

Avoiding Ecocidal Smart Cities: Participatory Design for More-than-Human Futures

Sara Heitlinger
Newcastle University
U.K.
sara.heitlinger@newcastle.ac.uk

Marcus Foth
Queensland University of Technology
Australia
m.foth@qut.edu.au

Rachel Clarke
Northumbria University
U.K.
rachel2.clarke@northumbria.ac.uk

Carl DiSalvo
Georgia Institute of Technology
U.S.A
cdisalvo@gatech.edu

Ann Light
University of Sussex
U.K.
ann.light@sussex.ac.uk

Laura Forlano
Illinois Institute of Technology
U.S.A
lforlano@id.iit.edu

ABSTRACT

The turn to participation in smart cities was intended to increase the involvement of diverse, often marginalised, citizens in the design and use of networked sensing technologies. However, ideals of activism, citizen engagement and democratisation through the co-design of networked technologies and services have been largely based on an understanding of urban space as separate from nature, and for human inhabitants alone. In current conditions of climate change, pollution, and loss of biodiversity, a human-centred perspective of cities is increasingly problematic. This workshop focuses on an expanded *more-than-human* perspective for cities, informed by studies in the Anthropocene in fields such as STS, geography, planning and design. We will interrogate how more-than-human perspectives and their resultant ethical, legal, and methodological concerns can shape participatory design practices and policies towards cohabitation, and push forward a cultural change in the agenda of sustainable smart cities, urban informatics, IoT, and design.

CCS CONCEPTS

- **Human-centered computing** → Interaction Design
- **Participatory Design**

KEYWORDS

Urban participatory design; smart cities; sustainable HCI; nonanthropocentric design; more-than-human; internet of things¹

1 INTRODUCTION

Many early adopters of sustainable smart city technology employed a technocratic approach. The dominant visions of these future cities, such as in the “eco smart city” [19], address environmental sustainability through the optimisation and rationalisation of urban processes, making them more efficient

and therefore more sustainable. However, critics claim that such approaches are too simplistic, are unable to deal with the complexities of real, messy cities [19] and perform sustainability in specific ways that leave little room for participation and citizen agency [7,11,19]. Furthermore, the technocratic approach limited the actual social benefit people could expect from their urban habitat, and this has led to a participatory turn in smart cities, e.g. [1,12], with many local governments starting to use human-centred and participatory design for the integration of technology in urban environments to address issues of sustainability.

However, the turn to participation within smart cities fails to address a human-exceptionalist notion of cities, in which urban space is designed for, and inhabited by, humans only. Within the age of the Anthropocene – a term used to refer to a new geological era in which human activity is transforming earth systems [16], accelerating climate change and causing mass extinctions [18] – a human-centred perspective is increasingly seen as untenable. In fields such as STS [10,13], environmental humanities [15,17], geography [2,21], planning [16], design [5,8,25] and HCI [24], scholars are expanding and challenging traditional binaries of Western thought such as City/Nature, Human/Non-human, to consider the entanglements between human and nonhuman worlds including in urban contexts, and the ways in which we can conduct participatory research in more-than-human worlds, in order to overcome problematic narratives of human privilege and exceptionalism.

The aim of this interdisciplinary workshop is to move the field of participatory design for sustainable smart cities forward and relate to the workshop themes of democracy and politics by bringing together designers, practitioners, and researchers to explore what it means to democratise genuinely sustainable cities that take into account the ways in which cities and nature, and humans and non-humans are interrelated and interdependent, for the co-creation of environmentally and socially just post-anthropocentric cities. We aim to develop new conceptions that move away from traditional binaries and open up new possibilities for thinking about participatory design for urban environments in hybrid digital-physical space. We also aim to explore practical ideas about how more-than-human perspectives can shape actual participatory design practices and

policies related to cities. For example, we might explore design responses to new legal rights of non-humans such as trees and rivers [20] and how their participation is negotiated in urban processes in hybrid digital-physical space [4].

