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### Comments

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# "The Words We Do Not Yet Have." A Creative Inquiry Into Human-Plant Relationships

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## ABSTRACT

Climate change, loss of plant biodiversity, and ocean pollution signal the drastic changes in our ecology that call us to attend to the needs of more than human forms of life on Earth. Sustainable design and HCI research are responding to this call by offering methods and approaches to design more sustainable products and systems and recently, more than human design is building momentum. This agenda seeks to reform traditional design processes by decentering the creative agency of the dominant socio-economical group of humans and foregrounding those of diverse Others.

In this paper, I focus on plants as a nonhuman form of life. Through synthesizing multiple research methods, such as fieldwork in nature, autoethnographic writings, drawing, "outpainting" with Generative AI (genAI), visual and thematic analysis, I propose a more than human creative process. In pursuit of that purpose, I use the notion of "transcorporeality," developed by feminist Stacy Alaimo [2], as a lens to develop designers' capacities to attend to the material configuration of human and nonhuman bodies. Decentering the designer's creativity is an aspirational goal, which for various reasons is quite difficult to achieve fully, but the approach undertaken in this project, at a minimum, complicates the experience of human-centered design creativity. It does so by increasing perceptiveness and insight within what Alaimo refers to as "the literal contact zones" between human and nonhuman corporeality; leveraging that heightened capacity to synthesize the practices of traditional nature writing and autoethnographic writing to reveal and engage the enmeshment of the self in/as nature; and finally leveraging discursive text and my drawings as prompts for genAI's outpainting technique, to experience how it extends, disrupts and reworks what I have done, revealing not only its own biases, but also many of my own.

## CCS CONCEPTS

• **Human-centered computing** → **Interaction design process and methods.**

## KEYWORDS

Design research methods, more than human design, sustainability, visual communication, human-plant interaction



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## 1 INTRODUCTION

The Human-Computer Interaction (HCI) research community has been exploring ways to contribute to social and environmental sustainability challenges through practical and theoretical interventions, such as sustainable interaction design and sustainable HCI [14, 26]. Given that it is a multi-dimensional challenge, not surprisingly, HCI researchers have pursued diverse approaches. Some have approached it at the macro level, connecting HCI to the political roles of end consumers and industries in shaping sustainable futures [27]. Ecofeminism-informed HCI scholars have considered the links between gender inequality and climate change —both subjected to paradigms of control [51, 52, 91, 98]— and proposed ways that HCI might intervene against these dominant practices.

Another body of work has questioned how human-centered thinking, including human-centered design, has contributed to climate crisis, pursuing as an alternative a multispecies, posthuman [33, 42], sometimes called more than human design perspective [57, 77, 95, 96]. This collection of research has considered research on human and animal cohabitation [88], turned to concepts such as nomadism and nomadic practice as a guide to an alternative humanist design and HCI discipline which embraces multiplicity and diversity rather than universality in design [94], and used theoretical concepts such as abjection to attend to the ecological relationships between humans and nonhumans, such as those with birds [13].

More than human design challenges HCI and design researchers to think beyond objectives such as control and trust, and to seek ways to sustain our very human lives as a part of Others' lives. It seeks ways to design better, more sustainable, and just futures by reforming traditional design and creative processes. Key to this approach is decentering humans in an attempt to foreground the needs, agency, and forms of creativity of nonhuman Others. This approach can be challenging for design researchers and practitioners, whose training has traditionally prepared them to develop creative ways to improve problematic situations and address human needs [22, 32, 37, 38]. Researchers of more than human design have thus grappled with the question of how to decenter humans, including design researchers themselves, considering the human-centered nature of design.

HCI research can approach more than human design challenges from a number of angles. In the present work, I focus on human-plant relationships for several reasons. Much, though not all, of

HCI research in this space, focuses more on animals than on plants, which reflects our predominantly zoocentric traditions in sciences and philosophies [45]. Further, carrying the eco-feminist theme forward, plants are often seen as a "lower" or less intelligent form of life than animals and treated accordingly [62]. Additionally, plants can be more difficult for humans to relate to—their nervous systems and basic physiology are far more different from ours than most animals' [21]. As such, plants feature greater alterity than animals do, which makes them easier to "other" and harder for us humans to perceive and to deeply feel our connections to them [67], revealing some of the limitations of an empathetic approach to vegetal life [63]. HCI research on human-plant interaction can help to overcome our biases and failures to perceive our interconnectedness with plant life, and in doing so more fully answer the call for a more than human design practice [58].

While perceiving and deeply feeling our connections to plants is challenging, we also have resources, including theoretical resources and existing practices. In this work, I draw from several related theories, in particular, the work of Alaimo, whose concept of transcorporeality supports my research objective to express human-plant relationships in support of more than human design research. More specifically, building on previous works in this space (e.g., [11, 96]) I propose a speculative practice that involves writing and drawings in nature and outpainting with Generative AI (genAI). In addition to theory, the proposed practice is also informed by a range of existing practices, including botanical drawing [83], landscape ethnography [76] and nature writing [60] as some self-reflexive ways of communicating more than human nature in their habitat. Self-reflexive writings about nature, independent from the writer's identity, epistemological, and socioeconomic position, start from an act of expressing nature and the life of non-humans, which then talks back to the human writer to outwardly include the writer's position in nature as a whole. Similarly, botanical drawings are a cultural product and embed the scientist's and artist's position, culture, and subjectivity in the choice of media, mark-making, details, and style.

As I explain in more detail later, the speculative practice entails going into natural environments that feature plants, engaging in acts of drawing and writing, subsequently analyzing and synthesizing those drawings and writings, and then using them as both visual and verbal prompts for genAI to outpaint them. In this paper, I used the word "outpainting" with two different but interrelated meanings: (1) as a specific genAI technique (OpenAI's DALL.E2), that extends an image beyond the original frame by adding pixels to it, (2) more metaphorically, as a way to talk about how the process decentered my creativity as a design researcher, by augmenting my creative work and subjectivity, helping to expose my own biases and preconceptions.

Obviously, any use of genAI comes with concerns. genAI is trained on human-created data, using large datasets; therefore, it generates from human, and not more than human, datasets, and so in itself, it cannot be considered more than human. Worse, the data it is trained on reflects centuries of social injustice, including racism, sexism, and colonial thoughts and practices [18, 28, 74]. Further, AI consumes considerable resources, including water and energy to train the models, power the data centers and to cool them down [10, 34, 70] and thereby contributes to the problems of

climate change that most HCI sustainability research is seeking to address.

