One Species amongst Many:

Creatively Thinking through Anthropocentrism

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ABSTRACT

One Species amongst Many:
Creatively Thinking through Anthropocentrism

Miranda Weigensberg

By analyzing the work of three contemporary artists, this thesis intellectually grapples with how different mechanisms of interspecies attunement can disentangle, challenge, and in some instances reiterate, modalities of anthropocentric thought and action. The first section examines Špela Petrič's performance piece *Skotopoiesis* (2015), which seeks to reconfigure human-plant relationalities and engender expanded anthropic engagement with the vegetative world. Petrič's work provides a generative ground for contending with modes of attunement such as lengthened temporality, cross-species communication, and the formation of meaning. The second part discusses Tomás Saraceno's interactive installation *Play-Ground* (2024), which aspires to bridge the sensorial worlds of humans and arachnids. *Play-Ground* generates a space to wrestle with notions of imaginative and embodied perception, while exposing the difficulty of thinking beyond anthropomorphism. The third section teases apart Alexandra Daisy Ginsberg's project that prioritizes the specific niches and needs of pollinators. Entitled *Pollinator Pathmaker* (2021-ongoing), Ginsberg's endeavour demonstrates how efforts of creative empathy and multispecies cooperation can instantiate ecologies of reciprocity, ethical frameworks of care, and multi-species coexistence. This thesis not only investigates how artistic praxis engages with paradigms of anthropocentrism, but actively confronts how art can employ creative methods to (re)construct our relationship with non-human entities. With the continual intensification of ongoing ecological imperatives, such work is integral as it highlights the challenges, as well as the value, of employing artistic endeavours to support interspecies flourishing.

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INTRODUCTION

In response to ongoing ecological imperatives—such as climate change, biodiversity loss, and environmental degradation—artistic practices offer spaces for intense reflective work where individuals can re-imagine relationships with nonhuman beings and ecosystems alike. In *When Species Meet* (2008), Donna Haraway identifies four cultural "wounds" that epitomize human exceptionalism: the "Copernican wound" placed Earth at the centre of the Universe; the "Darwinian wound" positioned human beings above all other species; the "Freudian wound" established anthropocentric consciousness as the highest form of sentience; the current "Synthetic wound" has disassociated the 'natural' from the 'artificial', fostering a nature-culture divide.[1] To devise a radically different comportment towards the environment, it is necessary to shift focus from human subjectivity to an increasingly ecosystemic understanding of the world.[2] Contemporary artistic efforts help us overcome the challenge of seeing that we, as human beings, are not separate from our surrounding world.

By fostering an expanded ecological consciousness, artistic practice and discourse constantly redefine the role art plays when grappling with pressing environmental matters. Such efforts demonstrate how art dynamically interacts with, impacts, and is influenced by, evolving eco-critical considerations. Art critics, as well as others who write about artistic endeavours, elucidate a myriad of ways art can be employed to begin to heal the world wounds. Prominent areas of scholarly inquiry explore expanded human-nonhuman interactions and the sustainability of interspecies relationships. In this context, philosopher Vinciane Despret challenges

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[1] Donna Haraway, *When Species Meet* (Minneapolis and London: University of Minnesota Press, 2008).
[2] Michael Marder, "Plant-Soul: The Elusive Meanings of Vegetative Life*," Environmental Philosophy* 8, no.1 (Spring 2011): 85, 88; The term 'ecosystemic' acknowledges an ontological and epistemological approach founded in an understanding that complex relationships between biotic organisms (such as people, plants, and animals) and abiotic factors (such as sedimentation, water, and carbon cycles) must be considered when discussing ecosystems.

conventional perspectives on human-animal connectivity, while anthropologist Anna Lowenhaupt Tsing investigates cross-species interdependencies to highlight their ecological and cultural significance.[3] The framework of actor-network theory serves as a platform for challenging traditional divisions that separate nature from society, with philosopher Bruno Latour advocating for an integrated approach that encompasses human and nonhuman entities.[4] Certain efforts highlight art's potential to catalyze political and cultural change to foster environmental awareness, as demonstrated through art historian T.J. Demos's work, which advocates for environmental justice as well as ecological responses to challenges such as resource depletion and pollution.[5] Engaging with notions of the Anthropocene, other scholars evaluate how art contends with extinction and biodiversity.[6] These insights illustrate how artistic endeavours can shape perceptions as well as responses to ecological challenges. Additional theoretical explorations encourage artists to generate novel modalities of representation that capture the scale and complexity of ecological crises, as exemplified through philosopher Timothy Morton's ideas that reposition expansive environmental phenomena as "hyperobjects."[7] Curatorial efforts also influence environmental art and activism, while certain writers and

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[3] Vinciane Despret, *What Would Animals Say If We Asked the Right Questions?* (Minneapolis: University of Minnesota Press, 2016); Anna Tsing, *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins* (New Jersey: Princeton University Press, 2015).
[4] Bruno Latour, 2010, "An Attempt at a 'Compositionist Manifesto'," *New Literary History* 41, no. 3 (2010): 471–490.
[5] T.J. Demos, *Radical Futurisms: Ecologies of Collapse, Chronopolitics, and Justice-to-Come* (Cambridge, MA: The MIT Press, 2023).
[6] In the 2023 book *Who Would You Kill to Save the World?*, cultural theorist Claire Colebrook philosophically explores how notions of morality can influence the ways artistic interventions critically contend with approaches to ecological crises.
[7] Timothy Morton, *Hyperobjects: Philosophy and Ecology after the End of the World* (Minneapolis: University of Minnesota Press, 2013).

theorists provide comprehensive overviews of how artistic praxis can be employed to prioritize ecological concerns.[8]

In recent decades, a growing concern for environmental issues, as well as an increased attention to the cognitive and communicative capacities of nonhuman beings, has propelled public interest and scholarly discourse on interspecies exchanges. Popular culture started to reflect a fascination with cross-species communication, exemplified by the media attention surrounding Koko the gorilla.[9] Beginning in the 1970s, psychologist Francine Patterson taught Koko American Sign Language, and over the following decades, Koko reportedly learned more than one thousand signs and understood thousands of spoken words.[10] Similarly, Alex, an African Grey parrot, demonstrated the capacity to learn and use English words meaningfully, challenging prevailing notions of avian intelligence.[11] In the 1960s, marine biologist John C. Lilly captivated public interest by exploring the potential for human-dolphin dialogue.[12] These instances underscore a broader cultural shift towards recognizing, as well as valuing, the cognitive and sentient capacities of nonhuman beings, fostering an expanded awareness for the complexities of interspecies relationships.

In order to grasp the significance of such work, it is essential to address the broader societal context that often marginalizes nonhuman beings and the environment. Contemporary

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[8] Refer to Lucy R. Lippard's 2007 exhibition *Weather Report: Art and Climate Chang*, edited by Stephanie Smith and Andrew Revkin (Boulder, CO: Boulder Museum of Contemporary Arts, 2007); One such art theorist is John K. Grande, who explores how artists employ their creative processes to grapple with sustainability and efforts of environmental activism (refer to Grande's 2012 book entitled *Art Nature Dialogues: Interviews with Environmental Artists* for further reading on this topic).

[9] Francine Patterson, Joanne Tanner, and Nancy Mayer, "Pragmatic Analysis of Gorilla Utterances: Early Communicative Development in the Gorilla Koko," *Journal of Pragmatics* 12, no. 1 (n.d.): 35–54. https://doi.org/10.1016/0378-2166(88)90018-5.

[10] Ibid, 39-40, 50-53.

[11] Researchers started working with Alex in 1977; Irene M Pepperberg, "Comprehension of "Absence" by an African Grey Parrot: Learning with Respect to Questions of Same/Different," *Journal of the Experimental Analysis of Behavior* 50, no. 3 (1988): 555-6, https://doi.org/10.1901/jeab.1988.50-553.

[12] John C. Lilly, *Communication Between Man and Dolphin: The Possibilities of Talking With Other Species* (New York: Crown Publishers, 1978).

society has long upheld a hierarchical view of life that places humans at the apex, relegating plants, animals, and other nonhuman entities to lower tiers of importance.[13] This anthropocentric perspective has been reinforced through rigid taxonomies and a classification system that prioritizes human needs and desires, often at the expense of ecological integrity and the welfare of nonhuman beings.[14] This dislocation manifests in various forms, from the reckless exploitation of natural resources to the disruption of animal habitats and the undervaluation of plant life. While causing harm to nonhuman entities as well as the environment, such practices reflect a profound failure to appreciate the interconnectedness of life on Earth. By adhering to a hierarchy that prioritizes certain forms of life over others, we fail to recognize the intrinsic value of biodiversity and the essential roles played by all species in maintaining ecological balance.

To counter such shortcomings, artists across various movements employ creative expressions that prioritize ecocentric efforts. Examples of environmentally conscious art include works from the Land Art movement, where artists such as Agnes Denes and Andy Goldsworthy actively engage with surrounding landscapes. Denes's iconic *Wheatfield – A Confrontation* (1982) transforms a Manhattan landfill into a two-acres wheat field, challenging urbanistic priorities and generating dialogues concerning sustainability practices (figure 1). Goldsworthy's site-specific sculptures, in addition to Richard Shilling's land artworks, and Nils-Udo's outdoor installations, emphasize the relationship between artistic efforts and environmental concerns (figures 2-4). Exploring interspecies engagements through the piece *I Like America and America Likes Me* (1974), Joseph Beuys curates a space to spend three days cohabitating with a coyote. To visually confront viewers with the impacts of climate change and consumerism, Olafur

[13] In the Western world, interpretations of Judeo-Christian scriptures, particularly the creation narrative in Genesis, have largely influenced the prevailing hierarchical views that elevate humans above nonhuman entities.
[14] Laura Gustafsson and Terike Haapoja, *Museum of Nonhumanity* (Santa Barbara: Punctum Books, 2019).

Eliasson's *Ice Watch* (2014) relocates ice blocks from Greenlandic glaciers to the Place du Panthéon in Paris (figure 5).[15] Rebecca Belmore's *Ayum-ee-aawach Oomama-mowan: Speaking to their Mother* (1991) investigates cross-species communication and perception, while Mark Dion's work critically examines nature-culture dualisms through scientific and artistic lenses (figures 6-8). Such endeavors exemplify how artists engage with the four cultural wounds outlined by Haraway, encouraging participants and viewers alike to reconsider interspecies understandings.

Such artistic work asks us to think "imaginatively and empathetically" about another being's existence.[16] Many artists endeavour to engage with nonhuman beings in empathetic ways, a task that proves immensely challenging due to the inherent complexity of comprehensively understanding alternate forms of existence. It is this challenge that forms the foundation of what I seek to explore and unpack throughout my thesis. Catalyzing change, art holds the potential to illuminate human-nonhuman interactions and bring to light these often overlooked or undervalued entanglements. Providing generative frameworks for novel ways of being in relation to our encompassing world, art – dissimilar to other disciplines in its ability to instigate playful, creative, and empathetic imaginaries – strives to engage interspecies awareness by elucidating transspecies sensitivities and attunements.

For the scope of this thesis, the term *attunement* is employed to describe the nuanced process of sensitively aligning one's awareness and responsiveness to the presence and expressions of nonhuman beings. This concept derives from philosophical ontology, notably

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[15] In line with Eliasson's effort to grapple with the environmental consequences of overconsumption, Chris Jordon's photographic series, entitled *Midway: Message from the Gyre* (2009), depicts how discarded plastic waste devastates seabird populations in the Midway Atoll.

[16] Heather Barnett, "Being Other Than We Are," *PUBLIC* 59, no. 30 (Summer 2019): 161-163; An artists and art critic, Heather Barnett explores the notion of interconnectivity, embodiment, and empathetic entanglements with nonhuman organisms. Since 2013, Barnett has conducted a myriad of experiments that connect humans with slime moulds in an effort to expand multispecies considerations.

articulated by the philosopher Martin Heidegger, who used the term attunement (*Stimmung*) to denote the pre-reflective states that shape how we encounter and interpret our surroundings.[17] In the realm of more recent aesthetics, however, attunement may be both pre-reflective and reflective grounding in the subtle, affective "modulations" that connect different entities—emphasizing the embodied and relational aspects of experience.[18] Adopting the term attunement within such a framework underscores the profound and implicated engagement required to foster interspecies relationships, a theme central to the artistic practices examined throughout this thesis.

There are specific lines of exploration that inform the core of my theoretical frame of reference and research. A relatively recent development in Western thought, only gaining prominence in the late nineteenth century, the notion of trying to "understand other minds"—explored by scholars such as historian of science Lorrain Daston—highlights a manner of thinking about nonhuman beings that contests anthropocentric paradigms of consideration.[19] Building on this, the importance of attuning to "different ways of knowing" to transcend "spatiotemporal barriers," as grappled with by philosopher Elizabeth Grosz, enables a deepened engagement with others beyond human limitations.[20] This discourse is extended through the articulation of an imaginative vision for a future in which, as expressed by Stacy Alaimo, a

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[17] Andreas Elpidorou and Lauren Freeman, "Affectivity in Heidegger I: Moods and Emotions in Being and Time," *Philosophy Compass* 10, no. 10 (2015): 662. https://doi.org/10.1111/phc3.12236.

[18] Julian Brigstocke and Tehseen Noorani, "Posthuman Attunements: Aesthetics, Authority and the Arts of Creative Listening," *GeoHumanities* 2, no. 1 (2016): 2, https://doi.org/10.1080/2373566X.2016.1167618; For further insights on ways in which artistic practices can (re)attune to, and grapple with, ongoing environmental imperatives, refer to the book: Geoffrey Rockwell, *Right Research: Modelling Sustainable Research Practices in the Anthropocene*, edited by Chelsea Miya and Oliver Rossier (Cambridge, UK: Open Book Publishers, 2021).

[19] Lorraine Daston and Gregg Mitman, "The How and Why of Thinking with Animals," in Thinking with Animals: New Perspectives on Anthropomorphism (New York: Columbia University Press, 2005), 10.

[20] Elizabeth Grosz, *Becoming Undone* (Durham: Duke University Press, 2011), 132; Influenced by thinkers such as Charles Darwin, Luce Irigaray, and Gilles Deleuze, Grosz's work reevaluates the human position within broader ecological contexts.

professor in the environmental humanities, "a multitude of species continue to exist" and flourish.[21] Critical of anthropic extractivist modalities, Alaimo advocates for more tangible and impactful environmental efforts, suggesting art can foster a "transcorporeal" awareness and facilitate engagement with "boundary-crossing entanglements."[22] Similarly, advancements of philosopher Karen Barad's notion of agential realism explore how artistic endeavours enact "unlikely transformative merger practices," as seen with work conducted by Callum Bradley and Georgia Perkins, PhD researchers in the Visual Cultures Department at Goldsmiths University of London.[23] Employing posthumanist perspectives to examine how art can generate "interspecies coexistence," individuals such as art theorists Olga Linn and Sunčica Ostoić examine possible proliferations of "interspecies coexistence" through ecocritical art.[24] Linn and Ostoić emphasize how collaborations involving "live materials" can extend subjectivities and encourage new forms of multispecies relationships, potentially resolving "misunderstandings" through "trans-species intermingling."[25] Such ideas establish a foundation for employing contemporary art as a tool to navigate and ameliorate points of disconnection between species, extending the boundaries of traditional notions that dictate multispecies relationality.

Analyzing three interventions by Špela Petrič, Tomás Saraceno, and Alexandra Daisy Ginsberg, this thesis will delve into the ways these artists employ artistic praxis—in form, content, and discourse—to explore different modalities of attunement that foster sensitivities towards other species. These artists confront conceptual frameworks of cross-species

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[21] Stacy Alaimo, "Wanting All the Species to Be: Extinction, Environmental Visions, and Intimate Aesthetics," *Australian Feminist Studies* 34, no. 102 (December 2019): 398, 401, 407.
[22] Ibid, 398-9, 405.
[23] Callum Bradley and Georgia Perkins, "In-human appetites and mineral becomings," *Antennae: The Journal of Nature in Visual Culture* 61, no.2 (Summer 2023): 133.
[24] Olga M.Linn and Sunčica Ostoić, "Curatorial Perspective on Contemporary Art and Science Dealing with Interspecies Connections," *Technoetic Arts: A Journal of Speculative Research* 17, no. 1 & 2 (2019): 79-80.
[25] Ibid, 83-4.

relationality by highlighting an equivalence amongst beings, broadening our perceptual frameworks, and reshaping our interactions with the surrounding environment. Interacting with "live materials," and experimentally engaging in what Hans Ulbrich Obrist calls "interspecies art," each artist employs distinct strategies that challenge and transcend traditional boundaries, inviting us to imaginatively align ourselves with nonhuman beings.[26] Špela Petrič's work, as exemplified in her performance piece *Skotopoiesis* (2015), challenges categorical conventions by fostering a direct, physical dialogue between human and vegetative life. Establishing an extended point of encounter through her embodied presence and interaction with a plant, Petrič disrupts typical human-vegetal dynamics and highlights the complex, dialogic relationships that exist amongst different species. Petrič's endeavour exemplifies the potential of human beings to both influence and be influenced by nonhuman entities, encouraging a more nuanced appreciation of, as well as approach to, interspecies interdependencies. Tomás Saraceno takes this dialogue one step further in the installation *Play-Ground* (2024), where participants are invited to experience the world by temporarily adopting the sensory perspective of spiders. Through directly engaging with the vibrational sensorium of arachnids, Saraceno's work invites reconsiderations of the sensory hierarchies that typically govern our interactions with the encompassing environment. This shift not only challenges models of anthropic perception, but teaches participants alternate modalities for attuning to the nonhuman world. Alexandra Daisy Ginsberg's *Pollinator Pathmaker* (2021-ongoing) builds on these themes by creating outdoor spaces which revolve around the notion of multispecies empathy. Prioritizing the needs and perspectives of pollinators, Ginsberg deepens her understanding of pollinators and their ecological niches to develop an

[26] Linn and Ostoić, 83; Serpentine, "In Conversation: Artist Alexandra Daisy Ginsberg and Hans Ulrich Obrist," video, January 4, 2024, 4:00, 10:30, https://www.youtube.com/watch?v=DX-mk5otbVc.

artistic plan of action that allows participants to learn about, engage with, and grow alongside, local ecosystems.

The artists' discourse surrounding their respective works provide generative insights into how they conceive of attunements amongst beings. My analysis sheds light onto this dynamic and multifaceted process. Petrič, Saraceno, and Ginsberg employ different strategies to instantiate, and then discuss, their envisioned goals. They engage with concepts of multispecies sensitivity via terms of interspecies communication, heightened sensory perceptivity, expanded empathy, and efforts of establishing co-created meaning. These artworks do not merely inform; they transform participants' conceptions of other-than-human beings. However, this challenging endeavour is fraught with complexities. The project of actively attuning to others demands a persistent reevaluation of our sensory and cognitive frameworks—often requiring us to step beyond conventional boundaries. These three artists navigate this process through innovative interactions that invite audiences to reconsider their relationships with other species. Yet, as I will explore throughout this thesis, despite their efforts, not all attempts at attunement yield constructive connections; some modalities may culminate in impasses, serving as critical nodes of growth that we can take with us and learn from. The healing potential expressed through different modalities of attunement artistically explored by Petrič, Saraceno, and Ginsberg reveals the profound challenges involved in overcoming cultural and ecological wounds. By acknowledging the creatively eco-coconscious efforts enacted by these artists, my work exposes the deep-rooted scars that continue to affect interspecies relationalities. Proposing pathways toward reconciliation between anthropocentric perspectives and ecocentric considerations, this thesis will explore how artistic practices reflect and instantiate critical shifts in our understanding

of, and interactions with, the nonhuman world, offering new models of attuning to a more sustainable and equitable future.

