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Permeance. A demodern artistic process for more-than-human collaborative practices in Participatory Design.

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Urgent socioenvironmental questions require traditionally human-centred disciplines, such as design, to adopt pluriversal stances. In this paper, we address pluriversality in Participatory Design (PD) through a collaborative more-than-human art-design process that engages with the concept of the demodern and is attuned to critical posthumanities. Within these two theoretical frameworks, we present the situated project ‘Permeance’, which, through an art-led methodology, rethought the tools of mapping, photography and chromatography to offer a demodernising alternative that accounts for human and more-than-human participation on equal bases. We discuss how critically and experimentally addressing common design tools, such as mapping or photography, can shape the creative design process and lead to generating alternative knowledge. We advance an art-led approach to developing well-suited tools and processes for more-than-human collaboration in PD. Lastly, we illustrate the transformative potential of an artistic methodological approach in a PD process as a means to initiate socioenvironmental action for change.

Keywords: demodernising, art, Participatory Design, chromatography, more-than-human

Introduction

Facing the contemporary and pressing socioenvironmental challenges, the human-centred foundations on which Participatory Design (PD), Co-Design, and, more broadly, design operate are increasingly being questioned (Akama, Light, Kamihira 2020). From a Western perspective, collaborations on equal footing between more-than-human and human participants are starting to emerge, contributing to reimagining pluriversal ways otherwise. We inscribe ourselves in an ongoing endeavour in Co-Design to include pluriversal perspectives to fill a knowledge gap in design which is crucial to effectively tackle environmental degradation and social injustice. The paper introduces ongoing research into the potential role that art practices can play in

enhancing human and more-than-human participation.

Through the ‘Permeance’ (de Gaetano 2022) project, this article advances an artistic approach that questions common design tools to propose alternative forms of engagement with more-than-humans in design practice. ‘Permeance’ was pursued by the first author (FA), a doctoral student working in the fields of architecture, anthropology and arts, and is collaboratively articulated into this paper with the two supervisors, coming from architecture sustainability and PD backgrounds. Through the experience and reflections of the FA during the artistic research process of ‘Permeance’, we outline a theoretical consideration of the project’s methodology and tools and advance their applicability within Co-Design processes.

Within the area of Co-Design, we focus more particularly on the field of Participatory Design (PD) due to our affinity to its historical interest in political aspects of participation, and its disposition to opening human participation to more-than-human collaborators. Furthermore, we place our contribution amongst the numerous politically engaged publications of this journal (Schoffelen et al. 2015; Huybrechts et al. 2020; Zuljevic, Roosen and Huybrechts 2023), the longstanding attunement to plural voices (Akama 2015; Rice 2018) and its expanding interests in pluriversality and decolonisation (Smitheram and Joseph 2020; Öz 2023).

As all disciplines rooted in modern knowledge, design research that strives to align itself to a decolonial practice, has to confront the basis on which it operates. According to Vázquez (2017), a decolonising design research practice ought to operate on the twofold front of modernity and coloniality to undo a discipline which reproduces this nexus through ingrained tools, methods and concepts. Likewise, Tlostanova (2017) questions the naturalised forms of operating relationality with the world, which design can perpetuate through coloniality as ‘a control and disciplining of our perception and

interpretation of the world, of other human and nonhuman beings and things according to certain legitimised principles' (3). We, thus, are in need of novel ways of relating, perceiving and understanding the world to shape design knowledge which aligns with decoloniality and pluriversality. However, for this special issue, we will address the ongoing discussion on pluriversality and decolonisation through the concept of the demodern. We borrow this notion from emerging conversations held between scholars from the disciplines of arts, curation and architecture (Esche 2017; Hilal and Petti 2018). We understand the demodern as complementary to the rich discourse on pluriversality and decolonisation. Specifically, the demodern emerges to address coloniality by confronting the modern narrative of progress from a Western positionality. It enables us to participate in the ongoing effort of decolonisation from our situated histories and knowledge, the specific case of this investigation lying between Belgium and the Netherlands. In this paper, we will advance how the demodernising effort can contribute to reshaping Western knowledge to align with pluriversality by presenting a detailed description of the case study 'Permeance'.

Picking up Vazquez's (2017) and Tlostanova's (2017) calls to propose design tools which respond to the need to decolonize, in this article, we present an art-led approach which rethinks the commonly-used design tools of mapping and photography. Design research which adopts conventional methods of visual investigation, often does not take into consideration their limited portrayal of reality. Nor does it acknowledge its complicity in reproducing hierarchies and perpetuating abstract, dominant and homogenising narratives (Tlostanova, 2017). Prevalent design tools such as photographs or maps, which present themselves as objective and universal representations, need to be contextualised as specific lenses onto the world. Tlostanova (2017) calls for design aesthetics which exceed this norm. We advance a critical review of these visualising

means, exploring ways of coming to terms with, confronting, and undoing modern design devices (Vázquez 2017) by proposing a demodern alternative. In the case study, we will present how questioning art tools in design research allowed the FA to perceive the site differently and critically investigate an extractive and polluting industry.

