humans and non-humans. Speculations, fabulations, noticing and indexing, and hope [2] are some explored avenues.

In our view, the key enabler for this direction is transdisciplinarity. The various disciplines investigating climate change focus only on certain aspects of it, thus fostering a silos approach rather than interdisciplinarity. Instead, HCI researchers are called to develop multidisciplinary competencies and work across discipline boundaries, which may be hard to achieve. Still, pursuing interdisciplinarity is not without challenges. During the workshop, we talked about what it means to be a research community, what it means to be a field, and how we can get more skilled in doing the kinds of boundary work that we need to do between what we consider to be our field and what we believe to be outside of our field. There are also different forms of knowledge. When do we want to invite people in? When do we need to make connections at the borders of various forms of knowledge? Is there a translation or other tools that can help with that? How can we become comfortable with questions about knowledge pluralism and different ways of knowing about a problem, which does not necessarily need to be synthesised into a single answer but can be multiple? It would be exciting to answer these questions together.

(2002 words)

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### Authors' bios (50 words max) and email addresses.

**Eleonora Mencarini** is an HCI researcher interested in understanding environmental relations and how to support awareness and action in communities affected by climate change. She is a researcher at Fondazione Bruno Kessler (Italy) and a Work Package leader in the European project NEVERMORE about adaptation and mitigation strategies against climate change. [mencarini@fbk.eu](mailto:mencarini@fbk.eu)

**Christina Bremer** is an HCI researcher; her latest research explores the factors that shape the energy-saving potential of behaviour change and energy efficiency technologies in buildings. She recently graduated with her PhD in Computer Science at Lancaster University (UK) and is a UX designer for a company that facilitates sustainable energy consumption. [c.bremer@lancaster.ac.uk](mailto:c.bremer@lancaster.ac.uk)

**Chiara Leonardi** is a social scientist who applies inclusive and participative methods to understand users' needs, values, and practices and envision novel digital solutions that address societal and environmental issues. She is a senior researcher at Fondazione Bruno Kessler (Italy). [cleonardi@fbk.eu](mailto:cleonardi@fbk.eu)

**Jen Liu** investigates the ecological, social, and political implications of computing technologies and infrastructures. Her current work is on the impact of climate change on networked infrastructures in the American South. She is a PhD student in Information Science at Cornell University (USA). [jenliu@infosci.cornell.edu](mailto:jenliu@infosci.cornell.edu)

**Valentina Nisi** is an artist and HCI researcher leveraging interactive Digital Storytelling, Gaming, and HCI to bring awareness and care to social and environmental issues. She is an Associate Professor at ITI LARSyS, IST, University of Lisbon (Portugal) and Adjunct Faculty at the HCI Institute Carnegie Mellon University (USA). [valentina.nisi@tecnico.ulisboa.pt](mailto:valentina.nisi@tecnico.ulisboa.pt)

**Nuno Jardim Nunes** strongly advocates digital as a scale technology for sustainability. He coordinates the Bauhaus of the Seas, a New European Bauhaus lighthouse project. He is a Técnico U. Lisbon (Portugal) professor, leading the Interactive Technologies Institute (ITI LARSyS) and the Carnegie Mellon International Partnership. [nunojnunes@tecnico.ulisboa.pt](mailto:nunojnunes@tecnico.ulisboa.pt)

**Robert Soden** is an HCI researcher focusing on improving information systems for understanding and responding to environmental issues, particularly disasters and climate change. He is an Assistant Professor in Computer Science at the University of Toronto (Canada) School of the Environment, where he co-leads the Toronto Climate Observatory. [soden@cs.toronto.edu](mailto:soden@cs.toronto.edu)