PART I: Being Held in the Embrace of the Other

An interdisciplinary artist currently based between Ljubljana, Slovenia and Amsterdam, Netherlands, Špela Petrič (b. 1980) actively deconstructs conventional concepts of anthropogenic superiority over nature through creating a space for mutual interactivity between a human and a nonhuman being.[27] Having completed a PhD in biochemistry and molecular biology, Petrič combines her knowledge of the natural sciences with artistic praxis to explore concepts of "inter-species dialogue."[28] Petrič describes her intermedia practice as "experiments that enact strange relationalities in [the] hopes of enriching our adjacent possib[ilities]" by teasing apart the "human-centered principles" that so commonly guide the formation of scientific knowledge.[29] Interested in exploring perceived boundaries between human and nonhuman agents through creative efforts of "plant-human intercognition," Petrič performed a work entitled *Skotopoiesis* at the Kapelica Gallery in Ljubljana, Slovenia in 2015.[30] Presented as a durational piece, *Skotopoiesis* is the first work in a tripartite performance opus—referred to by the artist as *Confronting Vegetal Otherness*.[31] *Skotopoiesis* occurred over the course of two days—from

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[27] "Nonhuman Agents in Art, Culture and Theory: Interdisciplinary Conference," Art Laboratory Berlin, November 24-26, 2017. https://artlaboratory-berlin.org/events/non-human-agents-in-art-culture-and-theory/.
[28] "COAL 2020 Award: Meeting with Špela Petrič," COAL. June 5, 2020. https://projetcoal.org/en/prize/coal-2020-award-meeting-with-spela-petric/; "Nonhuman Agents in Art, Culture and Theory," 2017.
[29] "Nonhuman Agents in Art, Culture and Theory," 2017; Špela Petrič, "Confronting Vegetal Otherness: Skotopoiesis," WAAG Futurelab, 2015. www.waag.org/en/event/confronting-vegetal-otherness-skotopoiesis; Špela Petrič, "Biography," Diffusing Durable Art, 2015. https://diffusingdurableart.org/spela-petric_eng/. MIT List Visual Arts Center, *Symbionts: Contemporary Artists and the Biosphere*, Hayden and Bakalar Galleries (Cambridge, MA: MIT List Visual Arts Center, 2022), 11, https://listart.mit.edu/sites/default/files/media/documents/2022-10/symbionts-brochure-mit-list_final.pdf.
[30] Ibid; Located in Ljubljana, Slovenia, the Kapelica Gallery, founded in 1995 by the Student Organization of the University of Ljubljana and managed by the non-profit Kersnikova Institute, is an art space dedicated to experimental practices, with a particular focus on exploring bioart and biotechnology. The gallery is led by architect and curator Jurij Krpan. While specific commissioning details for Petrič's *Skotopoiesis* are not publicly available, the Kapelica Gallery's active participation in funded initiatives—such as the Creative Europe-supported project *Trust Me, I'm an Artist* (2011-2017)—demonstrates the gallery's engagement within the European art community.
[31] The two other works in the series *Confronting Vegetal Otherness* include *Vegetariat: Work Zero* (2019) and *PL'AI* (2020).

12pm-12am on September 10th, 2015, followed by a continuation of the performance from 10am-6pm on September 11th, 2015—and concluded with a panel discussion.[32]

The term *Skotopoiesis*, which means to be "shaped by darkness," acts as a descriptive reference to the content of the work.[33] For twenty hours, Petrič stands motionless in front of a rectangular patch of germinating thale cress (*Arabidopsis thaliana*) (figure 9). A light is projected from behind the artist, simultaneously illuminating Petrič and the plant (figures 10-11).[34] As Petrič's body casts a shadow on the center of the thale cress patch, the plant experiences a process known as etiolation, where the green blades of the cress slowly begin to blanch and whiten due to the obstruction of direct light.[35] The absence of light created by the artist's body alters the cress. Plants have molecular mechanisms that perceive, as well as respond to, a change in, or lack of, light.[36] Non-photosynthetic light sensors in plant cells, called phytochromes, perceive changes in light intensity.[37] When this occurs, plants begin to produce the hormone auxin which triggers the acidification of cellular walls, effectively causing a plant's green foliage to elongate.[38] In an effort to grow towards the projected light, the cress changes in color, shape, and length over the course of *Skotopoiesis* (figures 12-13). Stimulated by the production of auxin, Petrič's shadow creates an area in the "rectilinear bed" where the stems of the thale cress

[32] Petrič, "Confronting Vegetal Otherness," 2015; Špela Petrič, *Confronting Vegetal Otherness: Skotopoiesis*, Špela Petrič Studio, accessed October 10, 2024, https://www.spelapetric.org/#/scotopoiesis/.
[33] MIT List Visual Arts Center, 11.
[34] Špela Petrič Studio.
[35] Ibid.
[36] Natasha Myers, "Conversation on Plant Sensing: Notes from the Field," *NatureCulture* 3, (2015): 36; Sandy Evangelista, "Thale Cress: The Unassuming Weed that's Lighting up Science," École Polytechnique de Lausanne (EPFL), May 27, 2024. https://actu.epfl.ch/news/thale-cress-the-unassuming-weed-that-s-lighting-up/.
[37] Evangelista, 2024; Špela Petrič Studio.
[38] Špela Petrič Studio.

gradually lengthen and pale, while the leaves became sparsely dispersed.[39] On the other hand, the sections of the cress exposed to light "erup[t] in a lush green" (figure 14).[40]

In an effort to sensitize herself to the thale cress and demonstrate a level of "courtesy" and consideration for her nonhuman partner, Petrič presents *Skotopoiesis* as an intentional lengthening of a human-nonhuman point of contact.[41] Historically described as "inaccessible" and "encrypted" to the human eye, vegetative life has a "rhythm of movement" customarily overlooked due to its subtle nature.[42] For example, plants operate on "time scales of growth, dispersal and regeneration" that are very different from human experiences.[43] Yet the two are bound, in Petrič's work, through their status as living beings with the capacity for movement. This association of life as inherently tied to "motion" is deeply rooted in Western culture, extending at least as far back as Aristotle, who, in the 350 B.C.E. book *De Anima*, outlined four types of movement that are used to characterize living entities.[44] Although plants move in "ways appropriate to [their] being," we have often been blinded by the disjointed differences in time frames that exist between certain nonhuman entities and ourselves.[45] In opposition to this, and striving to attune to the thale cress in a more plant-sensitive manner, Petrič actively slows down her experience of being in close proximity to a nonhuman being. Petrič's curated zone of contact with the cress is so lengthened that it appears to be frozen in time. The movement experienced by both participants occurs on a timescale that is imperceptible to a human viewer. Therefore, to

[39] Ibid; MIT List Visual Arts Center, 11.
[40] MIT List Visual Arts Center, 11.
[41] Petrič, "The Vegetal, Intimately," 44:00; Gibson, 1.
[42] Marder, 85, 88.
[43] Gibson, 13.
[44] Marder, 84; Aristotle, *De Anime*, trans. Hugh Lawson-Tancred (London: Penguin Books, 1986).
[45] Marder, 85; Gibson, 112.

register the changes Petrič and the thale cress endured over the course of *Skotopoiesis*, a two-channel video documented the durational performance (figures 15-17).[46]

Petrič deliberately curates an instance of extended temporality as a mechanism of attunement. This elongation fosters a space where the subtle, gradual changes endured by both participants become focalizing points of reflection for the artists as well as the audience. Employing performative artistic praxis, *Skotopoiesis* invites those who engage with the work to transcend their usual pace of observation and interaction, advocating for a shift away from the typical considerations that govern human-nonhuman engagements. Influenced by post-anthropocentric efforts, the transfiguration that occurs throughout the work instantiates an event of relation that crosses species boundaries by enlivening an extended spatiality of contact, and curates a space for the artist and the plant to be held together.[47] As the thale cress grows in a manner informed by the artist's shadow, Petrič dramatically slows her own body down, and constrains its normal sphere of mobility, transforming her into a being that is slightly more akin to the cress. Noting that plants possess distinct "articulations" of life, Petrič describes the thale cress as a living being who,

> [g]ives way to the gentlest of touches, and protests if you burden it with deadlines and desires of the human kind by turning purple, attesting stubbornly to [its'] clandestine vegetable principle.[48]

Petrič notes the confrontation of such diverse life forms allows for her to "surrender to the plant," creatively instantiating an interspecies attunement arising from a sense of fostered respect

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[46] MIT List Visual Arts Center, 11.

[47] Prudence Gibson, *The Plant Contract: Art's Return to Vegetal Life* (Leiden: Brill, 2018), 3; Helen F. Wilson, "Contact Zones: Multispecies Scholarship Through Imperial Eyes," *ENE: Nature and Space* 2, no. 4 (2019): 718; Robin Wall Kimmerer, *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants* (Minneapolis: Milkweed Editions, 2015).

[48] Špela Petrič Studio; Špela Petrič, "The Vegetal, Intimately. Panel: Plant Intelligence," (conference presentation, Nonhuman Agents in Art, Culture and Theory, Berlin, Germany, November 24-26, 2017), 4:50.

and equivalence for an other-than-human being.[49] Throughout *Skotopoiesis*, Petrič actively fosters a physiological, psychological, and emotional intimacy towards the thale cress so as to "penetrate the armour of scientific imperviousness which I had been trained to portray."[50] Petrič describes her experience of standing alongside thale cress for twenty hours as, "intricately connect[ing] sphere[s] where the freedom of entities is expressed by their capacity to make sense of," as well as alter, each other's physical manifestations.

The changes experienced by the thale cress and the artist are unsettling and uncomfortable, as both experience a level of perturbance—in the form of physiological stress and psychological strain—in order to transiently attune themselves to the other. Rather than focusing on drawing comparisons between plant, animal, and human "cognitive" abilities, Petrič's work demonstrates the need to prioritize merging multispecies worldings while "respecting the foreignness" of others.[51] Resisting the temptation of sacrificing specificities relating to anthropic and vegetal life, Petrič's performance allows viewers to contemplate ways in which one might draw together the world of human beings and that of plants. By drastically altering her manner of mobility, Petrič attempts to form a connection with the cress on "plant time" in the hopes of mediating an extended instance of human-plant relationality.[52] Emphasizing that plants are not passive entities, Petrič performs *Skotopoiesis* as an intervention into anthropic modes of interacting with nonhuman beings, fostering an intentional shift towards the more "elusive…characteristics of vegetative life."[53] This illustrates how initiating a sense of attunement—instantiated through curating a space of lengthened temporality—between humans

[49] Petrič, "Confronting Vegetal Otherness," 2015.
[50] Ibid.
[51] Myers, 2015, 39; Barnett, 160; "Nonhuman Agents in Art, Culture and Theory," Art Laboratory Berlin.
[52] Gibson, 13-15.
[53] Marder, 88.

and nonhumans can foster extended connectivity amongst multiple beings. Petrič's endeavour of creatively lengthening temporalities demonstrates the potential for multispecies alignments.

As the cress transforms on a molecular and phenomenological level, the artist also physiologically begins to change. Standing still for such a prolonged period of time causes Petrič's body to temporarily shrink in height. This shrinkage occurs due to gravitational forces exerted on the artist, and causes an impermanent loss of fluid from Petrič's spinal discs.[54] As time passes, perceptible changes occur amongst "both partners" due to the immense strain that is exerted on the thale cress as well as the artist.[55] Petrič refers to this bodily transformation as entering a "vegetalized" state that highlights the physical "inter-changes" between plant and artist.[56] This effort is enacted by the artist to put forth an iteration of human-plant "hybridity."[57] Building upon a curated instance of lengthened temporality, Petrič employs imaginative perception as an additional method to sensitize herself to the cress. Beholden to one another, the artist and the thale cress "merge," becoming "indifferent to the distinctions" that separate plant from human.[58] Specific distinctions between Petrič and the thale cress include differences in mobility, alternate modes of sensory perception, and varied forms of consciousness. While humans actively move and interact within their environment, plants are largely stationary, absorbing nutrients and sensing the world through chemical signals rather than through conscious thought or mobility.[59] In *Skotopoiesis*, these distinctions are challenged as Petrič mimics the plant's static nature, immersing herself in a state of stillness that aligns with modes of existence expressed by the cress, effectively questioning the perception that anthropic mobility

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[54] Ibid; Petrič, "Confronting Vegetal Otherness," 2015.
[55] Špela Petrič Studio.
[56] Ibid; Petrič, "Confronting Vegetal Otherness," 2015; Petrič, "Biography."
[57] Petrič, "The Vegetal, Intimately," 9:30, 14:15.
[58] Marder, 92.
[59] Michel Thellier, *Plant Responses to Environmental Stimuli: The Role of Specific Forms of Plant Memory* (Dordrecht, Netherlands: Springer, 2017).

and responsiveness are superior traits. This blurs the lines between human and plant life, fostering a unique space where physical and metaphorical boundaries dissolve, encouraging viewers to reconsider the conventional hierarchies that separate human from nonhuman beings. Petrič's effort extends a human desire to relate closely to nonhuman beings by collapsing "distinction[s] between the self and the other," allowing different species to attune themselves to, and become slightly alike, one another.[60] The zone of contact established between Petrič and the thale cress upends the "usual order" of human-plant interaction, which is often exploitative, transactional, and commodified.[61] In exposing herself and the thale cress to prolonged stillness and the direct impact of one another's presence, Petrič highlights a shared vulnerability. This disrupts the usual observer-observed dynamic and places the artist and the plant in a more equal position, as both beings are subject to external influences. Demanding attention to the emergence of alternate and mutual "lives and worlds," the zone of contact manifested throughout the performance *Skotopoiesis* provokes a "recognition of other ways of being," contesting assumptions that interspecies engagements should be unidirectional.[62] Petrič's act of mirroring the seemingly static nature and growth patterns of the thale cress serves as a gesture of extended multispecies unity. Furthermore, through intimate and elongated contact with the plant, the artist invites an emotional response from viewers that might parallel her own, fostering a collective sense of connectedness and understanding towards the cress. Each of these approaches forge imaginative and meaningful connections between humans and nonhuman beings, encouraging a reevaluation of how we perceive and interact with other forms of life.

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[60] Gibson, 19.
[61] Ibid, 4; Myers, 2015, 41-45.
[62] Wilson, 718, 721.

What emerges from this extended perceptuality is an understanding of equivalence between living beings, perhaps akin to recognition, which offers an alternative for the need to comprehend one another. By placing anthropic notions of knowledge, relationality, and perception at risk, Petrič proposes an ethical repositioning of what it means to be in connection with other-than-human beings. This teaches viewers different modalities of extending an ecocritical consciousness towards alternate life forms. With a goal of questioning the need for categorical distinctions that separate humans from nonhumans—such categories include but are not limited to language and communication; self-awareness; culture; as well as aesthetics and recreation—Petrič calls for a radical revision of "ethical" frameworks allocated to nonhuman entities.[63] While working alongside vegetal partners, Petrič draws attention to ongoing challenges she faces when incorporating the growing "knowledge and awareness" of nonhuman entities into "everyday experience[s]."[64] Petrič's artistic practice highlights how certain beings—such as plants in particular (although bacteria and fungi face similar struggles)—are attributed with lacking qualities including "interiority, autonomy…and individuality."[65] Such notions contribute to a considerable disregard for nonhuman beings within the context of contemporary ethical discourse.

Striving to disseminate the concept that nonhuman beings are not "inert backdrop[s]" to anthropocentric actions, Petrič employs artistic expressions of attunement to transport plant life into "proximity of the human."[66] Capable "for-themselves and in-themselves," other-than-human

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[63] Josep Call and Michael Tomasello, *Primate Cognition* (New York: Oxford University Press, 1997); Jr. G. G. Gallop, "Chimpanzees: Self-recognition," *Science* 167, no. 3914 (1970): 86-7; Horner, Victoria, Andrew Whiten, and Frans B. M. de Waal. "Conformity to Cultural Norms of Tool Use in Chimpanzees." *Nature* 437, no. 7059 (2005): 737-40; Ellen Dissanayake, *Homo Aesthetics: Where Art Come from and Why* (Seattle: University of Washington Press, 1995); Wilson, 719.
[64] Špela Petrič Studio.
[65] Petrič, "Confronting Vegetal Otherness," 2015.
[66] Gibson, 4; Špela Petrič Studio.

beings possess complex and distinct properties.[67] Petrič asserts that *Skotopoiesis* establishes exchanges across difference and creates "meaning making" on multiple sides by grappling with establishing connections in less invasive, and more plant-like, ways. [68] The artist's engagement with the thale cress leaves one curious about the extent to which a framework of meaning-making might contribute to expanding interspecies sensitivities. Understanding that thale cress embodies an "openness" and potentiality to build "alliance[s]" alongside, Petrič describes her nonhuman partner as:

> A small innocuous weed that you might see growing in the gravel at construction sites, or at the side of railroads. A tiny green plantlet with white four-petal flowers you would pull out from your garden row…never to give it a second thought.[69]

In an effort to "ope[n her] heart" to the thale cress, Petrič learned that nonhuman others, and plants in particular, do not like to be touched.[70] The artist's observation that plants do not favor physical contact aligns with scientific findings indicating that plants perceive touch as a stressor, leading to altered growth patterns and energy allocation.[71] Aware that plants are commonly treated as "living material," Petrič notes the challenges of working with other-than-human beings in a way that does not simply cast them as "transducers for human affects and aspirations."[72] And yet this goal is difficult to attain, even for Petrič. In her attempt to form a meaningful connection, it might be argued that Petrič treats the thale cress as an object, more similar to the light projector

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[67] Gibson, 5-6.
[68] Abram, 166; Petrič, "The Vegetal, Intimately. Panel: Plant Intelligence," 30:00; Kimmerer.
[69] Petrič, "The Vegetal, Intimately," 4:20, 5:40.
[70] Ibid, 27:30, 44:00; La Trobe University, "Plants Don't Like to Be Touched: Study Finds Physical Contact Causes Stress, Inhibits Growth," *ScienceDaily*, December 17, 2018, https://www.sciencedaily.com/releases/2018/12/181217105853.htm; Lund University, "How Plants React to Being Touched, " *ScienceDaily*, May 23, 2022, https://www.sciencedaily.com/releases/2022/05/220523102237.htm.
[71] Ibid; For instance, research from La Trobe University in Melbourne, Australia, reveals that plants are extremely sensitive to touch, and repeated physical contact can significantly obstruct their growth. Similarly, a study by Lund University in Sweden found that touch can trigger stress reactions in plants, affecting their genetic expression and overall health. These studies suggest that minimizing unnecessary physical interaction with plants is beneficial for their well-being.
[72] Myers, 2015, 41; Petrič, "The Vegetal, Intimately. Panel: Plant Intelligence," 28:00.

within her artistic narrative, rather than as an equal participant. Although Petrič describes her interaction with the cress as collaborative, their exchange presents itself more closely as directorial, where the artist establishes the parameters and guides the human-plant engagement. As Petrič dictates the terms and conditions—since the thale cress has no say in its' participatory role—*Skotopoiesis* demonstrates how multispecies encounters are not necessarily equitable, nor do they always impact those involved in equally meaningful ways.

Through such an intentionally curated and lengthened interaction, Petrič notes that the work pushes against hegemonic boundaries of multispecies "intercognition".[73] *Skotopoiesis* forces viewers to contend with how physio-chemical signaling, and multispecies alignment, can facilitate transformations amongst humans and nonhuman beings. At the end of the performance, as Petrič finally walks away from the thale cress, a lingering imprint is revealed: the plant preserves the artist's "penumbral silhouette…as a rash of yellowed sprouts" (figure 18).[74] Petrič characterizes this human-plant interaction as "a form of communication intelligible" to the cress.[75] *Skotopoiesis* attempts to reposition normative practices of trans-species communication by highlighting a multispecies "negotiation."[76] The artist's discourse encourages us to consider how the plant reciprocally communicates with the artist. And so we are justified in asking: In what ways does the performance create space for the thale cress to communicate with Petrič? Is the thale cress not merely undergoing biological processes instigated by a lack of light?

