



IMAGINATIONS:

JOURNAL OF CROSS-CULTURAL IMAGE STUDIES |
REVUE D'ÉTUDES INTERCULTURELLES DE
L'IMAGE

Publication details, including open access policy
and instructions for contributors:

<https://imaginationsjournal.ca>

Sustainable Publishing

Guest Editors: Brent Ryan

Bellamy, Abigail Fields, Rachel

Webb Jekanowski, Margot Mellet

Image credit:

<https://speculativespace.wordpress.com>

To cite this article:

Shams, Ahmed Tahsin. "Publishing with Tree-Media: Arbo-real Aesthetics, Pedagogical Ruptures." *Imaginations: Journal of Cross-Cultural Image Studies*, Vol. 16, No. 1, 2025, pp. 139-164.

To link to this article: <https://dx.doi.org/10.17742/IMAGE29735>



The copyright for each article belongs to the author and has been published in this journal under a **Creative Commons 4.0 International Attribution NonCommercial NoDerivatives** license that allows others to share for non-commercial purposes the work with an acknowledgement of the work's authorship and initial publication in this journal. The content of this article represents the author's original work and any third-party content, either image or text, has been included under the Fair Dealing exception in the Canadian Copyright Act, or the author has provided the required publication permissions. Certain works referenced herein may be separately licensed, or the author has exercised their right to fair dealing under the Canadian Copyright Act.

PUBLISHING WITH TREE-MEDIA: ARBO-REAL AESTHETICS, PEDAGOGICAL RUPTURES

AHMED TAHSIN SHAMS

In response to the ecological and epistemic crises of the Capitalocene, this paper examines how eco-artist Thijs Biersteker develops tree-media—sensor-driven AI installations that treat trees and fungi not as metaphors or data sources, but as co-authors of environmental knowledge. Through the concept of arbo-real aesthetics, the paper proposes an elemental model of publishing rooted in multispecies reciprocity, latency, and refusal. Biersteker’s installations resist extractive AI paradigms by staging alternative epistemologies grounded in vegetal sensing, seasonal rhythms, and symbiotic time. Analyzing six installations produced between 2018 and 2024, the paper theorizes how these works enact a compostable media logic—one that unsettles mastery and reimagines publishing as a sensory, ethical, and relational process. Rather than offering techno-utopian solutions, the installations inhabit the Promethean paradox: they critique digital extractivism while operating within its constraints. As a prescriptive intervention, the paper introduces *Listening with Trees*, a three-day pedagogical prototype that speculatively translates these insights into multispecies publishing practices. By publishing with trees—through slowness, decay, and co-authorship—this model offers a low-carbon, speculative alternative to academic and AI-driven knowledge systems in the age of the Chthulucene.

INTRODUCTION

“Trees are nature’s record keepers. They document their lives through annual growth rings hidden behind their bark, and for those that know how to read this arboreal script, the rings tell a detailed story.” — Thijs Biersteker, Voice of Nature

Trees inscribe ecological memory silently—encoded not in language but in time, temperature, and water, registering planetary changes through material growth. This arboreal metaphor, derived from Thijs Biersteker’s *Voice of Nature*, furnishes an access route into this article’s investigation: how environmental knowledge might be co-authored, translated, and mediated through digital systems involved in extractive processes such as energy-intensive sensors with servers contributing to resource depletion?

Ecological crises in the Anthropocene have exposed the limits of dominant media infrastructures—systems that privilege human-centred narratives while operating through energy-intensive technologies that contribute to the very degradation they document. Digital platforms, often perceived as immaterial, rely on rare-earth mining and resource-intensive AI models, along with sizable server farms that consume water and electricity at rates comparable to those of small cities. Grandinetti and Ingraham depict this dynamic through media extractivism, where platforms reproduce colonial and petro-capitalist logics (2021, 101-3). For example, Google’s server farms consume over 4 billion gallons of water annually—comparable to 29 golf courses (Hölzle)—while the mining of cobalt and lithium for AI technology causes severe ecological and human harm in places like the Congo and Chile (“Forced Evictions”). Similarly, academia’s reliance on fossil-fuel-funded grants often skews research toward industry-friendly narratives (Harrabin).

These extractive operations are not confined to Silicon Valley. The academic sphere, too, is embedded in what Elliot et al. call “oily entanglements”: carbon-intensive archival travel, fossil-fuel-funded research grants, and high-emissions publishing infrastructures (2022).

Donna Haraway, drawing from Malm and Moore, reframes the Anthropocene as the Capitalocene—highlighting capitalism’s relentless extraction of “cheap nature” and multispecies futures (Haraway 100). The Anthropocene frames environmental crises as those caused by generalized human activity; however, the Capitalocene particularly highlights capitalism’s systemic extraction as well as exploitation of natural resources and labour. Conversely, Haraway’s Chthulucene suggests a contrasting model. It accentuates multispecies entanglements, collaboration, and kinship, positing these as survival methods that exceed capitalist extraction. For instance, in Biersteker’s installation *Symbiosis*, trees’ metabolic stress data visualize ongoing relational networks, illustrating Chthulucene entanglements, not merely as passive victims, but as active participants co-creating ecological narratives.

Chthulucene is defined as a compound of Greek roots: “khthôn” (earth/ground, evoking underworld powers and depths) and “kainos” (now/a time of beginnings, freshness, and open questions) (Haraway 2). It is a “kind of timeplace for learning to stay with the trouble of living and dying in response-ability on a damaged earth” (ibid.). Haraway stresses it is about “symchthonic forces” (earth-bound collaborations) where humans are part of dynamic powers for flourishing, not dominance (101). She asserts: “the earth of the ongoing Chthulucene is sympoietic, not autopoietic” (33). This means it is a collaborative, making-with system (sympoiesis) involving all beings, rather than self-contained or automatic (autopoietic) processes. It is a framework for “intense commitment and collaborative work and play with other terrans [Earth beings]” for possible flourishing, not a return to paradise (101). So, Chthulucene focuses on “attentive practices of thought, love, rage, and care” amid damage, without cynicism or defeatism (56).