This paper seeks to self-reflexively stay with these concerns [48] and unpack them as they relate to the purpose of this paper: developing a speculative practice in support of expressing the human-plant relationship through attending to the transcorporeality of human-nonhumans and political and ethical possibilities of that connection [2]. It leverages the insight that what AI generates can be surprising, and that surprise can, through reflection, reveal our own biases and also reveal alternative ways of seeing and thinking. In this paper, outpainted images were generative because they literally expanded my drawings. Those expansions were subject to genAI's unpredictable combination of competently parroting human art (e.g., using line drawings to represent common objects and stippling to add texture and shading to them) and what are increasingly known as AI hallucinations [61] (i.e., where AI produces nonsensical or absurd results), the result of which were a number of surprises, many of which featured violations of norms of representation (e.g., spatial perspectives, scale, light and shadows, figure/ground). These surprises prompted my own reflection and occasionally confronted me with my own tacit assumptions and unrealized biases, while the resulting outpainted images supported my reimagining, and working towards, alternate possible local worlds, as described in [31].

In summary, the paper describes a creative and autoethnographic inquiry of a design researcher with a background in arts, design and sustainability. It shows how I experimented with classical creative methods of immersion within nature (e.g., nature walks, nature writing, sketching, observation, reflection), as well as new technologies like genAI, to attune to the nuances of plant life. This paper contributes to the more than human design agenda and strives to understand how the HCI community might begin to decenter the human.

## 2 GROUNDS AND RELATED WORKS

This research integratively uses a number of key sources: HCI research on sustainability, and in particular, more than human approaches to designing in the context of climate crisis; practices of depicting plants, including botanical drawings and nature writing; and theoretical resources, in particular those of Anna Tsing [92] and Stacy Alaimo [2], whose notion of transcorporeality shaped both the development of my approach and the articulation of its outcomes.

### 2.1 Sustainable and More Than Human Design

In sustainability-related human-computer interaction (HCI) and design research, posthumanism [33] poses one of its central epistemic challenges: how can humans decenter humans in a practical sense while trying to achieve the human goal of designing for more than human worlds and building more sustainable futures [95]. Oogies and Wakkary used the concept of *repertoire* to attend to the different ways human designers can facilitate the participation of nonhumans in design research practices [77]. The authors employed methods such as landscape ethnography and Tsing's concept of noticing to weave the stories of the design researcher into the nonhuman actors' stories. Care as a lens has been employed

for speculative and feminist posthumanism [53] or in sustainable agrilogistics [68] through ethnographic studies in the farms of the American Midwest [12].

Another relevant stream of research in the HCI and design research is the relationships between humans and nonhuman lives, or "nature." In this area, researchers either seek to use technology to mediate the human-nature relationship ([71, 97]) or to consider nature as a participant in the design process under the umbrella of human-nature interaction or multispecies design [4]. Loh et al.'s work is particularly relevant to this paper, where they surveyed a series of human-plant interaction design projects and offered ways that HCI can move from the view of plants as utilitarian objects to plants as co-inhabitant, contributing to the more-than-human turn in human-plant interaction design [58]. Attending to the complexities and nuances of human nature relationships has also been researched in numerous works. For instance, Rodgers et al. identified key human relationships with nature by probing participants' relationships with their gardens, inspired by Phenology, which is the study of cyclic biological events [82]. Vella et al. used camera traps to observe the interactions of participants with their gardens (plants and animals) and identified two different relations with nature: care and control [93]. Spors et al. conducted a scoping literature review of human-nature interaction publications in recent years and identified four types of interactions with nature or, as they put it, "encountered, approached and made sense of nature": (1) nature as a research site (2) depiction and portrayal of nature, (3) modalities of encountering nature, (4) understandings of nature [89].

Common to most of these works is an attempt to (re)connect to nature and make sense of our relationship with nature with its multitude of dimensions, whether through observation techniques, personal experience, or artifacts that support moments of reflection.

## 2.2 Transcorporeality

Tsing highlights that "making worlds is not limited to humans," and we are surrounded by many nonhuman world-making projects [92]. Each world-making project has the capacity to alter our planet by making ecological living places and workable living environments. Those worlds can also overlap, allowing space for more than one species –e.g., when "beavers shape streams as they make dams," or "plants live on the land because fungi make soil by digesting rocks," or "pines flourish in landscapes burnt by humans." Tsing uses the concept of "assemblage," which not only shows us the potential of histories in the making but also us as a kind of subject in the making [92]. Tsing also compares it to polyphonic music, in which individual and independent melodies intertwine to make music; there is no leading element but a horizontal and organic assemblage of sounds and voices. Similarly, Barad's feminist and quantum physics notion of Intra-action conceptualizes the mutual agency of entangled entities, that is the actions emerge only from within the relationships among inseparable entities ([8], p.79). Barad writes: "A phenomenon is a specific intra-action of an "object" and the "measuring agencies"; the object and the measuring agencies emerge from, rather than precede, the intra-action that produces them." ([8], p.79-80).

Alaimo made a closely related argument in her concept of transcorporeality. However, whereas Tsing's assemblages focus on the heterogeneity of sites in accommodating multiple species and even

their "worlds," Alaimo focuses specifically on the "literal contact zones" between human and nonhuman corporeality. Alaimo's work critiques certain postmodernist feminist analysis of the body and nature, which she argues divide woman from nature, such that, and here Alaimo quotes Julia Kristeva: "nature, charged as an accessory to essentialism, has served as feminism's abject—that which, by being expelled from the 'I,' serves to define the 'I.'" ([54] page 1-4, cited in [1]). Instead, Alaimo invites us to attend to relational aspects, where human corporeality is transcorporeality, in which the human and nonhuman bodies are always intermeshed. That understanding leads us to underlay the extent to which the human is ultimately inseparable from the "environment," and that very understanding makes it impossible to put nature as the background [2]. Alaimo's transcorporeality is an ethical and political stance, which "dwells in dissolve, where the fundamental boundaries have begun to come undone". Similar to Braidotti's "sustainable becoming" subject [16], transcorporeality proposes an ethical subject that is ordinary and rooted in everyday micro-practices of living life on the Earth ([3], page 2-3). Alaimo argues further for a need to integrate practices such as nature writing and popular science writing—as one of the most crucial genres of environmentalism—to science writing. Because these every day "micro-practices" produce a "highly immediate and highly mediated" kind of knowledge that supports a better grasp of biospheric connections ([3], page 3).

Common to Tsing's "polyphonic assemblages" and Alaimo's transcorporeality is the idea of an interconnected mesh of bodies, where none is backgrounded or foregrounded, and that these bodies are inseparable from the environment. The concept of not having or being a center is a key idea that ties together all the parts of this research paper.

## 2.3 Depicting Plants

Two major relevant and interrelated areas of study after ecology and botany have offered tools and practices for communicating nonhumans: feminist studies of ecological and evolutionary phenomena of human-nonhuman lives [50] and Critical Plant Studies (CPS) [90]. Critical Plant Studies is an interdisciplinary field that aims to re-imagine and reexamine our relationships with the plants and vegetal world [55]. It draws on diverse disciplinary fields within arts, humanities, and social sciences, such as ecocriticism, anthropology, STS, and feminism [43]. Following their lead, this study also turns to nature writing, in landscape ethnography [76] and botanical drawing [83] to communicate about plants.