While the interaction between the artist and the plant presents elements that might resemble communication, such as the reciprocal influence on each other's physical states, it is

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[73] Petrič, "Confronting Vegetal Otherness," 2015.
[74] MIT List Visual Arts Center, 11.
[75] Ibid.
[76] Bradley and Perkins, 142-44; Wilson, 725, 727; David Abram, "The Speech of Things," in *Becoming Animal: An Earthly Cosmology*, (New York: Knopf Doubleday Publishing Group, 2011), 165-7.

necessary to consider whether this interchange fulfills the criteria associated with communication. Communication involves the intentional sending and receiving of messages interpreted by all participants. For this reason, it is challenging to apply the term of communication as a descriptor for the connection between Petrič and the thale cress. The plant's responses more likely reflect instinctual reactions to environmental stimuli rather than anthropic understandings of a conscious reception of messages. This discrepancy highlights a limitation in using anthropocentric paradigms of communication to discuss human-nonhuman relations. Although the apparent responsiveness of the thale cress suggests a point of exchange between the artist and the plant exists, classifying the interaction as a form of communication inaccurately anthropomorphizes the nonhuman being. This demonstrates that, while *Skotopoiesis* mimics communicative acts, the challenge of imposing anthropic terminology onto other-than-human entities creates schisms in the ways we think about, and act alongside, other beings.

Characterizing the human-plant interaction as an example of "intercognition" and interspecies "communication," Petrič inadvertently anthropomorphizes and misinterprets the cress.[77] Anthropomorphization is often employed as a strategy by individuals seeking to attune to others, attributing anthropic traits and emotions to nonhuman entities in an effort to bridge species divides.[78] Yet, this approach may not provide the most fulsome understanding of complex interactions amongst beings. For example, throughout *Skotopoiesis*, Petrič notes that she actively employs a suspension of disbelief that allows her to imagine the cress as a "conversational partner" not dissimilar to herself.[79] It is helpful to consider how reframing the encounter—allocating space to the cress as interacting in a vegetative manner in, of, and for itself—might

[77] Petrič, "Confronting Vegetal Otherness," 2015; MIT List Visual Arts Center, 11.
[78] Daston and Mitman, 2005.
[79] "Nonhuman Agents in Art, Culture and Theory," Art Laboratory Berlin.

alter the ways in which it is possible to think about the experience of forming a plant-human connection. Although *Skotopoiesis* provides an instance of unsettling dominant notions of common human-nonhuman points of relation, insisting on forming a communicative connection unintentionally repeats anthropocentric relations, ultimately reinforcing a separation between Petrič and the cress. This contradiction within Petrič's work demonstrates how challenging—and perhaps inevitable—it is to leave anthropocentric thinking behind. Under the pretense of establishing "human-plant intercognition," *Skotopoiesis* fundamentally delineates anthropic paradigms that govern our interactions and understandings, which require continued intellectual deconstruction to overcome.[80]

In a panel presentation held following the performance of *Skotopoiesis*, Petrič discusses attempting to highlight the plant's "internal life…[and] vitality."[81] Yet, the conditions under which the cress exists and reacts are entirely shaped by human design as the plant is confined to an artificially curated exhibition space that may, or may not, respect the nonhuman being's needs and preferences. Accidentally reinforcing the very hierarchy she seeks to dismantle, Petrič's "estranged proximity" to the thale cress upholds an asymmetrical dynamic.[82] While she intends to step away from "playing the human" and openly embody "another self," Petrič nonetheless establishes an interaction dictated by human intention.[83] In this way then, the performance, governed by human-designed parameters, fails to escape the anthropocentric framework it critiques; the thale cress remains a prop within a human narrative, unable to influence its role or participation. Consequently, the interaction between Petrič and the cress remains without a sense of reciprocity that would honor the agency of the nonhuman participant. Aware of such

[80] Špela Petrič Studio.
[81] Petrič, "The Vegetal, Intimately. Panel: Plant Intelligence," 28:00.
[82] Ibid, 9:00.
[83] Ibid, 18:10.

shortcomings, Petrič openly expresses her frustration with an unattainable desire to "understand plants on their [own] terms," claiming *Skotopoiesis* is "potentially unsuccessful."[84] This sentiment underscores the very challenge of what Petrič attempts to accomplish. Given the task of navigating, as well as reshaping, human-plant interactions, we must acknowledge the value of Petrič's endeavour. It is exceedingly difficult to dismantle the long-standing schisms that separate humans from nonhumans. Thus, while certain mechanisms of attunement—such as lengthened temporalities and extended perception—establish a rich ground for working through interspecies points of connection, further exploration must occur to assess the role of communication and meaning-making for transcending humancentric interpretations of nonhuman beings.

Once the performance comes to an end, not wanting "to make waste of such nutrient-rich" vegetation, Petrič suggests viewers "consume" the thale cress.[85] This part of the performance raises questions about the nature of attunement and its romanticization. Does attunement necessitate equitable relationships between species, or can it exist within asymmetrical dynamics? As *Skotopoiesis* shifts the role of the thale cress from an active collaborator to a consumable item, the work prompts reflections on whether absorption can be considered a form of interspecies alignment. Although the thale cress remains present, albeit in a transformed capacity, this aspect of the performance invites viewers to consider the implications of regarding the vegetative being in a utilitarian context. By highlighting and intervening in the reciprocity between human and plant, Petrič calls for a reconsideration of how interspecies relationalities can evolve.

Cognizant of encountering issues elicited by flattening and reducing differences amongst living beings, Petrič's work questions the possibility and the need to comprehensively "know the

[84] Špela Petrič Studio.
[85] Ibid.

other."[86] Mindful that such a modality of interaction is not completely "truthful to the otherness" of the cress, Petrič asserts a level of being "in it together" that might nevertheless very well be one of "the best tool[s we] have" for fostering interspecies sensitivities.[87] Confronting "conceptual distinctions" (such as notions of consciousness, cognition, mobility, and communication) that separate vegetative from human life, *Skotopoiesis* defies "established indexes" (including taxonomical classifications, intellectual capabilities, moral considerations, and ecological roles) which discern "different classes of beings."[88] By remaining still for such an extended period of time, Petrič mimics the ecological role, and creatively enters into the taxonomical classification of, the cress. *Skotopoiesis* also highlights the capability of plants to sense, react to, as well as move in accordance with, a stimulus. While the performance, along with its technological documentation and dissemination, inevitably benefits the artist by enhancing the visibility and viability of her practice, Petrič consciously seeks to transcend such individualistic motives by reorienting attention toward more ecocentric modes of relationality. Rather than searching for "potential, profit, and…individual" growth, Petrič's work encourages viewers to develop a sensitivity towards the "intentionality" of, as well as the possibility for, meaningful interactions with other-than-human beings.[89] The intentionality of such interactions suggests a shift towards recognizing the agency and subjectivity inherent in all living forms. This calls for an approach to nonhuman entities not as mere resources, or aesthetic elements, but as beings with their own contributions to our shared ecologies. *Skotopoiesis* attempts to resist hierarchical and oppositional classifications of being by creating a zone of contact between a plant and a person where the multispecies encounter demands polyphony. Although the voice of

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[86] Špela Petrič Studio; Wilson, 724.
[87] "The Vegetal, Intimately. Panel: Plant Intelligence," 25:00; Daston and Mitman, 6-14.
[88] Ibid.
[89] Gibson, 112; Marder, 95.

the thale cress is overruled by the human—and the plant appears as a backdrop to the overall performance—intellectually grappling with Petrič's work reveals numerous strategies of attunement that can be expanded on to foster connectivities amongst species.

Skotopoiesis demonstrates the transformative capacity of bringing different actors into view through different mechanisms of attunement in order to overcome the "lack" of human recognition and understanding for nonhuman beings.[90] This is particularly significant when such entities exist at the far reaches of our anthropic consciousness.[91] By ultimately altering the other, Petrič and the thale cress enact a connecting of different "worlding[s]" in an effort to accommodate, make space for, and "welcome the other better."[92] While it is important to acknowledge the potential impasses encountered by *Skotopoiesis*, reflectively thinking through this work underscores the significant challenges inherent in reshaping anthropocentric thought and practice. Upending categorical conceptualizations of anthropocentrism, speciesism, and utilitarianism, *Skotopoiesis* ultimately demonstrates a mode of thinking, creating, and acting alongside nonhuman beings that proposes a "radical reconfiguration of theories" regarding what it means to be human.[93] Such creative reconfigurations of relationality highlight potential equivalences between humans and nonhuman beings. In the hopes of changing our understanding of other forms of life, Petrič's work engages with multiple mechanisms of attunement that emphasize imaginings toward fluid, multispecies ontologies. This repositioning allows humans and nonhumans to be held in the "embrace of…each other," challenging

[90] Alaimo, 398-412.
[91] Gibson; Marder; Alaimo.
[92] Barnett, 167; Marder, 97.
[93] Myers, 2015, 41; Alaimo, 402; Grosz.

traditional hierarchies of relation, situating people as one species among many, and fostering an expanded alignment between beings. [94]

[94] Barnett, 167; Marder, 97-98.

PART II: Shaking Us Out of Our Human-Sensibilities

Exploring the dynamics of interspecies attunement through embodied learning, Argentinian-born, Berlin-based contemporary artist, Tomás Saraceno (b. 1973), challenges traditional hierarchies of knowledge by enabling participants to experience the 'invisible' vibrational world of spiders. Instantiating connections across species lines, Saraceno strives to position humans as if they are experiencing the world from the sensory perspective of spiders. Encouraging a radical reevaluation of anthropocentric perceptions that typically govern our interactions with nonhuman species, Saraceno's endeavour exemplifies a transformative engagement with the other-than-human world, sensitizing us to alternative forms of life. By opening ourselves to imaginative modes of reception, Saraceno's work employs different mechanisms of attunement that challenge us to broaden our perceptual frameworks and align ourselves with other species.

Recognized for his interactive installations, Saraceno's artistic practice contends with "dominant threads of knowledge" and creates spaces for a multiplicity of alternate "forms of life."[95] Presented as part of the 2024 Berliner Festspiele, the exhibition *Radical Playgrounds: From Competition to Collaboration*—which was held in front of the Gropius Bau in Berlin, Germany from April 27th to July 14th, 2024—includes one of Saraceno's most recent works that explores the possibilities of instantiating interspecies relations through embodied, artistic praxis (figures 19-20).[96] Entitled *Play-Ground* (2024), Saraceno's walk-in installation allows participants to vibrationally attune themselves to an arthropodin group of nonhuman beings frequently disregarded and dislocated from society's considerations. Without charge, visitors

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[95] Tomás Saraceno, https://studiotomassaraceno.org/play-ground/, Tomás Saraceno Studio, accessed October 15, 2024; *Radical Playgrounds: From Competition to Collaboration* (Berlin: Berliner Festspiele, 2024), 52.
[96] Ibid; Established in 1951, the Berliner Festspiele is a cultural organization in Berlin, Germany, that annually hosts various festivals, exhibitions, and artistic events. Since 2002, it has operated under the Kulturveranstaltungen des Bundes in Berlin GmbH (KBB), a federal government-sponsored cultural institution dedicated to facilitating interdisciplinary artistic dialogue and cultural exchange.

enter an outdoor, "radical play space" where they are invited to sit on one of two park benches to remove their shoes (figures 21-23).[97] Participants are then encouraged to use their bare hands and feet in order to feel vibrations resonating from their encompassing environment (figures 24-27). Amplified through the cobblestone ground, clusters of "shakers" project vibrations created in collaboration with five different species of spiders, including: jumping spiders (*Evarcha arcuata*), cob-web spiders (*Steatoda bipunctata*), garden spiders (*Araneus diadematus*), wolf spiders (*Pardosa lugubris*), and marbled cellar spiders (*Holocnemus pluchei*) (figures 28-32).[98] Described as "inaudible yet sensible," the vibrations that resonate throughout *Play-Ground* are intended to initiate a "network of earthly alliances" as they "distort" and "upend" normative encounters between people and spiders.[99]

Vibrations used during *Play-Ground* originate from the archives of Arachnophilia, an interdisciplinary research platform that works to disseminate knowledge regarding "entangled relations" between human beings and our "arachnid kin" in an effort to foster interspecies sensitivities.[100] The Arachnophilia organization emerged as a result of Saraceno's fifteen-year long collaboration alongside spiders and their webs.[101] Saraceno worked with Arachnophilia members Roland Mühlethaler (a former biologist and researcher with Germany's Nature and Biodiversity Conservation Union), Hannelore Hoch as well as Andreas Wessel (an entomologist, and respectively, zoologist, at the Museum of Natural History in Berlin), and Peggy Hill (a Professor Emeritus of Biological Sciences at the University of Tulsa) to develop "sonification

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[97] *Radical Playgrounds*, 3; Tomás Saraceno Studio.
[98] Tomás Saraceno Studio.
[99] Ibid; Bradley and Perkins, 137; *Radical Playgrounds*, 3.
[100] *Arachnophilia*, accessed October 15, 2024, https://arachnophilia.net; "Walk-Through: Spider/Web Mapping Against Extinction," Berliner Festspiele, 2024, https://www.berlinerfestspiele.de/en/programm/2024/radical-playgrounds/programm/spinnen-netzkartierung-gegen-das-aussterben.
[101] *Arachnophilia*.

and signaling devices" that magnify vibrational patterns produced by spiders and their webs.[102] This work is situated within the field of biotremology, which explores "sonic manifestations" of signals emitted by nonhuman beings.[103] Focusing on vibrations produced by spiders, in addition to investigating the function and materiality of spiderwebs, the Arachnophilia research/creation group developed devices, referred to as "Feelers and Buzzers," that are able to perceive, and then re-produce, spiders' previously inaudible "vibrational dialogue."[104] These recorded vibrations, captured at Saraceno's studio, resonate through the cobblestones of the interactive installation, *Play-Ground*. Participants are encouraged to visit the Arachnophilia online platform as well as Saraceno's artist website to further educate themselves on the elaborate lives of spiders and their webs. Extending efforts into interspecies relationality, Saraceno's work merges artistic, scientific, and traditional ecological knowledge to create "hybrid architectures" of human-nonhuman connectivity.[105] Throughout *Play-Ground*, participants slowly learn how to sensitize themselves to vibrational signals produced by spiders, and then practice this newfound skill.

In this way, participants in Saraceno's work are offered an opportunity to actively attune themselves to a nonhuman way of inhabiting the world. This cross-species harmonization begins by developing human awareness that spiders perceive and engage with the world through different modalities of interaction than those employed by human beings. As stated on Saraceno's artist page:

> Essentially blind, the web-building spider creates an image of the world with the vibrational tremors it sends and receives through the web, functioning as … [a tool] for transmission and reception.[106]

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[102] Ibid; Tomás Saraceno Studio; "Walk-Through," Berliner Festspiele.
[103] Boštjan Perovšek and Roland Mühlethaler, "Interweaving Soundscapes," MFRU International Festival of Computer Arts, 2020, https://www.mfru.org/projects/zvo%C4%8Dna-prepletanja.
[104] *Arachnophilia*.
[105] Ibid; Stefanie Hessler, "Tomás Saraceno — How to Entangle the Universe in a Spider Web," *Flash Art*, August 24, 2020, https://flash---art.com/article/tomas-saraceno/.
[106] Tomás Saraceno Studio.

Relying on their webs to catch prey, spiders receive information from their surrounding environments. They do this by sensing changes in tension and vibrations of their webs' silken threads.[107] Webs can be viewed as finely tuned, "specialized instrument[s]" that are the material extension of a spider's "sensory system."[108] By no means passive beings, spiders manipulate their web structures in a multitude of different ways for distinct reasons, such as: "plucking," which creates ripples that radiate across a web; and "tuning," which a spider engages in when a web is damaged.[109] Saraceno's artwork fosters interspecies attunements by enhancing human perceptivity to the intricate receptivity spiders have for their environments. This exposure cultivates a heightened awareness in participants to other expressions of sentience, ultimately bridging the sensory world of spiders to humans, and expanding our engagement with nonhuman forms of life. In order to diminish the gap between people and their arachnid partners, Saraceno's installation literally shakes participants out of their human-sensibilities and offers them a tangible experience of how spiders feel the world. *Play-Ground* curates a place of encounter where people begin to align themselves with other-than-human entities. In doing so, participants of Saraceno's installation practice opening themselves to novel and creative modalities of interspecies receptivity.

Through the amplification of pre-recorded vibrations produced by spiders, Saraceno's work reveals the otherwise "invisible sound world" of these octopedal beings.[110] Interestingly, many of the vibrational signals created by spiders are not "sounds"; rather than hearing through an auditory appendage, spiders detect surrounding vibrations.[111] Spiders, unlike insects such as

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[107] *Arachnophilia*; Perovšek and Mühlethaler, "Interweaving Soundscapes."
[108] Ibid.
[109] *Arachnophilia*.
[110] Perovšek and Mühlethaler, "Interweaving Soundscapes."
[111] *Arachnophilia*; Katrina Miller, "Spider-inspired Sensor Can Detect Human Speech and Pulse," *Science*, June 28, 2023, https://www.science.org/content/article/spider-inspired-sensor-can-detect-human-speech-and-pulse.

crickets and cicadas, do not have ears.[112] However, even without ears, spiders can discern the vibrational patterns of "an approaching insect or human." As explained on the Arachnophilia website, a type of jumping spider (*Phidippus audax*) is capable of detecting vocal articulations produced by people through "quivers of…hairs on [the spiders'] legs."[113] Since people cannot perceive most of the vibrational frequencies produced by spiders, the world of these nonhuman beings may initially appear inaccessible to a human audience.

In the 2005 book *Thinking with Animals: New Perspectives on Anthropomorphism*, Lorraine Daston raises questions regarding the potential for people to imagine alongside and accurately understand how nonhuman beings perceive their surroundings.[114] This touches upon a risk that surfaced in Petrič's *Skotopoiesis*: that of turning outwards to the world and viewing one's own reflection "mirrored therein."[115] The shift in perspective that interspecies art highlights is thus accompanied by the critical task of transcending inherent human-centered viewpoints to allow for more authentic understanding—grounded in approaches attentive to the perceptual, biological, and ecological specificity of a particular species—and appreciation of the distinct worlds inhabited by nonhuman beings. Embracing this perspective enables insights into the rich tapestry of other-than-human sentience. Saraceno's interactive installation attempts to align with this perspective by physically engaging participants' bodies within the artwork as a form of resistance against hegemonic "blockages imposed on sense-perception."[116] Rather than watching an artwork unfold from a disembodied standpoint, *Play-Ground* furthers Petrič's effort of extending interspecies perception as participants actively engage with their bodies to feel

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[112] Ibid.
[113] Perovšek and Mühlethaler, "Interweaving Soundscapes"; Hessler; *Radical Playgrounds*, 9.
[114] Daston and Mitman, 3.
[115] Ibid, 3-8; Andrea Conte, "Andrea Conte: art, sustainability, and the climate," *Antennae: The Journal of Nature in Visual Culture* 61, no.2 (Summer 2023): 68.
[116] *Arachnophilia*.

vibratory frequencies resonating throughout the installation. In this manner, Saraceno's work fosters multispecies attunements that are in opposition to "passive viewing".[117] Challenging our human sensibilities, *Play-Ground* connects distinct living beings and produces a "sensation[al]…force" which instantiates a merging of different perceptual worlds.[118]

Immersing participants within the sensory environs of spiders, *Play-Ground* teaches individuals how to conceive of nonhuman beings in a manner that is beyond language and sound. Saraceno notes the spiders' "*umwelt* is one of vibration," so that their encompassing world exists beyond distinct boundaries.[119] Translating to 'surrounding world', the term *umwelt*, popularized by German biologist Jakob von Uexküll in 1934, points to coexisting entanglements amongst living beings and their environments.[120] This way of thinking can be further developed to consider how different species experience, and coevolve, alongside their "life-worlds".[121] Acting as "counterpoint[s]" for one another, the concept of an *umwelt* highlights how living beings fuse with their surroundings, effectively resonating, changing, and evolving together.[122] *Play-Ground* proposes an alternative way for people to momentarily glean what it might feel like to be a spider, as participants are encouraged to transcend traditionally enacted human sensorial engagements by simulating how spiders receive and process environmental signals via their webs. Such an experience shifts human awareness from a visual and auditory stance to a perception that appreciates the vibrational receptivity central to spider existence.

