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MORE-THAN-HUMAN PARTICIPATORY DESIGN

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Abstract

The ecological crises we face are fed by a disconnect from interspecies interdependencies and mis-guided human-exceptionalism (the belief we are somehow distinct from nature). Given that design may contribute to our worsening socio-ecological conditions, this is seen as a pivotal moment to question and expand Participatory Design's traditional tenets, such as those grounded in democracy, rights, fairness, inclusion and empowerment, to consider what a different philosophical starting point and commitment to more-than-human Participatory Design might bring.

This chapter explores the different traditions underpinning existing Participatory Design work oriented towards sustainability. We show the beginnings of a Participatory Design drawn from an appreciation of the innately interdependent and entangled nature of the world, called here the more-than-human. Two lineages of Participatory Design scholarship are traced: Sustainability (with branches in Modernist and rights-based thinking) and Entanglement (with branches in care-based and co-ontological being). The chapter presents three cases to ground our explorations and bring to light how human-nature separations in systems, structures, values and mindsets inadvertently condition our practice. Our cases ground the theories and paradigms identified in the four branches and show how commitments play out and evolve through practice. This allows us to critically examine existing tenets of Participatory Design and reinterpret the visions that these hold to explore what more-than-human relationality might entail. Our discussion reveals the tensions, politics, paradoxes and difficulties in turning towards more-than-human relationalities and in working across and between worldviews. The chapter closes with the questions that the ambitions of more-than-human Participatory Design pose for our practice. At best, we hope they present a means to tread more gently and responsibly on the earth we share.

Introduction

Life on Earth will continue to be impacted by decisions we make now about technologies and design long after our current choices and justifications look obsolete. Even in Participatory Design, where we strive to be inclusive and democratic in our practices, we can expect rapid transformations and increasing uncertainty to undermine our capacity for good long-term choices. For instance, much technology development is predicated on reliable sources of carbon-neutral energy becoming available, but present renewables depend on the mining of minerals that are scarce, causing different perils, such as pollution, habitat loss, Indigenous land dispossession (Ninomiya et al., 2023) and modern-day slavery.¹ All this contributes to worsening socio-ecological conditions. Knowing this, we have another decision to make. We need to tackle immediate problems but also take the wider context into consideration and ask how design theories and practice must

change to be fit for purpose as we recognise the damage that industrial priorities have caused.

In this chapter, we explore the different intellectual, philosophical and political traditions underpinning existing Participatory Design work, especially those oriented towards sustainability, and consider the beginnings of a Participatory Design drawn from an appreciation of the innately interdependent and entangled nature of the worlds through which we move. In doing so, we acknowledge that, while this thinking may bring a fresh perspective to Participatory Design, it echoes worldviews that go back in time and across the planet to cultures and people who better recognise the need for ecological balance and respect.

We write in the context of mass species loss, rising forever pollution and extreme weather events with impacts experienced unequally across the globe. The ecological crises that we face are fed by misguided human-exceptionalism (the belief that we are somehow distinct from nature) and a disconnect from interspecies interdependencies. We see this as a pivotal moment to question and expand Participatory Design's traditional tenets, grounded in democracy, rights, fairness, inclusion and empowerment, which emerged from a commitment to support people to self-determine their own wellbeing (Greenbaum, 1993). In considering the future of Participatory Design, we are alive to several tensions, not least that human flourishing depends on all flourishing and that this matter is remote from Participatory Design's historic domain: coming together to make better technology to foster democracy in workplaces and solidarity in communities. But we remain in the terrain of considering design processes for the betterment of conditions and worlds – a form of ethics that is familiar, if differently expressed, for most people working in Participatory Design and which has been argued to unite the field (Iversen et al., 2010).

Approaches which question the basis of current resource management have been called strong sustainability, with a commitment to system change beyond tweaking current behaviours and consumption patterns. Though we address sustainability in Participatory Design in this chapter, we can draw on a far wider range of Participatory Design concerns, such as building solidarity, and be more radical in our commitments, such as embracing entanglement theories, if we reframe our commitments to look at relations as the fundamental focus of our work. Again, this will be familiar to Participatory Design practitioners and we stress this through-line even as we explore the key tensions and inspirations of committing to more-than-human relationships. We introduce three cases to ground our explorations in practice.

“More-than-human” is a term used here to acknowledge that all life and non-living entities are interdependent². Not everyone shares a definition of “more-than-human”. We are not seeking a consensus here either. Our literature review shows this variety. We offer our position: that the more-than-human points to the fundamental relational condition of our ontological co-existence. This orientation is characterised by a movement towards a deeper ecological embrace, one which recognises interdependence and care as the fundamental relations that pertain to all beings and non-beings on Earth. Because it is an ontological position, we think it changes why, what and how we do things in Participatory Design. To clarify, “more-than-human” is

not a category that others non-human species; rather, it is an ethics of committing to relationality. For our discussion here, we use “non-humans” as a noun to indicate individual actors, entities, species and such like.

To explain the difference between our broadly aligned position and other philosophical traditions, we trace two lineages of Participatory Design scholarship, each with two branches. We are calling these lineages (1) sustainability (with branches in Modernist and rights-based thinking) and (2) entanglement (with branches in care-based and co-ontological being) (see Figure 4.1).

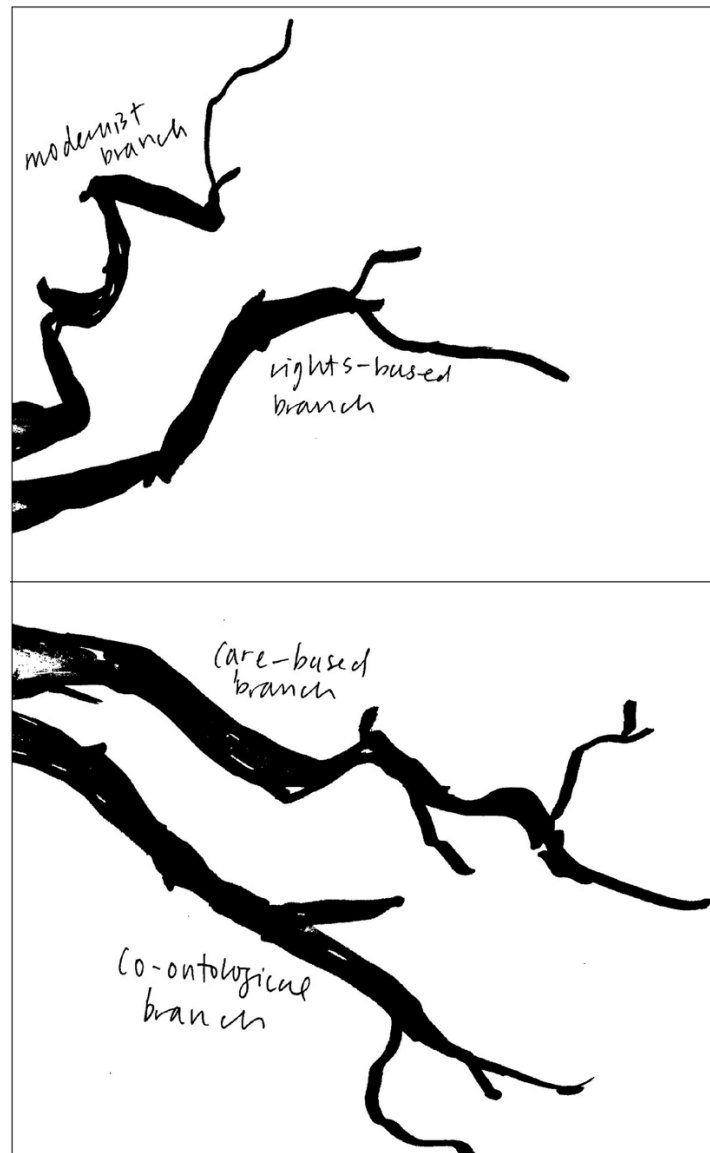


Figure 4.1 Top: sustainability lineage. Bottom: entanglement lineage (image credit: Yoko Akama, with permission)

We arrived at these lineages and their branches by analysing Participatory Design Conference (PDC) proceedings, adjacent discourses and other works since 2012 (when the 2013 Participatory Design Handbook was published) and endeavouring to make sense of the differences in focus we were seeing. Distinguishing these trajectories helps clarify the politics when the term more-than-human and similar ideas appear. For instance, in the cognate field of human-computer interaction,

“more-than-human” is used to describe quite varied relations (e.g. Yoo et al., 2023), such as between humans and other species, between humans and machines, in rethinking agencies (e.g. Wakkary, 2021) and remaking interspecies relations. Work that is not related to ecological concerns is not in our review.

Sustainability and Entanglement

The two lineages we trace in recent Participatory Design work on addressing climate care and environmental crises concern what we are calling here sustainability and entanglement.

The sustainability lineage in Participatory Design builds on design’s tradition of working technically to improve products with a focus on outcomes. We show how sustainability approaches are based on paradigms of productivity and development, involving linear thinking from defining problems to moving towards solutions. This includes delivering behaviour change and better re- source management, linked to broader sustainability work in science and positivist social science. Aligning with mainstream narratives of modern “advancement”, initiatives based on these traditions are powerful in developing and scaling up sustainable interventions to meet the challenges of climate catastrophe. This is urgent to protect biospheres or ensure the livelihoods of marginalised communities but does not change the underlying relations that pose the threat.

