

This forum showcases emerging approaches, new ideas, and promising pathways that draw attention to the diverse, interdisciplinary, and impactful work of global scholars to advance dialogue in the field on how we can best contribute to climate action.— **Robert Soden, Vishal Sharma, Matthew Louis Mauriello, and Nicola J. Bidwell, Editors**

Climate for Change: New HCI Research for Climate Action

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Climate change is increasingly being recognized as one of the most critical crises of our time. Climate scientists from across the globe have repeatedly warned about the climate breakdown, leading to the declaration of a climate emergency in 2019. The message was clear: Without significant and immediate action to reduce emissions, ecosystems and vulnerable communities worldwide would face catastrophic and irreversible damage. With growing urgency, experts have called for significant changes to our ways of living, working, and structuring society. For example, the 2022 Intergovernmental Panel on Climate Change report emphasized the need to transition from a high-carbon, consumption-based, growth-oriented economy to an economy centered on collective well-being, justice, and equity. Along with colleagues in other research communities, human-computer interaction scholars are increasingly responding to the call, both through our research and how we organize ourselves as a community. With this issue of *Interactions*, we are launching a new forum to further discussion and debate in this arena.

While questions regarding HCI's contributions to sustainability are not new [1], we are currently witnessing a surge of interest in climate change from across many subareas of the field. This includes recent plenary panels and workshops at annual CHI conferences, a special issue of *IEEE Pervasive Computing* on sustainability [2], and a

growing focus on the impacts of climate-change-induced disruptions on the lives and livelihoods of underresourced and underserved communities around the world. Initiatives such as the SIGCHI Sustainability Committee and Computing Within Limits have emerged to nurture alliances between researchers across the broader HCI community interested in addressing climate change by leveraging the potential of computing technologies to support socially and ecologically sound futures. Meanwhile, design education programs that aim to develop competencies to better address interdependencies across social and environmental worlds have proliferated. This broad response is hopeful evidence of a wide range of relevant expertise and highlights the opportunity for our field to make an impact.

As an expansive and ferociously complex matter of concern, however, the challenges raised by climate change relate to and have the potential to unsettle nearly every area of HCI scholarship. As devices, data, and algorithms increasingly intervene in human relationships with the environment at all scales, the design decisions shaping these tools and the variety of settings in which they are implemented have risen sharply.

Insights

- There is a surge of interest in climate change across many areas of HCI.
- We launch this forum to highlight new HCI research into climate change understanding, mitigation, and adaptation.

This complexity has driven HCI researchers to develop new design methodologies and to critically reflect on the social, political, and economic systems that underpin technological development. For example, some HCI researchers have adopted a “more than human” approach to technology design, drawing inspiration from natural systems or finding new ways of highlighting the ecological relationship and entanglements between humans and nonhuman entities. In addition, as the impacts of climate change accelerate, they are being felt in different ways across nearly every facet of society, from biodiversity loss to forced migration to increasing resource scarcity. There is an incredible range of technical expertise, contextual understanding, disciplinary backgrounds, and methodological approaches that the entire HCI community can contribute to the fight against climate change.

Even given all the tools at our disposal, climate change remains a thorny problem. Notably, the contributions to and impacts of climate change are unevenly distributed. For example, in 2022, Pakistan experienced devastating climate-induced floods that disproportionately affected marginalized and disenfranchised communities, and resulted in approximately 1,700 deaths, 12,867 injuries, and the displacement of 8 million people. Similarly, in 2021, the U.S. Department of Agriculture reported that Black and Hispanic households faced significantly higher rates of climate-induced

food insecurity compared to white households. In example after example, those who have contributed the least to climate change are often among the most affected, leading to a gulf of responsibility that creates significant challenges for climate action.

Furthermore, while individual behavior and lifestyle changes may be part of the solution, it is now widely understood that more systemic and infrastructural changes are necessary to avoid the most catastrophic effects of climate change. These include transitioning to renewable energy sources globally, redesigning systems to prioritize low-carbon alternatives, implementing circular economy principles throughout all aspects of the supply chain, and developing technologies that support the transition to resilient and sustainable communities. HCI can support this agenda in various ways, from improving the tools that communicate climate and energy data in actionable forms to diverse user groups, to facilitating collaboration among activists and policymakers and combating the misinformation and political polarization that undermine climate crisis efforts.