I adopt the term arbo-real (with hyphenation) from Selmin Kara’s 2024 conference paper “The Roots of Contingency: Documenting the Arbo-real,” where she proposes a mode of arboreal mediation in cinema that privileges continuity, contingency, and vegetal presence over representation. However, in this article, I present the notion of “arbo-real aesthetics” to articulate an artistic construct that unifies “ar-

bor” (Latin for tree) with “real” (stressing genuine or hyper-real experiences) as it fabricates engaging installations where living trees and real-time environmental data become dynamic participants in art. The hyphen functions as a compound modifier, signaling a hybrid unity: an aesthetics rooted in tree-like authenticity, rendering ecological media tactile and immersive rather than abstracted. Yet, this punctuation enacts a “rupture” in language itself—mirroring the article’s pedagogical disruptions—by imposing a pause that compels reflection on the blend, akin to how Biersteker’s interfaces stall human mastery. Without the hyphen, “arbo real” fragments into duality, risking anthropocentric separation. By contrast, a one-word merger like the existing “arboreal” (meaning “tree-related”) or an invented variant would collapse the roots seamlessly, diluting the pun on “real” and evoking botanical connotations over Chthulucene disruption; it risks autopoietic unity, implying harmonious resolution that contradicts relational uncertainty and “staying with the trouble” (Haraway 1-7). With the hyphen, the term instead embodies sympoiesis, a collaborative forging that invites ethical diffraction across human and nonhuman realms. This linguistic entanglement advances Chthulucene inquiries: How might such hyphenated forms “publish” relational uncertainty, composting words into regenerative cosmograms for multispecies flourishing?

For instance, in Biersteker’s *Voice of Nature* (see figure 1), arbo-real aesthetics manifests as a living tree equipped with sensors monitoring pollution readings every second, translating the tree’s physiological responses into expanding and contracting digital rings projected on a halo-like screen (Biersteker, *Voice of Nature*). This not only visualizes air quality impacts in real-time but also invites viewers to touch the tree, altering the rings’ patterns and demonstrating that individuals can change the environment. Therefore, abstract climate data becomes a tactile interactive reality. I see Biersteker’s broader array of eco-art works—like *Xylemia*, *Symbiosia*, *Fungal Faculty*, *MB>CO₂*, *Wither*—as imaginative blueprints for a sympoietic form of publishing yet to fully emerge: vital repositories tuned to the pulse of ecosystems, from the ebb and flow of sap to the cadence of seasons, the ups and downs of contamination, or the sway of carbon levels, all



Figure 1. "Voice of Nature" by Thijs Biersteker, installation at Chengdu, China in 2018.

Partner: Netherlands' Delft University of Technology; Production: Woven Studio;

Producer: Sophie de Krom.

beyond our urge to dominate. (Here, "sympoietic"—Haraway's term for collaborative "making-with" others—should not be conflated with "sustainable," which often implies a stabilizing of existing systems rather than the radical, multispecies entanglements that embrace decay, renewal, and uncertainty.)

John Durham Peters's conceptualization of the sky as a cosmogram—a natural, ambient map representing the universe's structure through patterns like stars and weather (172)—provides a convincing parallel for interpreting trees as similarly ambient maps in eco-art installations. Just as the sky's ever-changing visuals serve as a "diagram" of cosmic order and disorder, blending navigation tools such as compass and calendar into a speculative representation of planetary entanglement (173), trees in Biersteker's works map these ecological rhythms as dynamic cosmograms of human-nature interconnections. This common thread is rooted in Peters's elemental media philosophy, in which both sky and trees function as non-human "publishers" of uncertainty, turning natural elements into immersive, relational blueprints without fixed boundaries.

I interpret this dynamic as an apedagogical practice, discussed by Steven Swarbrick and Jean-Thomas Tremblay as “negative life,” a form of media engagement that unravels traditional, didactic approaches to knowledge, emphasizing unlearning human-centred ways of seeing the world (18). This “negative life” takes existential contradiction—between individual continuity and planetary viability—as a generative condition for thought, rejecting mastery in favor of sensorial disorientation and epistemic fracture (4-5). Trees “publish” ecological rhythms not as fixed archives but as ephemeral yet enduring loops. Wendy Hui Kyong Chun describes this dynamic as one of precarious persistence, where continuity depends not on static storage but on constant repetition and regeneration—a process “as destructive as it is as constructive” (87). Biersteker’s works enable viewers to confront ecological fragility without narrative closure, as fleeting data (e.g. sap flow) regenerates cyclically, sustaining bare vitality amid extinction.

Instead of presenting data as a form of ecological control, these works foreground the volatility and fragility of vegetal responses, which are usually invisible to human perception. Alexander R. Galloway describes such interfaces not as transparent windows but as thresholds—zones where mediation actively shapes meaning rather than merely conveying it (25-32). Anne Friedberg explains that traditional media frames, rooted in Renaissance optics and Alberti’s metaphor of the window, structured visual experience through linear perspective and a fixed point of view (3-5). Biersteker departs from this convention: installations entangle viewers directly within non-human temporalities.

Critics might argue that eco-art contributes to the very climate catastrophe it critiques. But the question is no longer simply “to be or not to be”—a false binary of presence or withdrawal. Instead, as Haraway reminds us, the urgent task is to cultivate “response-ability on a damaged earth” (2): a relational form of survival rooted in entangled care. Biersteker’s regenerative aesthetics confront this paradox head-on. His installations may also rely on resource-intensive infrastructures that contribute to the environmental degradation they visualize. For instance, *Symbiosia* makes this tension explicit: it us-

es real-time projections of tree ring growth data to reveal climate stress, yet the process itself depends on constant power consumption. In this way, the work does not resolve but inhabits what David Macauley calls the Promethean paradox (40-42), fostering ethical attention without techno-utopian escape. Biersteker's installations invite a multispecies publishing ethic via refusal of resolution, an ethic based in relational uncertainty in which viewers, sensors, and trees participate within continuing ecological witnessing acts. They stage an apedagogical encounter—a scene emptied of moral insight, where viewers are denied narrative resolution or ethical instruction (Swarbrick and Tremblay 18).