What distinguishes these logics from the entanglement tradition is the binary at the centre, where ambiguities and paradoxes are eliminated in the pursuit of Enlightenment clarity. As such, a separation of self-other, human-nature, brain-body and so on proliferates.

The lineage of entanglement and relationality draws on a different philosophical tradition with roots in the environmental humanities, feminist STS, New Materialism and theoretical critiques of positivism. This lineage stems from ontological practices that include ancestral wisdoms acknowledging interdependencies as part of different and pluriversal roots. Work influenced by these positions tends not to pursue the linear, logical or outcome-led results of the sustainability lineage. For those schooled in traditions of (post)industrial Modern thought, it may, consequently, be harder to recognise the priorities and achievements of what the entanglement branch offers and how it might support design. Reading our cases may help the reader understand its potential in practice.

In presenting these roots (and branches), we know that our review is not exhaustive; many valuable papers are missing. Our aim is not for comprehensiveness, but, rather, we have selected those materials best able to help us articulate the politics of these areas of concern. For instance, we regret that groups with entangled ancestral wisdoms and expanded notions of “participation” have often felt excluded by the Anglophonic, Global North and Euro-US leaning academic conventions of Participatory Design and adjacent fields and we have chosen some texts to refer to these excluded traditions. It is important to acknowledge First Nations’ practices, onto-epistemologies and ancestral wisdoms that have always premised relational interdependence and which Western/ Modern thought has eroded and disconnected. The plurality that underlies such relational starting points is important to recognise and respect. The five authors have differing worldviews and intersectional

experiences, which then shape our politics, positions and, thus, how we practice Participatory Design. These differences inflect the authors' cases. The authors are part of various prior assemblages that have fostered long friendships or fresh collaborations with one another. We are academics working within well-resourced Western institutions (Sweden, the UK and on lands now called "Australia") that afford us certain privileges. As such, regardless of individual or collective positionality, our work acknowledges how we are part of global asymmetries in which power has been accumulated and distributed unevenly. We hope, through the cases presented here and reviewed in the discussion, we bring to light how human-nature separations in systems, structures, values and mindsets inadvertently condition our practice. In our commitment to a fuller embrace of the more-than-human, we have begun to recognise the inconsistencies and tensions that working across and between world(view)s bring. In choosing to reveal these tensions, we accentuate the politics, paradoxes and difficulties of turning towards more-than-human relationalities.

Our cases ground the theories and paradigms we identify in the four branches as they evolve through our practices. This allows us to critically examine tenets of Participatory Design such as democracy, rights, fairness, inclusion and empowerment and reinterpret them for more-than-human relationalities at their fullest. Trying these new positions does not negate older practices; our traditions are the context against which we evaluate and reflect. We close the chapter with a discussion of how the ambitions of more-than-human Participatory Design pose questions for our practice and offer a different lens. At best, we hope they present a means to tread more gently and responsibly.

A Review of Two Lineages and Four Branches

Sustainability: Modernist Branch

Sustainability and design are well-paired because design has long been an agent in the unsustainability of industrial processes. Mindful of this, approaches to change this relationship have included "green design" in the 80s, "eco-design" in the 90s and "sustainable design" or "design for sustainability" in the 2000s (Walker and Giard, 2013). These movements all aimed to reduce environmental impact through efficient use of resources, materials and energy, minimising waste and making advancements with technology and innovation. But, while advocating for a change from business-as-usual, nothing much was changing (Fry, 2009). The solutions being offered remained in the paradigm of the problems they were solving; that is, they were tethered to a Modern tradition that sees development, growth and productivity as essentials. This tension is caught in the idea of the Triple Bottom Line, popular in the 90s, where evaluating people, profit and planet aimed to shift commercial and consumer imperatives. Yet design was reluctant to let go of production and consumption cycles (Manzini, 2006). Much early work in sustainable interaction design focused on the individual, with limited behaviour change models and conceptions of agency (DiSalvo et al., 2010). It was felt this work did not go far enough, only minorly mitigating the worst of industrial practices. Individualist and Modern approaches to strengthening environmental awareness have been dismissed by many (Brynjarsdottir et al., 2012; DiSalvo et al., 2010; Dourish, 2010;

Strengers, 2014). The absence of spiritual dimensions has also been addressed (Inayatullah, 2005; Walker, 2013). Fry (1999, 2009) has been a prominent critic of design, noting its apolitical disposition and lack of response to the crises of our time. Within Participatory Design, there is no strong tradition of prioritising ecological concerns; instead, the focus has been on social viability. This is confirmed by Poderi and Dittrich (2018) who found Participatory Design has had a nebulous and tentative relationship with sustainability. They identified 21 out of 693 articles using the term “sustain” over 28 years of PDC history. When it appeared, the term was mostly used to refer to project longevity and duration beyond external interventions, owing more to criteria for evaluating development projects than to sustainability science.

There are examples of participatory processes being used to develop tools for matters of eco- logical concern, such as monitoring water use (e.g. Carroll et al., 2019). But, largely, the presence of time-old Participatory Design values (rights, fairness, inclusion, democracy, empowerment) continues to throw a focus on the human. We see, for example, ways to foster awareness, solidarity, community and relationships to shift behaviours towards socially just and ecological transitions (Dick et al., 2012). Building neighbourhoods may be a practice that creates conditions in which sustainable futures can be explored and established (Huybrechts et al., 2017). There are considerations of scale, where climate change and other environmental crises require people to think and act more consciously with larger systems and structures for global impact. For instance, citizen participation in ICT infrastructuring for community energy management is helping people imagine futures beyond the limitations of capitalism (Capaccioli et al., 2016). We find discussions around sustainable smart cities at these scales (Chopra et al., 2022; Heitlinger et al., 2018), while a strength of Participatory Design work is that, even when issues scale, there is an attempt to keep in sight the local and the marginalised.

Sustainability: Rights-Based Branch

Participatory Design has a long history of considering human rights. Human rights are intended to provide a universal commitment to protect people and give them due as equal subjects of the world. Rights (as a political entity) come into their own with the Enlightenment, when human life and learning became an end in itself. But rights are structured in an extension of self-other, human-nature separation and closely follow old religious hierarchies. Principal among these is the command in the Bible, informing all Judeo-Christian faiths, that man should hold dominion over all creatures of the earth and waters, which has structured living relations in much of the world (e.g. Lent, 2017). For many centuries, women, animals and plants were deemed to have no soul or reason and the legacy of that thinking – and what counts as sentience – is only now being evaluated. Rights are adjusted as such beliefs change. When we see transposition of rights to non-human entities like animals and rivers for their protection, they may be granted “legal personhood”. This relies on a human to represent and speak on their behalf and downplays other lifeforms and Indigenous cosmologies that relate and exist differently (Salmond, 2014).

A vein through many Participatory Design works is the exclusion and inclusion of “voices”, their representation directly or via a proxy and the agency they are afforded in shaping the de- sign process. While voice is an important, continued marker of inclusion, it is curious how a rights-based notion is applied literally to non-humans:

“Ecosystems cannot voice their opinion on their own, and it is up to their codesigners to find ways of inviting them” (Pettersen et al., 2018). Relatedly, digital technologies like algorithms, sensors and data are seen as actors that “influence who counts as a ‘user’: . . . they often provide us with the (only) means to include nature as a participant, at least as a matter of concern to be considered here and now” (Parmiggiani and Karasti, 2018). Intermediaries and forms of representation have been a long-standing concern for Participatory Design, now raised to ask how these can mute or skew non-human presence. If we consider ecology, rather than species or individual entities, rights become tenuous. Bastian et al. (2016), who ask how to participate with water and bees, point out (with feminist and critical race scholars, e.g. Ahmed (2012)) that merely increasing the kind and quantity of representation can mask deeper structures of power and causes of exclusion and oppression.

Research in most Western contexts arises out of Enlightenment traditions, supporting a separation between ontology, epistemology, axiology (values) and methodology (Wilson, 2008). When humans and non-humans are accounted for, it is very often in such a way that follows the conventions of scientific research. But, just because barnacles, humidity and rocks have been named and measured by humans does not mean that they exist in that way. Increasingly, scientists are recognising that the scientific method creates results rather than discovering them (Barad, 2007). The act of measuring is becoming regarded as a creative act of interpretation, rather than only of explanation. If Participatory Design follows this line of reasoning, we can see how it might turn towards the more-than-human to trace a different paradigm, commitment and politics, while holding true to its interest in wellbeing and inclusion.

Entanglement: The Relational Turn

If we attempt to articulate the emerging turn to the more-than-human as a philosophical, ontological and practical commitment (Light et al 2024a), we must do so provisionally, noting that this is a field of inquiry that is rapidly expanding. For some time, without using the term more-than-human, scholars in Participatory Design, including the authors of this chapter, have grappled with the challenges of the Anthropocene and working with non-humans to find new meanings in, for and through design. Lindström and Ståhl (2016) explore composting plastics with common meal- worms to politicise everyday material participation (Marres, 2015) and argue for “respons-able stakeholders”, sensitised to entanglements and obligation. Similarly, an explicit focus on care and relationality acts as a harbinger in Light and Akama’s work (e.g. 2014), who build on Puig de la Bellacasa’s thinking with care (Puig de la Bellacasa, 2011, 2012). Ludic encounters for multispecies care and cohabitation through Participatory Design with marginalised urban farming communities are the focus of Heitlinger et al. (2014; Heitlinger, 2016). Creative practice for decentring the human and approaching ecological concerns is explored in DiSalvo et al. (2009) and DiSalvo and Lukens (2011).