Progress on climate action will require drawing on diverse forms of knowledge and practice, especially those of affected communities as well as Indigenous and other non-Western traditions [3]. A problem as systemic as climate change demands new ways of thinking that go beyond those that contributed to it. Such transformations are not easy. Recent HCI work has explored how issues such as competing epistemologies of art and science [4], lack of recognition of traditional and Indigenous knowledge [5], and racial and economic divides [6] can hinder collective progress toward sustainability goals. These findings illustrate the potential for HCI research to support communication, collaboration, and solidarity in collective action.

Finally, the climate crisis demands that we move beyond long-standing debates about the boundaries of HCI's research agendas and questions of overreach. Instead, we need to draw on our field's full range of knowledge and experience to support climate



action. Such recognition requires our field to reevaluate many of our assumptions about our research priorities and what we consider to be our impact. Core commitments to design values, such as efficiency and ease of use, will need to be brought into better balance with those that center environmental sustainability and justice. How might we also learn to prioritize research's social and environmental impact as much as its supposed novelty? For example,

there is a growing conversation in some corners of the HCI community about how our research can better support policymaking. It is difficult to imagine an area of policy that would be more effective than climate mitigation and adaptation.

This forum will highlight some of the best new HCI research into understanding, mitigating, and adapting to the intensifying climate emergency. We will use the space to showcase emerging approaches, new ideas, and promising pathways in scholarship, design, and practice. We will invite inspiring perspectives that have so far been underrepresented in mainstream HCI. And we will curate a collection of pieces that draw attention to the diverse, interdisciplinary, and groundbreaking work of scholars from around the world, each of whom brings their perspective and areas of expertise. In doing so, we aim to

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advance a more global discourse in the field on how we can best contribute to climate action.

Specifically, this forum will do the following:

- Feature research that leverages interdisciplinarity and intercultural efforts toward climate action
- Promote awareness of and efforts to mitigate the uneven impact of climate change on diverse communities globally
- Consider how infrastructures and platforms are designed, engineered, launched, and maintained, and how they contribute, both negatively and positively, to climate change
- Encourage contributions to policy and systemic change by showcasing case studies with the potential to reshape HCI design practices, systems, and interventions
- Highlight emerging approaches to the design of services and interfaces that translate and communicate climate information effectively.

We invite contributions from HCI scholars from diverse research areas, geographies, and identities that highlight recently published work or activities related to the above or similar topics. We are also open to jointly authored pieces that put multiple papers in conversation to consider a broader theme from several angles. Details on the submission process and formatting can be found on the magazine's website (<https://interactions.acm.org/submissions>).

If you have questions or would like to propose an article, please email Climate4Change@interactions.acm.org. The editors may consider featuring some proposals through other venues, such as the sustainable-sigchi@acm.org listserve or elsewhere.

ENDNOTES

1. Bendor, R., Nathan, L.P., Mauriello, M.L., and Bates, O. 'Everything in the forest is the forest': A decade of the sustainability in (inter)action forum. *Interactions* 28, 4 (2021), 65–67.
2. Mauriello, M.L. and Hazas, M. Pervasive sustainability. *IEEE Pervasive Computing* 23, 2 (2024), 4–6.
3. Aquino, A.A., Gumbula, I.M., Bidwell, N.J., and Bird, S. What's the weather

story? Both-ways learning in Indigenous-led climate communication workshops in northern Australia. *Proc. of the Participatory Design Conference 2024: Exploratory Papers and Workshops 2*. ACM, New York, 2024, 166–74.

4. Kannabiran, G. and Reddy, A.V. Exploring Kolam as an ecofeminist computational art practice. *Proc. of the 14th Conference on Creativity and Cognition*. ACM, New York, 2022, 336–49.
5. Kotut, L. and McCrickard, D.S. Winds of change: Seeking, preserving, and retelling indigenous knowledge through self-organized online communities. *Proc. of the 2022 CHI Conference on Human Factors in Computing Systems*. ACM, New York, Article 257, 1–15.
6. Biggs, H., Suttles, S., and Bardzell, S. Redlining maps and terrains of sustainability: Interdisciplinary mapping of racialized redlining to present-day sustainability agendas in HCI. *Proc. of the 2023 CHI Conference on Human Factors in Computing Systems*. ACM, New York, Article 141, 1–18.

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