Art and design share a longstanding history, with disciplinary boundaries being, at times, blurry. Design scholars have addressed how an aesthetics of participation, which is collaboratively shared and created, might look like (Holt 2015; Smitheram and Joseph 2020). For example, Smitheram and Joseph (2020) report on a design research investigation which employs art as ‘a methodological framework to guide practical research’ (Vannini 2015 and Schadler 2019, quoted in Smitheram and Joseph 2020). In their words (Smitheram and Joseph 2020), the art-led project allowed them to recognize ‘that creative practice enables alternative forms of understanding through artistic experimentation and aesthetic production’ (301). We, too, argue that art-led design research, employed as a methodology of investigation, paired with critical tool development, can enhance the transformative and political engagement needed to recognize socioenvironmental co-constituency and act towards justice for all. Moreover, PD particularly, intended as ‘socio-material assemblies’ (Manzini and Rizzo, quoted in Holt 2015) of collaborators, lends itself to bridge human and more-than-human relations through art (Holt 2015). As an evident example, Holt (2015) proposes designers and artists to engage with ‘elements of the environment itself – soil, plants, water, etc. –’, wherein the environment ‘is itself a user’ (151). For Holt (2015), this ‘is not a theme to be explored, an idea to be given material, aesthetic form, but itself an active participant in an ongoing practice’ (151). Design’s role, then, is to provoke transformative change beyond mere spectatorship (Holt 2015), in which ‘design is the shift from displaying knowledge about a subject to the subject representing itself’ (Hein 2000 and Message

2006, quoted in Holt 2015), a key aspect which we will encounter in the case study. Furthermore, exceeding forms of art and design which enhance subjective and individual experiences, the relational aesthetics of art in PD also allow space for a political dimension. In fact, Holt (2015) underlines the role of art not merely being that of representing an idea of our environment but rather that of ‘forming assemblages enacting and thereby modifying environmental, political, and economic concerns’ (151). PD project’s objective remains to provoke transformative experiences in the participants. For a complete overview of the history and intersections between PD and participatory art, and their social and political dimension, we refer to Holt’s (2015) article.

In the case study, we propose art as a research process and as a tool of investigation into more-than-human and human relations in socioenvironmental concerns. Through site-specific art, the FA’s research strived to ground in the context and engage with its materiality to reflect on how the local stories are implied in and perpetuate larger questions of coloniality. The processual understanding of a site through situated engagement, combined with the permeability of a site to surrounding socio, environmental, economic, historical and political broader dynamics, makes site-specific art an apt tool for bridging local to global concerns as called for in PD (Dolejšová et al. 2021; Huybrechts et al. 2020; 2022). However, as mentioned above, relying on conventional anthropocentric tools or methods may prove to be ineffective when attempting to engage with the complexity of situated practice. Instead, maintaining open-ended critical design research requires tools and processes to be reinvented specifically to investigate each studied case. With this paper, we invite design researchers working with more-than-human participants in PD to experiment

with methodology as a fundamental step in unrestrained inquiries responding to pluriversality.

To address the interaction with more-than-humans through art, we coupled the search for apt methodologies to demodernising with the framework of critical posthumanism. Through this approach, we wish to address the reciprocity between environmental and social concerns. Furthermore, through a posthuman lens on the project, we attend to the issues of voice, agency and representation of more-than-humans and strive to resolve hierarchies in PD collaborations. We pair the two frameworks with insights into the transformative role of situated art in design processes through reflections from the case study ‘Permeance’.

Fundamentally, in this article, we aim to answer the following: *how can artistic approaches inform design research processes to enable more-than-human collaborations in Participatory Design to politically engage with socioenvironmental challenges?* Additionally, we also respond to the subquestions: *how can we rethink design tools through a demodern art practice?* More in particular, in this research case: *can chromatography, as an artistic research tool, facilitate a demodernising approach to PD between human and more-than-human collaborators?*

Following the initial chapter [1] introducing the case study ‘Permeance’ (de Gaetano 2022), we will consider how the case study can be informative for design research, in particular for PD, in four stages:

as a *process* [2] presenting the concept of the demodern, which guided the artistic practice and its applicability in design research;

as a critical reflection on *tools* [3] describing alternatives to the commonly used photography and mapping and its relevance for the repoliticisation of PD aesthetics;

as *participation* [4] with more-than-humans in design research through chromatography, linking to the discourse of critical posthumanism in PD; and as *transformative potential* [5] of situated art methodologies applied in PD scenarios.

[1] Case study: ‘Permeance’

A small river meanders through the Campine, the Dommel, crossing the border between Belgium and the Netherlands. At this confine, a zinc smelting factory has dumped for over 125 years industrial wastewater containing high levels of dissolved cadmium and zinc into a ditch which runs along its terrain (De Jonge et al. 2008; Wijngaard et al. 2017). These heavy metals are carried by the stream from the industrial site to the environment surrounding the river, binding to the sediment of its river bed and banks. To this day, the soil of the area still has dangerously high levels of heavy metal contaminants, which pose a threat to both aquatic and terrestrial ecosystems (De Jonge et al. 2008; Wijngaard et al. 2017), entering the bodies of algae, worms, cows, humans alike. The movement of such pollutants through this particular environment of the Campine became the focus of this case study. However, the displacement of zinc ores has also connected sites of manufacturing to sites of extraction, both landscapes which have long histories of degradation, contamination and dispossession.