Biersteker's *Wither*, presented during COP16, featured unsettling clicks as a soundtrack, with each one marking the real-time flicker and vanishing of digital leaves, synchronized with live deforestation data. These sensory cues transformed abstract statistics into embodied discomfort, prompting delegates to pause and reflect amid policy negotiations (Biersteker and Bandelli). These installations do not deliver clear messages or moral lessons; they create perceptual standstills, where the viewer is held between beauty and unease. Such moments unsettle human-centred assumptions and invite ethical reconsideration. As Biersteker and Bandelli argue, eco-art can help decision-makers imagine new responses—not through instruction, but through affect.

These affective disruptions can be read pedagogically, not as structured lessons, but as invitations to unlearn habits of mastery and control. Clate Korsant describes pluriversal education as a process of learning-with difference: an embodied decentring of the human that foregrounds plural ways of sensing and knowing the world (371-373). Biersteker's installations enact this through interfaces that provoke physiological entanglement. This is a “pedagogy of discomfort,” a term borrowed from Megan Boler: one that resists the smooth legibility of neoliberal eco-interfaces and foregrounds ecological interdependence as vulnerable, situated, and incomplete (Boler 175-199).

To clarify, the “pedagogical ruptures” of my title allude to deliberate breaks or disruptions within the customary, human-centred edu-

cational model. They create opportunities to enable transformative learning via challenging established norms and fostering new relational dynamics with the environment. Drawing from Sharim Hannegan-Martinez's work on "seeds of resistance" in urban education, these ruptures manifest as moments in which conventional teaching hierarchies are inverted, allowing for activist, embodied experiences (Hannegan-Martinez et al. 2070-2077). This ruptures passive observation by turning the viewer into an observer of dynamic effects—e.g., proximity allowing real-time witnessing of environmental impacts—thus shifting from didactic instruction to experiential accountability and prompting reflection on collective impact (Griffiths).

This pedagogy of embodied unlearning takes shape in Biersteker's installations, which also function as epistemic traps in the sense described by Alberto Corsín Jiménez: recursive, environment-making devices that capture and redistribute relations, like spiderwebs that both entangle and mediate ecological intelligences (62-66). This resonates with Mario Blaser and Marisol de la Cadena's concept of the pluriverse: a world where nature is not singular or universal, but composed of many ontologies that coexist without convergence (4). Rather than offering a unified narrative, these works stage encounters through partial translation—interfaces that maintain difference while enabling relation.

These installations imagine not just aesthetic alternatives, but ethical infrastructures for multispecies publishing in the Capitalocene. Robin Wall Kimmerer deepens this vision through a "grammar of animacy"—a Potawatomi linguistic ethic that recognizes plants and other nonhumans as sentient kin, requiring a shift from control to conversation (55). In Biersteker's installations, this animacy becomes interface: trees are not subjects of representation but communicative partners.

My exploration proceeds through three interwoven orientations. First, it offers detailed readings of Thijs Biersteker's eco-art installations to examine how sensor-based tree-media reshape environmental witnessing through elemental aesthetics. Second, it speculates on

alternative pedagogical and publishing frameworks grounded in latency, refusal, and multispecies relationality. Third, it composts these insights into a flexible, three-day workshop model—*Listening with Trees*—designed as a prescriptive yet open-ended intervention that educators can integrate into existing curricula. Rather than prescribing closure, the prototype invites experimentation, unlearning, and sympoietic drift across disciplinary boundaries.

BIERSTEKER'S TREE-MEDIA IN THE CHTHULUCENE

"I had still not managed to become a tree. But I had at least become its shadow."

—Sumana Roy (81).

With this quiet confession, Sumana Roy shifts from human-centred views to a partnership with plants, creating equal bonds between bodies, shadows, and light. Her idea of "tree time"—a slow, thoughtful pace that pushes back against rushed industrial life (62, 221)—sets an emotional and conceptual stage for analyzing Biersteker's installations as sympoietic media that cultivate relational unlearning amid ecological tensions. Roy's thoughts on tree shadows as raw, outsider art and ancient trees as living landmarks encourage a careful attention that unlearns fast-paced, human-dominated habits of speed, ownership, and easy understanding. Yet, this creates a useful tension: if Roy's "tree time" defies quick readability and human-driven speed, Biersteker's installations treat trees as natural record-keepers—channels for breath, growth, and air that capture environmental changes not through clear symbols but through what Peters describes as the elemental expressiveness of media such as clouds and sky—world-shaping textures that register planetary presence through variability, circulation, and sensory atmosphere (Peters 386-87). Biersteker's sensor-powered setups convert plant cycles into digital displays, making hidden ecological info approachable while keeping the mystery and incompleteness of nonhuman viewpoints.

Exploring Biersteker's arboreal installations as "tree-media" in the Chthulucene offers a progressive method for publishing with trees

that challenges knowledge control. By tree-media, I mean artworks where trees are not just symbols but sensing partners and story co-creators; they are tech-supported while still resistant to total comprehension, defying thorough decoding and neat conclusions. Unlike bio-art, which tweaks biology or displays living things, or data art that highlights number visuals, this arboreal-media singularly presents trees as animated narrative-formers with natural messages shaping creative outcomes, which distinguishes it from other forms, such as bio-art or data art. “Arbo-real aesthetics,” then, captures the wider sensory approach in tree-media, spotlighting gradual plant paces and knowing styles that shake up human-focused timing and sight, welcoming a humbler eco-awareness.