As explained by academics Constance Classen and David Howes, cultural sensory meanings are created through specific frameworks a society adopts, which dictates how that

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[117] Bradley and Perkins, 137.
[118] Barnett, 161; Grosz; *Arachnophilia*.
[119] Tomás Saraceno Studio; Tomás Saraceno Studio; *Arachnophilia*.
[120] Barnett, 161.
[121] Grosz, 174.
[122] Ibid, 170-185.

society interprets the world. In turn, such frameworks guide and transform sensory understandings into distinct "worldview[s]."[123] Following a hierarchy of senses, Western societies have historically prioritized sight and sound, while touch and smell have been classified as "lower…senses."[124] Such ocularcentrism promotes the dominance of vision over other senses, forming a bias towards what can be seen as opposed to what can be touched, heard, or smelled. This propensity towards the visual is present within various aspects of society and culture, including art, philosophy, and science, where sight is often considered the primary, and most reliable, source of knowledge.[125] Furthermore, a hierarchy of senses informs how people relate to both their surrounding environment, as well as to the nonhuman entities who occupy those spaces. In line with this classification system, spiders (who cannot see or hear in the same capacity as humans) have been regarded as less sensorially aware, and intelligent, than other living beings. By aligning human sensory modalities with the *umwelt* of arachnids, Saraceno's work fosters expanded multispecies attunement, revealing a world where vibrations are as significant as sight and sound. This begins to demystify the sensory world of spiders and highlights a sophisticated model of other-than-human perception.

By shifting the focus from an anthropocentrically-visual perception of the world, to a "tacit" and tactile modality of embodied sensitivity, *Play-Ground* encourages participants to actively attune to interspecies entanglements.[126] In line with work conducted by researchers Bradley and Perkins at Goldsmiths University of London, which explores the healing capacity of

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[123] Constance Classen, *Worlds of Sense: Exploring the Senses in History and Across Cultures* (London: Routledge, 1993), 402.
[124] Constance Classen and David Howes, "The Museum as Sensescape: Western Sensibilities and Indigenous Artifacts," in *Sensible Objects: Colonialism, Museums, and Material Culture*, ed. Elizabeth Edwards, Chris Gosden, and Ruth Phillips (Oxford: Berg, 2006), 199-202.
[125] Classen and Howes, 210-220.
[126] Barnett, 167; Tsing, 2015; Donna Haraway, *Staying with the Trouble: Making Kin in the Chthulucene* (Durham: Duke University Press, 2016).

artistically merging living entities with abiotic processes, participants within Saraceno's installation transform "into [the] other" and transcend "objective difference[s]" by generating a network of vibrational alignments across multiple beings.[127]

This demonstrates the potential artistic practice holds to curate interspecies attunements through physically sensitizing individuals to co-existent modes of perception. Curating sensorial "dimensions of difference" that lead to new and generative "ways of being," *Play-Ground* encourages participants to enact a process of becoming something other than they presently are.[128] This mode of engagement ultimately develops a notion that, rather than privileging the human, teaches participants to view human beings as "one among" a multitude of different species.[129] Building upon a concept of "collective coordination," *Play-Ground* is an exercise where people can momentarily explore an alternate modality of perception by imaginatively engaging with the sensory world of an other-than-human being.[130] In line with theorist Donna Haraway, *Play-Ground* questions anthropocentric perspectives on sensorial subjectivities. Reconciling "perceptual divides," Saraceno's installation cultivates a sensitization towards "companion species" within our "shared habitat."[131] While the goal of Saraceno's interactive work is not for participants to physically 'become' spiders, *Play-Ground* demonstrates the power of attuning to "different way[s] of knowing" in order to expand "spatiotemporal barrier[s]" and enable the human body to "extend beyond itself."[132] This recognition reflects the broader notion that human perception is only one way of experiencing the world. Expanding our ecological

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[127] Bradley and Perkins, 141.
[128] *Radical Playgrounds*, 4; Wilson, 724.
[129] Barnett; Grosz, 2.
[130] Barnett, 159, 163.
[131] Haraway, 2016; Barnett, 159-161.
[132] Grosz, 132; Hessler.

consciousness, such efforts acknowledge the varied expressions of other species and cultivate our ability to adopt perspectives that transcend anthropocentric thinking.

An area of Saraceno's installation includes a box where participants can submit handwritten questions relating to spiders (figure 33). This "postbox" is allocated for "enquiries to…spiders and diviners" in Somié, Cameroon.[133] If interested, participants are further instructed to visit the spider diviners' website, *Nggamdu.org*, where traditional Cameroonian spider divination is employed to allow people to "seek knowledge."[134] A selection of submitted questions are listed on the spider diviner's website, such as: *Do spiders like humans?* (asked by Vinciane Despret); *Do spiders know everything?* (submitted by Michael Marder); *Is humanity a part of nature?* (wondered by Garance Primat); and *Are we here?* (inquired by Hans Ulrich Obrist).[135] Audience members are encouraged to consult with the human diviners following a submission, which begs the question: After such an experience, do individuals gain an altered conception of, and expanded consideration for, spiders?

Taking on the form of an interspecies consultation, Somié arachnid diviners interact with spiders through a "language of vibration."[136] It is interesting to note what is involved in the transition from an initial human-human consultation to a subsequent human-spider interaction. Relying on non-verbal cues from ground-dwelling spiders, human diviners sensitize themselves to ways arachnids engage with their surrounding environment. By including spider divination as one aspect of the installation, the work transcends time, space, and culture, approaching connectivity in a manner that fosters "harmonic coordination[s]" amongst multiple living

[133] Tomás Saraceno Studio.
[134] Ibid.
[135] Nggaam Dù, accessed October 4, 2024, https://nggamdu.org/nggam-du/.
[136] Tomás Saraceno Studio.

beings.[137] Attempting to initiate human-nonhuman communication, this facet of Saraceno's work denotes one possible method of fostering imaginative, interspecies attunements.

Building upon the notion of an arachnid mailbox, Saraceno asserts that spiders move their bodies to generate a "communicative dialogue" in the form of vibrational patterns.[138] Although the artist emphasizes that spider vibrations should be viewed as a sophisticated form of "communication," it is unclear as to who or what the spiders might be communicating with.[139] The Arachnophilia platform suggests that spiders communicate through movements including "tremulations" (which is when a spider engages its' body in a "jerking" or "bouncing" manner) and "stridulations" (which is when a spider "rubs…rigid body parts" together to produce oscillatory signals).[140] While Saraceno and the Arachnophilia group describe spider vibrations as intentional methods of communication, it remains uncertain whether these vibrational patterns serve primarily as communicative tools or are secondary byproducts of other behaviours. Although it is clear that spiders utilize their webs as sensory extensions of their bodies, detecting environmental cues and potential prey, the extent to which they consciously transmit information to other receivers through these vibrations is less supported. And so, again, I find myself asking: is the interpretation of arachnid actions as *communication* an anthropomorphic characterization of non-human behaviours? Does labeling spider vibrations as communication not reflect, and linguistically reiterate, anthropic projections more closely aligned with human constructs of interactivity rather than with the *umwelt* of spiders?

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[137] Grosz, 174; Barnett; Demos, 2023.
[138] *Arachnophilia.*
[139] Ibid; Perovšek and Mühlethaler, "Interweaving Soundscapes."
[140] Ibid.

Saraceno's interpretation of spider vibrations raises questions regarding the concept of communication.[141] Associated with "imparting (of ideas)" for a communal or relational context, historically, the term communication indicated the act of sharing "something in common."[142] Engaging in "consultation…[and] discussion," this implies a bidirectional exchange of information.[143] As discussed, vibrations within spider webs serve as pathways through which arachnids receive environmental cues, particularly from prey. While a sophisticated form of environmental sensing, this process might not conform to the classical definition of communication, as it is not conclusively demonstrated that there is an intentional exchange of information reciprocated by spiders. Therefore, the distinction between perception and communication becomes critical here. Perception involves the reception of signals and processing of information, which spiders undeniably accomplish through their webs. However, labelling this process as communication presumes an additional layer of intersubjective engagement. Echoing back to Petrič's performance, Saraceno's attribution of communicative qualities to spiders assumes anthropomorphic bias. While arachnids employ their webs to detect vibrations, categorizing this capability as communication projects anthropic constructs of dialogue onto nonhuman entities. Thus, while Saraceno's engagement with, and discussion of, arachnids enriches our understanding of spider behaviours, defining their vibrational interactions as communication is an overextension of the term, conflating perception with a more complex process of mutual exchange.

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[141] Oxford English Dictionary, s.v. "communication (*n.*), Etymology," December 2024, accessed February 24, 2024, https://doi.org/10.1093/OED/8410851954.
[142] Ibid.
[143] Ibid; As noted in the Oxford English Dictionary, the etymology of "communication" traces back to Latin and French origins, initially signifying "participation in Holy Communion" in late second century Latin and evolving by the third century to mean "imparting (of ideas)." Over time, by the late thirteenth century, this concept expanded in early Anglo-Norman to denote the notion of sharing "something in common with another person or thing." By the fourteenth century, the term came to include meanings such as "being connected." By the fifteenth century, Anglo-Norman definitions encompassed notions such as the "action of sharing" and the dissemination of "information."

Whereas Saraceno's exploration of how embodied, perceptual alignment encourages participants to confront their "humanness" as they engage in an other-than-human way of being, classifying vibrations as a mode of communication perpetuates anthropocentric thinking.[144] By expanding and projecting the internal world of spiders onto an external environment physically accessible to people, *Play-Ground* risks overlooking the multifaceted world of spiders and their webs. This unintentionally imposes a simplified, human-centered framework upon spider behaviour, demonstrating the difficulty in circumnavigating anthropic modalities of thought and action. Reminiscent of Petrič's discussion regarding multispecies "intercognition" and communication, Saraceno's discourse surrounding *Play-Ground* similarly reveals that the concept of communication, employed as a mechanism of interspecies attunement, inadvertently perpetuates anthropocentric desires and efforts, echoing the very paradigms it seeks to challenge.[145]

Another component of Saraceno's installation involves the artist's endeavour to cultivate empathy amongst viewers for nonhuman beings. Referring to spiders as "arachnoid architect[s]," Saraceno presents spiders as "makers of culture" and creators of knowledge.[146] In opposition to the notion that spiders are merely a part of the "natural world," *Play-Ground* educates viewers about the "versatile…and remarkable" ways arachnids engage with their surrounding environments.[147] Spiders, and their webs, do not seek "human representation," however, as Saraceno demonstrates throughout his work, the expressions of arachnid beings are certainly "worthy" of acknowledgement, regardless of how foreign their articulations of life may initially

[144] Barnett, 168.
[145] Petrič, "Confronting Vegetal Otherness," 2015.
[146] Hessler.
[147] Ibid.

seem.[148] Historically discomfited by the thought of becoming "too close to other[s]," dominant hierarchies of interspecies relations still inform which nonhuman beings individuals choose to align themselves, as well as empathize, with.[149] In effect, people do not think about, or with, all forms of life.[150] Certain species—including chimps, dogs, and cats—are viewed as "good to think with," while others—such as fungi, eels, and amoebas—are not.[151] Spider vibrations constitute a form of signaling intrinsic to the survival and social interactions of arachnids. In fact, spider vibrations are not random, instead, they are calibrated responses to specific environmental and/or internal states. For instance, a study conducted by arachnologist George Uetz at the University of Cincinnati observes that spiders alter the tension and stickiness of their webs according to nutritional needs.[152] This directly influences the vibrations emitted from a web.[153] Beth Mortimer, a biologist and spider web researcher at Oxford University, further details how arachnids can detect and respond to minute differences in vibrational frequences.[154] Such changes in web vibrations allow spiders to sense prey, mates, and even threats.[155] The ability to finely tune and interpret web vibrations highlights the engagement of spiders within their environments and challenges the notion that these eight-legged beings are passive entities. By capturing and translating spider vibrations into forms perceptible to humans, Saraceno's installation invites participants to reevaluate the sensorial capacities of arachnids, promoting an extended appreciation for these often-misunderstood beings.

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[148] Hessler.
[149] Bradley and Perkins, 145.
[150] Daston and Mitman, 11.
[151] Ibid; *Radical Playgrounds*, 3.
[152] George W. Uetz, J. Andrew Roberts, and Phillip W. Taylow, "Multimodal Communication and Mate Choice in Wolf Spiders: Female Response to Multimodal versus Unimodal Signals," *Animal Behaviour* 78, no. 2 (August 2009): 301-302.
[153] Ibid, 303-4.
[154] Beth Mortimer *et al.* "The Speed of Sound in Silk: Linking Material Performance to Biological Function." *Advanced Materials* 26, no. 30 (August 2014): 5180-81.
[155] Ibid, 5182.

Expanding normative human-spider interactions, as well as opposing hegemonic "rules and dimensions" of multispecies entanglements, Saraceno's installation encourages space for compassionate negotiation, where those who are marginalized, and who have historically been dislocated, can be considered.[156] This enhanced understanding points towards a broader ecological awareness, where human and non-human systems of interaction are viewed as equally valid. *Play-Ground* asks participants to empathetically embrace an alternate form of sentience without "absorb[ing] or consum[ing]" the other.[157] Rather than attempting to "matc[h] sameness" between humans and spiders, *Play-Ground* encourages people to welcome "multiscalar connections" that intertwine diverse species.[158] This approach suggests empathy may instigate a response that extends beyond recognition. While empathy can impart emotional affect, its role as a generative mechanism of attunement warrants further exploration. Investigating whether empathetically attuning to other beings can contribute to more nuanced interspecies alignments could provide valuable insights. For example, such an inquiry might clarify whether empathy merely evokes feelings or if it facilitates transformative modes of consideration across species boundaries.

The capacity for Saraceno's installation to instill a framework that influences long-term, anthropic behaviours remains an open question. *Play-Ground* ultimately encourages ways of thinking through transgressions and "forms of difference" concerned with how the human is unsettled during the experience.[159] Is it merely enough to vibrationally represent our arachnid others? Does Saraceno's installation fully explore the complexities of a spider's sensorial *umwelt*? Even with good intentions, the human remains the most privileged actor throughout

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[156] Daston and Mitman, 13; Bradley and Perkins, 138; Grosz.
[157] Bradley and Perkins, 138.
[158] Hessler.
[159] Wilson, 725.

Play-Ground, mirroring challenges Petrič's familiar to us from work. In line with Daston's critique regarding a societal lack of agency allocated to nonhuman entities, both Petrič and Saraceno accidentally center human perspectives.[160] Once participants depart from *Play-Ground*, will they carry their new-found awareness of, and respect for, nonhuman beings with them? If presented with a spider, for example, inside a participants' home, will the individual kill, ignore, or open a door to the outside world for, their arachnid co-habitant? Although Saraceno's work offers a generative place for intellectually grappling with different modes of interspecies attunement, *Play-Ground* encounters the difficulty of providing a drastically altered and "integrated" ontological roadmap of "thought-actions" for participants to bring with them, and use, going forward. To raise this limitation is not to dismiss the work's valuable contribution but, rather, to recognize the magnitude of the challenge it attempts to face.[161] This struggle demonstrates how difficult it is to curate spaces that teach people how to overcome anthropocentric modes of interaction. Stemming from a desire to bridge human-nonhuman divides, efforts initiated by individuals such as Saraceno reflect the idea that, rather than merely exposing viewers to alternate modalities of thought, art should—as it holds the potential to—transform how we conceptualize nonhuman beings. Involving a lasting change in the ethical and practical stances we adopt towards other species, artistic interspecies endeavours, including *Skotopoiesis* and *Play-Ground*, begin to reshape our relations with nonhuman others by demonstrating and embedding new approaches to multispecies alignment. As Saraceno's installation demonstrates, achieving this level of influence is challenging, and demands meticulous crafting for such an experience to extend into a profound pedagogical realm.

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[160] Daston and Mitman, 5.
[161] Wilson, 725; Barnett, 167.

Regardless of the partial nature of its success, Saraceno's installation can help us think through modalities of attunement that accentuate and respect what is "inhuman"—both within and around us.[162] This shift away from anthropocentrism employs the medium of play to reveal unspoken "histories of inclusion and exclusion."[163] *Play-Ground* foregrounds the necessity of exploring different modes of alignment in order to re-constitute notions of interspecies interdependence.[164] Using their bare hands and feet to touch the vibrating ground, participants imagine, and effectively begin to form, "new possible histories" of thought and practice that stretch "a space at the heart of the border" separating people from arachnid beings.[165] Inviting individuals to embrace a creative "shift into otherness," Saraceno's installation is a place of "collective learning" and unlearning.[166] By imaginatively minimizing the space between spiders and people, participants in *Play-Ground* unlearn concepts of "contestation and competition," and replace them with notions of "collaboration and community" forming.[167] Saraceno's artwork opens individuals to the possibility of reinventing rules through a coming together of shared "with-in-difference."[168] Orientating the space that separates humans from spiders in a novel way, Saraceno's installation becomes a zone of attunement, receptivity, and resistance. These transformations are constituted through alliances that merge, as well as respect, differences in diverse ways of being.[169]

Through an artistic "re-con-figuration" of the vibrational worlds of ground- and web-dwelling spiders, Saraceno's work makes visible the difficulties, as well as the importance, of

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[162] Grosz, 6.
[163] *Radical Playgrounds*, 8.
[164] Ibid, Barnett, 164.
[165] Bradley and Perkins, 138-8; Grosz, 58.
[166] Barnett, 164; *Radical Playgrounds*, 8.
[167] *Radical Playgrounds*, 3.
[168] Ibid, 8; Bradley and Perkins, 138.
[169] Bradley and Perkins, 133, 138.

deconstructing anthropocentric thinking. Developing a sensitivity towards other beings instigates moments of embodied "wit(h)nessing" that can grow into, and "reassemble" as, points of connected human-nonhuman alliances.[170] In the hopes that participants of *Play-Ground* will leave the experience having acquired something along the way, Saraceno's work fosters connections that bypass differences between beings.[171] As traces shared across the cobblestone surface, the spiders' vibrational frequencies momentarily "become a part of" the human participants' sensorial experience.[172] In this manner, Saraceno's installation generates a "kind of worlding" that constructs expanded interpretations of the "worlds we inhabit."[173] Such creative, multispecies attunement and receptivity give rise to a state of ecological connection that nurtures a refusal to treat nonhuman beings "like uninvited guests" within a human-centric world.[174] Directing us to a humanity that is constantly in the process of "overcoming and transforming" itself, Saraceno's artistic endeavour elaborates, builds upon, and creates with, interspecies differences fundamental to structuring relations between beings.[175] Such artistic practice instantiates an access to the world that demonstrates a sensitivity for, and expanded considerations towards, all forms of life.

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[170] Ibid.
[171] Johanne Sloan et al., "The Foray – La cueillette," The Grantham Foundation of the Arts and the Environment, 2021, 4; Daston and Mitman, 8.
[172] Sloan, 4; Bradley and Perkins, 143.
[173] Myers, 2019, 120; *Radical Playgrounds*, 9; John Law and Michael Lynch, "Lists, Field Guides, and the Descriptive Organization of Seeing: Birdwatching as an Exemplary Observational Activity," in *Human Studies* 11, no. 2/3 (April – July 1988): 271-283.
[174] Barnett, 167.
[175] Grosz, 174.