‘Permeance’¹ (de Gaetano 2022) is a mixed-media artistic research which investigates in a more-than-human Participatory Design process the story of heavy

¹ The title of the project borrows the notion of *permeance* from the material sciences, which understand permeance as the rate at which a certain material allows the transmission of other matter.

metal pollution in the river Dommel. During the project, the FA used art as a way to engage in dialogues in the field, with the field itself, through artistic artefacts and exhibitions. Continuing, we will alternate between descriptions of the fieldwork and the art practice, documented in notes and reflections, and theoretical considerations which guided the artistic research process from the perspective of the main artist (FA).

[1.1] Exposing a polluted river: soil chromatography

The traces, invisible to the naked eye, of heavy metal contaminants accumulate in and cause slow deterioration of living bodies. The effects manifest as blooms of the most resilient and the voids left behind of the less adaptable. When ingested, cadmium trickles through the ecosystem. I wonder, how can we speak of our bodies and landscapes, affected by heavily embodied pollution, yet so elusive to witness? Instead of the effects on the environment, could the soiled river itself be manifested? ²

‘Permeance’ materialises through the medium of soil chromatography by using earth samples gathered along the polluted Dommel river (see Figure 1). Chromatography is a compound separation method which operates through the absorption of matter into a light-sensitive medium (Kokornaczyk et al. 2017). The single elements disperse into a paper, arranging in patterns which become visible through a photographic reaction. The technique colourfully visualises the chemistries of a given solution, which is commonly used as an analytical indicator of a sample’s compounds. Pfeiffer’s circular chromatography is a scientific method used in laboratories, mainly to assess the chemical composition of agricultural earth samples (Kokornaczyk et al. 2017). As indicators of soil health, chromatographies’ complex patterns represent the levels of mineral content, organic matter or hummus, in which a more complex design implies a

² We report in italics excerpts from the FA’s fieldwork notes elaborated as reflections.

more diverse and flourishing soil (Kokornaczyk et al. 2017). Additionally, intense warm hues stand for good quality earth, and cooler colours represent poorer microbial activity (Kokornaczyk et al. 2017). The colours and patterns visualised through chromatography indicate, in the case of ‘Permeance’, the health state of the river ecosystem affected by heavy metal industrial pollution.

Chromatography visually reveals to us how differently composed soils are, each sample containing a distinctive arrangement of molecules, every earth as its unique fingerprint. It offers a peek into the complex composition of the soil, which reflects the convoluted stories of ecosystems living on it, as well as the human footprints of labour, all stored in the chemistry of the earth.



Figure 1. Sixteen Pfeiffer’s circular chromatographies made of earth samples of the river Dommel (FA’s own photograph).

[2] A demodern process

The exploration of art as a research approach which informed the ‘Permeance’ project was guided by the concept of the *demodern*. In this chapter, we give a brief introduction to the term and describe how we position ourselves and the project’s methodology within it.

Demodernising or, more precisely, *demodernity* is a concept developed in a conversation between scholars Alessandro Petti, Sandi Hilal, Emilio Distretti, Charles Esche, Rolando Vázquez and Walter Mignolo. Together, they reflect on the potential of demodernising practices in art, curation, architecture and education to conceive how to intervene in modernity’s pervasive rhetoric of progress. These considerations stem from the need to expand the theorizations, to address its working specifically within Europe and counter the loss of futurity it generates. Indeed, the discourse proposes to confront modernity’s coloniality from a Western positionality, contributing to and complementing the decolonial effort. Stepping away from modern and colonial constructs that do not enable just futures for all requires both decoloniality and demodernity (Esche 2017; Hilal and Petti 2018). Although the two concepts are not synonymous, both contribute to pluriversal knowledges that undo colonial differences (Vázquez 2017).

The continuing conversation on demodernity is open-ended and serves more as a research approach for practical investigation and a means for reflection rather than offering a consolidated theory. However, we would like to build upon the discourse by positioning our reflections on demodernising art and design in Western Europe, specifically among marginalised territories and people, deemed unproductive and backwards, that have fed the modernisation of the State through the exploitation of labour and nature, and have been carved up as sacrifice wastelands and expendable

beings. Demodernity here, should not be understood as a total rejection of modern technoscience (and a return to the pastoral) but rather as an inquiry into questioning modernity's progress and upholding of coloniality in and from the Western context.

In what follows, we explore demodernity through the development of the 'Permeance' project, giving precedence to an understanding of demodernising research through processual and empirical knowledge grounded in art-design practice.

[2.1] Practising the demodern

From my excursions to the river, I brought back sixteen samples of earth. On the sterile lab table are sixteen Petri dishes, each with a round filter paper. I label the collected samples and arrange each next to a Petri dish. One by one, I process the soil samples into a solution using demi water. Careful to not cross-contaminate, I pour the earth solution into separate dishes. Quickly, the soil chemistry starts arranging into the papers, each into its own shape. While exposing the chromatographies to UV light, the colours of the soil's chemicals begin to emerge. The sixteen images are soil photographs of samples gathered from different moments along the river: at its source, among agricultural fields, near the industry, at the site of wastewaters entering the ditch, and at the border crossing. Looking at the sixteen chromatographies, I wonder how these isolated samples can possibly reflect the complexity of fluxes moving through a river landscape. Is this methodological, clean and 'uncontaminated' scientific process failing to trace the complex relationalities of contaminated landscapes? Have the permeable exchanges between the polluted river and its beings perhaps eluded this scientific reading?