Biersteker’s tree-media can be framed as a negotiation between time-biased and space-biased communication forms in the Capitalocene (Innis 33-60). Time-biased media, such as the arboreal ‘scripts’ of growth rings, prioritize durability, relational depth, and multispecies continuity over centuries—fostering stability and ethical entanglements akin to Haraway’s Chthulucene (ibid., 33-34). In contrast, the space-biased elements of sensor-driven AI installations enable wide dissemination and real-time interaction across geographies, yet risk reinforcing extractive logics through energy-intensive infrastructures. By hybridizing these biases, Biersteker’s works exemplify a sympoietic publishing model that resists the “obsession with space” in digital media while harnessing arboreal time for regenerative knowledge practices (ibid., 60).

To examine how Biersteker’s eco-art constructs a theory of multi-species publishing and elemental aesthetics, this chapter analyzes six installations spanning 2019 to 2024. These works were selected not to be exhaustive, but because they trace a deliberate arc from individual vegetal witnessing to distributed, ecosystemic intelligence. Grouped by conceptual focus—air (*Voice of Nature*), sap and internal stress (*Xylemia*), networked roots and symbiosis (*Symbiosia*), deforestation and climate grief (*Wither*), digital infrastructure critique (*MB>CO₂*), and fungal-AI entanglement (*Fungal Faculty*)—the sequence maps a progression from surface-level sensory mediation to deeper, inter-species epistemologies. Each installation expands the question of

what it means to “publish” in a post-extractive world and stages refusal, latency, and co-authorship in distinct aesthetic forms. The selection, therefore, is not about chronology or scope, but about modeling a nonlinear pedagogy that composts extractive publishing through arbo-real media.

The first of these works, *Voice of Nature* (2018), transforms a living tree into a responsive atmospheric interface. Exhibited in Chengdu—a city facing critical levels of air pollution—the installation was developed in collaboration with scientists from Delft Technical University. A living tree was equipped with twelve environmental sensors that collected over 12,000 data points on pollutants, CO₂ levels, temperature, moisture, photosynthesis, and growth patterns. From these, 1,600 real-time data points were used to generate a continuous visualization of the tree’s wellbeing as digital rings, updated every second instead of every year (Biersteker, *Voice of Nature*). Rejecting linear narratives of redemption, the halo-rings expose pollution’s immediacy as urgent alerts, resistance to anthropocentric delay, and relational entanglements where staying with the trouble becomes a method of survival in the Chthulucene.

Shifting inward from this atmospheric urgency, *Xylemia* (created for Ruinart Carte Blanche 2024 in Reims, France) shifts to internal vegetal time—the slow, often invisible rhythms by which plants endure and respond to environmental stress. Embedded in a sculptural form made from sustainable materials, sensors track sap flow within the tree and translate drought stress into a real-time visualization that climbs the trunk. The movement resembles blood flowing through human veins, drawing attention to the shared vulnerability of vegetal and human bodies (Biersteker, *Xylemia*). Viewers witness each of the tree’s metabolic processes that include the sap flow that then responds to environmental conditions, but receive absolutely no explicit guidance. This apedagogical approach is evident in how participants confront the rupture, unlearning assumptions of human control over nature without gaining a solution, as seen in audience reflections from similar installations like *Voice of Nature*, where one

young viewer noted that the tree “gets angry if a lot of cars are smoking” (Chaisson).

Nature is not a seamless puzzle; it is a messy web where differences create strength, as seen in ecosystems where plants and fungi exchange nutrients without becoming one entity. Such eco-arts redefine education as humble and adaptive, countering human-centred arrogance that worsens climate issues—partial relations encourage us to “stay with the trouble” (Haraway 2), building sustainable alliances amid uncertainty, rather than false harmony. *Symbiosia* brings these threads together—melding growth data, environmental rhythms, and speculative interfaces into a vegetal archive of lived stress. Developed for the 2019 “Trees” exhibition at Fondation Cartier, Paris, two trees outfitted with sensors generate second-by-second ring formations based on fluctuating data, including air quality, temperature, photosynthesis, and moisture (Biersteker, *Symbiosia*). Biersteker describes this system as revealing “the symbiotic relationship of trees and their communication in times of climate change” (ibid.). The installation does not translate environmental knowledge into anthropocentric terms; rather, it composites temporal data into layered, speculative traces. This speculative layering does not seek full legibility, but cultivates a kind of ethical diffraction across species, technologies, and tempos.

In *Symbiosia*, rings of light translate climatic stress into legible pulses, derived from sensors that “listen” to internal growth rhythms—rendering vegetal life audible without totalizing it. This gesture aligns with what Kimmerer calls the “Honorable Harvest,” a guide for ethical engagement grounded in restraint, reciprocity, and gratitude (175–201). Rather than erasing extractive contradictions, these works model a speculative publishing-with—a co-authored practice of listening, witnessing, and staying with the trouble of ecological entanglement. The tree’s growth rings in *Symbiosia*, historically used to date forests or register drought, now become moving images—celestial inscriptions in vegetal form. It echoes Eduardo Viveiros de Castro and Deborah Danowski’s argument for resisting premature “cosmopolitical unification,” where true learning—especially in interspecies or cross-world contexts—emerges not

through synthesis or consensus, but through the fragile coexistence of divergent lifeways and conflicting ontologies (178).

Yet this speculative gesture does not escape inscription's imperial residues. Publishing, even here, remains bound to histories of inscription as control. As Peters notes, writing is a "power technology"—dependent on substrates like stone, papyrus, or silicon and on hidden infrastructures of forestry, energy, and vision—that binds futurity to imperial logics of order, from Caesar's census to metadata colonialism (278-279).