Further, Participatory Design in these branches is necessarily pluralistic. Some concepts and articulations are in formation now and others arise from practices millennia old, etching a path that fundamentally questions the human-world relations that have dominated in philosophy and in how the majority lives. Inspiration is not from one distinct ontological position, but comes from a range of associated theorists, stressing different parts of the evolving relational sensibility. These cluster

around various themes: feminist technoscience; entanglement; relational ontologies. There are also powerful wisdoms and axiologies shared by Indigenous scholars and communities that continue to teach and inspire, such as those we cite (Kimmerer, 2013; Moran et al., 2018). The turn to plural onto-epistemes, philosophies and belief systems, such as Buddhism and Indigenous cosmologies, is becoming a significant movement. For this reason, it is particularly important that debts are paid: many scholars and practitioners on the margins have been thinking relationally, while much Western/Modern thinking continues to be mired in positivism.

Entanglement: Care-Based Branch

This branch has a theoretical lineage that comes from several scholarly fields anchored in critiques of positivism and Modernist thinking (i.e. they question or reject the dualism, categorisation and hierarchies of self-other, mind-body, human-nature, etc., forged in the Enlightenment). Critical discourses for decentring human-exceptionalism or radical re-distributions of agency across humans and non-humans have emerged from STS as actor-network theory (e.g. Latour, 1999; Law, 2004; Mol, 2002), Feminist Techno-science (e.g. (Barad, 2007; Haraway, 2016; Tsing et al., 2017) and object-oriented theory captured in concepts like the “hyper object” (Morton, 2013). Other literature has taken a more applied focus, drawing on burgeoning research on alternative infrastructuring, such as Gibson-Graham’s alternative economies (2006). Taken together, they challenge technological reductionism, asserting all things on the earth are beings in kinship relationships and refusing their reduction to subjects of or vehicles for exploitation, extraction and depletion. The more-than-human becomes a powerful rhetorical device for considering how power, agency and values are distributed across actors and emerge through unfolding relations (Akama et al., 2020; Heitlinger et al., 2021) and resituating care as a foundational quality of interdependent life (Puig de la Bellacasa, 2011, 2012, 2017).

The explicit use of the term more-than-human becomes pronounced in Participatory Design after 2018. The year leading up to that edition of PDC was marked by a turning point, when the environmental crisis was growing in the public consciousness. For many researchers, it marked a period of re-evaluation (Light et al., 2017). PDC’18 came on the heels of key feminist publications, including Haraway’s *Staying with the Trouble*, Tsing’s *The Mushroom at the End of the World*; Puig de la Bellacasa’s *Matters of Care*; and the edited collection, *Arts of Living on a Damaged Planet*. The 2018 PDC invited us to amplify the politics of democracy in addressing urgent global challenges (Huybrechts et al., 2018). We can see this as a critical moment in opening Participatory Design concerns beyond the pursuit of well-made products and systems (Kyng, 2010). Research-ers took up this invitation in a workshop on more-than-human Participatory Design (Heitlinger et al., 2018) and with a speculative walk to imagine cohabitation in urban spaces (Clarke et al., 2018). These experiments attempted to recognise urban spaces for more-than-human flourishing. Important themes emerged: decentring human agency, critiquing human-exceptionalism; exploring temporalities, recognising tensions between climate urgency and longer timescales like geological deep-time; incorporating other wisdoms, learning from Indigenous onto-epistemes; and introducing expertise from distant disciplines and a non-Western canon, including folklore (Clarke et al., 2019).

These themes drew inspiration from feminist technoscience in their exploration of agency, power and values.

As Chapter 5 reports, running alongside this concern has been another decolonising current. PDC'20 went to the Global South,³ and its chairs' theme-setting helped onto-epistemes from the Global South make inroads into the narrowness of participation defined by Euro-US worldviews (Del Gaudio et al., 2020). The conference provided an opportunity to learn with and from generations that have taught wisdoms through stories and practices. We witnessed the focus shifting from methods, projects, theories, methodology and epistemologies towards embodiment of "sentipensar" (Borda, 1979), bringing a feeling-thinking dimension (Salazar et al., 2020). Then, at PDC'22 (Vlachokyriakos et al., 2022), we observed a pronounced self-reflexive stance in experimenting with data, methods, multispecies communing (Haldrup et al., 2022) and creative practices to engage more critically, creatively and deeply in more-than-human relations (Cooper, 2022; Dolejsova et al., 2022; Szaniecki, 2022; Westerlaken et al., 2022). There, "Reworlding" was a term offered for self-critique (Huybrechts et al., 2022): to develop capabilities needed in Participatory Design to articulate radical interdependence.

Entanglement: Co-Ontological Branch

Sitting alongside these theoretical critiques and new experimentations are practices from age-old living, making and being. We use the term "ancestral wisdoms" in this chapter to allude to all the practices and stories we encounter that have been passed through generations and which are related to, but may not have the status of, the onto-epistemes, worldviews and cosmologies of those that politically identify as Indigenous or First Nation members. These include recipes for fermenting, know-how for sourcing food and practices for saving seeds. Speaking of ancestral wisdom allows us to address the vernacular teachings and practices that continue to live and be embroidered through many hands, families and cultures everywhere. This body of work appearing in Participatory Design is still nascent, so all analysis must be tentative and possibly premature, but, by widening our understanding of such expertise, we draw attention to and reposition the heritage upon which much-revitalised thinking sits. In this branch of entanglement, we see both implicit and explicit evocation of different knowledge traditions that do not fetishise separation and categorisation.

In this vein, commitment to empowering those who are structurally marginalised from dominant constructs of "participation", such as tribal groups and First Nations peoples living in Africa and Australia (see Bidwell and Browning, 2010; Rodil et al., 2020) are important early precedents. More recently, we see onto-epistemes from the Global South (Loh Chee Wyai et al., 2022) and Traditional Ecological Knowledge (Lujan Escalante and Mortimer, 2022) making impact.

Commons-like initiatives for managing shared natural resources (Heitlinger et al., 2019; Marttila et al., 2014) nod to ways people have always governed and managed in agriculture, forestries, fisheries and more, preceding and/or beyond the state, institutions or market-based interventions. While work on commoning (Teli et al., 2018) and infrastructuring (Chopra et al., 2022; Vlachokyriakos et al., 2018) may not

identify specifically with sustainability or the more-than-human, it points to engagement with alternative, solidarity and pluralist cultures and belief systems necessary for system change. In other words, traditional Participatory Design strengths accompany discourses that critically examine the who and expand these beyond humans and, with this expanded inclusion of other-than-human lifeforms, reconfigure power and political agendas with the same critical, reflexive enquiry. There are important precedents when Participatory Design foregrounds peoples' ecological kinships with animals, ancestors and spiritual entities. Guidance from First Nation scholars and creative practitioners has been significant, reminding us as to what may have been eroded from Western mindsets through modern living and working.⁴ Indigenous Elders teach us to see how de-signing is already embedded and enacted between all living beings as co-operating and co-creating and not contained within a human-only frame. We quote the wisdoms shared by Bundjalung and Wiradjuri Elders from Aboriginal Australia to inspire reflection:

Design is how all living beings co-operate to co-create . . . (p. 93) . . . Living in intelligent environments, it is obvious that things of all kinds have always gathered, shared, and decided their best way to be and to do things. These gatherings continue regardless of human beings. We respect this already existent design where knowledge lives in a peopled landscape.
(Moran et al., 2018, p. 96)

Other species and non-beings are also teachers. There are hierarchies, but not Western/Modern ones. Potawatomi Nation artist, writer and scientist Robin Wall Kimmerer explains:

in Native ways of knowing, human people are often referred to as “the younger brothers of Creation”. We say that humans have the least experience with how to live and thus the most to learn – we must look to our teachers among the other species for guidance. Their wisdom is apparent in the way that they live. They teach us by example. They’ve been on the earth far longer than we have been, and have had time to figure things out.

Knowledge, place and relations are inseparable, tethered to time, bodies, stories, species and ecologies in ways that must be respected to be considered as teaching, as wisdom. This resonates with existing discourses in Participatory Design that see all knowledge as situated (Suchman, 1987) yet goes further. In contrast to feminist technoscience, this situatedness is understood to be ontologically entangled with being and becoming of everything spanning geological time and planets.

Participation, then, takes on a new dimension when we reflect on these wisdoms. In Participatory Design, Akama and colleagues (2020) wrestle with the implications of putting an unusual emphasis on ontology rather than methodology. By learning from those who understand sentience peoples in Aotearoa – they conclude that “participation” can no longer be addressed only by expanding categories of stakeholders. More-than-human relationships have always involved participatory practices, such as listening to ancestral “voices” of people, lands, waters and tremors when making decisions about co-existence and passing this to future generations. These cosmological rhythms speak to “co-ontology where being and becoming are always-participating-with-many” (Akama et al., 2020).