In the case study, the FA wished to visualise the contaminated environment while challenging a modern reading of the world, as is often foregrounded through mapping, photography and chromatography. While adopting visual tools was considered essential to initiate conversations about the heavy metal presence in the river, the FA sought to reimagine these common modern tools of visualisation. In the next chapter [3], we will delve into reconsidering photography and mapping as tools applied in PD. First, we

focus on how the process of applying such tools was directed by the search for a demodern research practice.

The FA addressed the technoscientific modern reading and knowledge generated through mapping, photography, or in this case, a combination of both, through chromatography, which shaped their understanding of the polluted landscape. To challenge this modern reading while simultaneously grounding the practice amidst Western knowledge, the project seeks to shape a demodernising approach to artistic methods in a more-than-human PD process. This process was inspired by Tratnik's (quoted in Pla-Vivas 2021) *misuse* through photographic experimentation, which opens a space of critical consciousness through the visual ontologies created (Pla-Vivas 2021). Furthermore, thinking beyond the cleanliness of scientific chromatography, this research proposes a demodern practice by muddying the clean scientific protocol of chromatography through the cross-contamination of multiple earth samples. Through misuse, the chromatography becomes scientifically unreadable, but by experimenting with this alternate visualisation of the polluted landscape, other interpretations and understandings emerge, ones of interconnectedness, of human porosity to contamination, of belonging in the surrounding environment. We will expand this reflection in the final chapter [5].

In 'Permeance', experimenting with chromatography blurs the lines—through contaminations—between art, design and science, and proposes a demodern alternative by misusing the visual scientific methodology. Having responded to Tratnik's (quoted in Pla-Vivas 2021) call, the project advances a more critical visual process which challenges the conventional understanding of modern apparatuses like maps and photographs. Ultimately, chromatography offers a visual instrument of collaboration

between humans and more-than-humans, on a macroscopic scale and in wavelengths visible to our eyes.



Figure 2. Detail of a developing chromatography of the ‘Permeance’ project (FA’s own photograph).

I place a large sheet of paper on the floor and take the leftover soil solutions. Retracing the river in my thoughts, remembering how I had moved in the landscape, I pour the liquid soils onto the paper. Contaminated samples contaminate each other, free to flow, repulse and absorb into their own design.

Navigating into uncharted waters, beyond any scientific interpretation, I wonder if the colours and patterns which emerge are still telling the story of the polluted river. Somehow, it has gained in complexity, the message indecipherable without

scientific rigour. Yet, does it not tell the tale of the interconnectedness of river entities? Does it not map the complex soil chemistries which form and are formed by those who live on it? Does it voice the story of the river?



Figure 3. 'Permeance', chromatographic mapping of the pollution of the river Dommel. 100 x 62 cm, earth samples on filter paper (FA's own photograph).

In the following chapter, we will critically reflect on *tools* [3] by describing alternatives to the commonly used mapping and photography, thinking along chromatography as a means to go beyond photography's ontologies and expand the ways in which mapping can be performed.

[3] Tools to repoliticise PD aesthetics

Large socio-environmental questions that engage with pluriversal future-making, which account for all diversities, human and more-than-human, require, according to

Huybrechts et al. (2020), the repoliticisation of PD. This objective should be supported by appropriate design tools, which are too often uncritically used and lead to the perpetuation of some (technocratic) visions over others (Huybrechts et al. 2020). As Forlano (2017) notes, design is prevailingly enmeshed in neoliberal and capitalist systems, which prioritise the individual over the communal, a sociotechnical order which should instead compel designers to reevaluate the tools and methodologies adopted in PD. Indeed, as Mazé (2019, quoted in Huybrechts et al. 2020) states, design's materialisation, representation and transmission of political discourses are equally important to the design scenarios which are created. Therefore, the repoliticisation of design should be paired with a 'process of experimenting with an aesthetic language' (Huybrechts et al. 2020, 13). Furthermore, as stated by Tlostanova (2017), the need for a decolonial aesthetics requires us to develop the ability to perceive differently, and, therefore, also cultivate materials, devices and apparatuses which enhance an alternate human sensing (Smitheram and Joseph 2020). We propose demodern art practices which trigger a different bodily experiencing and facilitate parting from 'the dominant politics of knowledge, being and perception' (Tlostanova 2017).

In the following subchapters, we will describe how the FA's artistic research project has experimented with critical aesthetic language by questioning the tools of mapping and, more expansively, photography. We do so through considerations of the visual art practice instruments used by the FA in 'Permeance', and illustrate the potential of questioning PD tools through this critical art process.

[3.1] Mapping

Challenging an indiscriminate use of mapping as a measured, conceptual spatial representation of the world and a depoliticised tool, the FA approached the research of

the site through experimental photographic pieces grounded in and made collaboratively with more-than-human entities, namely soil, to map the site contamination of a river. In an attempt to investigate the complex entanglements in a landscape, the ‘Permeance’ project proposes to artistically grasp the complex constructs which science struggles with to depict without dissecting the world systems into isolated events. The FA’s practice seeks demodernising tools which do not perpetuate Western knowledge that relies on compartmentalised realities. As noted by Huybrechts et al. (2020), design visions which are expressed through collaborative mapping can contribute to the repoliticisation of PD. However, the tools of PD need to be redesigned to incorporate the voices of more-than-human collaborators, which can help shape the repoliticisation of socioenvironmental discourses in PD. In ‘Permeance’, the mapping exposes relations in contaminated landscapes through a contaminated scientific process and a more-than-human collaboration.