Scaling from relational networks to critiques of deforestation and digital complicity, *Wither* (2019) is a digital rainforest in which leaves vanish in real time—"every second, ten leaves disappear, with each flicker signifying the loss of 1280 square meters of rainforest" (Biersteker, *Wither*). Powered by live deforestation data, the piece transforms into what Biersteker calls a "living monument" (ibid.). Created during a 71% spike in deforestation amid COVID-19 lockdowns, and developed with fashion brand Daily Paper (ibid.), *Wither* critiques the Capitalocene while running on the very infrastructures it questions. This paradox mirrors Mark Allwood's "accidental sculptures" at Toronto's Leslie Spit—rubble twisted into feral forms that "juxtapose a degraded and discarded city with fertile and vigorous ecology" (Allwood 29, 38)—where human waste seeds multispecies resurgence, challenging eco-art to witness without resolution. Can such interfaces foster relational ethics without veiling the scars of the Capitalocene? And who, ultimately, is invited to feel these entanglements—the institutions that host them, or the communities they represent? Rather than resolving these tensions, the work holds them open, offering not harmony but speculative, sympoietic futures.

Further interrogating the Capitalocene's hidden costs, *MB>CO2* (2022) makes the invisible carbon footprint of digital life palpable by releasing real CO₂ into a sealed terrarium each time a viewer initiates an online action—streaming, video calls, or NFT trades. Housed in a sphere built from recycled steel and powered by a low-energy processor, the work visualizes emissions in real time, translating seemingly weightless activities into visible plant stress. With each

data-triggered puff, viewers witness the slow suffocation of flora, exposing the ecological cost of our virtual habits (Biersteker, *MB>CO₂*). Unlike Biersteker's vegetal interfaces that foreground sympoiesis through tree rhythms, here the algorithm acts as a Galloway's threshold—an active gateway that mediates between systems by opening passage and shaping interactions rather than serving as a transparent window (31)—for partial translations between human actions and planetary responses, compelling viewers to linger in the apedagogical disorientation of watching flora suffocate under their own virtual footprints. This sensor-based ecosystem literalizes what Biersteker calls “making complex problems smaller,” shrinking planetary-scale emissions into an intimate, apedagogical moment of friction (Biersteker, *MB>CO₂*). Rather than offering solutions, *MB>CO₂* confronts audiences with its criticism of digital extractivism while operating within it, relying on data infrastructure and industrial CO₂ emissions.

Finally, as tree-media extends underground, *Fungal Faculty*, commissioned by Vrije Universiteit Amsterdam, combines old mycelial intelligence and adaptive Artificial Intelligence, allowing it to question human cognition hierarchies. At first, viewers guide the system by using a depth sensor and a light grid, but they soon lose control because the installation takes over. Developed with Prof. Dr. A.E. Eiben's Computational Intelligence research group and constructed from recycled steel and 3D-printed plastics, the work blends regenerative material ethics with technological critique (Biersteker, *Fungal Faculty*). Biersteker frames this shift as a call toward “reimagine humanity's place in the intelligence hierarchy,” and it replaces autopoietic control with sympoietic entanglement (ibid.).

The installation mirrors Anna Lowenhaupt Tsing's fungal assemblages, where intelligence thrives in precarity, not control (Tsing 23-29). Participants confront systems that adapt unpredictably, because those systems demand they unlearn control as well as linger within an apedagogical impasse that is decentralized, unsettling, and alive (Vera). *Fungal Faculty* opens speculative futures, posing the question of whether fungal epistemologies—rooted deeply in multi-species reciprocity rather than simple domination—might then seed

ethical AI, and how their pedagogical roots may cultivate even more entangled, decolonial ecologies. Across these case studies, I ask: What does it mean to publish with trees in a time of ecological exhaustion? And how might such practices reframe pedagogy not as instruction, but as modes of dwelling with fragility?

“ARBO-REAL” FUTURES IN PEDAGOGY AND PUBLISHING

The existing models of scholarly publishing, especially within environmental media and the digital humanities, remain deeply entangled with extractive operations. Whether in the energy-intensive infrastructures of online journals or the metrics-driven frameworks of AI-assisted platforms, these systems reproduce the ongoing colonial exploitation and erasure of Indigenous epistemologies that Zoe Todd critiques as inherent to Euro-Western academia (7-8) because they extract value from Indigenous thought while denying reciprocity to Indigenous peoples and their relations with land and nonhumans. Artificial intelligence is not a neutral abstraction but a system rooted in planetary-scale depletion, from lithium mines located in Nevada to e-waste sites in Ghana (Crawford 26-32). Such operations, far from accidental, encode and sustain “homogenizing universals” that prioritize optimization over pluralism (Korsant 371).

Against this backdrop, Biersteker’s installations propose a critical reimagining of publishing and pedagogy. Rather than treating AI as a translator of nonhuman signals into legible human data, these installations configure it as a co-listener within a multispecies archive. Sensors respond to both human biometrics and plant rhythms, creating an interface that adapts, rather than dominates. The system does not seek to “speak for” the tree; it listens with the tree, participating in what Laura McLauchlan calls a “non-heroic” conservation practice that privileges relational duration over technological triumph (141).

Such tree-rooted co-authorship aligns with what Wendy Hui Kyong Chun names “enduring ephemerality”—the internet’s logic of update and decay, in which platforms promise permanence through continual degradation (15). But arbo-real publishing, as imagined through

Biersteker's installations, does not overwrite past versions. It composts them. Each data ring, sap reading, or visual pulse is not a replacement, but a resonance—what Chun might contrast to the “epistemology of outing,” where revelation becomes spectacle (150-52). Here, revelation is refusal: a refusal to stabilize, to resolve, to instruct. Instead, these interfaces metabolize data into latency, breath, and partial witnessing. They reject the extractive demand for visibility and instead cultivate a pedagogy of inhabitation and lingering.