Examples in Action

In this section, we see how different commitments are addressed in three cases. These are offered to make visible how the different lineage, branches and commitments can play out in practice. Each study is written in the first person (as individuals or pairs). The cases vary from a small project across three workshops to a fleeting encounter, to a 3-year platform/project. This variety captures the different timescales in the way we work and the need for problematising “projects”, with their finite offer of care.

Algorithmic Food Justice

I, Sara, present a pilot research project, called Algorithmic Food Justice, exploring more-than-human values in food systems. Through this project I examine democracy, inclusion, justice and giving a voice to the voiceless, discussing how these are enacted and troubled in more-than-human Participatory Design. I show how the project links to the first lineage of sustainability by proposing to design new blockchain-based prototypes for fairer and more ecologically nourishing food systems, thus suggesting a Modernist techno-fix. It also draws on rights-based approaches within Participatory Design to explore ways to bestow rights and privileges to non-human actors, particularly within accounting systems. At the same time, I show how the project connects to the second lineage through care and the commons, as well as links to ancestral wisdoms.

My collaborators (academics Lara Houston and Alex Taylor and artist-curator Ruth Catlow, from the arts organisation Furtherfield) and I were interested in how we might transition from an unjust food system that focuses on human benefits alone, towards alternative food futures where benefits are distributed more fairly across the food web, and in ways that are more nourishing to the earth. We were motivated to re-design away from unsustainable inequalities, injustices and monopolies that prioritise profit, towards a multispecies food commons – with the help of blockchain technology.

The project ran for three months and involved three workshops at Spitalfields City Farm, an urban farm in East London characterised by high socioeconomic deprivation and cultural diversity. It grew out of ten years of prior collaborative research with the farm (Nichols and Heitlinger, 2022) that began with my PhD, which looked at Participatory Design of urban encounters for interspecies care and cohabitation. This prior research worked to surface the expertise of migrant communities typically elided in the dominant global industrial food systems (Heitlinger, 2016; Heitlinger et al., 2019). It taught me much about the interrelations between humans and non-humans such as microbes, plants, seeds, animals, water and climate, as well as sensors, batteries and data, in urban food systems, as well as the rich ancestral wisdom of the farm community, especially around growing, sharing, preserving and eating food from different places and heritages. The Algorithmic Food Justice project was funded with UK research money distributed by a platform dedicated to social justice and digital technology. It asked if blockchain might help us think differently about the urban food web and move

beyond extractive relationships towards fair and nourishing ones where the benefits are distributed more evenly across species. One way we thought blockchain might help us was by making visible and accounting for the contributions of diverse multispecies actors who otherwise remain invisible in the global industrial food system. Doing so might allow us to imagine alternative food systems that prioritise healthier ecosystems and increased biodiversity. We used creative speculation and co-design of blockchain conceptual prototypes to reflect on the current inequalities in urban food systems and flesh out ideas for a multispecies food commons.

As described previously in (Heitlinger et al., 2021, 2022; Houston et al., 2023), we resisted a techno-optimistic approach to a “blockchain solution”. Rather, we approached the technology as design material; a tool with which to critically engage and think creatively about value systems and ethics. Simultaneously, we hoped to reveal some of the risks this technology might pose. Approaching it in this way opened up conversations about values, governance and democracy within the context of more-than-human politics and helped reveal some tensions and limitations of doing more-than-human Participatory Design.

In the first workshop, we mapped human and non-human stakeholders in the city farm into the future. These activities privileged the perspectives of urban growers, drawing on their expert knowledge of regenerative agricultural techniques and thereby bringing attention to the many interspecies interdependencies in the urban food web. It highlighted the contributions, needs and resource flows between the different human and non-human stakeholders of the farm now and to come. Participants were prompted to think about resources beyond human, material and financial, revealing examples such as volunteer labour, oxygen, time and care, all of which are invisible in the global industrial food systems. This mode of knowledge production, grounded in the perspectives of community growers and organisers, formed the basis for the scenarios we developed in the second workshop. In the second workshop, the team facilitated a speculative participatory activity in the form of a multispecies live-action role-play (LARP), where human actors took on both human and non-human roles in a future deliberative decision-making forum (see Figure 4.2). The role-play was set 15 years in the future, following a fictional food crisis, when London is turned into an urban farm and decisions must be made about how to organise it as a multispecies food commons. Drawing on the list of stakeholders generated in the first workshop, the human characters held representative roles on committees including Coordination, Health, Agriculture, Security, Culture, Justice, Resources and Waste Management, Education, Energy, Infrastructure and Liaison, while non-human characters included birds, insects, farm animals, honey bees, soil, plants, trees, sensors, water, air and weather.



Figure 4.2 LARPing in the multispecies decision-making forum at Spitalfields City Farm (photo credit: Lorenzo Strappelli, with permission).

We worked through dilemmas and conflict in considering governance for sustaining our fictional commons, adhering to the values of inclusion, democracy and rights, and following an agenda informed by Ostrom's (2015) design principles for the commons. Role-play and ritual was used as a way to embody/enter the spirit of, and speak as, non-humans and attempt to represent their interests in decision-making. Players' actions were informed by scenarios based on what we learnt about "matters of care" (Puig de la Bellacasa, 2011) from the first workshop, as well as real-world events, and current facts about food and environmental injustices. We tried to establish new decision-making systems and urban infrastructures and to stress-test them to find out what might go wrong. Player-participants were able to draw on their experiences and knowledge of being community gardeners and activists who had intimate knowledge of mutually-beneficial multispecies relationships within the food web.

To illustrate with an example, in workshop 1, we discussed ways to support pollinating insect communities (concerned about their population decline) through the creation of new habitats and the ban on pesticides. This "matter of care" was included in the role-play script as an agenda item in the LARP introduced by the assembly Chair: "An issue that's come up recently in the sharing policy: so the bees, as you know . . . have been on strike now for six months. They've stopped working". The Chair continued: "How was the Justice Committee proposing to resolve the dispute between the bees and the gardeners?"

The character playing the representative from the justice committee then replied (unscripted), "We are piloting various multispecies assemblies, which have representatives of all sorts of actors on the farm, to give equal voice to them all. But also working closely with infrastructure to meet the bees' demands. Which on the whole don't seem too wild and quite fair". Other members from other committees then contributed to the discussion, representing both the interests of their human and

non-human characters. These scenarios helped us to imagine our emerging food commons and work out a system of governance that would produce and distribute food for the benefit of all species.

In the final workshop, participants developed blockchain-based conceptual prototypes for governing a more-than-human food commons. Together we used these to consider the implications for algorithmic food justice. How could we use blockchain, sensors and artificial intelligence to co-design food governance systems that consider multispecies justice? What risks and challenges would these designs pose? We explored these questions through conceptual prototypes of speculative future socio-technical systems that foregrounded thriving multispecies relations, more-than-human values and fairer distribution of resources.

To give a flavour of the outcomes, DAO'n-to-Earth was to be a London-wide currency exchange for community currencies – to federate and help manage smaller community currencies and scale sustainable interventions to meet environmental challenges. The exchange rate is set automatically according to the soil health data of each community, as measured by networked sensors and AI, and calibrated over time. The better the quality of the soil, the higher the value of that local currency. As a participant explained, “The aim of the DAO⁵ platform was to create a common incentive for people to create healthy soil and transmute that into a positive market value for their community”. This fits within what we have been calling the “sustainability” lineage, in problem-solving, but conversations were wider ranging.

One of the richest discussions took place in LARPing about the problem of vegetable theft (a real problem for the farm). As described in Houston et al. (2023), the discussion circled around punishment, education and rehabilitation of offenders, before reaching the limits of more-than-human justice. The Resources representative asked: “Is justice an anthropocentric concept though? You couldn't expect a carnivorous animal to be just to its prey”. The Energy representative drew hard limits: “Driving other species into extinction is a no-no”. The Coordination representative's answer prioritises the overall balance of the ecosystem over relations between individual subjects: “Mostly, if you create the right conditions and the structure is right then most organisms will exchange fairly and that usually works. And there are a few that will take and not give back, but still, overall, the system works”. In this kind of exchange, we see both rights-based and care-based approaches emerging in a reckoning with ecological entanglement.

As well as considering justice, the project invoked core Participatory Design values of democracy and sharing of power. For example, growers brought up power imbalances and the potential for blockchain-based systems to intensify inequalities depending on whose stories were told. In the DAO'n-to-Earth prototype, currencies are affected by soil health determined by sensors. But such an intervention surfaces inclusion and power imbalances, as one grower highlighted: “If you're focusing on PH or the chemistry of the soil, then that's telling us a story about the soil. A chemical story rather than a microbiological one”. Does the proxy of chemical balance adequately reflect the creatures and plants of that land? Whose stories are technologies telling and who benefits? As a participant said, different stories around data “produce different types of truth” and “could be corrupted in lots of different ways”. Intensifying the capability of these technologies could prioritise some

narratives over others, benefiting some interests over others. A chemical story might support an extractive and profit-driven food system, benefiting humans alone over a regenerative and fairer one that considers interspecies interrelations in a living soil community. Without an examination of these power dynamics, new designs may accelerate inequalities. In looking through both sustainability and entanglement lenses, the project was able to consider critical questions of power and democracy provoked by acknowledging more-than-human relations.