1.2 Workshop topics of interests

The topics of interest for the workshop include, but are not limited to the following:

- Participatory design and use of smart cities, urban informatics and IoT technologies that explore human/more-than-human relations;
- Methodological approaches, including opportunities and challenges for designing in more-than-human worlds;
- Speculative designs, design fictions, and art projects;
- Ethical and legal considerations, e.g. design responses to a new legal status of nature;
- Designs that decentre the human or privilege other species;
- Cultural aspects of sustainable smart cities in this space;
- Theoretical perspectives from the literature e.g. Anthropocene, Capitalocene [18], Chthulucene [13], and;
- “World-making”, what could a more-than-human city be?

2 FORMAT OF THE WORKSHOP

2.1 Goals of the Workshop

The workshop goals relate to the specific conference themes such as *Infrastructures and complex challenges* and *Domain-specific applications* (e.g. city-making and datafication) by doing the following: 1) Bring together researchers and practitioners who are conducting participatory design research at the intersections of sustainable smart cities, urban informatics, urban interaction design, IoT, and notions of the more-than-human; 2) network participants; 3) collect case studies of designs in this space; 4) bring together critical, theoretical, and methodological approaches to inform future work in the area; 5) make audiences working in the space of sustainable smart cities within participatory design aware of emerging more-than-human perspectives, including the opportunities and challenges of the topic, and; 6) foster the research community and solicit authors and audiences for an edited book on the subject.

The workshop is organised as a one full day workshop. It will consist of discussions around more-than-human encounters, demos, a group exercise and discussions, and will be held in a FabLab facility for approx. 25 people. The estimated number of workshop participants is 15-20. Each participant will contribute to the workshop with a position paper or research note, which introduces aspects of the participant’s prior research, future plans, insights, or interests in the area. The submissions will be reviewed by the organisers for relevance. If participants exceed places, we will choose a balance of different perspectives on the workshop topic.

The workshop will be promoted through the workshop webpage: <http://morethanhuman.urbaninformatics.net>

We welcome researchers and practitioners working on design cases, prototype development and artistic installations, as well as those working on theoretical, critical, legal, or ethical perspectives, including those from STS, environmental humanities, and other disciplines. We welcome methodological contributions, such as object-oriented ontology [3], non-human ethnographies [22], speculative design, and actor-network and assemblage theories related to decentring the human in design.

2.2 Draft Timescales

2nd March – CfP release email, social media, website

2nd April – 2nd call for CfP

25th May – notification to participants

20th June – camera ready submissions uploaded to website

21st August – workshop

2.3 Draft Schedule

The preliminary workshop schedule is as follows:

9:00 – **Introductions**

9:15 – **Encounters** (ca. 5 minutes each): participants will present an artefact relating to an urban encounter or experience of cohabitation with other-than-human. Followed by discussion.

11:30 – **Coffee**

12:00 – **Interrogate and discuss** existing examples of prototypes, visions, and projects through photos, videos, reports, newspaper articles [4], and artefacts, to begin to elicit opportunities and challenges and serve as inspiration for the afternoon session.

13:00 – **Lunch**

14:00 – **Group work**: Prototypes, theories, methods: an exercise done in groups of 4-5 people, working on prototyping futures for multispecies entanglements in smart cities including technologies, services, methodologies, legal, and ethical frameworks, and theoretical lenses. Participants will have the opportunity to produce low-fi prototypes in the FabLab workshop, including laser cutting, electronics, 3D printing as well as from craft and low-tech materials. These prototypes will serve as the basis for a Situated Action (also accepted at PDC).

15:30 – **Presenting back to the rest of the group**

16:00 – **Coffee**

16:30 – **Group reflections and next steps**

17:30 – **Finish and workshop dinner**

3 POST-WORKSHOP PLANS

The artefacts and materials produced during the workshop will form the basis of a Situated Action as a way to engage with a wider audience at PDC and beyond. After the workshop, we will finalise our proposal for an edited book on the subject. We have had initial talks with the acquisitions editor of MIT Press, who has expressed interest. We will invite participants from the workshop to submit book chapters. We will also submit a summary article to ACM *Interactions*. The workshop papers will be available via the workshop website prior and after the workshop, providing opportunity for participants to familiarise themselves with all papers prior to their presentation.