**2.3.1 Nature Writing.** Nature writing is a nonfictional genre of writing about nature [60] and has a long history across continents and cultures. We can find writing about nature in ancient Persia, India, and China, in poetry or prose [102]. Despite the long history, nature writing in prose "has achieved a unique fullness and continuity within Anglo-American context" and was highly influenced by naturalist writings in English literature [29]. It has three distinct dimensions: information about natural history, personal responses to nature, and philosophical interpretation of nature ([60] p.20-22). Essays on natural history can be in the form of first-person narratives, such as in John Hay's *Spirit of Survival* (1974), which adds a personal reflection and meaning to the scientific facts and observations [49], or from a third person perspective such as in Rachel Carson's *The Sea Around Us* (first published in 1950), where she presents a

collection of scientific facts of oceanography, but tellingly to represent ecological humans relationships with the ocean [20]. When nature writing is on the human experience and the connection between humans and nonhumans, scientific facts are featured less than qualities of human experience, as in Stephanie Mills' *In Service of the Wild* (1995), where she talks about healing the biodiversity and care for nature by attending to her needs [66]. Terry Tempest Williams' *Refuge* (1991) also wrote a biographical piece on her own childhood memories as a way to write about human-nonhuman connections ([100], p.21). Accordingly, writing about nature can take an ethnographic form, where the subject of the ethnographer's study is the landscape and the relationships between humans and nonhumans. Hence it can be one of "the ways in which our relations with nonhumans produce what it means to be human" [76].

Similar to other cultural products, North American nature writing is tied to the complexities of the continent's social, cultural, and political becoming. For decades, the genre was practiced only by a fraction of society, which consisted mainly of white, upper-class, educated, and wealthy individuals who had the time and financial resources to experience nature for pleasure and as a source of inspiration. However, that tradition has slowly and gradually started to transform to include feminist, women, and Black writers who reflected on their own unique experiences of nature, which often represented traces of identity, origins, belonging, class, and social injustice. One example is Black nature writing, which often links experiences of nature from socially and economically disadvantaged and marginalized Black American communities. As Erin Sharkey puts it, "Just as the ways we [African Americans] experience nature in this country are not isolated from our identities, nature writing is not neutral" [85]. Similarly, starting from the twentieth century, women nature writers started to connect their writings to feminist values, such as in ecofeminist writings, in which nature was a key to express gender discrimination and injustice [79] and that women and nature are notions with historically complex interrelationships, as the same forces and ideologies that want to control the natural environment, want to control women.

**2.3.2 Botanical Drawing.** Building on previous works, Gemma Anderson, in her book *Drawing as a Way of Knowing in Art and Science* argues about drawing as a collaborative tool and method that bridges the arts and sciences [5], and that is used to point and to address questions ([5], p.4). Drawing can also "make visible relations between things that otherwise remain invisible." ([5], p.18). Botanical drawing is an observational technique; that is, in Goethe's words, it reflects what the person sees in the world, and it leads to reflection and from reflection to combination and theorizing ([44] cited in [5], p.18). In the late eighteenth century, Goethe's *Metamorphosis of the Plants* focused on the dynamic and transformative forms of plants rather than their static forms and shapes [44]. A practice that he calls "delicate empiricism" is a morphological method for studying plants through prolonged, reflective, and empathetic observation, "grounded in direct experience" ([5], p.119). This practice improves observers' ability to see outwardly and to become more sensitive and attentive observers of plant development. Anderson's note on this method emphasizes that Goethe's aspiration was to develop human subjective experiences, rather than assuming we can avoid

it in studying nature so that an observer "becomes an instrument of their own mediation of the world" ([5], p.119).

Botanical drawing was pivotal not only in scientific discoveries and communications but also in women's empowerment and scholarship. As Anna Sagal points out [83], the domestic spaces of home and the garden provided abundant opportunities for women's "emotional fulfillment and meaningful intellectual labor" in the eighteenth century. Further, she conceptualizes the notion of "entanglement" as a way for women to rework and subvert the restrictive dynamics of the woman and nature relationship by using woodlands and gardens.

Common to both nature writing and botanical drawing practices are their power to support an ability to see outwardly and to look beyond oneself to cultivate a sense of closeness and intimacy with more than humans.

### 3 METHODOLOGY

The primary goal of this project is to improve one's capacities to attend, as a designer researcher, to one's connection to the biosphere, specifically to plant life. Alaimo's concept of transcorporeality shaped my approach. I started to explore creative everyday "micro-practices" for depicting plant species [1]. I decided to start with drawing and writing about plants and their ecological environment reflexively and outwardly [5, 44, 60, 64]. Other similar practice such as Natasha Myers's Kriya is a meditation and breathing technique that is commonly practiced in Yoga, which further aims to broaden our subjectivity and to include those of plants so as to be able to express the vegetal life [69] outwardly. The methodological process that I present here is inspired by several other theories and practices, such as Indigenous embodied practices of knowing nature [11], tactics to decolonize research methodologies [87] as well as centuries of practices in visual and literary arts and scientific facts on the positive effects of nature on creativity [78, 103]. However, I arranged the methodological process in a particular order and sought to translate theories into embodied and intentional "micro-practices" that are unique to designerly practices and ways of knowing, in general, [23] and to more than human design [96] in particular.

During this year-long project, I visited 11 natural reserves and parks in Sweden and the USA and spent about 48 hours in nature walking and drawing (an average of 4 hours (-/+2 hour) in each natural setting). The methodological process started with the choice of places in the vicinity of my place (Southern Sweden and Southern California). I deliberately chose to visit places that were nearby and within 20 miles/31km in an attempt to reduce the environmental impacts of travel. I gathered information about the site's plant biodiversity, native species, flora and fauna, and the geographical characteristics of the place, such as if there was a river, dams, lakes, and hills.

Another goal is to expand my creativity toolkit by probing genAI's outperforming capabilities and limitations, while fully cognizant that genAI reflects and perpetuates biases imbued in human society. Outpainting (OpenAI's DALL·E2) is a genAI technique; it uses AI to generate new pixels that extend an image's existing boundaries, meaning that we can add new details to an image, extend the background, or create a panoramic view. The technique is

prompted both by a text prompt (i.e., my nature writings) and an image (i.e., my drawings). It then adds visual frames in continuity around the prompt image. It learns from both the visual elements of the image and the text prompt. I used drawings of specific individual plants and nature writings of the same place. I was drawn to outpainting for two reasons: its primary inputs and outputs are image-based rather than text-based, and it both depends on and also literally extends my work in a way that is both high fidelity and usually surprising. That combination of high fidelity and surprise often contributes to an experience of feeling pushed aside as the creator. Thus, even as outpainting can literally move the art I drew out of the center (e.g., by outpainting content on the right, my image moves to the left of the total composition), I also experience decentering as a creative when genAI pushes me aside as the creator of the work.