Part III: Reciprocity amongst Species

Integrating education with artistic praxis and active engagement, Alexandra Daisy Ginsberg's (b. 1982) work propels a shift from anthropocentric concerns to ecocentric perspectives by teaching participants how to reimagine multispecies interdependencies within encompassing ecosystems. Ginsberg's project reshapes interspecies considerations by sensitizing individuals to notions of reciprocal care for mutual flourishings amongst beings. This establishes a framework that urges individuals to adopt more inclusive considerations for the environment by challenging traditional binaries that position nature in opposition to culture. Ginsberg's artistic endeavour narrows the gap between humans and nonhuman beings by presenting a model of multispecies attunement that engenders awareness and respect for other species.

A multidisciplinary artist who employs creative strategies to advocate for environmental reparation, Ginsberg completed a PhD at the Royal College of Art in London with a thesis that explores how dreams for a "better" future shape what we design and create.[176] Captivated by the transformative potential of synthetic biology and biodiversity conservation, Ginsberg addresses how the current climate emergency can act as a "catalyst" for societal change.[177] One of Ginsberg's most recent endeavours, entitled *Pollinator Pathmaker* (2021-present), started as "an invitation" to work with the Eden Project, an "arts, science, and educational charity," in Cornwall, United Kingdom.[178] Commissioned by the Eden Trust, a charity commission that operates throughout England and Wales, Ginsberg was tasked with devising an artwork that

[176] Serpentine, 5:00; Alexandra Daisy Ginsberg, "Better," PhD thesis, Royal College of Art, 2017; Gabrielle Schwarz, "Flower Power," *Outland*, July 14, 2023, https://outland.art/alexandra-daisy-ginsberg/.
[177] Pollinator Art, "Artist - Pollinator Pathmaker," 2024, https://pollinator.art/about/artist; Serpentine, 3:00; T. J. Demos, *Beyond the World's End: Arts of Living at the Crossing* (Durham: Duke University Press, 2020).
[178] Alexandra Daisy Ginsberg, "Pollinator Pathmaker," Alexandra Daisy Ginsberg Studio, accessed October 20, 2024, https://www.daisyginsberg.com/work/pollinator-pathmaker.

draws attention to the "jeopardy facing pollinators."[179] Due to factors including habitat degradation, climate change, and pesticide use, global pollinator populations have drastically declined in the past thirty years.[180] In response, Ginsberg designed a "living artwork" specifically intended for bees, beetles, butterflies, hoverflies, moths, and wasps.[181] Intentionally planted in an idiosyncratic manner, the work prioritizes the needs and preferences of nonhuman beings, resulting in an arrangement of blooms that seems "haphazard" to human eyes.[182] In this way, *Pollinator Pathmaker* employs the garden as an artistic medium to answer the question: *What would an outdoor space look like if it were created for, and from the perspective of, pollinators – rather than humans?*[183]

Realized in 2021, the first edition of *Pollinator Pathmaker* is a 55m permanent installation located at the Eden Project (figures 34-36). The following year, the Serpentine requested an iteration of Ginsberg's work, which took the form of eleven "meandering beds" in Kensington Gardens, London (figures 37-38).[184] The most recent adaptation of the project, completed in 2023, was commissioned by the LAS Art Foundation, and is located outside of the Natural History Museum in Berlin, Germany.[185] The first international edition of *Pollinator Pathmaker*, the living artwork in Berlin occupies four planting beds and is comprised of more than 7,000 plants, including sedges, lavender shrubs, and clusters of sneezeweed (figures 39-

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[179] Serpentine, 7:00; Charity Commission for England and Wales, "The Eden Trust," accessed March 23, 2025, https://register-of-charities.charitycommission.gov.uk/charity-details/?regId=1093070&subId=0; The Eden Trust is a registered charity commission that primarily funds projects and initiatives focused on public education and research concerning ecological sustainability. The organization allocates resources towards maintaining and developing programs such as the Eden Project, prioritizing environmental resilience within communities across England and Wales.
[180] Ibid.
[181] Alexandra Daisy Ginsberg Studio.
[182] Serpentine, 1:00; Schwarz.
[183] Alexandra Daisy Ginsberg Studio.
[184] Ibid.
[185] Ibid.

40).[186] Although similar in their intention, these three living artworks are distinct from one another, as each planting design is specifically tailored to the local environment.[187]

Ginsberg's project includes an accompanying, online component. Open to the public, the website *pollinator.art* allows participants to virtually view the three gardens in Cornwall, London, and Berlin (figures 41-42). Employing pedagogy to sensitize individuals to the needs of other species, *pollinator.art* offers educational insights into garden ecosystems. Visitors are encouraged to learn about topics such as: the fundamental role pollinators play in crop diversity, the co-evolution between pollinators and plants, invasive species, and biodiversity.[188] Ginsberg's work teaches participants that the curation and planting of outdoor spaces holds significant societal, as well as environmental, implications. Visitors are prompted to use a garden-design tool on *pollinator.art* to create their own unique living artwork. Free of charge, participants are led through a systematic process which includes selecting garden conditions—such as physical dimensions of the space (this can range from a balcony planting box to a backyard area), soil type, and shade coverage. Participants are also guided to select vegetation preferences—which includes planting density, blooming species, and flowering patterns.[189] Ginsberg created an algorithm that incorporates diverse garden aesthetics so that the layout of the outdoor spaces is not limited by the artist's personal design preferences (figure 43).[190] Visitors are further asked to choose between "patch" or "path" layouts that appeal to different pollinator foraging styles.[191] The artist explains that spatial configurations influence the variety of pollinators that may visit a garden, as the choice between layout patterns caters to the distinct navigation and memory

[186] Schwarz.
[187] Serpentine, 36:30.
[188] Schwarz; Alexandra Daisy Ginsberg Studio.
[189] Alexandra Daisy Ginsberg Studio.
[190] Serpentine, 7:30.
[191] Alexandra Daisy Ginsberg Studio.

capabilities of different pollinators.[192] For instance, "patch" layouts, with their random distribution of flowers, are better suited for beetles who, rather than remembering specific locations, spontaneously explore areas. In contrast, "path" layouts, which feature more structured and repeated planting patterns, align more closely with the foraging behaviour of bees, who memorize the locations of flowers to optimize their pollen collections routes. This tailored approach ensures that each garden design maximally attracts and benefits the specific types of pollinators it aims to support.

Once these preliminary steps are completed, *pollinator.art* generates an exclusive garden design. Participants can explore the garden blueprint as a 3D painting or as a 2D deconstructed "planting plan."[193] The blueprints are devised from a selection of 600 of Ginsberg's drawings that depict all the plants in the database across four seasons (figure 44).[194] Individuals can adjust, or completely reconstruct, their design as many times as they please.[195] During a 2023 interview with art critic Hans Ulrich Obrist, Ginsberg asserts that what the generator provides is "not the artwork," but rather guidelines on how to create the work of art.[196] Visitors are encouraged to share, save, or download seeding instructions which allows them to "realize the artwork…by planting it."[197] Provided with a certificate of authenticity and an edition number, every commissioned garden includes a curated list of locally appropriate plants, referred to as a "planting palette," accompanied with information about the pollinators such plants will attract (figure 45).[198] Finally, participants are urged to turn on a feature entitled "pollinator vision," which alters the artwork's color palette, and allows individuals to imagine how pollinators might

[192] Schwarz.
[193] Alexandra Daisy Ginsberg Studio.
[194] Serpentine, 40:00.
[195] Ibid, 27:00.
[196] Ibid, 28:00.
[197] Ibid; Alexandra Daisy Ginsberg Studio.
[198] Ibid; Schwarz.

experience the garden.[199] The goal of "pollinator vision" is to demonstrate how pollinators see different parts of the color spectrum. For instance, as explained on *pollinator.art*, the human eye might appreciate "a vibrant splash of red," however, as red appears black to bees, our nonhuman companions prefer purple flower patches (figures 46-49).[200] Ginsberg's project highlights how outdoor spaces intentionally designed for pollinators require ecocentric considerations.

Rather than prioritizing anthropic preferences, *Pollinator Pathmaker* instigates interspecies attunement by teaching participants how to shift their perspective to imagine what gardens created for, and about, nonhuman beings might be like. Encouraging ecocentric thinking and action, Ginsberg's project is informed by scientific understanding and "applied research" from various fields including biology, ecology, physics, and entomology.[201] Lars Chittka, a professor of sensory and behavioural ecology at Queen Mary University of London, is one of the specialists Ginsberg partnered with to develop knowledge of different foraging styles selected for by the algorithm on *pollinator.art*.[202] Chittka's research delves into how "bumblebees memorize flower locations" to find the shortest flight paths between blooms.[203] Referred to as "traplines," Chittka records these flight paths with radars attached to bumblebees to track how the nonhuman beings travel across landscapes (figure 50).[204] On *pollinator.art*, individuals are encouraged to engage with scientific literature (made accessible through embedded links on the website), where visitors can learn about "traplines" and how bees perceive the world.[205] For example, one link

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[199] Serpentine, 28:00.
[200] Schwarz.
[201] Conte, 68; Linn; Serpentine, 34:30; Pollinator Art, "Artist – Pollinator Pathmaker," 2024, https://pollinator.art/about/artist; Pollinator Art, "How it Works."
[202] Serpentine, 11:00-13:00; Pollinator Art, "Pollinators - Pollinator Pathmaker," 2024, https://pollinator.art/resources/pollinators.
[203] Pollinator Art, "Pollinators."
[204] Serpentine, 12:00-15:00.
[205] Adrian G. Dyer, Scarlett R. Howard and Jair E. Garcia, "Through the Eyes of aa Bee: Seeing the World as a Whole," *Animal Studies Journal* 5, no. 1 (2016): 97-109.

leads visitors to an article entitled "Through the Eyes of a Bee: Seeing the World as a Whole," which explains how bees' "compound eyes" create a "grainy…flicker[ing]" view, so that they can discern individual flowers as they fly past them – whereas to humans, such speed would create a blurred view.[206] Building on this, Ginsberg's work situates participants within the perceptual frameworks of nonhuman entities. Similarly to how Saraceno's installation sensitizes participants to the sensorial world of arachnids, *Pollinator Pathmaker* extends anthropic perception by employing animation to render the viewpoint of pollinators, not just imaginable but, visually accessible. This aspect of Ginsberg's project reduces the distance between, and instantiates creative alignments amongst, humans and nonhumans.

Pollinator Pathmaker thus encourages a shift in perspective by providing participants with a direct, experiential understanding of an environment from the stance of another species. This decenters the human and allows people to contend with the notion that human beings are simply, as Elizabeth Grosz writes, "one species among many."[207] In this manner, *Pollinator Pathmaker* trains participants how to adopt a posthumanist perspective that encourages an "exten[sion of] subjectivities beyond the human species."[208] In the book *Becoming Undone: Darwinian Reflections on Life, Politics, and Art*, Grosz asserts that Darwin's conception of life positions human beings on the same line as nonhuman beings, as people, animals, and plants alike are constantly in the process of evolving, ultimately "becoming" something else.[209] This modality of thought is transformative because it implies a harmonization amidst the disparate "forms of life" on earth.[210] Congruous with interspecies scholarship, such a framework refutes

[206] Ibid; Pollinator Art, "Pollinators."
[207] Grosz, 5.
[208] Linn and Ostoić, 80.
[209] Grosz, 170.
[210] Ibid, 5.

deconstructed concepts of "the abject, [and] the inhuman" which are systematically wielded against interspecies flourishing.[211] By challenging participants to think about, and create spaces for, pollinators rather than people, Ginsberg's artwork is an intervention into the formation of knowledge and aesthetics that is solely directed to the human. Training individuals to leave anthropocentric thinking behind, *Pollinator Pathmaker* is an exercise in understanding life as no longer bound by, and defined through, a hierarchy in which humanity is "the pinnacle of all living forms."[212] Those who engage with Ginsberg's project practice contending with philosophical considerations that prioritize nonhuman beings over themselves.

Pollinator Pathmaker also employs a creative translation of the human capacity for empathy as another method of accessing interspecies attunement. Aspiring to encode an altruistic "human emotion" into the algorithmic tool used on *pollinator.art*, Ginsberg worked alongside string theory physicist Przemek Witaszyka to develop the technological component of *Pollinator Pathmaker*.[213] Ginsberg defined empathy, in the context of the computer algorithm, as the ability to "maximize pollinator diversity."[214] Translating the human emotion of empathy into an ecology of diversity, this definition underpins her intention of utilizing interspecies art to foster emotional resonance amongst beings. To generate a planting design, the algorithm evaluates pollinator populations in relation to local plants such flower-visitors forage from, and then selects an arrangement informed by a participant's preferences.[215] Every garden edition created on *pollinator.art* supports the widest possible range of pollinator species.[216] This is a complex challenge since the relational coexistence between plants and pollinators is multifaceted; the loss

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[211] Alaimo, 408; Law and Lynch, 298.
[212] Grosz, 4.
[213] Ibid, 10:45; Schwarz; Pollinator Art, "How it Works - Pollinator Pathmaker," 2024, https://pollinator.art/about/how-it-works.
[214] Serpentine, 11:15.
[215] Pollinator Art, "How it Works."
[216] Alexandra Daisy Ginsberg Studio.

of a "single species of pollinator" can be the cause of demise for a plant species.[217] Artistic in the "biological forms it induces," life generates a multiplicity "in patterns of living."[218] *Pollinator.art* teaches participants about the inherently interconnected relationships between nonhuman beings and their environment.[219] By redefining ecological considerations to prioritize the health and proliferation of pollinators, Ginsberg's project fosters a sense of care for other species.

This endeavour shows that care is reciprocal; as we become more attentive to the needs of other beings, we, in turn, benefit from the enhanced health and balance of the ecosystems around us. *Pollinator Pathmaker* reveals that such reciprocity manifests in different forms. Rooted in human emotions, anthropic care can instigate affective responses intended to positively influence the lives of others. A second understanding of care, which Ginsberg's project touches upon, pertains to how the environment holds space for, and sustains, the well-being of multiple species. Care, in the form of environmental nourishment, supports ecosystems in which humans, as well as nonhuman beings, benefit. While it should be recognized that pollinators may not 'care' for us in the anthropic sense of the term, actively prioritizing pollinator diversity directly impacts our health and prosperity. By redefining empathy as pollinator diversity, *Pollinator Pathmaker* engenders interspecies attunements and transcends anthropocentric paradigms that have historically governed cross-species relationality.

Ginsberg's work allows us to intellectually reframe care as a term that encompasses emotional reciprocity and environmental nourishment. Unlike Petrič and Saraceno's discourse regarding cross-species communication, Ginsberg avoids the pitfalls that accompany equating human experiences with nonhuman *umwelts*. This is accomplished through Ginsberg's

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[217] Pollinator Art, "How it Works."
[218] Grosz, 173.
[219] Kari M. Norgaard, "The Sociological Imagination in a Time of Climate Change," *Global and Planetary Change* 163, (2017): 171-176.

acknowledgement that human emotions, such as empathy, cannot directly translate into other-than-human experiences. *Pollinator Pathmaker* demonstrates how empathy—an inherently human-laden term—can be employed to access an ecocentric sensitivity by thinking through the concept of diversity. Rather than anthropomorphizing pollinators, Ginsberg invites participants to consider alternate modalities of interspecies connectivity. This approach is exciting as it may lead to further explorations of how other human concepts, such as creativity and notions of forming alliances, can be translated into modalities that significantly alter our relationality towards the environment and nonhuman beings.

Ginsberg asserts that *Pollinator Pathmaker* employs creative empathy by challenging participants to move away from being "consumers of art" to becoming caretakers of a living, changing, and "planted artwork," as the project encourages visitors to plant their own pollinator garden.[220] For instance, Berlin's LAS Art Foundation initiated a campaign to generate community involvement. Thus far, five gardens, in school districts and public spaces, have been planted by different communities.[221] In an effort to further contribute to "temper[ing]" the accelerating climate catastrophe, Ginsberg started a pollinator garden in her backyard, and notes she regularly tends to it.[222] By granting the public access to *pollinator.art*—where individuals are encouraged to create, download, and carry out personalized planting instructions—Ginsberg's project fosters a shift in anthropocentric consideration.[223] By actively taking care of a pollinator garden, the artwork reflectively returns a form of care back to the steward. Through the process of planting a pollinator garden, thinking about pollinators, and caring for the plants, as

[220] Serpentine, 26:00-27:00.
[221] Schwarz.
[222] Serpentine, 28:30.
[223] Pollinator Art, "LAS Edition, Forecourt of the Museum für Naturkunde Berlin, Germany, 2023 - Pollinator Pathmaker," 2024, https://pollinator.art/gardens/commissioned-gardens/las-berlin.

anthropologist Tim Ingold suggests, "[one] become[s] what [one plants]: not in shape but in affect."[224] Embracing a "call to care for other life forms in…reciprocal" ways, *Pollinator Pathmaker* instantiates interspecies, boundary-crossing entanglements of difference that "engender empathy."[225] This aims to facilitate an affective, lived environmental ethic.

Not only does Ginsberg's work curate designs that foster pollinator diversity, it also promotes an expanded environmentalism that pushes past anthropocentric "utilitarianism," which regards nature simply as a resource for anthropic (mis)use.[226] Highlighting biological interdependencies and ecological processes that connect humans with nonhuman beings, *Pollinator Pathmaker* dissolves boundaries through teaching participants ways to be "undisciplined."[227] As noted by Bruno Latour, environmental degradation demands solutions that "continually compos[e] and recompose[e]" a sense of interrelated ecologies.[228] *Pollinator Pathmaker* creates ecological coalescence through instantiating multispecies interconnectivity which prioritizes "nature-based" solutions.[229] The enriched understanding of environmental systems that participants gain from engaging with Ginsberg's project fosters a recognition for the reciprocal relationships between humans and the nonhuman world. For instance, by creating gardens that cater to the specific needs of local pollinators, *Pollinator Pathmaker* enhances the biodiversity of a region while supporting the stability and productivity of nearby agricultural activities. This emphasizes that nurturing surrounding ecosystems plays a crucial role in supporting the flourishing of ourselves as well as nonhuman others.

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[224] Tim Ingold, "Drawing the Line," in *Making: Anthropology, Archaeology, Art and Architecture* (New York: Routledge, 2013), 128-129.
[225] Alaimo, 406.
[226] Ibid, 399.
[227] Conte, 40-46.
[228] Latour, 480; Alaimo, 402.
[229] Hessler; Conte, 45.

While *Pollinator Pathmaker* leverages creative empathy to bridge human and non-human divides, the depth and enduring impact of such emotional relations deserves further exploration. Empathy, although instrumental in fostering immediate points of connection, may not always translate into long-term changes in anthropocentric attitudes and behaviours. This prompts questions regarding the extent to which creative empathy can inspire sustainable practices and environmental engagement. Does empathy extend beyond momentary compassion and instantiate ecological stewardship? The scope and scale of empathy fostered by Ginsberg's project may not be sufficient to address systemic challenges such as global habitat destruction, climate change, and a loss of biodiversity. Although *Pollinator Pathmaker* encourages a sense of environmental care and responsibility amongst participants, emotional engagement is only one step towards catalyzing large-scale advocacy and action. This reiterates the challenges faced by artists including Ginsberg, Petrič, and Saraceno, as altering anthropocentric paradigms of interspecies engagement requires efforts that extend beyond the individual. Nevertheless, *Pollinator Pathmaker* demonstrates how invaluable artistic attempts are for extending alignments amongst beings.