Figure 4. Chromatographic maps of the ongoing pollution of the Dommel environment (FA’s own photograph).

[3.2] Photography

Our interest in photography stems from the diffused use of, specifically, camera-led photography as a tool for meaning creation. In PD, digital photography has been used in community building and place-making projects, public art and auto-photography (Loopmans, Cowell and Oosterlynck 2012, 19), and in iterative cycles of critical investigation to both reflect and visualise theorisations (Liu, Bardzell and Bardzell 2018). Yet, the pervasive use of photography as an investigative or representational tool should be questioned as, if applied uncritically, a photographic camera –like the map– could reinforce disparities between the observer and the observed, increasing differences between the dominant, the human, the male over the ‘othered’ (Harper 1998, quoted in Loopmans, Cowell and Oosterlynck 2012). What we notice through a camera lens, how and who is being framed, or who presses the shutter release defines how we perpetuate and understand an image of the world. Exploring novel ways of viewing could be an exercise in questioning who, what and how we represent and embrace more pluriversal forms of seeing. Broadening the viewing experience (and other senses more generally) could bring about new knowledge enriching what we perceive (Tlostanova 2017), how we understand and relate to our environment (Smitheram and Joseph 2020), and validating alternate representations (Loopmans, Cowell and Oosterlynck 2012). As Light, Shklovski and Powell (2017) argue, design should ‘unseat humans from the centre of the universe and support a more equitable gaze’ (quoted in Biggs, Bardzell and Bardzell 2021, 1). We thus raised the question, can we find better photographic means that provide egalitarian visuals and whose process reflects on socio-environmental problems through more-than-human participation in PD?

Turning to its basis, photography is generally understood as a light-generated representation through the medium of a camera. Theorisations on the discipline of

photography and their applications in PD processes have almost exclusively covered lens-generated photography, omitting the nuanced ontological difference that the wider spectrum of experimental and alternative photographic practices entail. Indeed, commonplaces such as the objective representation of a photograph and the exclusive agency of the photographer are aspects challenged by a broader understanding of the discipline (Barlett 2018; Lenot 2021). Alternative photography, in the words of Pla-Vivas (2021), ‘minimizes optic unconsciousness, to put into question some of the most controversial concepts on photographic ontology, and to adopt highly critical stances on issues related to representation and communication’ (77). According to Tratnik (quoted in Pla-Vivas 2021), photographic experimentation through the misuse of the camera undermines the system of power imposed by the apparatus, opening ways to challenge photography as a modern tool. Confronting the medium of the camera also addresses the dichotomy of subject-object that the photographic gaze produces, opening a space of reflection around photography’s instilled hierarchies and the representation of human and more-than-human actors.

The ‘Permeance’ project strived to decenter the human, inviting soil to collaborate on equal grounds. The FA ceded part of the control over the outcome of the maps, surrendering to the soil’s agency over the arrangement on paper, in a co-creative process. As stated by Smitheram and Joseph (2020), detaching from anthropocentric views, where ‘matter and place have been positioned as objects in relation to human subjects’ entails ‘to recognise a vitality of matter as both subject and collaborator’ (294). In our study case, working with a visual means which surpasses the subject-object dichotomy, such as chromatography, allows for a collaboration with more-than-humans which attempts to overcome hierarchies. We will now proceed to explore more-than-human collaborations in greater detail in the next chapter [4].

[4] More-than-human participation in design research

Smitheram and Joseph (2020) present an expanded notion of collaboration in design, as mutually constructed between human and more-than-human participants. These beyond-human encounters can be facilitated by personal and transformative change processes which enable individual dissolution and human decentering to relate on equal grounds with more-than-humans (Liu, Bardzell and Bardzell 2018). This requires a paradigm shift beyond theorisation (Biggs, Bardzell and Bardzell 2021; Rosén, Normark and Wiberg 2022). Having pointed out the lack of design processes and methodologies that involve more-than-human actors in participation, both Rosén, Normark, and Wiberg (2022) and Biggs, Bardzell and Bardzell (2021) present case studies which broaden the limits of our human knowledge and perceptions by altering between, combining and finding new design technologies.

However, posthumanism-inspired design research has received criticisms from both the humanities, for not being able to detach sufficiently from anthropocentrism, and from critical race and decolonial theory, for the lack of subjectivity and its depoliticisation (Forlano 2017). In this research, we align ourselves with critical posthumanism, as presented by Rosi Braidotti (2013), which proposes an embodied and materialist research, detached from a universal subjectivity, rather, immersed among human and more-than-human relations. This inspires the critical posthumanist tasks with which PD is confronted, namely mediating between welcoming more-than-human participants from a non-anthropocentric stance and maintaining attention towards societal issues. If PD wishes to facilitate these beyond-human encounters (Forlano 2017) and support transformative change (Hakio et al. 2022), then a new methodological approach is needed for ‘participation otherwise’ (Akama, Light and

Kamihira, 2020), as PD has thus far concentrated on adopting tools to facilitate human interactions which might be unfit for more-than-human collaborations.