All of the above resolved into a multi-stage fieldwork process, which supported attending to the plants, their sensory qualities, the ecological settings, and the plant's relationships with humans and surroundings; and subsequently genAI reworking my verbal and visual depictions of plants. The process unfolded in four steps as follows: (1) learning: embodied ecological walks, (2) probing: intra-active observations, (3) expressing: words and drawings, (4) outpainting: plants and I. In this paper, I focus primarily on the last two steps: expressing and outpainting.

### 3.1 Positionality Statement

Neither Sweden nor the USA is my birthplace, and I live in the USA on the unceded lands of Juaneno. In the spirit of self-reflexivity, I position myself as an educated Iranian, middle-aged woman, first gen, and immigrant. This work was approached through a very personal and self-reflexive way, which may or may not resonate with other fellow humans whose diverse cultures, ideologies, political stands, genders, and childhood experiences, shaped their subject and led them to experience the world the way they do. My cultural and educational background in arts, design, and sustainability provided me with the means to think ecologically and to layer sustainability commitments with those of design and intersectionality.

### 3.2 Expressing: Words and Drawings

After nature walks, observing, and attending to ecological connections between plants and other species, I chose a spot and sat down on the ground where I could have the space and possibility to engage and to see the plants and their ecology more closely. Then, I drew plants and wrote about them and their surroundings [36]. The practice of sitting on the ground was inspired by Welling's *Spirit Walk*. It is a practical and accessible method for nature writing, and the major steps are naming, detailing, and interacting [99].

Sitting on the ground after long and slow nature walks and observations was yet another practical means to immerse my subject fully in a more-than-human nature. Further, sitting and lying on the ground aimed to help change the human perspective (e.g., seeing from human eye-level while walking) to that of humans, such as mosses, SkyLupines, and Bilbery, by getting the head and eyes close to the ground. This bodily practice allowed to see the plants and their particularities from a perspective that was perhaps closer to theirs than ours. I predominantly used inks with different

mark-making techniques, such as stippling and hatching (Figure: 2).

I creatively engaged with drawings, especially with different line weights and mark making, as my pen moved through the surface of the paper and aligned with what my eyes were seeing and what my body was feeling. Those were essential ingredients for this experiment of crafting a creative process of drawings and writings that captured my experience of interacting with plants but from a different perspective. I further kept a journal about the plants but also started to engage in a more intentional way of writing about plants: nature writing. As introduced above, nature writing is a non-fiction literary work composed by humans about nonhuman natures, including plants and animals. I let the situation, the environment and what I felt at the moment guide me in deciding to start with writing or drawing and how and when to switch between these two creative processes.

### 3.3 Outpainting: Plants and I

In this last step, I used outpainting (a genAI technique) as a way to extend, change, and go beyond what I observed and expressed in nature, including other plants, humans, sea, river, etc. I first prepared my drawings and writings for genAI by reworking them, while seeking to keep the lines and styles of expressions as close as possible to the original drawings, to keep the expressions of the plants true to the feelings of the moment. This step was to focus on my own art (not on AI art) and to compose and elaborate further on the expression and memories of the place and the plants. Although AI is sometimes perceived as a collaborator (e.g., [39, 56, 73, 81]), I intentionally wanted to experiment with genAI as a tool for creativity [35, 86]. When I felt satisfied with my drawings, I scanned each of them to have digital copies. I used image editing software (e.g., Adobe Photoshop) to reduce the size to about 1MB and removed the background, and saved it in PNG (Portable Network Graphic) format. The transparent background helps the genAI diffusion model which uses a Contrastive Language-Image Pre-trained (CLIP) building block, to fill the negative spaces in the image during image generation –i.e., to fill the white spaces between leaves and petals instead of regarding them as input and reproducing the same negative spaces.

Lastly, I imported each drawing to the Outpainting application and wrote one to two phrases as prompts to generate about 50-60 frames around the drawings. In the prompts, I mostly used nature journal entries and nature writings of places I visited. In particular, I chose those writings that included other forms of life, bodies and activities, such as "children", "sea" and "swimming", and plant's name and characteristics. The assumption was that the genAI would pick up on the style of drawing and use the textual prompt and the drawing as a visual prompt to illustrate the ecology of the place. During the process, I sometimes removed and edited some parts of AI-generated images, for example, if they were repetitive or if they were not adding anything meaningful to the overall composition. Figure 3, shows two examples of outpainted images. Each is organized in three rows: the top row shows my photographs and drawings, the second row shows the AI-generated image, and the bottom row presents the prompt I wrote and used for outpainting. The numbers on each image are used to clarify the steps in the creation process.





Figure 1: Diversity of natural places that I visited during this project in Southern Sweden and Southern California.

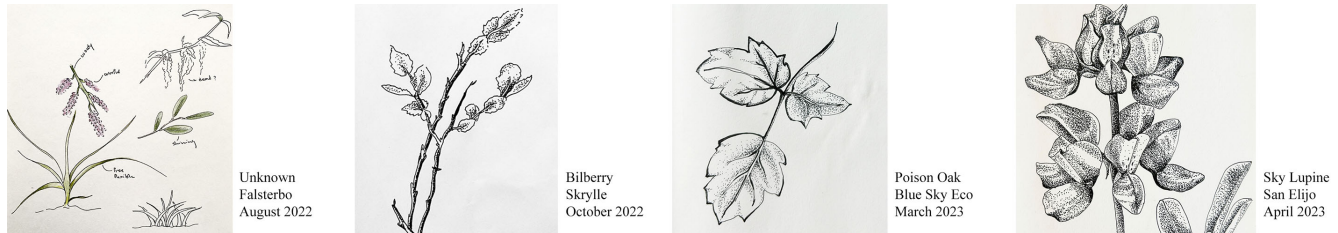


Figure 2: Some examples of my drawings.

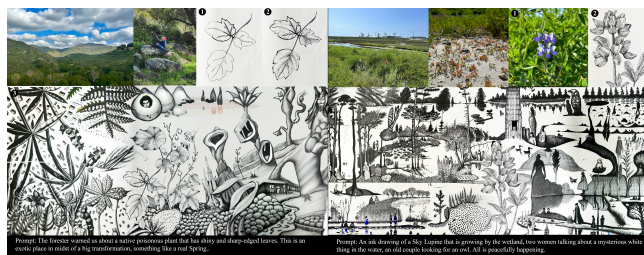


Figure 3: Examples of outpainted images, left, Blue Sky, CA, March 2023, right, San Elijo, CA, April 2023 (see the appendix for more and higher resolution images).

representative of different seasons, natural habitats, and locations (Fig. 4).



Figure 4: Visual analysis of the outpainted images.