HYBRID MATTERs: Plastic Imaginaries

In the year of 2015, we (Åsa and Kristina) were part of a project called HYBRID MATTERs, investigating hybrid ecologies and the transformation of our planet through human activity. At the time we had just finished our collaborative PhD where we combined feminist technoscience and Participatory Design to explore designerly public engagement in issues around living with technologies. In line with a lot of Participatory Design work at the time, ours was grounded in an understanding of distributed agency between human and non-human actors. It was also part of a move within the Participatory Design community that had started to expand its commitments from participation in the workplace into broader societal issues and emerging publics (Binder et al., 2015; Ehn et al., 2014; Lindström and Ståhl, 2014).

The themes addressed in HYBRID MATTERs were somewhat new to us as they involved a shift from primarily working with social implications of living with (digital) technologies to engaging with long-term socio-ecological implications of design. Put in a slightly different way, we worked with hybrid matters that had come into being in the aftermath of what had previously been made. Within the Participatory Design community the term “non-human actor” was at the time primarily used to acknowledge agency of technological devices and systems. For us, the term and framework of hybrid matters and ecologies became an invitation to expand our understanding and use of the term non-human actors not only to include technologies but also other species and entities such as stones, oceans and fire. This move made us attend to participatory processes as material configurations over long timescales as something that is not only about future-making, which tends to be design’s usual focus, but also taking into account how pasts, presents and futures are intricately intertwined.

Our part of HYBRID MATTERs puts focus on plastics – fossil-fuel-based materials with long histories – and how they come to matter in strange, unexpected and often undesired ways. Plastic is a material that has been central in design in enacting Modernist imaginaries of human mastery over nature in several ways. Plastics have been understood as a passive and malleable material for designers to shape according to their wishes. It has been praised for its durability and its capability to resist decay. It is different from many other materials in that it has come out of scientific laboratories and is named after its characteristic plasticity. More recently, imaginaries of malleability and control associated with plastics have been brought into question. Plastics are ubiquitous and now appear in unintentional constellations and interact with other materials and actors in unanticipated ways – in oceans, polar areas and species of all kinds.

To further engage with shifting materialities and imaginaries of plastics, we invited different groups to engage with two findings related to plastics that, at the time, had generated both curiosity and worry. The first finding was a new geological entity called plastiglomerates (Corcoran et al., 2014), fused from plastic and stone. It comes into being through burning plastic and inadvertent littering, lack of recycling and bonfires. This appeared in dystopian narratives pointing towards the severity of the problem of plastic waste. The second discovery showed that common mealworms can biodegrade styrofoam (Yang et al., 2015), a particular form of plastic. The media portrayed this story as a potential solution with optimism. To move beyond these polarising media responses oversimplifying “bad” and “good” futures and to further explore what we could learn from these matters, we brought them into everyday situations, where participants could make them tangible and negotiable. We hosted walks along beaches in Iceland where we went looking for plastiglomerates. In a separate event, we invited people in the Öresund region, mainly Malmö and Copenhagen, to try out composting their own plastic waste in collaboration with common mealworms.

We focus on the plastiglomerate walks here (for work with mealworms, see Lindström and Ståhl, 2016, 2020).

Departing from normative expectations for design to solve issues around plastic waste, we invited participants to explore how these plastiglomerates come into being, like the practices that have generated this hybrid matter, how we can understand them, to whom and how they might be a concern or a potential resource and what it might entail to continue living with these. The walks were attended by locals, families, tourists, artists, geologists and those who enjoyed outdoor activities. To some people’s relief and to others’ disappointment, we did not find any plastiglomerates. Still the event allowed us to engage with our questions since the walks were designed to encounter not only plastiglomerates but also the different kinds of matters (such as plastics and lava stone), practices (such as having bonfires) and forces (such as currents and waves) that participate in plastiglomerates coming into being. For example, we encountered a lot of plastic waste that potentially could become plastiglomerates in the future. We collected a Christmas tree, a cassette tape, a container for oil, threads from fishing nets, the canvas from a tent, as well as plastic pieces that were hard to identify (Figure 4.3). Some were later taken to a recycling station to yet again become part of plastic products, rather than plastiglomerates.

Following what we have called the sustainability lineage, plastiglomerates were here approached as a problem to be solved by removing plastic waste from the beach. For some, this felt “good” as a responsible visitor concerned with environmental sustainability. However, we reflected that this way of intervening in the becoming of plastiglomerates also has limitations. What would those recycled plastics become, and would they end up on these shores or elsewhere, again? How do we live within the aftermath of design driven by Modern imaginaries of human mastery over nature?

In contrast to the dominant agendas in Participatory Design that seek to empower marginalised groups through an increased agency like voice and visibility, this event became an exercise of re- thinking agency. For us, it revealed distributed agencies

and responsibilities within entanglements that stretch far in time and space. We figured that these plastics arrived on these shores from distant locations and practices, maybe from other parts of the world too. Directing our shared attention towards the multiplicity of activities and lives they are part of, such as celebrating Christmas, listening to music, fishing and going hiking, further emphasised the multiple ways in which we are all, already, entangled in plastics. In other words, rather than considering the ways in which the event enabled the empowerment of marginalised groups, the event had a focus on fostering response-ability amongst a group of more or less privileged actors. We use response-ability here



Figure 4.3 Findings during a plastiglomerate walk: pieces of tent canvas, a container for oil and part of a Christmas tree (photo credit: Kristina Lindström, with permission).

with reference to Haraway (2016), to emphasise the practice of learning to act in emerging, un- certain and entangled relationships and to do so responsibly. This compelled us to recognise the distributed character and lack of control in how plastic comes to be and comes to matter in hybrid ecologies. There are no easy fixes, but rather something we will have to live with for a long time to come. There is no pristine past to return to and no clean cuts between nature and culture. In other words, recognising the distributed character and lack of control of how plastic comes to matter in hybrid ecologies, in this and other locations, could potentially result in a sense of hopelessness or disempowerment, as it does not lend itself to easy solutions. However, recognising entanglements and lack of human control does not mean letting go of a desire to do something. Rather, the act of troubling anthropocentric imaginaries of human mastery of nature entails a shift from seeking empowerment to attending to emerging commitments, obligations and responsibilities (Lindström and Ståhl, 2016), within existing entanglements with plastics. It also means revisiting and learning from commitments that are, or were once, part of our families, ancestries, cultures and communities, to re-ignite the resilient wisdoms we have inherited (Akama, 2021). Emerging commitments in this case involved taking care of waste that we were not directly responsible for, while at the same time recognising our entanglements in plastics.

The event further provoked a range of responses that suggest different ways of attending to, as well as intervening into, the becoming of hybrid matters and ecologies that we are already part of. Some participants, tongue-in-cheek, started to make compositions of findings into a kind of speculative material sketches of plastiglomerates or other forms of hybrid matters (Figure 4.4). One participant stuck

a piece of gum to a seaweed. Another participant pressed small stones into a foam-like material. Others made small installations of collected materials along the walk that were captured in photographs. Yet another hesitated to pick up the plastics that were stuck underneath a stone in a small waterfall where moss had started to grow on top of the plastics. Some of us gathered around this piece of hybrid matter and sat there for a while with the dilemma of deciding whether to pull it out or leave it (Figure 4.5). Taking away and carrying it to a recycling station did not seem like the easy choice when there was a new life growing. Taken together these responses could be seen as attempts to confront or envision ongoing and continued living within entangled hybrid matters.

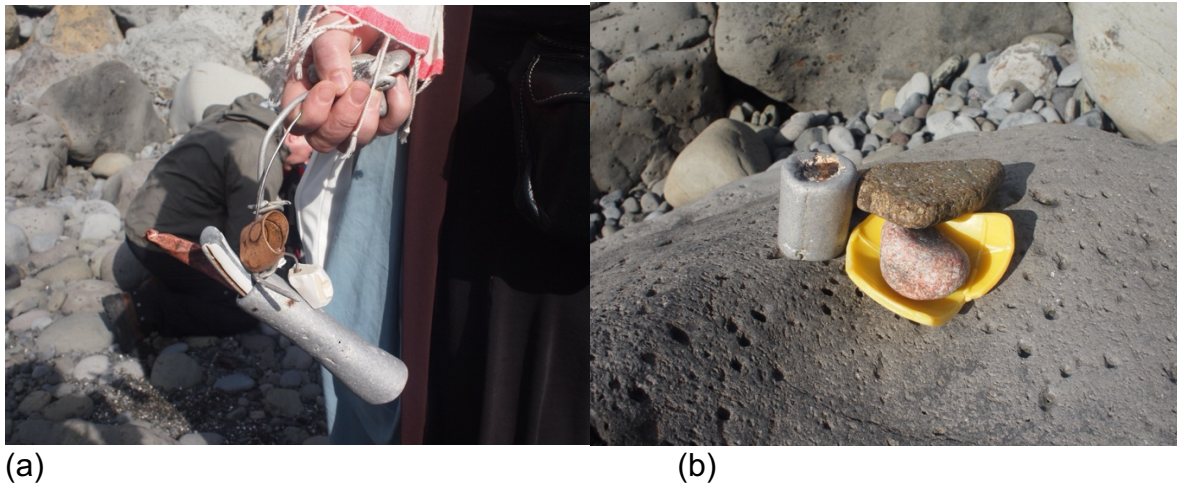


Figure 4.4 Compositions during a plastiglomerate walk as expressions of curiosity about how to live with hybrid ecologies and hybrid matters (photo credit: Kristina Lindström, with permission).