In the following subchapter, we delve deeper into interactions with more-than-humans through insights gained from the 'Permeance' case study, and discuss the central concerns of PD: voice, agency and representation.

[4.1] Chromatography as a stage for collaborations with more-than-humans

In the FA's case study, the artistic tools used, the chromatographic process, decentralised the human, opening a collaborative stage with more-than-humans, specifically the polluted river. The maps produced through soil chromatography are photographic acts led, not by one sole human photographer, but rather in collaboration with plural entities: the soils. Through the misuse of the scientific protocol by artistic chromatographic mappings, the soil as a collaborator gained more agency to flow freely in unconstrained and unisolated manners. Furthermore, the more-than-human collaborative artistic process challenged the individually driven attitude of camera-led photography, and put into question the differentiation between subject and object.

Indeed, in the absence of the photographer's gaze, the othering dichotomy did not occur during chromatography. Instead, through the absorption of the soil solution, the earth's agency transferred into the paper, saturating the piece with its subjectivity. The agency for the creation of the river mapping is thus distributed between humans and more-than-humans. Moreover, chromatographies are not superficial, objectified, or abstract interpretations of the river, rather the contaminated soils are transposed into the piece. Therefore, the chromatography is not a representation of the contaminated soil; rather, through absorption into the paper medium, it is the contaminated soil itself. Lastly, the patterns and colours of the chromatography are unique to each sample, and if we attempt to speak of more-than-human voices, this could perhaps be the way in which

soil expresses its genealogy.

Artistically using chromatography enabled the FA to bridge interactions between them and river earths. We propose that integrating a demodern framework in PD's methodological approaches can, comparably to the FA's case, drive more-than-human collaborations. In the last section, we investigate the transformative potential of adopting artistic, site-specific practices with more-than-humans in PD.

[5] The transformative potential of art-led PD processes

In PD projects, collective and personal transformations mark the beginning of the change needed to work towards environmental and social justice. As Hakio et al. (2022), Light and Akama (in Hakio et al. 2022) and Dolejšová et al. (2021) note, addressing socioenvironmental concerns through grounded, experimental artistic participation facilitates transformation, which allows for personal and shared reflection, imagination and change. Additionally, the socioenvironmental change stimulated through co-creative practice allows us to connect the local scale to global issues, a challenge that PD currently faces (Dolejšová et al. 2021; Huybrechts et al. 2020; 2022). In particular, to generate persistent and pervasive individual transformation which welcomes pluriversality, one must begin from site-specific concerns (Akama, Light and Kamihara 2020). Therefore, we propose that bringing together the ability of site-specific art to bridge local to global struggles and the processual knowledge which emerges by practising grounded art, can address the socioenvironmental gap and repoliticisation in PD. Ultimately, PD is well-known for involving creative tools and methodologies, a disposition which pairs well with co-creative and site-specific art tools and processes that offer the means for a methodology of grounded engagement in collaboration with more-than-humans.

In the next subchapter, we propose examples from the FA's study case, which, through the art-led design practice, fundamentally brought a change in perspective about their (and more generally our human) being in contaminated landscapes.

[5.1] The permeance of the self

I walk in the shadow of the zinc smelters. As I look to the ground, I see vibrantly pebble-sized rocks scattered all around me. I pick one up to inspect it: it is dark purple, lightweight and bubbly. It looks like a volcanic rock. Another seems a weirdly melted black glass shard. Another is dusty orange. I put it in my pocket and brush the powder off my fingers.

My hands are stuck in the wet mud, sludgy water seeping in between the white lab glove and my skin. Then, the thought of my own material porosity immersed in this wasteland struck me.

This FA's realisation prompted a personal shift which can best be described by Neimanis' (2012, 104) quote, 'In an ocular-centric culture, some of these membranes, like our human skin, give the illusion of impermeability'. Rather, selectively permeable membranes are transversed by in- and outbound fluids, which bind all bodies, together (Neimanis 2012). Confronting our human porosity, equally exposed to the fluxes of matter happening in and around us, pressed the FA to come to terms with their exposure and accountability in socioenvironmental disorders.

At the local design festival, people walk past the exhibited maps. Some stop to share their childhood river stories, some in disbelief to ask, 'Is this the river of our city?', some, tempted, touch the patterned papers. I warn them to not touch, but what difference does it make? A pair of latex gloves are added to the installation.

'Permeance', exhibited in the city crossed by the Dommel, served as a visual medium designed to prompt a public debate on the topic of the river's contamination. Wanting to share the personal transformative experience, the FA decided to add a pair

of latex gloves to the installation (see Figure 4). This contributed to disseminating, through the exhibition display, the considerations on the immersion within and our permeability towards contaminated matter in the environment we inhabit. The public was invited to interact with the soiled pieces, inspect and touch the maps, and was given the choice to either shield their skin through the latex membrane or not. The exhibited aesthetic manifestation of polluted soil through the chromatographic mappings served as the spark to engage in conversations about the current river health in the city, and how we, as inhabitants, decide to intervene. By engaging with the bodily materiality of the public, the exhibition sought to inspire the public with a diffused consciousness and sense of action for the local river.