Through fostering transformative spaces that reveal the creative agency of nonhuman entities, *Pollinator Pathmaker* engages interspecies cooperation as an additional modality of accessing interspecies attunement. Pollinators and plants are the intended audience, as well as the co-creators, of Ginsberg's artwork, since the garden layouts are created with the explicit intention of catering to the ecological needs and preferences of plants and pollinators. Ginsberg further emphasizes that the true artwork in *Pollinator Pathmaker* lies not merely in the planting itself, but in the dynamic interplay of planting (initiated by human participants) and pollination

(continued by nonhuman beings).[230] This interactivity, which encompasses the evolving relationships between gardens, pollinators, and the people who tend the spaces, illustrates a continuous process of change and growth. A contributor to *Pollinator Pathmaker*, Rodger Dewhurst, a beekeeper at the Eden Project, explains flowers unfurl at different times in order to be in sync with pollinators.[231] On *pollinator.art*, participants learn about the co-evolution between pollinators and the visual appearance, as well as the timed emergence, of flowers.[232] These "mutualistic pulses across landscapes" dictate how different flowers bloom, and eventually die, throughout the cycle of the year.[233] Ginsberg also consulted with Marc Carlton, an expert in wildlife planting, who explains how specific flowers suit pollinators' "different-shaped mouthparts."[234] For instance, "small, pea-shaped flowers" attract solitary bees, while "deep, foxglove blooms" appeal to "long-tongued" bumblebees.[235] By focusing on such interactions, *Pollinator Pathmaker* highlights how ecosystems and human contributors co-evolve, artistically underscoring ecological interrelations and mutual development.

This project encourages participants to attune to the role "the inhuman" plays within the constitution of art.[236] *Pollinator Pathmaker* incorporates specific colors, patterns, and plant species known to attract various pollinators. Moreover, the plant arrangements are strategically planned to optimize the interactions between the vegetative beings and their respective pollinators. Such considerations curate dynamic habitats that serve as functional microcosms for nonhuman beings. Ginsberg's project highlights cooperative efforts between humans and other-

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[230] Serpentine, 20:00.
[231] Ibid, 11:00-14:00.
[232] Pollinator Art, "How it Works."
[233] Ibid; Serpentine, 12:00-13:00.
[234] Marc Carlton, "The Pollinator Garden: About plants, pollinating insects, and gardening," January 2020, https://www.foxleas.com/about-this-website.asp.
[235] Pollinator Art, "How it Works."
[236] Grosz, 170.

than-human entities, as pollinators continuously remove, and add to, different parts of each living artwork.[237] As pollinators forage through a garden's vegetation, flower pollen clings to the bodies of pollinators, who then carry remnants from one plant to the next.[238] If successfully fertilized, pollen transported by nonhuman participants can create additions to a garden by "grow[ing] into…new plant[s]."[239] *Pollinator Pathmaker* reflects a range of changes "evident in different forms of coexistence."[240] Through auxiliary factors including wind dispersal and animal interventions—such as squirrels, birds, and raccoons who might consume and ultimately relocate seeds and other parts of a garden's vegetation—that which was intentionally planted by humans comingles with novel flora which appears within a pollinator garden.[241] Merging distinct living beings together to create a cohesive, "living organism," Ginsberg's pollinator gardens exemplify how ecosystems are "assembled piece by piece" by an array of participants "working in [a] myriad [of] ways."[242] Illuminating the agency of "covert actors"—human and nonhuman alike—challenges people to engage in, and imaginatively attune to, cross-species collaborations.[243] This artistic effort demonstrates the creative propensity for multispecies interactions to "bind together and reemerge in…new wholeness[es]."[244] Such flourishing epitomizes cross-species sensitivities that encompass "far-more-than" simply the human.[245] A generative modality of attunement, *Pollinator Pathmaker* demonstrates how interspecies cooperation can propel us out of anthropocentric paradigms of thought and action.

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[237] Dorkenwald; Serpentine, 22:00.
[238] Pollinator Art, "Pollinators."
[239] Ibid.
[240] Linn, 80.
[241] Serpentine, 28:30.
[242] Ibid, 19:00; Dorion Sagan and Ken Rinaldo, "Dorion Sagan's Thermodynamics of Life," *Antennae: The Journal of Nature in Visual Culture* 61, no.2 (Summer 2023): 231.
[243] Cole Swanson, "Lecanora Muralis: Matter Matters, Surfaces," *Antennae: The Journal of Nature in Visual Culture* 45, no. 5 (Autumn 2018): 42.
[244] Lynn Margulis, *The Symbiotic Planet: A New Look at Evolution* (London: Phoenix, 1999), 11.
[245] Sagan and Rinaldo, 229.

Ginsberg asserts the project's goal is to "no longer have distinct editions" of individual gardens, but rather for the outdoor spaces to merge into a supportive, "growing network across a landscape" of living artworks.[246] This notion establishes pollinator gardens as "porous…spaces" throughout which pollinators and plants travel amidst. [247] Such connectivity between gardens could foster a community of human stewards, where participants would care for their respective gardens. This proposes a continuous exchange amongst all species involved, as the interconnected systems between plants, pollinators, and people rely on supporting one another. In this way, those who engage with Ginsberg's work learn how "to extend…gesture[s] of recognition across…species lines."[248] Such interspecies alignment teaches us methods to formulate questions about "understanding other minds" in a way that transcends the paradigmatic question of: *What is it like to be an X?*[249] Embracing organisms that embody "other ways of being" epitomizes ecological considerations necessary for biodiversity to thrive within our entangled world.[250] Fundamentally constructed upon co-existent imaginaries that connect nature with culture, such notions of expanded and connected entanglements encompass the human as well as the nonhuman. Rather than focusing on distinctions between disparate forms of life, Ginsberg's project challenges anthropocentric modalities of "binary thinking" by engendering different mechanisms of attunement amongst species.[251] Through learning about pollinator gardens, and then by planting as well as developing care for such living artworks, *Pollinator Pathmaker* instantiates a way of thinking that teaches us how to welcome, create with, and grow alongside otherness.

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[246] Serpentine, 39:00.
[247] Ibid, 40:00; Ingold, 128.
[248] Lorraine Daston, "Intelligences: Angelic, Animal, Human," in *Thinking: New Perspectives on Anthropomorphism,* luc by Lorraine Daston and Gregg Mitman (New York: Columbia University Press, 2005): 54.
[249] Ibid.
[250] Barnett, 168.
[251] Petrič, "The Vegetal, Intimately," 7:30; Gustafsson and Haapoja.

CONCLUSION

This thesis has unpacked how artistically enacted refusals of anthropocentrism demonstrate different modalities of attuning to multispecies interconnectivities. The artworks by Petrič, Saraceno, and Ginsberg do more than merely depict environmental themes—they actively mobilize ecocentric sensitivities through cultivating alternative awareness towards nonhuman entities. Teasing apart boundaries that separate humans from nonhuman beings, *Skotopoiesis*, *Play-Ground*, and *Pollinator Pathmaker* illuminate the dynamic and reflective role artistic practice can play within ecocritical discourse. Petrič challenges our conceptual frameworks of communication and recognition, making visible an equivalence between humans and nonhumans; Saraceno's installation fosters a receptivity towards alternative sensorial experiences, broadening our perceptual boundaries; and Ginsberg provides a model for us to empathetically reshape reciprocal relations with the surrounding environment. Together, these works foster creative attunements for, and expanded connections to, alternate forms of life that prompt an ethical repositioning of anthropic interactions with nonhuman entities.

My exploration allows us to intellectually grapple with strategies of interspecies harmonization employed by these three artists, separating the broader concept of attunement into components such as lengthened temporality, cross-species communication, heightened sensory perception, the formation of meaning, extended empathy, and multispecies cooperation. The mechanisms of attunement employed by Petrič, Saraceno, and Ginsberg vary; some modalities more comprehensively facilitate healing, while others inadvertently repeat anthropocentric paradigms of thought and action. Throughout this thesis, I have identified where rehearsals of anthropic wounds are evident. For instance, I note anthropomorphism and empathy—typically manifested as one-way projections of our assumptions onto others—may not be the most

effective modality for attunement. Similarly, forced notions of interspecies communication proves to be least convincing, while the role of meaning-making for the formation of interconnected understandings warrants further exploration. Conversely, other forms of interspecies sensitivity, such as those mediated through artistic perceptions, lengthening temporalities, and cross-species cooperation, demonstrate promise as they instantiate generative potentialities for multispecies alignment.

This work reveals the substantial obstacles inherent in attempting to think otherwise—challenges that are often formidable, if not insurmountable. The healing capacity of *Skotopoiesis*, *Play-Ground*, and *Pollinator Pathmaker*, coupled with the difficulties they encounter in overcoming the deeply-etched wounds of multispecies relations, highlight the need to continue wrestling with interspecies considerations. Such work is extremely valuable; efforts enacted by Petrič, Saraceno, and Ginsberg reveal profound mutual influences that challenge anthropocentric biases, foster shifts that "train…our thought[s] back to…nature," and demonstrate an equivalence amongst species. [252] Advocating for a more inclusive world where humans are not overseers of nature but participants in a shared life-world, these three artworks curate "sharing…in-difference" that activates a stitching together of the "world-wounds" Haraway identifies as dislocating people from relations with that which is other-than-human.[253] As human beings, our desire to flourish is often "caught up in a defensive and destructive" modality that prohibits the flourishing of other species.[254] My analysis of Petrič, Saraceno, and Ginsberg's work proposes alternate modalities of multispecies burgeoning. By peeling away the layers of attunement accessed by these three artists, this thesis not only sensitizes us to the project of

[252] Gibson, 1-5.
[253] Bradley and Perkins, 136; Haraway, 2008.
[254] Gibson, 112.

interspecies awareness but also reshapes our thinking by inviting us to align ourselves with this ongoing challenge.

With profound implications for conservation, sustainability, and environmental policy, this effort clears a path forward that is not one of dominance and exploitation but of attunement, understanding, and respect for all forms of life. Radical acts of environmental advocacy, *Skotopoiesis*, *Play-Ground*, and *Pollinator Pathmaker* redefine the role of artmakers—which includes professional artists and participants alike—as agents of change. In this way, Petrič, Saraceno, and Ginsberg challenge us to envision and enact a world that is vibrantly coexistent. Through my analysis of their artistic endeavours, we find a powerful call to action: to reimagine our roles within the biosphere, to dissolve the barriers between humans and nonhumans, and to forge a future where art and ecology are inextricably linked. As we move forward, it is clear that artistic efforts will continue to play a crucial role in shaping our ecological imagination, instantiating conversations towards more ethical interactions with, for, and alongside our planet.

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FIGURES

Fig. 1. Agnes Denes, *Wheatfield—A Confrontation*, summer 1982, two acres of wheat was planted and harvested by the artist on the Battery Park landfill, Manhattan, New York, United States of America, commissioned by the Public Art Fund. Image credit: John McGrall. Source: Phoebe Hoban, "Agnes Denes's Prophetic Wheatfield Remains as Relevant as Ever," *Architectural Digest*, November 6, 2019, https://www.architecturaldigest.com/story/agnes-denes-prophetic-wheatfield-remains-as-relevant-as-ever.

Fig. 2. Andy Goldsworthy, *Tree Painted with Black Mud*, March 2014, Dumfriesshire, Scotland. Source: Gillian Orr, "Andy Goldsworthy's Ephemeral Works: Artwork that is a testament to passing time," *The Independent*. October 17, 2015, https://www.independent.co.uk/arts-entertainment/art/features/andy-goldsworthy-s-ephemeral-works-artwork-that-is-a-testament-to-passing-time-a6694826.html.

Fig. 3. Richard Shilling, *Stacked Millstone Grit Cairn*, 2008, Birk Bank, Forest of Bowland, Lancashire, England, United Kingdom. Source: Richard Shilling, "Equilibrium." Richard Shilling Land Art, accessed March 25, 2025, https://www.richardshilling.co.uk/equilibrium.html.

Fig. 4. Nils-Udo, *Habitat II*, 2002, oak trees, pine trees, grapevines, Vignoble de Taissy, Maison Ruinart, France. Source: Nils-Udo, "Art in Nature," Nils-Udo, 2020, https://www.nils-udo.com/art-in-nature/?lang=en.

Fig. 5. Olafur Eliasson, *Ice Watch*, 2014, Eliasson relocated ice blocks from Greenlandic glaciers to the Place du Panthéon, Paris, France. Image credit: Martin Argyroglo. Source: Olafur Eliasson and Minik Rosing, "Ice Watch," Studio Olafur Eliasson, 2014, https://olafureliasson.net/artwork/ice-watch-2014/.

Fig. 6. Rebecca Belmore, *Ayum-ee-aawach Oomama-mowan: Speaking to their Mother*, 1991, Gathering, Mount Mackay, Fort William First Nations, Thunder Bay, Ontario, Canada. Image credit: Michael Beynon, courtesy of Walter Phillips Gallery, Banff Centre for Arts and Creativity. Source: Banff Centre, "Rebecca Belmore, 'Ayum-ee-aawach Oomama-mowan: Speaking to Their Mother,' n.d," accessed March 25, 2025, https://www.banffcentre.ca/listening-devices/speaking-to-their-mother.

Fig. 7. Mark Dion, *Roundup: An Entomological Endeavor for the Smart Museum of Art*, 2000/2006, steel, maple tree, plywood, books, and mixed media, Tanya Bonakdar Gallery, Los Angeles, United States of America. Source: School of the Art Institute of Chicago, "Mark Dion - Earthly Observatory." 2025. https://sites.saic.edu/earthlyobservatory/artists/mark-dion/.

Fig. 8. Mark Dion, *Cabinet of Extinction*, 2022, wood, paint, resin sculptures, string, Tanya Bonakdar Gallery, New York, United States of America. Source: Tanya Bonakdar Gallery. 'Mark Dion, Cabinet of Extinction, 2022.' https://www.tanyabonakdargallery.com/artists/34-mark-dion/works/11231-mark-dion-cabinet-of-extinction-2022/.

Fig. 9. Špela Petrič, *Skotopoiesis*, 2015, Petrič stands motionless in front of a rectangular patch of thale cress, photographed at Kapelica Gallery, Ljubljana, Slovenia. Source: Špela Petrič, *Confronting Vegetal Otherness: Skotopoiesis*, Špela Petrič Studio, accessed October 10, 2024, https://www.spelapetric.org/#/scotopoiesis/.

Fig. 10. Špela Petrič, *Skotopoiesis*, 2015, a light is positioned behind the artist which casts a shadow of Petrič's body onto the thale cress, photographed at Kapelica Gallery, Ljubljana, Slovenia. Source: Špela Petrič, *Confronting Vegetal Otherness: Skotopoiesis*, Špela Petrič Studio, accessed October 10, 2024, https://www.spelapetric.org/#/scotopoiesis/.

Fig. 11. Špela Petrič, *Skotopoiesis*, 2015, the projected light simultaneously illuminates Petrič and the thale cress, photographed at Kapelica Gallery, Ljubljana, Slovenia. Source: Špela Petrič, *Confronting Vegetal Otherness: Skotopoiesis*, Špela Petrič Studio, accessed October 10, 2024, https://www.spelapetric.org/#/scotopoiesis/.

Fig. 12. Špela Petrič germinating thale cress from seeds, images courtesy of the artist. Source: Špela Petrič, "Confronting Vegetal Otherness," October 31, 2015, https://www.slideshare.net/slideshow/pela-petri-confronting-vegetal-otherness/54592217#19.

Fig. 13. Thale cress growing in Špela Petrič's studio prior to the performance of *Skotopoiesis*, image courtesy of the artist. Source: Špela Petrič, "Confronting Vegetal Otherness," October 31, 2015, https://www.slideshare.net/slideshow/pela-petri-confronting-vegetal-otherness/54592217#19.

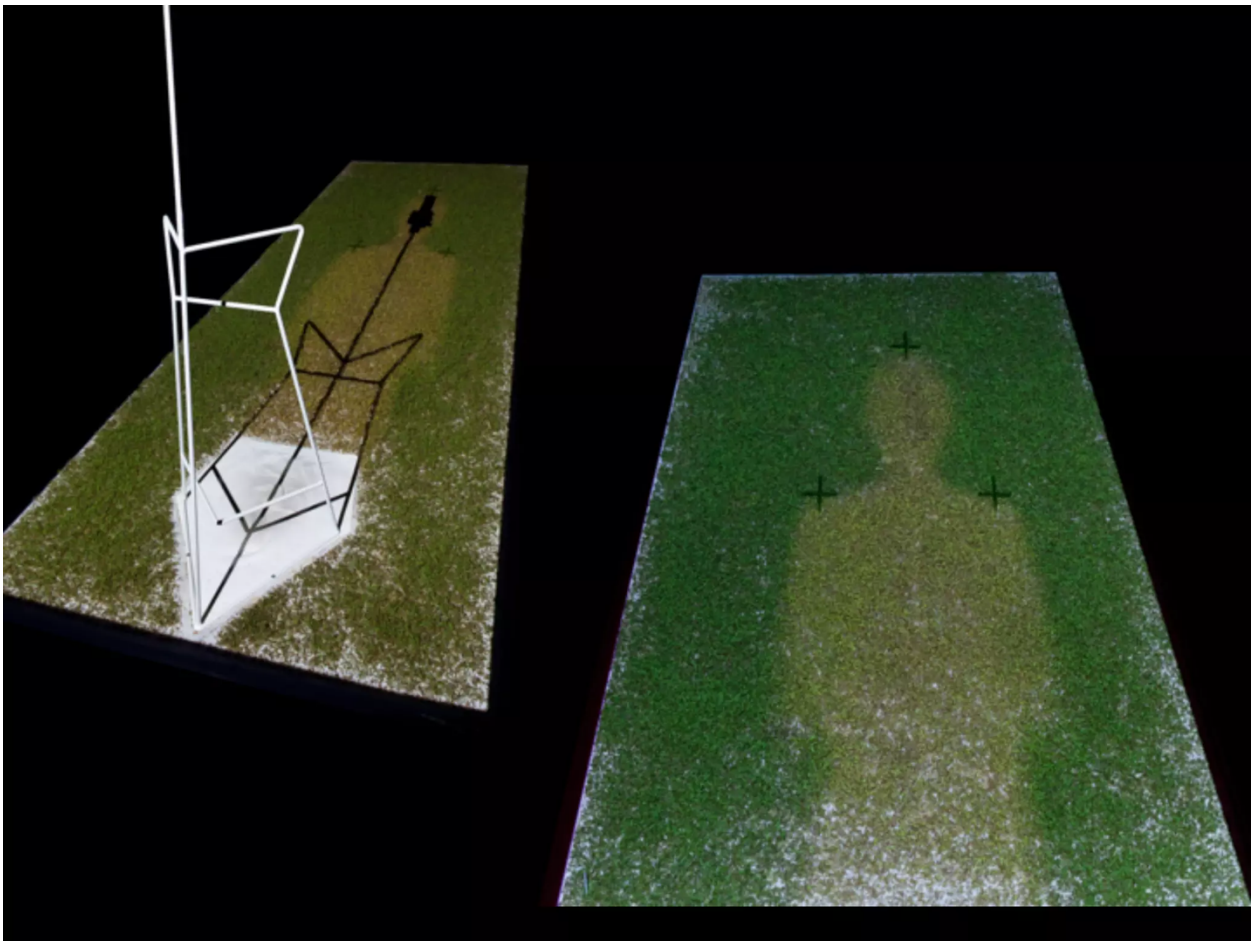

Fig. 14. Špela Petrič, *Skotopoiesis*, 2015, Petrič's shadow creates an imprint on the thale cress where the plant's stems lengthen and pale, while the section of cress exposed to lights becomes vibrantly green. Source: "Trust Me, I'm an Artist," WAAG Futurelab, 2024, accessed October 15, 2024, www.waag.org/en/project/trust-me-im-artist/.