Figure 4.5 A sheet of partly melted plastic that has started to become overgrown and fully entangled in its new environment (photo credit: Kristina Lindström, with permission).

While there are limitations to all of these responses, they point towards an important challenge when it comes to Participatory Design practices. While early Participatory Design was committed to democratising the development of emerging technologies, Participatory Design is now faced with how to collectively respond to and care for the aftermath of design and technologies developed to solve immediate problems and desires (Lindström and Ståhl, 2020). Much like a game of cat's cradle (Haraway, 1994) and located accountabilities, we might not be fully responsible for the patterns we have in our hands, but we need to cultivate our ability to respond and do so with consideration for the patterns we participate in making and handing over to generations to come. In other words, living responsibly with hybrid matters in the aftermath of design driven by imaginaries of human mastery over nature implies that we cultivate the ability to respond to matters that one is implicated in but not fully responsible for. This also requires responses beyond, but not excluding, those available in the sustainability lineage.

CreaTures

CreaTures (a European-Union-funded project on Creative Practices for Transformative Futures: creatures-eu.org; creaturesframework.org) was unusual in applying entanglement logics to both its research design and its analysis of others'

designing, thereby tackling some of the issues raised in moving “beyond sustainability” head on. It set out to resist not just business-as-usual in what it produced, but also the accepted norms of research and the underlying Modern productivist philosophy behind them. The project was devised by more than 30 participatory researchers and practitioners to ask how creative practice could change cultures towards more liveable futures, based on a different understanding of relationality that embraced interdependence at its core and attempted to act on that acknowledgement. We wrote it to incorporate an entangled understanding of relations and to see how these might be generative of new relations within and between the projects and people who participated or came into contact with the researchers involved (see Light et al., 2024). In doing that, we considered all life forms but focused most on relations as they might manifest between people changed by encounters with a different way of thinking (see Light, 2023), to look towards the human in the more-than-human and a concern for our reflexivities and what it is possible for us to imagine.

I, Ann, helped construct the proposal, introducing the overall theme from earlier work (Light, 2011; Light et al., 2018), and led one of the CreaTures work packages. The whole project involved 11 partners and many productions over three years (see Dolejšová et al., 2021; Light et al., 2024), but I focus on two aspects chosen relevant to more-than-human entanglement to ask what we learnt through our research about:

- Considering the human in the more-than-human;
- How trying to enact entanglement puts people and projects in tension with everything around them in practical terms.

CreaTures was an action research project based upon a rhetoric of care, a resistance to abstraction for the sake of it and a refusal of extractive practices. Involving an ambitious plan for recognising the whole person as researcher and learner (with no expectation for emotional objectivity to accompany professional analytic objectivity) as a microcosm of changed human-world relations, it sought to produce analyses that are deeply situated and contextualised. It started from a premise that, although more-than-human futures concern (and show concern for) all living beings, how humans make meaning from relations and what surrounds us, affects all life. Humans are the only species that, collectively, may have the agency to halt or slow the systems that are destroying life across the planet and to prevent the worst of climate change and biodiversity loss (which is not to say that all humans have equal agency). So, a tenet of CreaTures was the decentring of humanity and replacing a hierarchical view of life (where humans dominate) with one that explores interdependencies. In slowing down and working on self-other relations, we anticipated the change we want to see happening more broadly around us: a cultural shift towards responsiveness and a new gentleness towards the damaged planet. We embraced and enacted this ethos for two reasons: first, it enabled us to be the change we wanted to see and attempt to bring this into the world; second, this approach is (perhaps the only one) congruent with understandings of agency that acknowledge interdependencies and entanglements, so this complemented more traditional forms of trying to exert influence. In this, we heeded a sense that “we do not need to attune ourselves to the entanglements and encounters of being-with, becoming-with, and living-with; these relations pre-exist us. We need to attune our

judgement to experience these relations fully and allow (endlessly) different potential to emerge” (Light, 2019).

The theme of the project was that creative practices (broadly understood as work by designers, artists, cultural workers and citizen-led collectives) can mediate complex issues of climate change and social inequalities. These practices include a wide range of aesthetic, affect-driven, reflective and participatory approaches designed in different ways to enact societal change, though often poorly resourced and badly understood in their goals and achievements (Light et al., 2018).

Of particular significance, some artist work addressed (inter)species relations, hoping to impact how people understand themselves as part of the world, relate to other species, embrace the need for greater social and environmental justice and protect biodiversity (see Light et al., 2024b). Some processes included quite specific more-than-human elements – we were invited to centre ourselves in the relations of another type of being as part of the play. Furtherfield presented *The Treaty of Finsbury Park*, where more-than-human negotiations are in play as humans take on the roles of other species to consider a future for the open spaces of London (Light et al., 2024b). Superflux staged *Invocation for Hope*, where the burned forest gives way to a flourishing clearing in which we see ourselves alongside neighbouring species. By contrast, some projects proposed different care relations and enacted them through new social structures or encounters with others (Dolejšová et al., 2021). Cassie Thornton’s *The Hologram* continues to offer a (sub)version of healthcare where emotional, social, and physical support comes in an ever-reproducing viral triangle of friends (Thornton et al., 2020). There were at least 17 more sponsored works, designed and iterated to affect people’s sense of themselves. Some targeted global systems of oppression using creative means and some focused on local action. While these were more human-focused, they upheld the values of relating differently and with more alignment to other creatures and all made moments of reflection possible, more or less explicitly articulating the changes they intended to make as part of making them. Further, most brought individuals or small groups to consider existential issues through affective interventions designed to help people see themselves and their worlds differently. So, we might see a third commitment – to reflexivity – as part of the overall project thinking about more-than-human concerns. This might be understood as a way of getting to a more-than-human approach in Participatory Design, starting with the entangled researcher-practitioner-self.

Instead of focusing on the problems of climate emergency and other crises, a common interest was collectively creating desirable paths away from existing values and finding new possibilities in the journey, impacting people’s sense of meaning. This was performed by helping people to encounter themselves as one living being among many types and to reflect on how that position relates to connection and belonging. It proposes an intrinsically entangled way of coming at the world: linking local actions to the wider movements of the planet and its politics so that interdependencies become more tangible. We hoped for care, rather than success, growth or independence, to operate as a core value. *CreaTures* concerned itself with transformation, not just once, but in an acknowledgement of the intrinsic flow of the world around us. But this emphasis also accepted that the relative certainties of much Western future(s) planning give way to a situation where there are no future states to propose, but only a period of flux to embrace.

This is caught in what is (as close as we got to) a CreaTures manifesto: a definition of the term that we began to use for articulating our vision, CreaTurely:

“Being creaturely incorporates our understanding of eco-social change: it is post-capitalist, playful, more-than-human and fundamentally relational . . .

“CreaTures transformative practices encourage this creaturely-ness Creaturely ways of doing aim at capturing the paradoxical connectedness and separateness of being alive. Given the struggle for language that talks of changing/changed ways of being, we offer creaturely as a placeholder for gentler, connected, pluralist and life-focused ways of doing, being and making. The term is an adverb, not a noun – it points to a way, not a state” (creaturesframework.org).

Multiple intellectual strands were woven together in the concept of creaturely, though the more-than-human is evidently a guiding factor. As an overall way of working, the project was characterised by a strong commitment to plurality. Practitioners’ productions were designed to support transformation in multitudinous ways – the research team did not produce an a-priori definition of what transformation should be but used the work being observed to understand what creative practitioners were trying to achieve and how. While some artists involved were more oriented towards rights for all, eco-social justice and what that meant at meeting points between lifeforms, most were oriented towards care for all or simply making visible other worlds, and these nuances were a subject of discussion for our understanding of more-than-human relations. This range in itself became a research finding.

Despite the scale of activity, we formed the project to be intimate, entangled and involved in people’s lives. The many studies we made became part of a whole that also had these values. This raised tensions between a rationalist model of activity (linear, objective, categorised, segmented) and a pull towards mutual trust and creative emergence. In upholding entanglement from philosophy to project design, the work was explicitly engaging with “alternative” onto-epistemes which value interdependence, but also looking for something positive and even joyful in the possibilities ahead of us. In this, it deliberately contrasted itself with the norms of European funding, evaluation and production, with their ethos of problem-solving at a time of great risk and focus on accountability. However, we had to follow EU rules of reporting and commissioning in making creative work, which created tension throughout. Research into the productions further exemplified these tensions: on the one hand, we sought to capture, break down and analyse creative partners’ practices, strategies and ambitions and, on the other, to respect the complexities that come with working across systems and focusing on complex societal-ecological relations. This incommensurability followed us about, caught in encounters with our project assessors who held conflicting values to ours, yet became a proxy for the funders to judge the significance of the work. The same incongruity ran between the formal project structure of work packages and the actual activities. At any time, most people were working across these structures as well as within them. Regular, frequent meetings in different groupings within the project team produced collaborative knowledge, culminating in investigating the project itself as a form of Participatory Design.