### 3.4 Visual and Thematic Analysis

I collected data that included auto-ethnographic notes, nature writings, drawings, photographs, and AI outpaintings. Due to the different kinds of data, I used and combined two different methods: visual analysis [84] and thematic analysis [17]. I conducted the visual analysis for each image based on their formal elements, such as color, scale, shapes, perspective, and principles of design, such as unity in variety, rhythm and balance [84]. In the visual analysis, I sought to identify elements that visualize concepts or theories informing this research, such as Alaimo’s transcorporeality [2], and Tsing’s polyphonic assemblages [92] (Fig. 4). The visual analysis process unfolded as follows: I organized the drawings and pictures and labeled them according to the name of the place and the kind of natural habitat (e.g., mountain, garden, forest, wetland, etc.). I attended to each outpainted image and formulated a claim, which is the intention of the artist or research question of the design researcher [84]. Then, I coded and wrote about the piece, considering how formal elements and the principles of design in each outpainted image impacted the meaning and the overall organization of the work. For the purpose of analysis, I chose four of them as

Using Braun and Clarke’s formulation of Thematic Analysis (TA), I sought patterns in the data *across* different data sources (e.g. autoethnographic notes, written visual analysis, and nature writings). I followed six phases of reflexive thematic analysis: familiarising, coding, generating initial themes, developing themes, naming themes and writing ([17], p.35). TA allowed to see shared meanings, patterns and experiences and making sense of those commonalities by coding the data (Fig. 5).

## 4 RESULTS

The key challenge of the data analysis in this project was analyzing the data that were collected through different forms of media: visual, verbal, and embodied. However, despite the fact that verbal language may fall short in communicating the richness and multitude of dimensions of experiences and emotions, the verbal language in the writings –albeit different kinds of writings (autoethnographic notes, nature writings, and written visual analysis)– proved to be a suitable meeting point of different forms of data.

The written data were coded and thematically analysed to find commonalities across various media and sections. The result of this



process led to the identification of several initial themes (e.g., metamorphosis, social ecology, more than human dimensions, moving bodies, noticing, attending, transforming, reflective conversation with plants through drawing, etc.). The initial themes were synthesized and clustered twice, first into six themes, then into three main themes based on the similarities and shared patterns. The main themes were labeled as follows: (1) heeding, (2) walking and drawing (with) others, and (3) transforming. The other three themes were social ecology, which took part in the theme of heeding; the life of others, which clustered under the theme of walking and drawing (with) others; and the more than human dimensions, which were included in the thematic cluster of transforming.

Some of the themes had stronger connections with specific places and/or seasons than others. For instance, the theme of transforming was more present in the spring season in Southern California, while social ecology and heeding were more ubiquitous in the writings and drawings of winter in Southern Sweden.

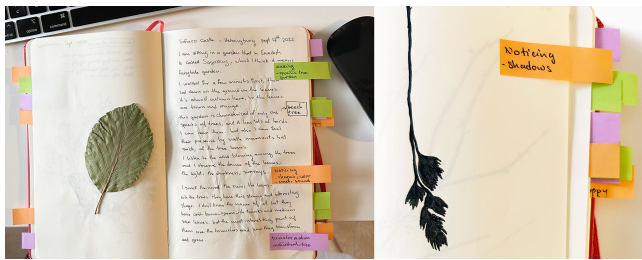


Figure 5: Coding and thematic data analysis.

#### 4.1 Heeding

The theme of heeding was presented through two ways of seeing: one was active looking, manifested mostly while intentionally attending to the plants' colors, shapes, particularities, and relationships for drawings; the other one felt forced or pushed by the environment onto me, at least initially, and then shifted to an intentional way of seeing, such as when I noticed strange things or unexpected shapes in the outpainted images such as the absence of perspective or cast shadows. In both ways, I heeded the plants by expressing through and analyzing drawings. The theme of heeding included several ways to attend to more than human nature, which spans from the individual physical attributes to the ecological identities and relationships. In my nature journal, I found notes about plants that were in green colors that were particular and were different than a *normal* green color that one attributes to leaves (September 22): *there are these trees here that have leaves that are not as green as one might assume. Some are silver-green, some others are blue-ish.* Noticing the tints and hues is not an unexpected skill for someone who has training in visual arts and design. But nonetheless, I noticed them differently and wrote about them in a relational and ecological way rather than separated from their environment. For instance, rather than describing a plant color as if it was, say, Pantone Chateau Green, instead I noticed tints of the plants in relation to their movements in different places I visited (August 2022; April 2023): *it has grown from an old trunk of a tree, in three directions. The new branches are thin and golden.*

*They move around delicately with the breeze.* In Southern California, however, it was impossible not to notice the super bloom season, with all those *tall and delicate bright yellow flowers, sweeping around with the mountain breeze*, similarly impossible to ignore, was the bright orange color of California poppies in the Blue Sky ecological reserve, March 2023.

I noticed the fact that even in the strictly vegetal world, there are some plants that can be easily pushed into the background or be foregrounded –e.g., the bright orange color of poppies makes it very easy to be noticed, in comparison to the soft green color of baby Fremont Cottonwoods (Figure 6). But while walking among the mountains, even those plants that were impossible to overlook opened up for me some deeper encounters with native (and not native) plants (Figure 6). As Tsing highlighted, world-making processes are activities that every form of life, including humans, animals, plants, and fungi, are engaged with, and as a result of those activities, we alter the environment, the world-making, and ultimately the worlds of the others [92]. I reflected on the value of those non-native plants that have yet to be discovered. What kind of worlds were they making? which worlds were they altering? why were they here? are they lost? were they forced to leave their homes? I was noticing plants, starting from their visual appearances or the botanical characteristics to noticing their identity, place, and world-making processes.



Figure 6: Examples of native Southern Californian plants observed during this project, February-April 2023.

September 22, I wrote: *I can hear them [the birds], but I can also feel their presence by the sudden yet subtle movements of the trees' leaves [...] the trees have this interesting and strange shapes [...] they have cold-brown-green-ish trunks and medium size leaves.* I noticed that I was focusing much more on the shapes and colors than how leaves sound in the wind or how a tree trunk sounds if I listened to it. But Welling's method of sitting on the ground and writing was helpful in that it supported my full body sensory experience of the plants, and as she puts it, our ears have three times more connections to our brain than our eyes have [99]. As Wohlleben puts it, our body often requires a full immersion in nature to be able to fully notice and feel it, and listening, in particular, "hones our senses until even stationary patterns register" [101]. That deep listening pause disrupted the usual process of drawing. For instance, in August 2022, while I was listening to the sea waves meeting the shore, I closed my eyes for a moment and listened to the wind blowing among the wildflowers; when I reopened my eyes, I noticed the movements of the shadows on the ground, which were overlooked before. So, I drew the shadows by tracing the shadow lines on my sketchbook (Figure 7). The practice of drawing the shadows of the plants, instead of the plants themselves, helped to discover a new

emergent way to express plants and what they put into the world, rather than a conventional scientific and/or artistic representation.

The theme of heeding was present in the visual materials through formal elements but in an unexpected and organic way. I noticed that some of the visual elements in the outpainted images did not fit or were not coherent with the overall composition and meaning of the work: elements that I would not have included in those places and formats or would have drawn differently. I noticed them because they were unexpected, troubling, or inharmonious to my eyes as a design researcher.