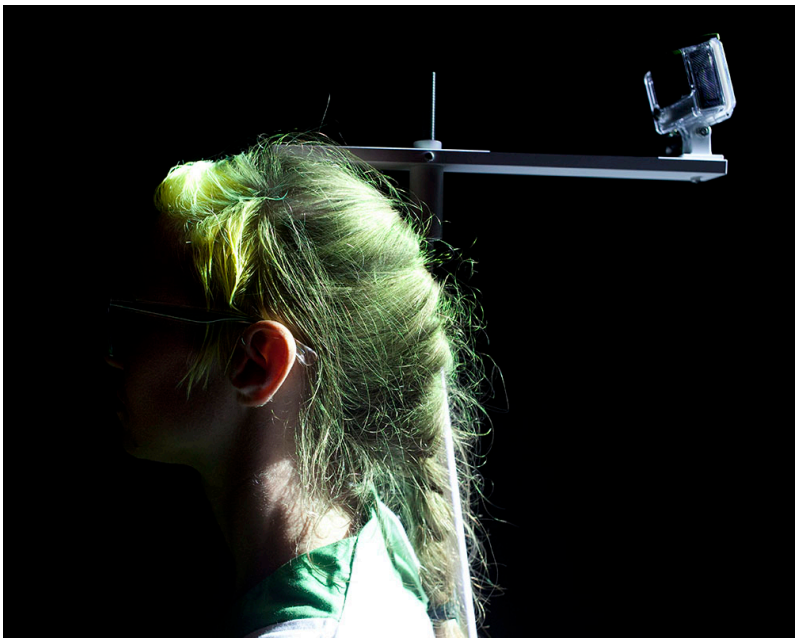

Fig. 15. Špela Petrič, *Skotopoiesis*, 2015, close-up of the two-channel videographic camera utilized to document the durational performance, photographed at Kapelica Gallery, Ljubljana, Slovenia. Source: Špela Petrič, *Confronting Vegetal Otherness: Skotopoiesis*, Špela Petrič Studio, accessed October 10, 2024, https://www.spelapetric.org/#/scotopoiesis/.

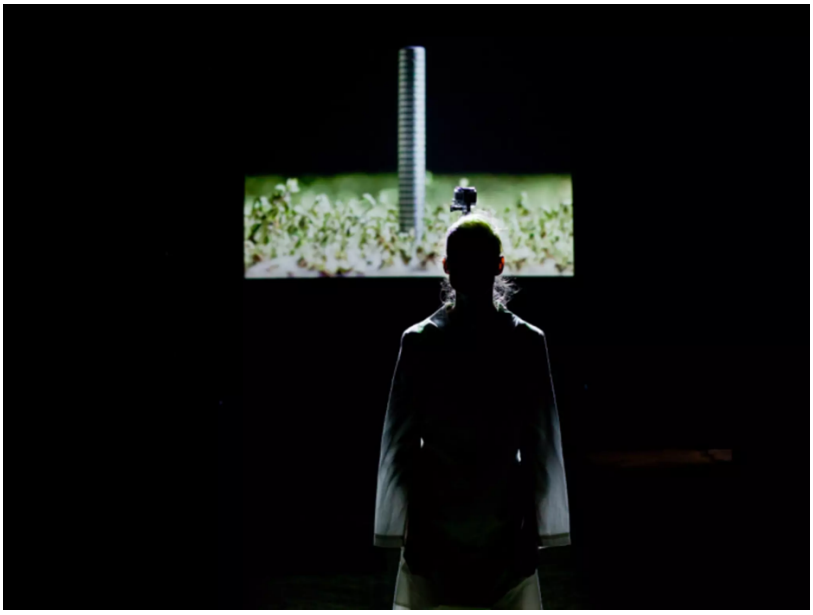

Fig. 16. Špela Petrič, *Skotopoiesis*, 2015, movement experienced by both participants (an upwards growth by the thale cress and a shrinkage by Petrič) occurs on a timescale that is imperceptible to a human audience, photographed at Kapelica Gallery, Ljubljana, Slovenia. Source: Špela Petrič, *Confronting Vegetal Otherness: Skotopoiesis*, Špela Petrič Studio, accessed October 10, 2024, https://www.spelapetric.org/#/scotopoiesis/.

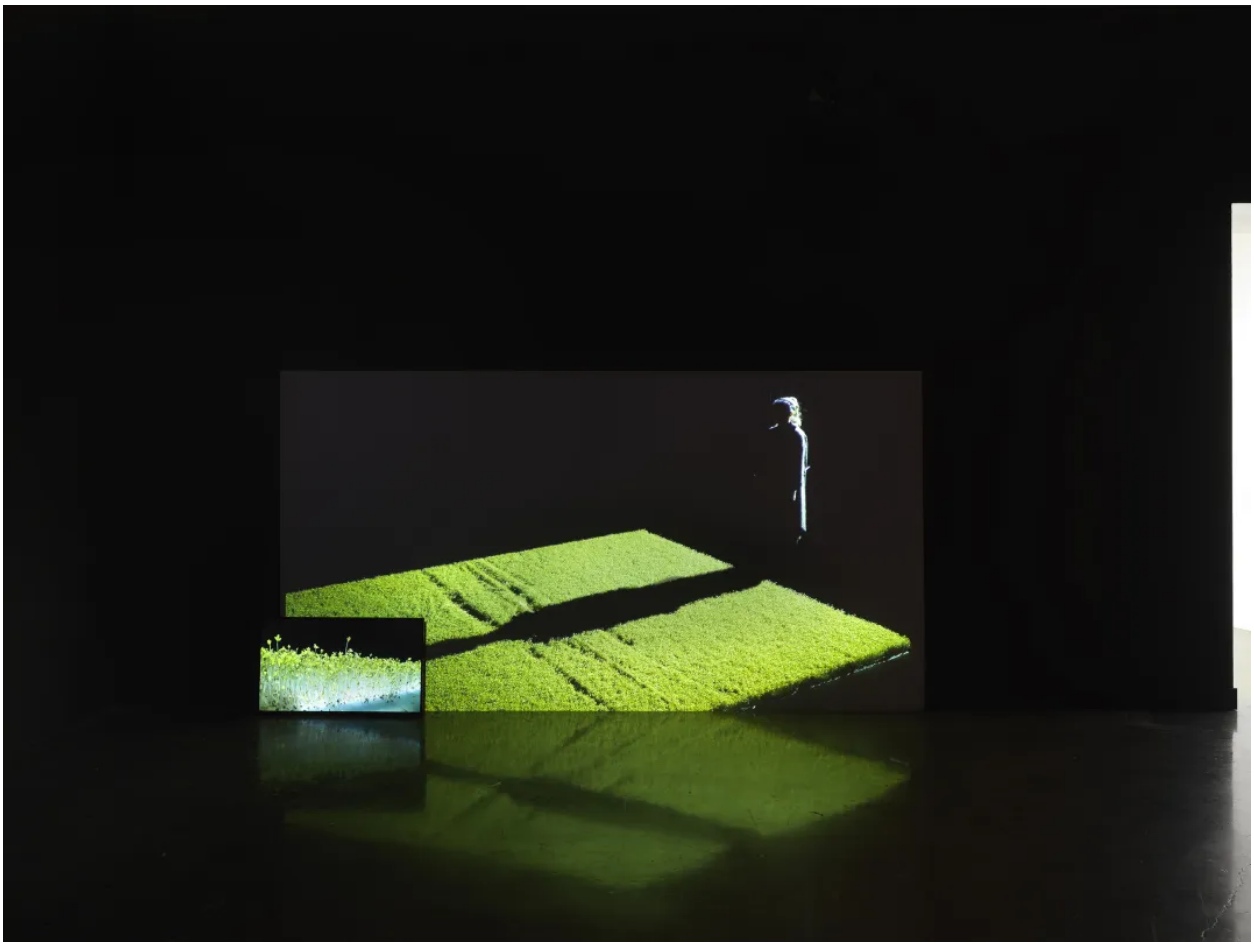

Fig. 17. Špela Petrič, *Skotopoiesis*, 2015, video documentation of Petrič's twenty-hour performance, presented at the MIT List Visual Arts Center as part of the 2022 exhibition *Symbionts: Contemporary Artists and the Biosphere*, photographed by Dario Lasagni. Source: MIT List Visual Arts Center, *Symbionts: Contemporary Artists and the Biosphere*, Hayden and Bakalar Galleries, Cambridge, MA, MIT List Visual Arts Center, 2022, https://listart.mit.edu/exhibitions/symbionts-contemporary-artists-biosphere.

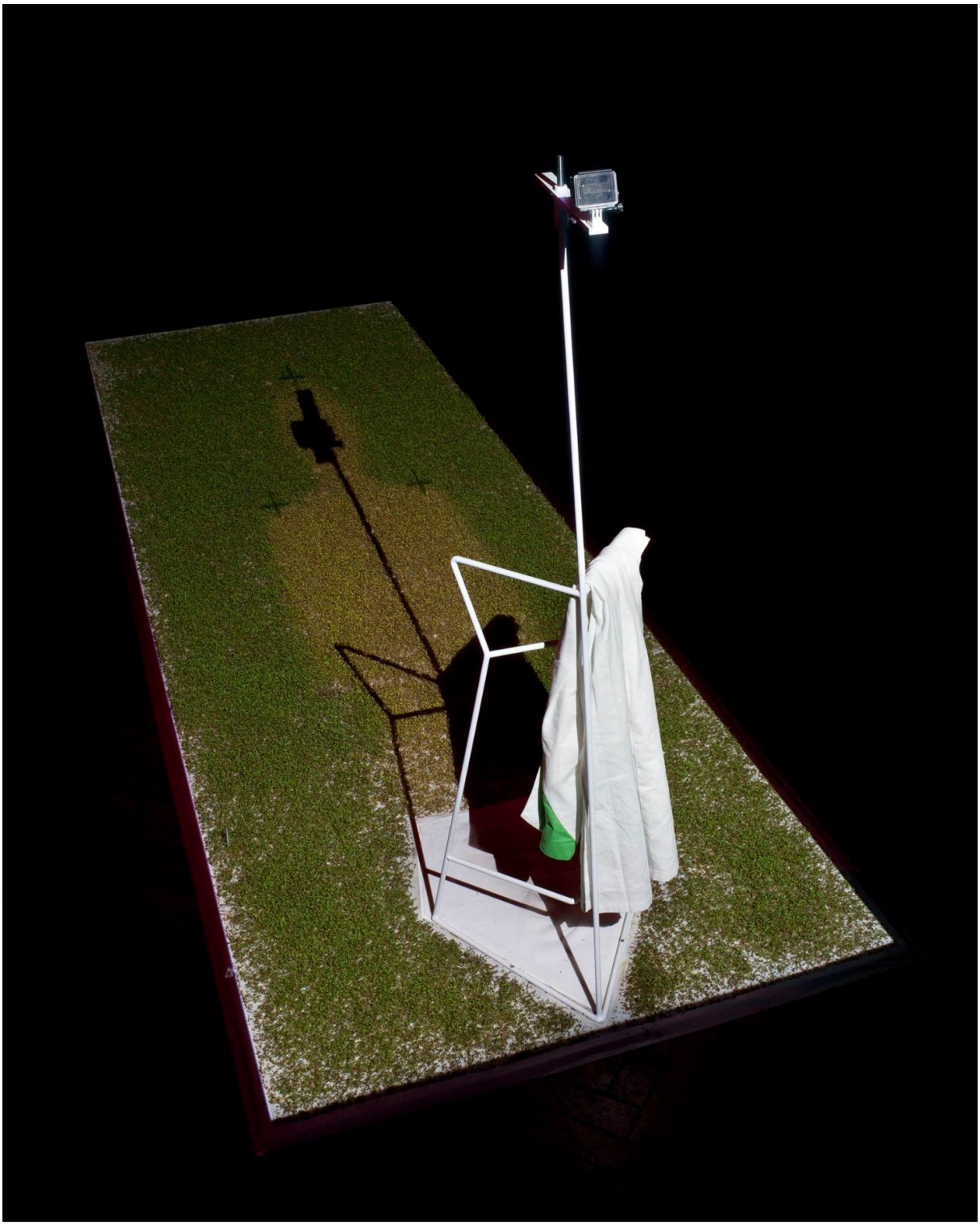

Fig. 18. Špela Petrič, *Skotopoiesis*, 2015, Petrič's silhouette remains visible once the artist walks away from the thale cress at the end of the performance, photographed at Kapelica Gallery, Ljubljana, Slovenia. Source: Špela Petrič, *Confronting Vegetal Otherness: Skotopoiesis*, Špela Petrič Studio, accessed October 10, 2024, https://www.spelapetric.org/#/scotopoiesis/.

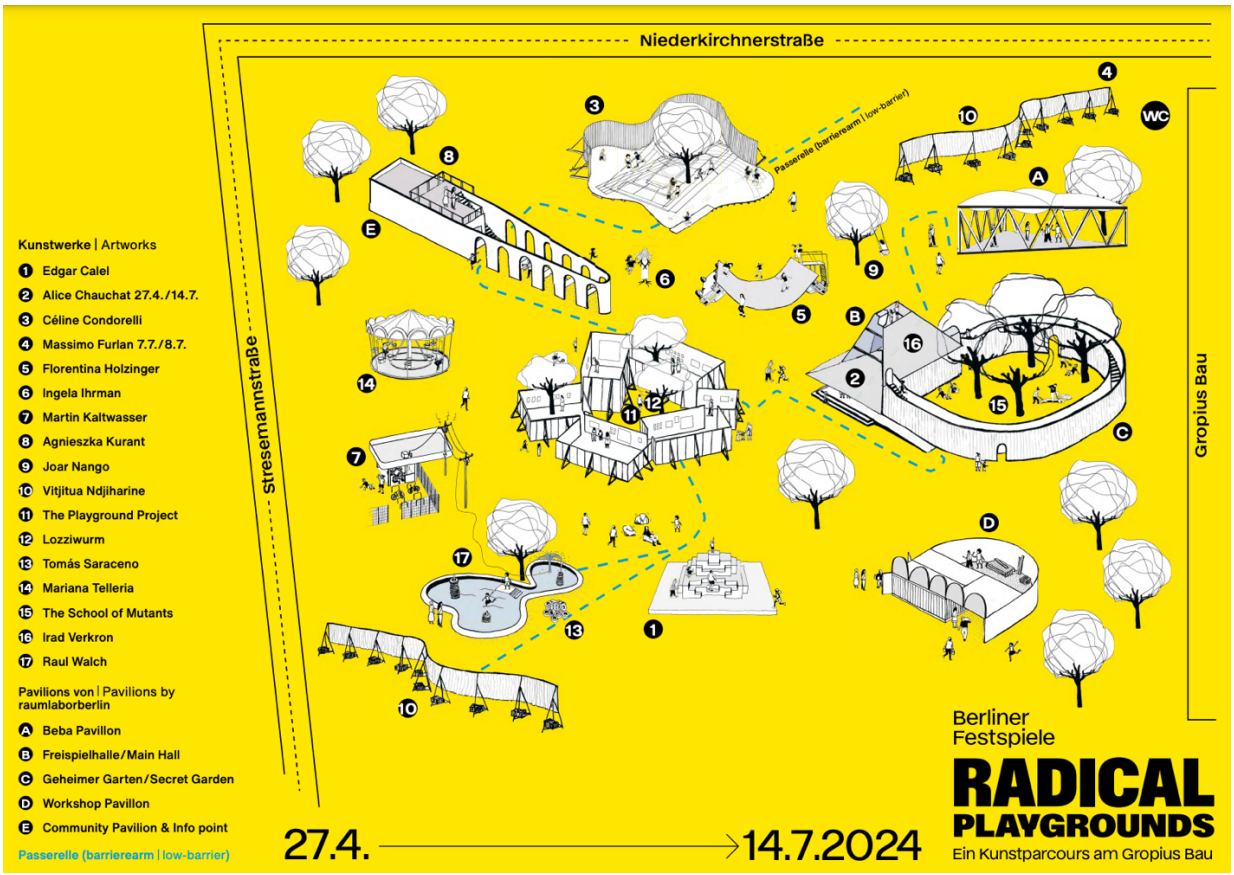

Fig. 19. Berliner Festspiele map with listed locations of the installations within the exhibition (note: Saraceno's *Play-Ground* is number 13). Source: *Radical Playgrounds: From Competition to Collaboration*, Berlin, Berliner Festspiele, 2024, https://www.berlinerfestspiele.de/en/programm/2024/radical-playgrounds.

Fig. 20. Tomás Saraceno, *Play-Ground*, 2024, installation photographed at the 2024 Berliner Festspiele exhibition *Radical Playgrounds: From Competition to Collaboration* in Berlin, Germany. Source: Tomás Saraceno, Tomás Saraceno Studio, accessed October 15, 2024, https://studiotomassaraceno.org/play-ground/.

Fig. 21. Tomás Saraceno, *Play-Ground*, 2024, visitors are encouraged to sit on one of two park benches found within the installation to remove their shoes, photographed at the 2024 Berliner Festspiele exhibition *Radical Playgrounds: From Competition to Collaboration* in Berlin, Germany. Source: Tomás Saraceno, Tomás Saraceno Studio, accessed October 15, 2024, https://studiotomassaraceno.org/play-ground/.

Fig. 22. Tomás Saraceno, *Play-Ground*, 2024, a participant feels the ground with their bare feet, photographed at the 2024 Berliner Festspiele exhibition *Radical Playgrounds: From Competition to Collaboration* in Berlin, Germany. Source: Tomás Saraceno, Tomás Saraceno Studio, accessed October 15, 2024, https://studiotomassaraceno.org/play-ground/.

Fig. 23. Tomás Saraceno, *Play-Ground*, 2024, participants remove their shoes to interact with the installation, photographed at the 2024 Berliner Festspiele exhibition *Radical Playgrounds: From Competition to Collaboration* in Berlin, Germany. Source: Tomás Saraceno, Tomás Saraceno Studio, accessed October 15, 2024, https://studiotomassaraceno.org/play-ground/.

Fig. 24. Tomás Saraceno, *Play-Ground*, 2024, visitors feel clusters of "shakers" that project vibrations, photographed at the 2024 Berliner Festspiele exhibition *Radical Playgrounds: From Competition to Collaboration* in Berlin, Germany. Source: Tomás Saraceno, Tomás Saraceno Studio, accessed October 15, 2024, https://studiotomassaraceno.org/play-ground/.

Fig. 25. Tomás Saraceno, *Play-Ground*, 2024, close-up of a vibrating "shaker," photographed at the 2024 Berliner Festspiele exhibition *Radical Playgrounds: From Competition to Collaboration* in Berlin, Germany. Source: Tomás Saraceno, Tomás Saraceno Studio, accessed October 15, 2024, https://studiotomassaraceno.org/play-ground/.

Fig. 26. Tomás Saraceno, *Play-Ground*, 2024, participants remain still to connect with the inaudible frequencies that resonate throughout the installation, photographed at the 2024 Berliner Festspiele exhibition *Radical Playgrounds: From Competition to Collaboration* in Berlin, Germany. Source: Tomás Saraceno, Tomás Saraceno Studio, accessed October 15, 2024, https://studiotomassaraceno.org/play-ground/.

Fig. 27. Tomás Saraceno, *Play-Ground*, 2024, Saraceno feels the installation's cobblestone ground with his hands, photographed at the 2024 Berliner Festspiele exhibition *Radical Playgrounds: From Competition to Collaboration* in Berlin, Germany. Source: Tomás Saraceno, Tomás Saraceno Studio, accessed October 15, 2024, https://studiotomassaraceno.org/play-ground/.

Fig. 28. Jumping spider (*Evarcha arcuata*), photographed by Marion Friedrich. Image source: https://arthropodafotos.de.

Fig. 29. Garden spider (*Araneus diadematus*). Image source: https://www.inaturalist.org/taxa/52628-Araneus-diadematus.

Fig. 30. Cob-web spider (*Steatoda bipunctata*). Image source: https://bugguide.net/node/view/53253.

Fig. 31. Wolf spider (*Pardosa lugubris*). Image source: https://www.inaturalist.org/taxa/1404316-Pardosa-lugubris.