However, this was clearly not a conventional Participatory Design project, despite being participatory in its preparation and execution. The experimental productions

were not the end point and the artefacts being created by them were not products or systems as such. The outcomes were intended to be changed participants, holding new understandings or an increased sense of agency, and it was mostly open to participants to decide what this might mean. Further, the partners had no intention of scaling their processes in traditional ways but instead were inclined to operate outside, or in challenge to, capitalist paradigms and avoid contributions to growth. CreaTures was necessarily unlike more traditional sustainability-focused design activities. We realised it might be possible to make the project itself a practical contribution to interpreting the difference in philosophy that we wanted to make as participatory designers. In this, as in the opportunity to see ourselves as other forms of life and discover our connections, we played up more-than-human relationalities to make them legible and open to interrogation, so, in our writings, we stress plurality, co-authorship, the paradoxes we face, the tension between different forms of knowledge and, perhaps above all, reflexivity as people bridging incompatible worlds. We might expect similar organisational and methodological faultlines to run through all work that seeks a different relationality. It will be counter-cultural and, if it eschews current forms of categorisation, segmentation and evaluation, it needs to be very clear about what it offers instead. For us, this was captured in a framework for designing and evaluating experiential projects, offering dimensions for attending to affective and prefigurative change and challenging current modes of evaluation ([https:// creaturesframework.org](https://creaturesframework.org)).

Discussion

The cases we describe earlier help illuminate the distinctions of lineage but also problematise them. Sara's case may be most familiar for Participatory Design: it intervenes in injustices experienced by marginalised members of a community and seeks to design new prototypes and methods for more-than-human food futures. Åsa and Kristina's case explores being-with plastics, once manipulated and highly valued, then reviled when they find a home inside our bodies or on seashores. Ann's CreaTures case is a study of how transformation might be attempted within (a recognition of) entangled relations.

These contrasting explorations suggest that lineages and branches are never clean separations, even if they are presented that way in an academic book. In showing the branches connected to tree trunks and roots, we hope to underscore that theories and practices are already entangled at the base (Figure 4.6). Nothing, including knowledge, is ever isolated. Knowledges are ontological instruments that make worlds, so those wielding research, analysis, thinking and writing must take care of what they propose.

The cases are not aligned in their understandings of what change is to be made or what methodologies are needed: they demonstrate that our relationships to many worlds can always be different, in different ways. Each makes an offer as to how. Multi-epistemic collaborations are fundamental to revaluing human-nature relationalities and attempting to move away from separation towards entanglement. Underscoring this is another point: that self-awareness is a constant necessity since we are part of making worlds. This includes interrogating values and worldviews sometimes taken for granted, including the tenets of Participatory Design. The cases invite us to sharpen our understanding of ourselves and more-than-human

relationships. They suggest ways in which we might revisit the ethics of our relationships, rediscover relationships and revalue them. Such acts are needed in systems change, not to mitigate the crisis and abuse of present regimes, but to appeal to regimes of care and fulfilment.

We have been deliberately provocative by selecting familiar Participatory Design principles, such as rights, fairness, democracy, inclusion and empowerment, to explore – to reveal there is no easy transposition when entangling with more-than-human relationalities. However, this does not mean abandoning Participatory Design tenets. In fact, the cases confirm how these are critical in combating human-made structures and processes that harm ecosystems.

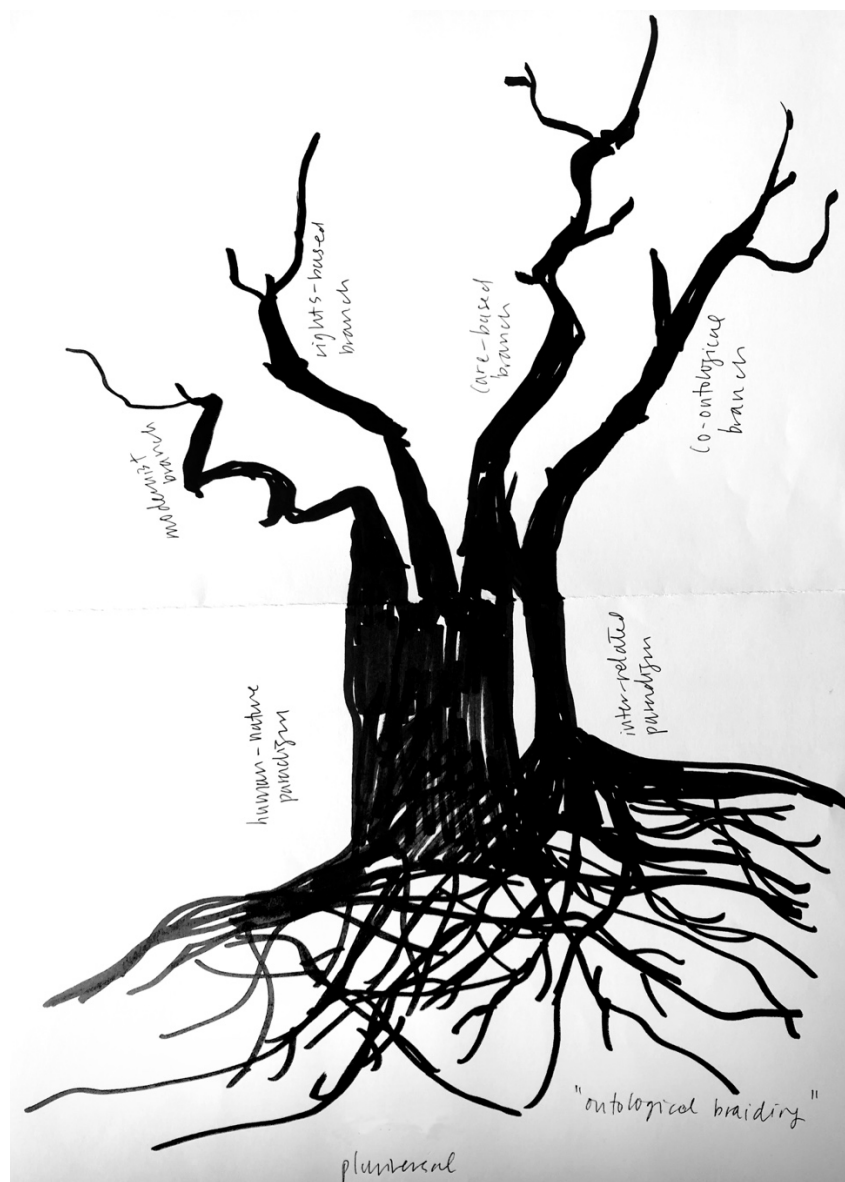


Figure 4.6 Entangled theoretical roots (image credit: Yoko Akama, with permission).

From Rights to Relationalities

A more-than-human agenda may not sit comfortably for Participatory Design practitioners because the prevailing value system in Participatory Design is based

on social justice relating to human rights. Forlano (2017) warns that posthuman and more-than-human perspectives may make room for multiple subjectivities, but may not serve those who have historically been considered “less-than-human” and excluded from society, based on intersectional categories such as gender, race, religion, class, sexuality, belief systems and geographies. While Forlano argues for taking this critique seriously, she also suggests that works intending to decentre the human share this politics, “in that they aim not to essentialise distinct categories, but rather to complicate them and illustrate the ways the human and nonhuman, nature and culture are mutually co-constitutive” (Forlano, 2017, p. 29). Much more-than-human work starts by rejecting all discrimination and domination, revealing the same abusive powers at work across disadvantaged humans and non-humans and arguing for fundamental change. If we abandon vertical power structures, we also abandon difference as the basis for structural exclusion (while remembering to stay mindful of the effects of current regimes).

Concern regarding a narrow and literal framing of “voice” and expanding “stakeholders” troubles the rights-based lineage of the sustainability branch. Those drawn to Participatory Design commit to the ethics of listening to those who are experts in their own lives, yet often excluded. Some rights-based literature extends this to non-humans. Can we engage non-human actors directly as participants? Do we need human intermediaries to speak as, or on behalf of, non-humans? Sara’s case shows how these questions can arise and examines them. The team used role-play to embody and enter the spirit of a non-human like a bird, farm animal or honeybee, and to speak for their interests, that is, species were individualised through a human-individual. While informative in context, this cannot be undertaken naively. Sara’s study sought to sensitise participants to issues in this way, ready for a design workshop. Yet, individualising a creature still separates out the creature from its entanglement with species and ecologies (Anzaldúa, 2007). Problems with human-individual mindsets are revealed starkly when one group of stakeholders is potentially the meal of another. What “co-existence” can the role-playing human negotiate? Species eat other species to live and for ecological cycles to continue. As shown in Sara’s example, this upsets notions of justice or inclusion. The rights-based framework of the sustainability lineage is not based on relationalities within ecosystems. Sara’s insights help us see how tricky it is to overcome human-nature separations, including in how we design our methods and technologies.

Nonetheless, the cases affirm that Participatory Design principles are vital in working with and listening to those with specific expertise and enduring relationships with non-humans. Sara’s project involved community growers with ancestral wisdoms such as how to grow crops not typically grown in a UK climate. These communities have intimate knowledge of interspecies relationships supporting regenerative agricultural techniques. By recognising people holding long, close relationships with specific non-human species and places – now and in the past – we learn how we may continue contributing knowledge and experiences to collaborative design situations. Knowledgeable, concerned humans must continue to represent non-humans and voice their stake and value in redesigning exploitative and harmful systems. There is no easy transition to a new system, but finding multiple ways of encountering being-with-relationalities may begin to deal with the complexity (and complicity).