For instance, I noticed there was little or no spatially represented perspective in the images. Perspectives are a kind of optical illusion, and we use them because we desire to represent an image as close to what we as humans see in the real world. Thus, it is not surprising that AI-generated images may lack those conceptions, as they do not actually see and perceive the world the way we humans do. Another unexpected formal element created by genAI was the scale of representations. For instance, I noticed gigantic flowers and leaves in comparison to tiny little human figures, creating interesting but also disorienting juxtapositions (Figure 3). I further noticed reflections of the figures on the surface of the water, an absence of cast shadows, and the direction of light in the outpainted images.

I observed formal elements, through vertical and horizontal shapes and lines, that connected human and nonhuman figures. I attended to how they intersected: humans were almost always presented in vertical forms, while trees, flowers, and leaves were presented both horizontally and vertically in several places. Also noticeable were formal elements that isolated figures and habitats, which otherwise were connected, such as the black isolated flower, which was confined by the horizontal and vertical lines, or the sea by the inland (Figure 3).



Figure 7: Noticing and drawing plants shadows, Ön, Malmö, Sweden, August 2022.

## 4.2 Drawing (with) Others

The act of drawing plants not only clearly helped me to attend to the ecological relationship between plants and others in a place (e.g., I noticed a kind of social activity or the essence of what brings different plant species together towards building a community) and to the specifics of the plants (e.g., their individual and collectively shared features), but also supported a self-reflexive process on my own place within it. In addition, it provided me with a sense of emerging connections to these two different countries, neither of which was my home country. In relation to that, my notes were reflections of an experience of a different and emerging life or a new world in transition: *I sat on the ground near the mosses for a*

*few minutes and looked closely at the plants around me. It's autumn, so plants' colors, shapes, and sounds are different; they even smell differently, as if they were entering into a new and different world.* This note reflects my growing experiential awareness of what I had read in Alaimo about the literal contact zone connecting diverse bodies.

During one of my field work in Southern California (Dixon lake), I observed a kind of *transformation that was bigger than spring*, and it felt like something Other, something more than human. Some plants made me reflect on my body scales in relation to each other and their immense otherness. One example was the Yucca flower. The one I encountered was in full bloom, sitting on a hill and was as tall as I was (Figure 6). What is striking about it is that it is a small shrub with a single, giant stem that grows about ten times the size of the shrub, with a dramatic flower on top; that stem and flower seems entirely out of proportion with the shrub and that sense of "disproportion" creates the sense of Otherness.

Transitioning my analysis from my fieldwork to the results of outpainting, the theme of Otherness also emerged. One of the outpainted images strongly featured chiaroscuro elements, and while analyzing the image's negative/positive spaces and their relationships with each other, I discovered new subjects. For instance, in the negative space outpainted between two trees, in one of the images, a woman-like figure was standing tall and facing the observer (see appendix, p.4), confounding Western artistic conventions, including the figure/ground relationship and the visual scale. Likewise, a horizontal line of the water in the San Elijo outpainted image, led to a dark spot of a big bush, which looked again like a woman figure standing along a vertical line (Figure 3). It felt similar to Angelucci's Arboretum [6], which foregrounds the photographs of trees on top of the human figures in her photography, yet different in that in outpainted imagery, the women figures were the products of two or more other figures coming together in a composition (Figure 3).

Another visual feature, as described in the previous section, was the omnipresence of "unexpected" and "unnatural" scales, such as a very big owl or an enormous flower. The tree-like shape reflection of a woman on the surface felt also both surprising and unsettling; similarly, the trees, with big open mouths that seemed to be yelling at the observer, were terrifying (Figure 3). The exercise of experiencing abruptness and staying with it, without trying to fix or reacting to it [48] led to a kind of deeper transformation that I write about in the next section: Transforming.

## 4.3 Transforming

The theme of transformation was omnipresent in my writings across places and plants that were going under a kind of bodily transformation. These were expressed through my fieldwork writings. The theme of transformation was presented as either individual transformation (e.g., of a leaf or a flower) or a more social and collective transformation (e.g., of a forest). For instance, an individual transformation was noted on September 4th, 2022, while drawing a plant under the shadow of a tree (the place was about ten minutes cycling from my home): *the edges are sharper when the leaf is older [...] they differentiate in forms and the negative spaces [between the leaves and branches] as they grow.* Another example of individual transformation was a description of the branches of

a beech tree, its organic and dynamic shapes as if they were in movement and growing: [...] *but the most interesting part of these trees are the branches and how they seem to transform and grow.* During another visit, I drew the transformation of a mature tree trunk by drawing young and delicate new leaves growing from the edges of the top of the trunk and attracting other plant species to themselves. Above the drawing, I wrote: *two plants lives [are] blended to each other, are they living happily?*

Writing related to the theme of transformations in Southern California was mostly about collective transformations, including ourselves, places, and bodies. In March 2023, I visited Blue Sky ecological reserve, which is a natural reserve with a lake situated at 1,312 ft above the sea level (about 400 m). I wrote: *this is a very exotic place! it feels like it's going through a sort of major transformation, something like a spring maybe, but bigger and more transformative.* It was then added *I think that is [partly] because California has been having some good rainy days [atmospheric rivers], basically since I moved here.*

The theme of transformation also came up in the visual analysis of the Outpainted images. I observed several bodily transformations in formal elements of the images through horizontal, vertical, and diagonal lines across different AI-generated imagery. For instance, in San Elijo image, the vertical lines that morphed from plant to human, or from building to plant and to human-like figure were omnipresent (figure 3). Similarly, in the same picture, the curvy line of the river on the bottom right corner of the picture is noticeable, leading to a tree trunk shape element, which morphs into a woman-like figure. In the outpainted images, vertical lines of women-like figures were omnipresent, that seemed to be growing from the soil, or from a body of water, or from a rocky cliff, just like plants. These vertical transformation lines were also found in the Sky Lupine flower, which was outpainted into two women-like figures on the top, facing each other (figure 3).

The theme of transformation was visualized not only through lines but also through principles of rhythm and repetitions [84]. For instance, a pattern of fish-like figures on the horizon, transformed into a pattern of birds in the sky on top (figure 3), reminding me of works of the artist M. C. Escher [30], who used repetitions (and transformation) as a principle in his works –and this means genAI clearly was trained on his works. Further, in one of the outpainted images, an individual and more detailed transformation, perhaps from a micro to a macro formal level, from flower petals to a woman-like figure, was also palpable, reminding me of the African American mixed media artist Wangechi Mutu [75] –which again may mean that genAI was trained on her works. Further, I observed leaves morphing into flower petals, echoing Goethe's remarks that the flowers are the results of a certain metamorphosis process of leaves [44].