Discussion

Practices such as collaborative chromatographies respond to the call of Akama, Light and Kamihiro (2020) to confront the limiting hierarchies that can arise during PD when involving more-than-human participants. Through ‘Permeance’, we found that alternative photographic practices such as chromatographic mappings can hold the potential to mediate more-than-human and human participation in a more balanced equitable collaboration. Practising the demodern also entails overcoming the modern divisions between humans and more-than-humans by finding balanced forms of relationality, surrendering exclusive human control, and making space for the agency and voice of more-than-humans. Crucially, we aimed to maintain equilibrium between human stories and more-than-human needs since both are inextricably linked in the socioenvironmental struggles a critical design should address (Akama, Light, and Kamihiro 2020). However, we acknowledge that this art-led practice is but a first step towards fully rethinking the demodern, expanding to human and more-than-human relations, where all collaborators can initiate, consent, and benefit equally from PD

processes. With this case study, we worked towards initiating theoretical reflections through a demodernising practice to begin shifting Western knowledge used in PD towards pluriversality, including both human and more-than-human actors.

The artistic research process of 'Permeance' also facilitated the FA's personal transformation through the groundedness of the project in the polluted landscape, the interaction with the river and its soils, and the numerous instances of reflection that the demodernising framework offered through experimental new tools. In particular, the FA was confronted by their own bodily porosity to the polluted river landscape, a personal realisation which helped them shape their artistic research outcome, how it was exhibited, communicated and discussed with the public.

Boiling down to define our position among the theories and practices explored in this paper, we argue that the tools and methods of an artistic practice supported by a demodern framework and critical posthumanist lens can inform PD as an example for rethinking the approach to creative, site-specific, more-than-human participatory and transformative processes. In this case study, through a demodern artistic research process, the FA reinvented artistic mediums such as chromatographic mappings, which enabled them to experiment, theorise and address some of the limitations of the design tools commonly used in PD while responding to the repoliticization of PD's aesthetics. We encourage design practitioners to question the design process in order to reinvent PD tools which fit the purpose and the project's theoretical framework, stimulate participants' transformative growth, open the discipline towards a demodernising pluriversality, and open up to the diverse human, but also more-than-human actors in the process.

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Declaration of Interests Statement

The authors report there are no competing interests to declare.

References

- Akama, Yoko. 2015. "Being Awake to Ma: Designing in between-Ness as a Way of Becoming With." *CoDesign* 11 (3–4): 262–74.
<https://doi.org/10.1080/15710882.2015.1081243>.
- Akama, Yoko, Ann Light, and Takahito Kamihira. 2020. "Expanding Participation to Design with More-Than-Human Concerns." *Proceedings of the 16th Participatory Design Conference 2020 - Participation(s) Otherwise - Volume 1*, 1–11. <https://doi.org/10.1145/3385010.3385016>
- Barlett, Flora. 2018. "Alternative Photography as an Ethnographic Method." *Brief Encounters*, 2 (1): 93-102. <https://doi.org/10.24134/be.v2i1.104>
- Biggs, Heidi R., Jeffrey Bardzell, and Shaowen Bardzell. 2021. "Watching Myself Watching Birds: Abjection, Ecological Thinking, and Posthuman Design." In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems*, 1–16. Yokohama Japan: ACM.
<https://doi.org/10.1145/3411764.3445329>.
- Braidotti, Rosi. 2013. *The Posthuman*. Cambridge United Kingdom and Malden United States of America: Polity Press.
- De Gaetano, Steffie. 2022. "Permeance: Unearthing the Remnants of the Zinc Industry" [portfolio]. <https://steffiedegaetano.net/permeance-project.html>

- De Jonge, Maarten, Bart Van de Vijver, Ronny Blust and Lieven Bervoets. 2008. "Responses of aquatic organisms to metal pollution in a lowland river in Flanders: A comparison of diatoms and macroinvertebrates." *The Science of the Total Environment*, 407(1), 615–629.
<https://doi.org/10.1016/j.scitotenv.2008.07.020>
- Dolejšová, Markéta, Cristina Ampatzidou, Lara Houston, Ann Light, Andrea Botero, Jaz Choi, Danielle Wilde, et al. 2021. "Designing for Transformative Futures: Creative Practice, Social Change and Climate Emergency." In *Creativity and Cognition*, 1–9. Virtual Event Italy: ACM.
<https://doi.org/10.1145/3450741.3465242>.
- Esche, Charles. 2017. "The Demodernising Possibility (a Lecture)." In *How Institutions Think Between Contemporary Art and Curatorial Discourse*, edited by Paul O'Neill, Lucy Steeds and Mick Wilson, PAGES MIT Press.
- Forlano, Laura. 2017. "Posthumanism and Design." *She Ji: The Journal of Design, Economics, and Innovation* 3 (1): 16–29.
<https://doi.org/10.1016/j.sheji.2017.08.001>.
- Hakio, Kirsi, Markéta Dolejšová, Tuuli Mattelmäki, Jaz H.J. Choi, and Cristina Ampatzidou. 2022. "Following Seals and Dogs: Experimenting with Personal Dimensions of Transformative Design." In *Proceedings of the Participatory Design Conference 2022 - Volume 2*, 167–72. Newcastle upon Tyne United Kingdom: ACM. <https://doi.org/10.1145/3537797.3537869>.
- Hilal, Sandi and Alessandro Petti. 2018. *Permanent Temporariness*. Art and Theory Publishing.
- Holt, Matthew. 2015. "Transformation of the Aesthetic: Art as Participatory Design." *Design and Culture* 7 (2): 143–65.
<https://doi.org/10.1080/17547075.2015.1051781>.
- Huybrechts, Liesbeth, Maurizio Teli, Mela Zuljevic, and Mela Bettega. 2020. "Visions That Change. Articulating the Politics of Participatory Design." *CoDesign* 16 (1): 3–16. <https://doi.org/10.1080/15710882.2020.1728907>.