The significance of this model becomes clearer when placed in tension with dominant AI-enhanced academic infrastructures. Citation tracking algorithms, machine-assisted peer review, and editorial platforms simulate objectivity while relying on resource-intensive data centres and invisible global labour. Crawford critiques these systems as perpetuating the illusion of digital weightlessness, obscuring their material dependencies and extractive foundations in planetary resources and exploited labour (117-18). Publishing with AI, under these conditions, risks deepening ecological harm while proclaiming sustainability. Yet Biersteker's installations turn this paradox on its head: its digital architecture exposes its entanglement with arboreal life, visibly tethering updates to tree respiration and environmental rhythms.

This redefinition of interface—from output machine to co-regulative membrane—extends beyond pedagogy. It signals a radical departure from the idea of publishing as a product. Instead, Biersteker's installations invite us to think of publishing as an atmospheric duration, a sensorial practice shaped by cohabitation and uncertainty. They propose what Tsing calls the “arts of noticing”—subtle, multispecies rhythms that evade metrics but matter ecologically (17-25). If JSTOR and Project MUSE, for instance, flatten knowledge into linear, paginated files, Biersteker's eco-arts offer something else: a breathing interface inseparable from its living source.

This model carries direct pedagogical implications. As Osgood et al. write, arboreal methodologies resist the idea of nature as a “separate space” and instead insist on entangled and accountable co-becoming (115). Translating this into academic publishing means re-

thinking value itself. A nonhuman publication agreement, for example, might take the form of plantable documents, biodegradable media, or sensor-driven archives that update through seasonal changes. Such formats are not utopian fantasies—they are already emerging through experimental infrastructures, such as Biersteker’s.

What these installations offer is not an escape from technology, but a rescripting of its purpose. Publishing, in this vision, becomes a durational act of multispecies co-authorship—formed through spore logic, fungal latency, and vegetal time. Rather than accelerating knowledge flows or rendering nature legible, arbo-real publishing slows us down. It invites us to listen with trees. To read with mycelium. To recompose not only what we publish, but how, and with whom.

TOWARD COMPOSTABLE PUBLISHING INFRASTRUCTURES

In dominant discourse, sustainable publishing often implies durability, optimization, or resilience. In contrast, the arbo-real framework advanced here defines sustainability as compostability: the capacity to decompose, co-adapt, and co-author with nonhuman rhythms. To sustain is not to preserve but to participate in cycles of decay, latency, and renewal. Publishing becomes a sympoietic act, not a perfected output.

Listening with Trees (see Appendix A) is not simply a workshop, it is a speculative prototype for multispecies publishing in the Capitalocene. Drawing from Biersteker’s sensor-based installations—such as *Voice of Nature* and *Fungal Faculty*—this model reframes AI as a sensor-mediated ecology, entangled with tree sap, fungal drift, and atmospheric delay. It resists extractive AI imaginaries by composting their epistemic foundations: speed, legibility, and abstraction. In place of progress, it offers perishability; in place of optimization, speculative resonance.

Each component of *Listening with Trees* functions as a low-carbon publishing prototype: tree-listening rituals model refusal-based peer review; fungal decay diaries become ephemeral media that reject permanence; tree-tied submissions transform weather and decay into

editorial collaborators; syllabus redesigns enact curriculum as soil—mutable, embedded, and non-metric. These are not symbolic acts. They constitute a material and ethical media logic for post-extractive publishing.

Just as Biersteker's works translate ecological data into sensorial rituals, *Listening with Trees* have the potential to translate arbo-real aesthetics into a compostable infrastructure—one not meant to scale, but to spore. It invites a publishing practice rooted in latency, refusal, and entanglement. In this vision, the future of publishing is not extractive but reciprocal, not fixed but alive.

WORKS CITED

Allwood, Mark. "Witnessing the Wasteland: A Phenomenological Account of Landscape and Its Discontents." *Imaginations: Journal of Cross-Cultural Image Studies*, vol. 15, no. 1, 2024, pp. 9-41, doi.org/10.17742/IMAGE29688.

Biersteker, Thijs, and Andrea Bandelli. "Art as a Catalyst for Policy Change." *Issues in Science and Technology*, vol. 41, no. 2, Winter 2025, pp. 5-15, doi.org/10.58875/TJUS8233.

Biersteker, Thijs. *Fungal Faculty*. 2023, <https://thijsbiersteker.com/fungal-faculty>. Accessed 6 June 2025.

Biersteker, Thijs. *MB>CO2*. 2022, thijsbiersteker.com/mbco2. Accessed 6 June 2025.

Biersteker, Thijs. *Symbiosia*. 2019, thijsbiersteker.com/symbiosia. Accessed 1 March 2024.

Biersteker, Thijs. *Voice of Nature*. 2018, thijsbiersteker.com/voice-of-nature. Accessed 1 March 2024.

Biersteker, Thijs. *Wither*. 2019, thijsbiersteker.com/wither-2021. Accessed 1 February 2024.

Biersteker, Thijs. *Xylemia*. 2024, thijsbiersteker.com/xylemia. Accessed 1 November 2024.

Blaser, Mario, and Marisol de la Cadena. "Introduction: Pluriverse: Proposals for a World of Many Worlds." *A World of Many Worlds*, edited by Marisol de la Cadena and Mario Blaser, Duke UP, 2018, pp. 1-22.

Boler, Megan. "A Pedagogy of Discomfort: Witnessing and the Politics of Anger and Fear." *Feeling Power: Emotions and Education*, Routledge, 1999, pp. 175-199.

Chaisson, Clara. "Dutch Artist Thijs Biersteker Gives Trees a Voice—in Lights." *NRDC*, 30 Jan. 2019, www.nrdc.org/stories/dutch-artist-thijs-biersteker-gives-trees-voice-lights.

Chun, Wendy Hui Kyong. "Inhabiting Writing: Against the Epistemology of Outing." *Habitual New Media*, MIT Press, 2016, pp. 150-54.

Coles, Laura Lee, and Philippe Pasquier. "Digital Eco-Art: Transformative Possibilities." *Digital Creativity*, vol. 26, no. 1, 2015, pp. 3-15, doi.org/10.1080/14626268.2015.998683.