Power, Structure and Democracy

Reflecting on rights leads us to ask what happens to Participatory Design's democratic commitments when we broaden concern to non-humans. Farmers with hands deep in rich ecology understand soil liveliness (Puig de la Bellacasa, 2015), but are not powerful enough for their voices to be heard. In Sara's example we learnt how Artificial Intelligence and big data selectively "listens" to a "chemical" story rather than a "microbiological" version, exposing how the entire game is rigged – and riddled with human-nature divisions. What gets "counted" is atomised and lifeless, used to extract value and enrich shareholders rather than promote a dynamic web of relations within a living soil community. There are hierarchies: Artificial Intelligence and big data in agriculture have more power than experimental farmers, let alone the microbes-of-soil. Democracy for non-humans is mired in the same limitations as the rights-based framework because individualism is carried into democracy by the way it counts representatives in decision-making processes. Arguably, microbes should have the deciding power if this system is taken to its logical conclusion. While this illustrates the limits of transposing democratic values to more-than-human ecologies, it also shows the importance of Participatory Design tenets that we work for and with minorities to keep addressing power-asymmetries between actors, such as farmers versus large agribusiness.

Important in this is how both Ann's project, as an overview, and Sara's project, in its detail, demonstrate the relevance of playful, speculative, embodied approaches for more-than-human Participatory Design practice. They provide important avenues to pay attention differently to entangled relationships that elicit profound experiences in some participants. Sara and her collaborators suggest that the LARP was "ultimately an exercise in failing at more-than-human design" (Houston et al., 2023). However, in recognising the anthropomorphic irony of speculating how bees could go on strike so that humans would reasonably support their demands, they creatively deconstruct human governance structures. The improvisational qualities of gameplay allow lively spaces, entertain "absurd" scenarios and invite shared, emotional experiences to foreground co-existences. What we might learn from this is the importance of not knowing, but experiencing, relating and being-with. Arguably, this is not a failure but the promise of what creative approaches to research can always offer (DiSalvo et al., 2009).

Kristina and Åsa's Plastic Imaginaries example shows a way of governing without steering towards parliaments of voices. Rather, practising agency by approaching and taking action on that which is speculative, curious and repulsive is a way of not letting others decide how to interpret new emerging relationships and entities. It is a way of understanding democracy as something we do the everyday with one's own body and presence on location.

The theme of Ann's CreaTures project – how creative practice can be transformative and inspire cultural change – takes up these questions. As part of the work, the team developed an evaluation strategy stressing the creative act of evaluating – this was undertaken to help redress the balance between artist-activists, who anticipate new worlds and the constraints of funders, whose priorities are based in present worlds where values of efficiency prevail. The nine categories of design/engagement/impact stress the embodied, affective and inspirational. Divided into three clusters, they propose to change meaning (embodying, learning, imagining), connection (caring,

organising, inspiring) and power (co-creating, empowering, subverting). An activist approach to evaluation was understood to be a core part of helping accountability cultures to transform into more compassionate spaces. While evaluation itself prioritises accountability, by simultaneously criticising it and making a radical version core to its activity, CreaTures has hoped to question these aspects. It is notable that the Participatory Design ethic of co-creation is one of the nine dimensions stressed as foundational to rethinking dynamics.

CreaTures can be seen as a bridging project, working in hybrid ways to include different world-views, stretching from artists interested in overthrowing the injustices of capitalism to those anticipating new forms of engagement based in care. Its mission was, in part, to create dialogue between different philosophical orientations and show how to stay faithful to them. In this exploration of power structures and imbalances, CreaTures' outputs were oriented to the difficulties of translating concepts such as democracy into worlds informed by entanglement and determined to support attempts.

Not More Stakeholders, but Deepening the Engagement

If plurality is intrinsic to more-than-human relationships, the concern becomes less about the inclusion of different non-human “participants” and diversifying representatives and more about deepening relationships. In two of the cases we use, the authors are not concerned with a tangible outcome, such as a better product: relationships are the focus. Åsa and Kristina's project invites intense engagements with non-humans deemed value-less as waste and, further, harmful as polluters. Through their work, we are invited to find footholds to renew our relationships with plastics, acknowledging that, despite best efforts to recycle, these materials are likely to be turned into further plastic objects only to be carried along currents to end up on further shores. This throws up sharp tensions in “sustainability”, revealing the delusion of productivity in re-processing waste. Plastiglomerate is a fusion where process and outcome can no longer be separated, used to show the web of production and reproduction at its starkest. Their exploration and eye-witnessing of everyday objects found on Icelandic beaches take us into this web, in which we are all implicated and show it afresh. They invite us to step in and “stay with the trouble” (Haraway, 2016), showing care and compassion in living with such open wounds. The focus is less on inclusion and empowerment and more on cultivating response-abilities in matters we are already implicated in. This might mean taking care of the consequences of that which one has not individually contributed to, but still share, in a culture of interdependencies.

This fundamentally questions the borders of “participation”, with its implicit statement of selectivity and the (sometimes arbitrary) way that this manifests. Just as Participatory Design practitioners wield power in choosing particular human stakeholders (Light and Anderson, 2009), so issues of inclusion and choice continue into more-than-human politics. For instance, it is easy to choose species or features of a landscape that are charismatic, preferred and uncontroversial, like dolphins, forests or waterways and there may be reasons to do so; we might need persuasion before focusing on mayfly, nematodes or bacteria. Åsa and Kristina's example is interesting for engaging with waste, commonly discarded as distasteful. It asks about the designer's intrinsic hubris in choosing cases, creatures or species.

Ann's case puts human experiences in the context of the more-than-human, asking if we can abandon human-exceptionalism. The project examines possibilities for different ways of feeling and meaning-making in a world where all of us are already entangled in the systems and structures that perpetuate harm and maintain human-nature divisions. Acknowledging that we may all be "victims", yet complicit in such violations, asks us to be reflexive of our privilege, power and politics. So, while CreaTures may not, in its aggregated whole, seek to work with other species, it is profoundly concerned with how we relate to them and what needs to change in our encounters, despite journeying into unknown territories. Reflecting – and applying a reflexive process through-out engagements – is fundamental to achieving new relations, allowing new alliances to develop.

In finding alternatives to relentless "solutioneering", we may hear, see and feel differently and find new ways to work. We live with a paradox, that to transform even to the extent of abandoning a rush to progress is a design challenge, but one that cannot be solved; it is a predicament to be managed. In redesigning Participatory Design to take on board these different, more entangled, traditions of thought, we may be able to reshape our trajectories through our challenges, but the outcomes may feel and look wholly unfamiliar.

Conclusion

The 2013 handbook (Simonsen and Robertson, 2013) captured an important moment in Participatory Design that recognised the shifting frame of reference and locus of ethics and politics in expanding beyond ICT and the workplace. In honouring that precedent, this chapter has examined shifts in ethics and politics in expanding Participatory Design to accommodate a fuller embrace of more-than-human relationalities. We honour another precedent in Participatory Design too: that we respond to change in the sites of design, technology and systems by continuing to broaden and attend to the new relationships created and the politics that come with them. This includes extending our commitments beyond the immediate implications of new designs and technologies to collectively care for long-term implications. To do so allows us to consider how designs have mattered and will continue to matter in more-than-human relationalities. Such accountability asks us to regard history and learn theories of agency and the potential of our own contributions.

We have shown that embracing more-than-human relationalities is neither merely including non-humans in Participatory Design processes nor finding methods for their "participation", but instead a philosophical undertaking. We have shown how entanglement necessarily goes deep to questions of worldview, values, of being and becoming-with and how human/nature lines are drawn or erased. When we regard ontological co-existence, we generate possibilities for change in why, what and how we practice Participatory Design. It has been with this end in mind that we have juxtaposed different philosophical lineages (sustainability vs entanglement) alongside the different types of practices that ensue. Our goal has been to offer insight into why these differences are significant and what informs them.

In closing this chapter, we offer some questions about our designing for the Participatory Design community and those considering more-than-human Participatory Design:

- How are we attending to the presence (or absence) of non-humans?
- Where do our theories, methodologies, mindsets and worldviews come from? How might we trace their lineage to understand the cause and symptoms of perceived human-nature separation in Participatory Design work?
- What means might strengthen reflexivity and confront the values, assumptions and worldviews that we take for granted and that perpetuate damaging binary thinking?
- Which systems, structures, principles and procedures are eroding care-based interdependencies?
- What Participatory Design actions are critical to addressing this?

Notes

1 www.independent.co.uk/climate-change/news/phone-electric-vehicle-congo-cobalt-mine-b2277665.html

2 This acknowledgement is not a novel way of thinking or a new paradigm, having its roots entwined with ideas that precede “civilisation”.

3 PDC’20 was planned for hosting in Colombia, but it coincided with COVID-19 pandemic, so the conference manifested virtually.

4 There is no space to discuss ethically and respectfully engaging with Indigenous cosmopolitics. See Akama et al. (2020) that advises “a reflexive, ethical vigilance”.

5 Decentralised autonomous organisation.

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