- Huybrechts, Liesbeth, Mela Zuljevic, Oswald Devisch, Virginia Tassinari, Anna Seravalli, Ann Light, Seppe De Blust, et al. 2022. "Reworlding: Participatory Design Capabilities to Tackle Socio-Environmental Challenges." In *Proceedings of the Participatory Design Conference 2022 - Volume 2*, 173–78. Newcastle upon Tyne United Kingdom: ACM.
<https://doi.org/10.1145/3537797.3537870>.
- Kokornaczyk, Maria. O., Fabio Primavera, Roberto Luneia, Stephan Baumgartner and Lucietta Betti. 2017. "Analysis of soils by means of Pfeiffer's circular chromatography test and comparison to chemical analysis results." *Biological Agriculture & Horticulture*, 33(3), 143–157.
<https://doi.org/10.1080/01448765.2016.1214889>
- Lenot, Marc. 2021. Introduction of the book. In *Introduction to Jouer contre les Appareils*, edited by Marc Lenot. Retrieved August 4, 2021, from
<http://photographie-experimentale.com/introduction-of-the-book-in-english>
- Liu, Szu-Yu (Cyn), Jeffrey Bardzell, and Shaowen Bardzell. 2018. "Photography as a Design Research Tool into Natureculture." In *Proceedings of the 2018 Designing Interactive Systems Conference*, 777–89. Hong Kong China: ACM.
<https://doi.org/10.1145/3196709.3196819>.
- Loopmans, Maarten, Gillian Cowell, and Stijn Oosterlynck. 2012. "Photography, Public Pedagogy and the Politics of Place-Making in Post-Industrial Areas." *Social & Cultural Geography* 13 (7): 699–718.
<https://doi.org/10.1080/14649365.2012.723734>.
- Neimanis, Astrida. 2012. "Hydrofeminism: Or, On Becoming a Body of Water." In Gunkel, H., Nigianni, C., & Söderbäck, F. (Eds.), *Undutiful Daughters: Mobilizing Future Concepts, Bodies and Subjectivities in Feminist Thought and Practice*. Palgrave Macmillan.
- Öz, Gizem. 2023. "Local Contexts as Alternative Knowing Spaces for Design Fields." *CoDesign* 0 (0): 1–14. <https://doi.org/10.1080/15710882.2023.2295023>.

- Pla-Vivas, Vincente. 2021. "Operating in alternative photography: agency through prolonged photographic acts." *Journal of Visual Art Practice*, 20:1-2, 64-80.
<https://doi.org/10.1080/14702029.2021.1917908>
- Rice, Louis. 2018. "Nonhumans in Participatory Design." *CoDesign* 14 (3): 238–57.
<https://doi.org/10.1080/15710882.2017.1316409>.
- Rosén, Anton P., Maria Normark, and Mikael Wiberg. 2022. "Towards More than Human-Centered Design: Learning from Gardening." *International Journal of Design*, 16(3), 21-36. <https://doi.org/10.57698/V16I3.02>.
- Schoffelen, Jessica, Sandy Claes, Liesbeth Huybrechts, Sarah Martens, Alvin Chua, and Andrew Vande Moere. 2015. "Visualising things. Perspectives on how to make things public through visualisation." *CoDesign* 11 (3-4): 179-192.
<https://doi.org/10.1080/15710882.2015.1081240>
- Smitheram, Miranda, and Frances Joseph. 2020. "Material-Aesthetic Collaborations: Making-with the Ecosystem." *CoDesign* 16 (4): 293–310.
<https://doi.org/10.1080/15710882.2020.1841796>.
- Tlostanova, Madina. 2017. "On Decolonizing Design." *Design Philosophy Papers* 15 (1): 51–61. <https://doi.org/10.1080/14487136.2017.1301017>.
- Vazquez, Rolando. 2017. "Precedence, Earth and the Anthropocene: Decolonizing Design." *Design Philosophy Papers* 15 (1): 77–91.
<https://doi.org/10.1080/14487136.2017.1303130>.
- Wijngaard, René R., Marcel van der Perk, Bas van der Grift, Ton C.M. de Nijs and Marc F.P. Bierkens. 2017. "The Impact of Climate Change on Metal Transport in a Lowland Catchment." *Water, Air, & Soil Pollution*, 228(3), 107.
<https://doi.org/10.1007/s11270-017-3261-4>
- Zuljevic, Mela, Barbara Roosen, and Liesbeth Huybrechts. 2023. "Thinging with the Past: Co-Designing a Slow Road Network by Mediating between the Historical Landscape and the Design Space." *CoDesign* 19 (3): 194–213.
<https://doi.org/10.1080/15710882.2022.2038633>.