4 WORKSHOP ORGANISERS

The workshop organisers collectively have a long history of participatory design research in the context of sustainability and cities [6,8,9,14,23].

Sara Heitlinger is a Research Associate in the Global Urban Research Unit at Newcastle University. Previously, she was a researcher Co-Investigator on *Connected Seeds and Sensors*, exploring internet of things, participatory design and data visualisation for sustainable urban food practices.

Marcus Foth is a passionate wombassador. In his spare time, he is Professor of Urban Informatics in the QUT Design Lab, Australia. He is also an Honorary Professor in the School of Communication and Culture at Aarhus University, Denmark. Marcus brings together people, place, and technology with a keen interest in cities and sustainability.

Rachel Clarke is a Global Challenges Research Fellow in the School of Design at Northumbria University. Her research focuses on socially engaged arts approaches to digital-material participation exploring how designers support practices of care within and across diverse constituents. More recently, her research has focused on urban cycling networks and multispecies use of inner-city back lanes.

Carl DiSalvo is an Associate Professor in the School of Literature, Media, and Communication at the Georgia Institute of Technology. His current research examines how sensing and data figure into new modes of political action and citizenship. As part of this research, he is exploring the idea of “more-than-human publics.”

Ann Light is Professor of Design and Creative Technology at the University of Sussex and leader of the Creative Technology Group. She specialises in the social impact of digital technologies, such as the Internet of Things, and the politics of design. Her design work concerns innovations in the fields of social process, community wellbeing and sustainability, which she researches using participatory methods.

Laura Forlano is an Associate Professor of Design at the Institute of Design and Affiliated Faculty in the College of Architecture at Illinois Institute of Technology where she is Director of the Critical Futures Lab. Her research is focused on the aesthetics and politics at the intersection between design and emerging technologies, material practices and the future of cities.