## 5 DISCUSSION

In this research, I focused on plants as a subject and a space to creatively express the matters of sustainability, identity, belongings, and otherness. In this section, using Alaimo's transcorporeality to help organize thought, I reflect on some of the ways depicting plant species and ecology in this project created political and ethical possibilities that emerge from the literal contact zone between

humans and nonhumans corporeality [2]; and the implications for sustainable and more than human design.

To be clear, I emphasize that I do not claim to have resolved the paradox of decentering a human-centered practice (i.e., design, creativity), but have sought to navigate that paradox in a self-reflexive and transcorporeal way, arriving at a perspective on (and in) the paradox. Hence, I will lay out and argue about multiple ways the journey –writing, drawing, and outpainting, at times intentionally and other times surprisingly– created political and ethical possibilities and decentered my subjective perspective.

For this discussion, I focus on the ways that my creative engagements with plants –as a visual artist/designer, a (nature) writer, and an outpainter –reflexively changed me. Drawing plants in nature, informed by writers such as Tsing [92] and Alaimo [2], helped me to attend to the corporeal "literal contact zones" where my bodies came together, and as I did, that zone grew in resonance and detail, until it reflexively changed me. Likewise, heading into this project inspired by the tradition of nature writing, I noticed over time that my writing was becoming increasingly autoethnographic, as changes in myself, brought on by my deepened engagement with plants, evidenced transcorporeality. Finally, the outpainting part of the project surprised and challenged me, as I hoped and expected it would, but it did so in at least one way that I had not expected, when its transgressions against conventions of depiction surfaced and made me confront some of my own biases.

### 5.1 Transcorporeal Drawing(s)

Throughout this project, I produced writings and drawings that were obviously all human-made cultural products. I walked, smelled, and noticed like a human. Surely, I have felt all along not only a sense of "biospheric connection" to the more-than-human nature but also to myself. As I saw and wrote about transformations in nature, I experienced it in myself (human); I heeded things in and among plants, colors, perspectives, and ecologies, and drew with others (genAI) as if I joined my Other selves, woman, immigrant, human.

The creative engagement through observations, writing and mark-making with the plants pushed me to go beyond merely representing the plants and "pressing outward" in Marder's words (cited in [43]). My hands, touching the paper and holding the pen, moved through the surface of the paper and aligned with what eyes were seeing and what body was feeling, drew plants' bodies and captured bodies around them simultaneously. I am trying to represent in writing something of the experience of transcorporeality, that is, what happens when the literal contact zone becomes the focus; when that zone seems to expand, develop, and grow once it receives that attention; and how I became otherwise as an outcome of that growth. Drawing plants was an embodied practice: I was not only noticing plants, but dancing light and shadows, the feel of the paper, the movement of my hands and eyes and shifting body on the hard ground. The bodies here also include those that we do not normally understand to be biological: cultural, social and experiential bodies. My senses crisscrossed and subverted traditional binaries between nature and culture, human and non-human. As one example: while my left hand was feeling the texture of the paper, my eyes used my embodied understanding of texture to note

details about the texture of plant stems and leaves I was looking at, while my right hand used conventional techniques of drawing, such as stippling (Fig. 2), to represent that texture that my eyes were seeing and my other hand was feeling, on the very same piece of paper I was drawing on.

In a different situation, I became attuned to plant shadows (Fig. 7). In the tradition of botanical drawing, noting color, volume, and texture so that one can represent that graphically is central to the practice. Initially, I defaulted to some of those practices. But at times, it was as if the plants spoke back to me and demanded that I attend to them in a different way. One such example happened when, on a breezy day I was trying to draw a plant, but its bouncing and bobbing in the breeze made it hard to draw. Suddenly, I saw the plants' shadows. The shadows were like figures that plants put into the world in a transcorporeal relationship with the soil, the tree trunk, and the sun. The shadows are visually flat and represent the contour of a plant as a subject. They are not the plant but an entity that emerges –to appropriate Barad's notion– from the soil, the plant, and the sun "intra-action" [7, 8]. Shadows do not represent plants the way pictures do. Still, that absence of visual details and flatness made them uniquely guide my attention to other and perhaps more subtle qualities of plants: movements, when plants sway, their shadows sway accordingly: intimate and trans corporeal [3, 43].

Clearly, drawing in nature was a multi-sensory activity which, like *repertoire* in Oogjes and Wakkary's words, opened up ways for me to facilitate the participation of nonhumans in the creative processes [77] and to weave my stories to the plants' stories. What I experienced was more intimate even than weaving stories together, however: as I became increasingly sensitized to the "literal contact zones," my drawing itself changed –what I wanted to draw, how I drew it, and how I felt as I was doing so. For me, transcorporeality was transitioning from a heady theory to mundane sensations in my fingertips [1].

## 5.2 Transcorporeal Writing(s)

I began this project inspired by nature writers, such as Rachel Carson [19], Erin Sharkey [85], and Stephanie Mills [66], whose writings linked their observations of nature with personal experiences and societal issues, including public policy and economic and environmental justice. But as this project changed my perspective, those changes in me became a sort of evidence of the impacts of my putative object of inquiry: plants in nature. This insight, that changes in the observer as a result of engaging the observed, has a long history in ethnography and is one of the deep justifications of autoethnography [80], and analogous insights has been expressed in HCI and design literature as well, e.g., [25, 72]. Autoethnography is a first-person [9, 59] qualitative research approach, which allows ethnographers to express their own first-person perspective regarding a situation, by situating the "ethnographer as the protagonist of the ethnographic narration" [80].

My nature writing shifted away from naturalistic science writing towards something like autoethnography, as it started to turn toward more self-reflexive expressions. My words reflected changes in my place of living, relationships, and surviving a global pandemic and also the "I" that was being bodily morphed to instead of transitioning to the new place. For example, writing about the details of a

yucca flower in the Southern Californian mountains and how I felt about it, as I discovered it, was not only about noticing a new exotic plant species but also discovering my other selves as branches of this more than human living society [13]. That expression was a deep reflexive practice that led me (similar to Biggs et al. [13]) to be simultaneously frightened and awed of the possibilities of the growth and expansion of this world in building.

Seemingly, nature writing is a practice of ecological perception of more than human nature and to "outwardly" include the human writers themselves [60]. Thus, my writings, albeit mostly about the trees, seasons, and flowers, their visual details, and environment, were weaved with the layers of my own stories of becoming, a self-reflexive account of exploring and finding my place, my footing, [77] or according to Ecofeminist scholar, Plumwood, the "self-in-relation" ([79], cited in [98]). That process of getting to know, closely looking at, and writing about plants did not exclude me from the equation or did not put me in the background, but was creating political and ethical possibilities of becoming a more than human designer, self-reflectively. That self-embrace echoes Plumwood's critiques of social ecologists, who, like Bookchin [15], question human domination by treating the human as a disease; instead, Plumwood affirms that "the critique of human domination must be part of the familiar and healthy practice of self-critical reflection, not an acultural and ahistorical expression of self-hatred and collective human-species guilt" ([79], p. 12). The visual and thematic analysis of my own autoethnographic notes and writings was yet another practice aspirationally pressing towards the decentering of the subject who was sitting in an office analysing the data, and foregrounding my other self, the one who was in the nature, wrote about and drew plants. This self-self-reflexive data analysis method opened up ways of attending to a transcorporeal experiences, thoughts and ideas, by rejecting and separating it from myself in an attempt to be able to attend and to notice the other[1, 13].