Corsín Jiménez, Alberto. "Spiderweb Anthropologies: Ecologies, Infrastructures, Entanglements." *A World of Many Worlds*, edited by Marisol de la Cadena and Mario Blaser, Duke UP, 2018, pp. 53-82.

Crawford, Kate. *Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence*. Yale UP, 2021.

Elliot, Kate, et al. "The Ways We Work: Part 1, Oily Entanglements." *NiCHE: Network in Canadian History & Environment*, 6 Apr. 2022, niche-canada.org/2022/04/06/the-ways-we-work-oily-entanglements.

"Forced Evictions at Industrial Cobalt and Copper Mines in the DRC." *Amnesty International*, 12 Sept. 2023, www.amnesty.org/en/latest/news/2023/09/drc-cobalt-and-copper-mining-for-batteries-leading-to-human-rights-abuses. Accessed 14 July 2025.

Friedberg, Anne. *The Virtual Window: From Alberti to Microsoft*. MIT Press, 2006.

Galloway, Alexander R. *The Interface Effect*. Polity, 2012.

Grandinetti, Justin, and Chris Ingraham. "Infrastructures of Flow: Streaming Media as Elemental Media." *Critical Studies in Media Communication*, vol. 39, no. 2, 2021, pp. 92-106, doi.org/10.1080/15295036.2021.2015356.

Griffiths, Alyn. "Digital Artwork Called Symbiosia Depicts Effect of Climate Change on Trees in Paris." *Dezeen*, 25 July 2019, www.dezeen.com/2019/07/25/digital-artwork-depicts-affect-of-climate-change-on-trees-at-foundation-cartier.

Hannegan-Martinez, Sharim, et al. "(Re)Imagining Transformational Resistance: Seeds of Resistance and Pedagogical Ruptures." *Urban Education*, 2022, doi.org/10.1177/00420859221092973.

Haraway, Donna J. *Staying with the Trouble: Making Kin in the Chthulucene*. Duke UP, 2016.

Harrabin, Roger. "How Big Oil's Big Money Influences Climate Research." *Grist*, 6 Sept. 2024, grist.org/accountability/fossil-fuel-funding-influence-university-climate-research. Accessed 14 July 2025.

Hölzle, Urs. "Google Shares New Details about Its Water Stewardship Efforts." *SiliconANGLE*, 21 Nov. 2022, siliconangle.com/2022/11/21/google-shares-new-details-water-stewardship-efforts. Accessed 14 July 2025.

Innis, Harold A. *The Bias of Communication*. U of Toronto Press, 1951.

Kara, Selmin. "The Roots of Contingency: Documenting the Arbo-re-al." *Visible Evidence XXX Conference*, 18 Dec. 2024, Monash University, Melbourne, Australia. Conference Presentation.

Kimmerer, Robin Wall. *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants*. Milkweed Editions, 2013.

Korsant, Clate. "A Freirean Ecopedagogy or an Imposition of Values? The Pluriverse and the Politics of Environmental Education." *Glob-alizations*, vol. 21, no. 2, 2024, pp. 370-87. doi.org/10.1080/14747731.2022.2038830.

Macauley, David. *Elemental Philosophy: Earth, Air, Fire, and Water as Environmental Ideas*. State U of New York P, 2010.

McLauchlan, Laura. "A Multispecies Collective Planting Trees: Tending to Life and Making Meaning Outside of the Conservation Heroic." *Cultural Studies Review*, vol. 25, no. 1, Sept. 2019, pp. 135-153. UTS ePRESS, [dx.doi.org/10.5130/csr.v24i1.6415](https://doi.org/10.5130/csr.v24i1.6415). Accessed 16 July 2025.

Osgood, Jayne, et al. "Arboreal Methodologies: Getting Lost to Explore the Potential of the Non-innocence of Nature." *Occasional Paper Series*, no. 50, 2023, pp. 113-18. Bank Street College of Education, doi.org/10.58295/2375-3668.1537. Accessed 16 July 2025.

Peters, John Durham. *The Marvelous Clouds: Toward a Philosophy of Elemental Media*. U of Chicago P, 2015.

Roy, Sumana. *How I Became a Tree*. Yale UP, 2021.

Swarbrick, Steven, and Jean-Thomas Tremblay. *Negative Life: The Cinema of Extinction*. Northwestern UP, 2024. doi.org/10.2307/jj.18473032.

Todd, Zoe. "An Indigenous Feminist's Take on the Ontological Turn: 'Ontology' Is Just Another Word for Colonialism." *Journal of Historical Sociology*, vol. 29, no. 1, Mar. 2016, pp. 4-22, doi.org/10.1111/johs.12124.

Tsing, Anna Lowenhaupt. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton UP, 2015.

Vera, Belén. "Insight: The Art for Environmental Awareness of Thijs Biersteker." *CLOT Magazine*, clotmag.com/news/insight-the-art-for-environmental-awareness-of-thijs-biersteker. Accessed 15 July 2025.

Viveiros de Castro, Eduardo, and Deborah Danowski. "Humans and Terrans in the Gaia War." *A World of Many Worlds*, edited by Marisol de la Cadena and Mario Blaser, Duke UP, 2018, pp. 172-204.

IMAGE NOTES

Figure 1: Biersteker, Thijs. *Voice of Nature*. 2018, Chengdu, China. *Thijs Biersteker*, thijsbiersteker.com/voice-of-nature.

APPENDIX A

Listening with Trees

This three-day workshop introduces a hands-on, multispecies approach to publishing and AI education. Instead of focusing on algorithms or output, *Listening with Trees* explores how trees, fungi, and environmental rhythms can co-author how we learn, write, and share knowledge. The workshop cultivates practices of slow attention, seasonal thinking, and speculative publishing. Designed for students and educators across the humanities, arts, and media studies, it invites participants to listen with trees, co-compose with fungi, and prototype low-carbon, earth-bound alternatives to extractive academic publishing.