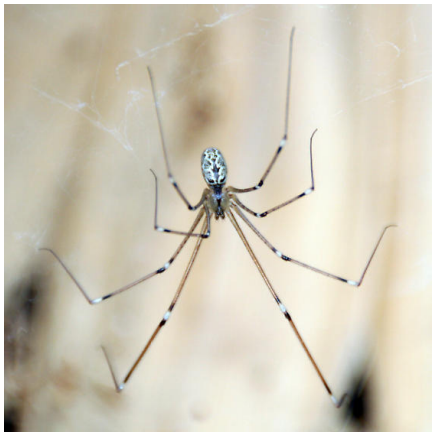

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Fig. 34. Alexandra Daisy Ginsberg, 2020, preparatory drawing by Ginsberg of the proposed Eden Project pollinator garden site. Image source: Pollinator Art, "Commission," 2024, https://pollinator.art/about/commission.

Fig. 35. Alexandra Daisy Ginsberg, *Pollinator Pathmaker*, 2021, horticultural apprentices and landscape students at the Eden Project partake in the planting of the first *Pollinator Pathmaker* edition, Cornwall, United Kingdom, photographed by Steve Tanner. Source: Pollinator Art, "Eden Project Edition, Cornwall, UK, 2021," 2024, https://pollinator.art/gardens/commissioned-gardens/eden-project-cornwall.

Fig. 36. Alexandra Daisy Ginsberg, *Pollinator Pathmaker*, 2021, planting overview of *Pollinator Pathmaker* at the Eden Project, Cornwall, United Kingdom. Source: Pollinator Art, "Eden Project Edition, Cornwall, UK, 2021," 2024, https://pollinator.art/gardens/commissioned-gardens/eden-project-cornwall.

Fig. 37. Alexandra Daisy Ginsberg, *Pollinator Pathmaker*, 2022, digitally rendered overview of eleven planting beds for the Serpentine Edition of *Pollinator Pathmaker*, Kensington Gardens, London, England. Source: Pollinator Art, "Serpentine Edition, Kensington Gardens, London, UK, 2022," 2024, https://pollinator.art/gardens/commissioned-gardens/serpentine-london.

Fig. 38. Alexandra Daisy Ginsberg, *Pollinator Pathmaker*, 2022, mid-summer installation view of three planting beds located at the Serpentine Edition of *Pollinator Pathmaker*, Kensington Gardens, London, England, photographed by Royston Hunt. Source: Pollinator Art, "Serpentine Edition, Kensington Gardens, London, UK, 2022," 2024, https://pollinator.art/gardens/commissioned-gardens/serpentine-london.

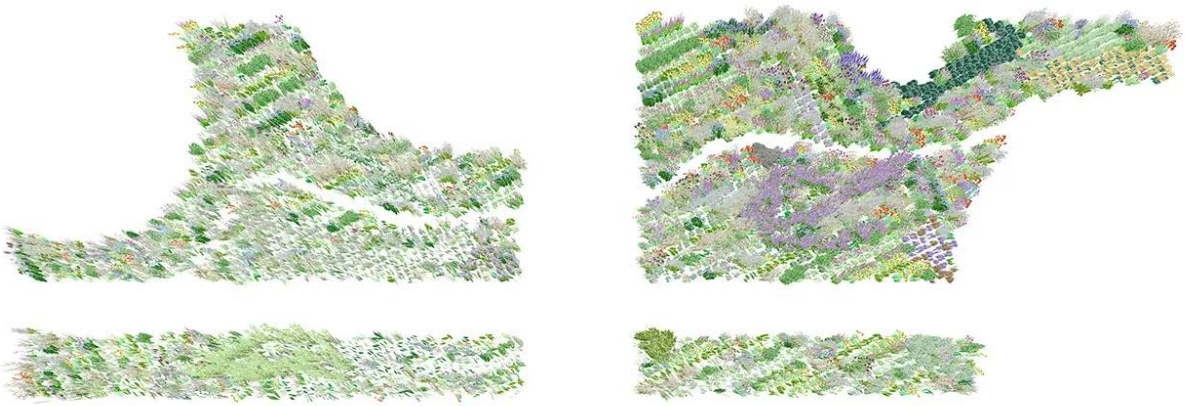
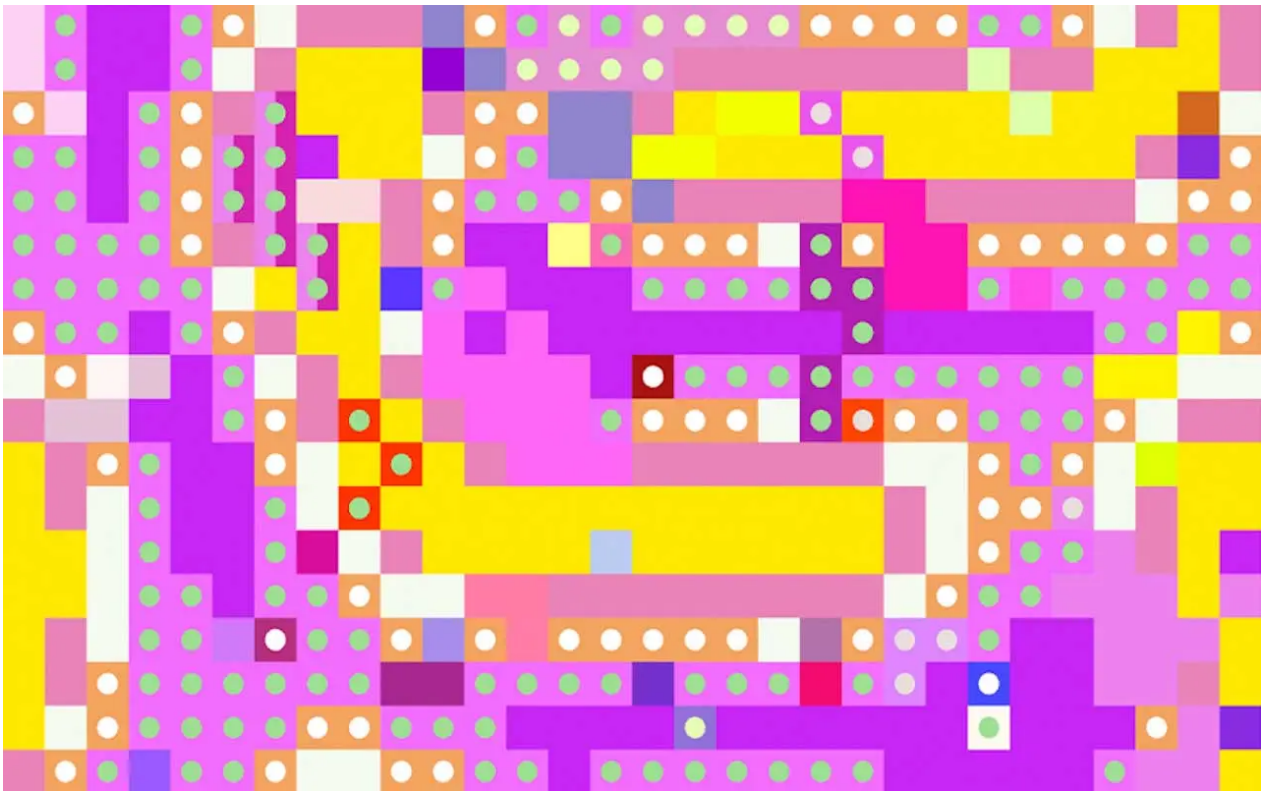


Fig. 39. Alexandra Daisy Ginsberg, *Pollinator Pathmaker*, 2023, digitally rendered planting plan comprising of four distinct flowering beds for the *Pollinator Pathmaker* LAS edition, Berlin, Germany. Source: Pollinator Art, "LAS Edition, Forecourt of the Museum für Naturkunde Berlin, Germany, 2023," 2024, https://pollinator.art/gardens/commissioned-gardens/las-berlin.

Fig. 40. Alexandra Daisy Ginsberg, *Pollinator Pathmaker*, 2023, commissioned by the LAS Art Foundation, the most recent rendition of the *Pollinator Pathmaker* project is located in front of the Natural History Museum in Berlin, Germany, photographed by Frank Sperling. Source: Pollinator Art, "LAS Edition, Forecourt of the Museum für Naturkunde Berlin, Germany, 2023," 2024, https://pollinator.art/gardens/commissioned-gardens/las-berlin.

Fig. 41. Alexandra Daisy Ginsberg, *Pollinator Pathmaker*, 2021, digital rendering of *Pollinator Pathmaker*, Eden Project Edition, Cornwall, United Kingdom. Source: Pollinator Art, "Living Artworks," 2024, https://pollinator.art/about/living-artworks.

Fig. 42. Alexandra Daisy Ginsberg, *Pollinator Pathmaker*, 2021, digital rendering of *Pollinator Pathmaker* [detail], Eden Project Edition, Cornwall, United Kingdom. Source: Pollinator Art, "Living Artworks," 2024, https://pollinator.art/about/living-artworks.



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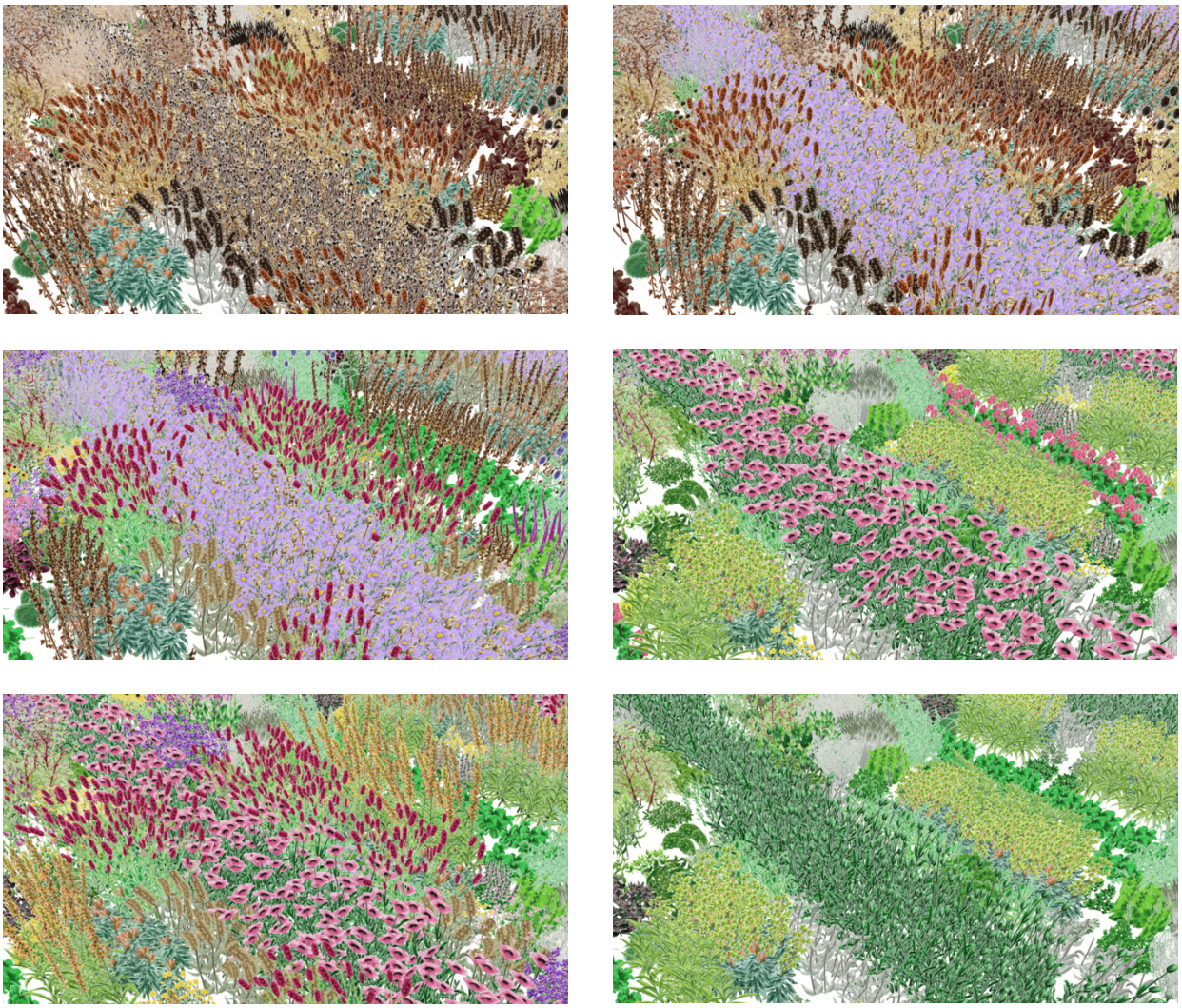

Fig. 44. Alexandra Daisy Ginsberg, *Pollinator Pathmaker*, 2021, algorithmically-generated garden blueprints, digital rendering of the Eden Project's edition of *Pollinator Pathmaker* as the garden transforms throughout the four seasons (the rendering depicts winter, spring, summer, and fall). Source: Pollinator Art, "How it Works," 2024, https://pollinator.art/about/how-it-works.

Fig. 45. Alexandra Daisy Ginsberg, *Pollinator Pathmaker*, 2021–ongoing, *Aster amellus* (left) *Verbascum nigrum* (right), example of two flowering species included in *Pollinator Pathmaker*'s planting palettes, digital paintings by Ginsberg. Source: Pollinator Art, "How it Works," 2024, https://pollinator.art/about/how-it-works.

Fig. 46. Alexandra Daisy Ginsberg, *Pollinator Pathmaker*, 2023, digital rendering of Berlin's LAS edition of *Pollinator Pathmaker* in pollinator vision. Source: Gabrielle Schwarz, "Flower Power," *Outland*. July 14, 2023, https://outland.art/alexandra-daisy-ginsberg/.

Fig. 47. Alexandra Daisy Ginsberg, *Pollinator Pathmaker*, 2021–ongoing, digital rendering of *Pollinator Pathmaker* that demonstrates how pollinator vision alters the artwork's color palette which allows participants to see alternate parts of the color spectrum. Source: Pollinator Art, "Pollinators," 2024, https://pollinator.art/resources/pollinators.

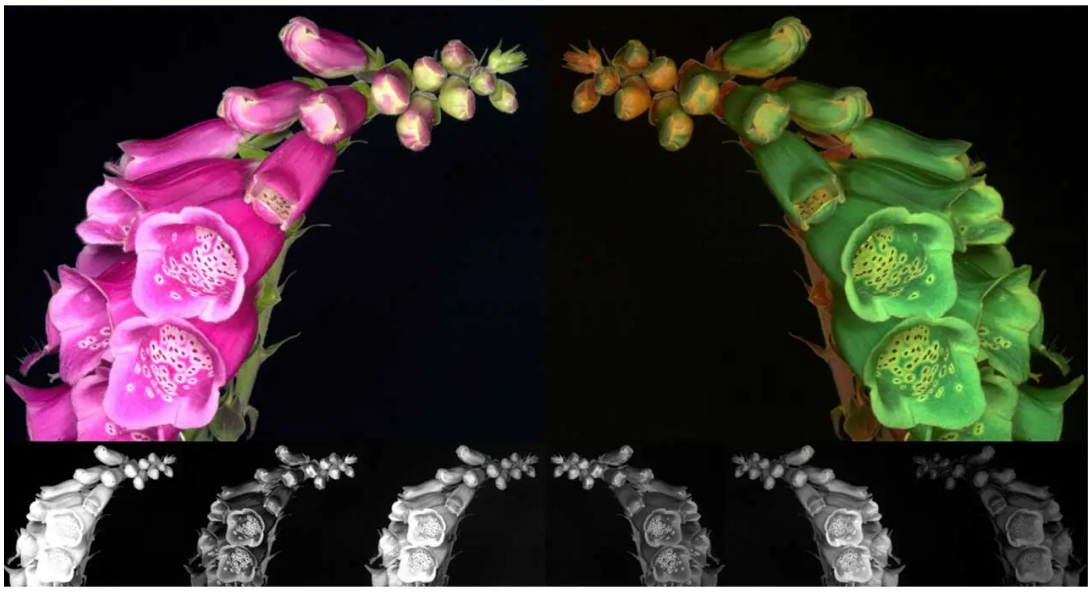

Fig. 48. Alexandra Daisy Ginsberg, *Pollinator Pathmaker*, 2021–ongoing, a flowering foxglove (*Digitalis purpurea*) depicted as perceived by the human eye (left) and through bee vision (right), image courtesy of Jolyon Troscianko. Source: Pollinator Art, "How it Works," 2024, https://pollinator.art/about/how-it-works.

Fig. 49. Alexandra Daisy Ginsberg, *Pollinator Pathmaker*, 2021–ongoing, flowering bugloss (*Echium angustifolium*) appears uniformly purple to the human eye (left), however, bees percieve alternate colors in addition to UV absorbent patches (right), image courtesy of Jolyon Troscianko. Source: Pollinator Art, "Pollinators," 2024, https://pollinator.art/resources/pollinators.

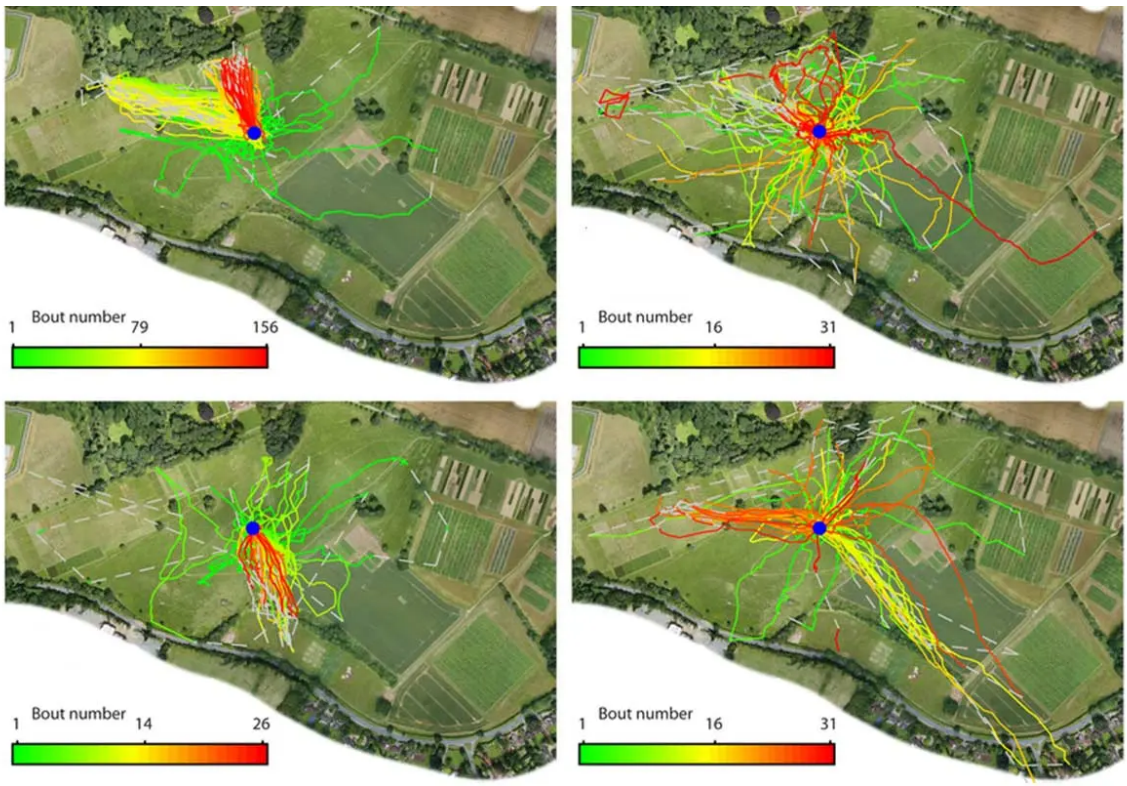

Fig. 50. Recorded flight paths of four different bees. Lars Chittka's research as a behavioural ecologist explores how bumblebees learn to find the shortest flight path between flowering blooms. Source: Joseph L. Woodgate, James C. Makinson, Ka S. Lim, Andrew M. Reynolds, Lars Chittka, "Life-Long Radar Tracking of Bumblebees," *Plos One* 11, no. 8 (August 2016): 4.