REFERENCES

- [1] Mara Balestrini, Yvonne Rogers, Carolyn Hassan, Javi Creus, Martha King, Paul Marshall, and Knowle West Media Centre. 2017. A City in Common: A Framework to Orchestrate Large-Scale Citizen Engagement around Urban Issues. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, pp. 2282-2294. ACM
- [2] Michelle Bastian. 2016. Towards a More-than-Human Participatory Research. *Participatory Research in More-than-Human Worlds* (2016), 19–37. Routledge. DOI:https://doi.org/10.4324/9781315661698
- [3] Ian Bogost. 2012. *Alien phenomenology, or, what it's like to be a thing*. University of Minnesota Press.
- [4] Tristan Cork. 2017. Street lights on Bristol to Bath cycle path switched off so glow worms can find love. Retrieved September 18, 2017 from <http://www.bristolpost.co.uk/news/local-news/street-lights-bristol-bath-cycle-182389>
- [5] Carl DiSalvo and Jonathan Lukens. 2011. Nonanthropocentrism and the nonhuman in design: possibilities for designing new forms of engagement with and through technology. In *From social butterfly to engaged citizen: urban informatics, social media, ubiquitous computing, and mobile technology to support citizen engagement*. 440–460. MIT Press, 2011.
- [6] Carl DiSalvo, Phoebe Sengers, and Hrönn Brynjarsdóttir. 2010. Mapping the landscape of sustainable HCI. In *Proceedings of the 28th international conference on Human factors in computing systems - CHI '10*, 1975–1984. DOI:https://doi.org/10.1145/1753326.1753625
- [7] Paul Dourish. 2010. HCI and environmental sustainability: the politics of design and the design of politics. *Proc. 8th ACM Conf. Des. Interact. Syst. . ACM*. (2010), 1–10. DOI:https://doi.org/10.1145/1858171.1858173
- [8] Laura Forlano. 2016. Decentering the Human in the Design of Collaborative Cities. *Design Issues*. 32, 3 (2016). DOI:https://doi.org/10.1162/DESI
- [9] Marcus Foth, Eric Paulos, Christine Satchell, and Paul Dourish. 2009. Pervasive Computing and Environmental Sustainability: Two Conference Workshops. *IEEE Pervasive Computing* 8, 1 (2009), 78–81.
- [10] Adrian Franklin. 2017. The more-than-human city. *Sociol. Rev.* 65, 2 (2017), 202–217. DOI:https://doi.org/10.1111/1467-954X.12396
- [11] Jennifer Gabrys. 2014. Programming environments: environmental and citizen sensing in the smart city. *Environment and Planning D*. 32, 1 (2014), 30–48. DOI:https://doi.org/10.1068/d16812
- [12] Daniel Gooch, Matthew Barker, Lorraine Hudson, Ryan Kelly, Gerd Kortuem, Janet van der Linden, and Marian Petre. 2016. Amplifying Quiet Voices: Challenges and Opportunities for Participatory Design at an Urban Scale. *ACM Transactions on Computer-Human Interaction (TOCHI)*. 25, 1, (2018).
- [13] Donna J Haraway. 2016. *Staying with the trouble: Making kin in the Chthulucene*. Duke University Press.
- [14] Sara Heitlinger, Nick Bryan-Kinns, and Janis Jefferies. 2013. Sustainable HCI for grassroots urban food-growing communities. In *Proceedings of the 25th Australian Computer-Human Interaction Conference: Augmentation, Application, Innovation, Collaboration*, 255–264.
- [15] Steve Hinchliffe, Matthew B Kearnes, Monica Degen, and Sarah Whatmore. 2005. Urban wild things: a cosmopolitical experiment. *Environment and Planning D Soc. Sp.* 23, 5 (2005), 643–658.
- [16] Donna Houston, Diana Maccallum, Wendy Steele, and Jason Byrne. 2017. Make kin, not cities! Multispecies entanglements and “becoming-world”. In *Planning Theory*. (2017). DOI:https://doi.org/10.1177/1473095216688042
- [17] Eduardo Kohn. 2013. *How forests think: Toward an anthropology beyond the human*. Univ of California Press.
- [18] Jason W Moore. 2017. The Capitalocene, Part I: on the nature and origins of our ecological crisis. *Journal of Peasant Studies*. 44, 3 (2017), 594–630. DOI:https://doi.org/10.1080/03066150.2016.1235036
- [19] Paul D Mullins. 2017. The Ubiquitous-Eco-City of Songdo: An Urban Systems Perspective on South Korea's Green City Approach. *Urban Planning*, 2, 2 (2017), 4–12. DOI:https://doi.org/10.17645/up.v2i2.933
- [20] Erin O'Donnell and Julia Talbot-Jones. 2017. Three rivers are now legally people – but that's just the start of looking after them. *The Conversation*. Retrieved October 12, 2017 from <https://theconversation.com/three-rivers-are-now-legally-people-but-thats-just-the-start-of-looking-after-them-74983>
- [21] Chris Philol. 1995. Animals, geography, and the city: Notes on inclusions and exclusions. *Environment and Planning D Soc. Sp.* 13, 6 (1995), 655–681.
- [22] Hannah Pitt. 2015. On showing and being shown plants - a guide to methods for more-than-human geography. *Area*, 47,1 (2015), 48–55. DOI:https://doi.org/10.1111/area.12145
- [23] Claire Rowland, Elizabeth Goodman, Martin Charlier, Ann Light, and Alfred Lui. 2015. *Designing Connected Products: UX for the Consumer Internet of Things* (1st ed.). O'Reilly Media, Inc.
- [24] Nancy Smith, Shaowen Bardzell, and Jeffrey Bardzell. 2017. Designing for Cohabitation: Naturecultures, Hybrids, and Decentering the Human in Design. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems (CHI '17)*, 1714–1725. DOI:https://doi.org/10.1145/3025453.3025948
- [25] Alex S Taylor. 2017. What Lines, Rats, and Sheep Can Tell Us. *Design Issues* 33, 3 (2017). 25-36.