## 5.3 Transcorporeal Outpainting(s)

Once my drawings were scanned and used as prompts for outpainting, I was confronted with a whole new kind of estrangement. There, I saw entangled bodies, distorted scales, "wrong" perspectives, lack of scale and cast shadows, blurry boundaries between habitats and the species, between living and non-living subjects, "unexpected" images, "unnatural" or abnormal greens, an unintentionality and above all a profound lack of unity in the outpainted images. The many ways that outpainting subverted my expectations, all while also carrying forward with high fidelity key characteristics of my work (e.g., black ink line drawings), was disorienting. But again, with the aspirational goal of decentering my own creative agency, I was not just "staying with the trouble" [48]; I was asking for it, even if I wasn't quite sure how it would manifest.

Though at the conceptual level it was not surprising that genAI violated conventions of representation, the specific extent to which genAI used, subverted, and seemingly randomly transformed or flagrantly disregarded those conventions was surprising at the more granular level of what it did with (and to) my initial drawings. It joined objects of different scales; it morphed from one type of object into another (e.g., from fish to birds); it produced shadows that were distorted and took on a life of their own. My point is not

to state the obvious, which is that genAI doesn't "understand" art and can not really produce it; rather, my point is that the specific ways it expanded my work created new experiences of wonder and sublimity. I have written earlier about my surprising first encounter with the yucca in mountains, whose flower seemed to be entirely out of proportion with the plant. When yucca plants were outpainted, they became yelling giant trees (Fig. 3). In other words, just as nature seemed to produce objects that did not respect norms of scale and organic coherence, creating vegetal "monsters," so too did genAI. That double-subversion of my expectation that organic bodies should respect certain norms of scale suddenly inverted: I realized that the problem was my own expectations, and at that moment, I felt wonder all over again, though I was sitting at a computer. And that experience, in turn, changed what I looked for, both in nature and in outpainted art.

The use of outpainting opened up to a few benefits. First, it worked as a tool for multispecies *visual* storytelling, to support one's ability to see and to question what surprising and "unexpected" and "abnormal" stories one could be part of [47]. The genAI's outpainting technique, although it works on the principle of prediction, still yielded unexpected results. It clearly and literally not only expanded my drawings but disrupted them, and through that genAI transformed my drawings to include other characters, humans and nonhumans. That transformation, which happened in a rather unplanned and surprising manner, helped me to see a pluriverse, a world in the making, and to notice extraordinary subjects, figures, and stories [31]. If my intention of putting the drawing at the center and then outpaint it with genAI was to augment and amplify my literally centered drawing, I was unsuccessful. In contrast, outpainting disrupted that narrative (due to genAI's technical imperfections) to show that not only was it not possible for the drawing to be centered, but also to question the existence of any center at all in the resulting images. For a research project focused on the seemingly impossible task of decentering humans, I was suddenly faced with an artifact where it was impossible to have a center at all. In these ways, the outpainted imagery communicated multiplicity of the stories [46] that were weaving polyphonically [92] to each other to visualize a transcorporeality without backgrounding or foregrounding any stories or components. The lonely flower was highlighted as much as the female-like figure morphing up from a tree, or the seaweeds. The multi-species world-making process [92] was presented in the absence of "right perspective" or scale.

Second, the outpainted images were evocative. They worked as tools for reflection [38, 40, 41]. The images triggered thoughts on how I could be in an embodied and affective relationship with plants, that "is in many cases represented as a kind of 'dance,' which is to say a series of movements and encounters in which the interdependency of bodies acquires shape and form" ([65], p.16) of a world in building. As Michael Marder puts it, the conditions for encountering plants, instead of confronting them as objects of knowledge, are their interactivity and distinct subjectivity ([64], p.13). The outpainted images with those transcorporeal and hybrid figures of human-nonhuman evocatively raised the question of from where "I" as a subject starts, and how my craft can be "about thickening relationality for and with the Earth."([47], p.2).

## 6 CONCLUSIONS

As with other design researchers in the broader HCI community, I am excited by thinkers in the critical traditions of posthumanism, critical plant studies and the Anthropocene, but I also find them difficult to translate into practice within design-oriented fields. Part of the challenge, as is widely recognized, is the difficulty of decentering the human in a field that is foundationally human-centered. Another part is the ways that many of us have been taught to see creativity as a uniquely human quality (though Tsing's world-building [92] and similar ideas clearly challenge this), and even to see it as the act of an individual (e.g., the "creative genius" mythology around the arts and design), though that, too, has been widely challenged (e.g., in social psychology [24]). In the present work, rather than staying at the level of abstract theories and attempting to contribute a new one, I approached these matters in an experiential, embodied, and physical way. There, I cultivated my senses, thoughts, and outward expressions in a way that reflected the goals, the desiderata, articulated by this body of theory in those moments of praxis, where as a design researcher, I have found the practical utility of this body of theory to remain elusive.

I have tried to communicate here how these experiences have changed me, but more relevantly to design research, I hope also to have communicated how these experiences have changed how and what I make as a design researcher. Above all, I have developed a novel approach, combining nature walking, journaling, drawing, outpainting, thematic analysis, and self-reflection. Additionally, within that approach, I also found shifts in how I act in natural settings (e.g., leveraging all my senses, intentionally using diverse points of view); how and what I draw (e.g., moving from a botanical drawing mode to objectively represent plants towards a mode where I try to receive and depict what they are expressing to me); how and what I write (e.g., moving from a mode of nature writing towards a kind of discourse that is more radically reflexive, which documents ways that plants impress their ways of being onto me, where I change to accommodate those impressions); and how I use genAI (e.g., letting its technical inabilities and even hallucinations challenge my biases and open me to new ways of imagining, new arts of noticing, the literal contact zones where bodies intermingle, and where strange worlds are made).

## 7 LIMITATIONS

This project comes with its own limitations. First, I was not able to ride my bike to many places. Hence, I used public transportation and drove my car, which, in addition to using genAI—which consumes a large amount of energy—contributed to the issues this research is trying to self-reflexively study. Second, this research could have been better informed and positioned with regard to the indigenous knowledge of the land and plants, especially those of Kumeyyay, Juaneno and Cahuilla. Third, I wish this paper could reflect the perspectives of African Americans, LGBTQ+ and women on nature writing, however, and even though they were mentioned in this work, it may not sufficiently represent their views or their epistemological commitments. Fourth, although I used my own art as a member of an underrepresented group, the genAI that I used was trained on arts of mostly colonial structure, and has reproduced visibly or invisibly some of those biases and thinking patterns.



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