Workshop Objectives

- Engage with nonhuman intelligence through hands-on, sensory activities that involve trees, fungi, and natural rhythms like sap flow, decay, and breath.
- Explore new ways of sharing knowledge by creating low-tech, compostable formats—such as tree-tied writings, fungal zines (magazine), and seasonal rituals—that invite co-authorship with the environment.
- Rethink educational outcomes by shifting focus from permanence and productivity to slowness, transformation, and relational learning across species.

Workshop Structure

Day 1: Tree Listening and Refusal

Morning (Outdoor Field Immersion)

- **Prompt:** “Can a tree refuse your gaze?”

- **Activity:** Choose one tree. Spend 20 minutes silently observing. Sketch, record breath/sound, or trace sap movement. The most accessible method is non-invasive auditory observation, which can be performed using a stethoscope or a contact microphone. Place the stethoscope's chest piece (diaphragm) firmly against the tree trunk, about 3-5 feet off the ground, on the south-facing side where flow is often stronger. Wrap the area with a towel to block wind or ambient sounds if needed. Listen quietly for 1-2 minutes. You may hear gurgling, bubbling, popping, or rushing sounds—like a heartbeat or water through pipes—as sap moves through the xylem (water-conducting tissues). This is caused by pressure changes pulling water upward from the roots.
- **To record:** Insert one earbud from your phone's headphones into a stethoscope earpiece (or tape the phone's mic near an open earpiece). Start recording on the app [smartphone] while pressing the diaphragm to the tree. To record with a contact microphone (commonly used in field recording for capturing internal vibrations) is a lot easier; however, that is a little expensive depending on the context.
- **Mini-discussion:** "Tree time" (reading excerpts from *How I Became a Tree* by Sumana Roy and Biersteker's *Voice of Nature*).

Afternoon (Reflection + Artifact)

- **Group Discussion:** What did you expect the tree to do? What did it refuse?
- **Create a 'tree resonance vessel':** Craft a simple amplifier from found materials (e.g., roll cardstock into a cone for an ear trumpet, weave yarn as mycelial 'strings,' layer leaves or bark as sound filters). Draw from morning sap whispers by replaying your recording softly through the cone—positioned near branches to blend ambient rustles with echoed xylem flows, held lightly without contact. Sketch the fused rhythms or murmur them aloud to the group, probing: How does this attunement compost extraction into mutual hum? (Preserve vessel, sketches, and recordings for Day 2 composting.)

Day 1 takeaway: Tree listening shifts our attention from extraction to attunement, asking us to notice refusal as a form of epistemic agency.

Day 2: Fungal Publishing and Decay

Morning (Indoor Studio/Lab)

- **Prompt:** “What does fungal intelligence teach us about delay?”
- **Build:** Simple ‘decay diaries’ using everyday classroom materials (e.g., recycled paper, tea bags or coffee filters for biodegradable pages, natural ‘inks’ like berry juice or pencil rubbings from leaves). Fold a few sheets into a mini-notebook, bind with string or staples, and inscribe slow-publishing ideas—such as notes that ‘fade’ over time by wetting edges with water. Weave in Day 1’s tree recordings (replay softly) or resonance sketches as embedded layers, composting arboreal refusals into fungal latencies for relational depth.

Afternoon (Design + Reflection)

- **Collaborative Artifact:** Making a Fungal Zine

This activity is a hands-on group project where 3-5 people work together to create a small, handmade booklet called a ‘zine’ (short for magazine). The zine is ‘slow-publishing prototype’—a basic, low-tech book that represents ‘slow publishing,’ meaning it’s made deliberately slowly, using natural materials that can break down over time, to contrast with fast, digital, AI-driven publishing. The theme is fungi (such as mushrooms and their underground networks), illustrating how fungal ‘intelligence’ (e.g., their slow connection and adaptation) can inspire more effective ways to create and share knowledge than AI’s rapid, extractive methods.

The zine utilizes ‘foraged elements’—such as leaves or berries. It takes about 30-45 minutes, and the goal is collaboration. Forage safely outdoors or use pre-collected items, such as leaves, moss, small berries (for ink—crush them to extract juice), rocks or sticks (for rubbing pigments), and charcoal bits (from a fire pit or art supply). Avoid

anything toxic or protected—stick to standard, non-harmful stuff like oak leaves or wild berries.

Decide on 4–6 pages: E.g., Page 1: A poem; Page 2: A drawn mycelium diagram. Fold your paper sheets in half to form a booklet (like a mini pamphlet—cut a slit in the center if needed for a 6-page version). Add textures. Gently press dead leaves or moss between pages (use a book or flat surface to flatten them briefly—they will leave imprints or stains for a natural feel). Stack the pages, fold them neatly, and tie with string through the punched holes (or staple if it’s easier). Add more foraged elements, such as tying a leaf to the cover. Test ‘slowness.’ Wet an edge with water to see the ink fade slightly, revealing how the zine changes over time, much like fungi decaying and renewing.

- **Discussion:** What counts as a ‘finished’ product in multispecies communication?

Day 2 takeaway: Fungi teach us to publish with slowness and rot, crafting ephemeral formats that prioritize decay over durability.

Day 3: Rewriting the Syllabus

Morning (Conceptual Mapping)

- Read excerpts from Haraway (“Sympoiesis”) and Kimmerer (“The Grammar of Animacy”) aloud together outdoors, using Days 1–2 artifacts as prompts—e.g., replay tree recordings or flip through fungal zines to diagram how sympoiesis and animacy reframe prior attunements and decays into curricular entanglements.

Afternoon (Activation + Integration)

- Mini-project: Update an existing syllabus (of any relevant course) or assignment using multispecies logic.

Example: Transform a final paper into a tree-tied ritual:

A ‘tree-tied ritual’ converts the paper into a performative, site-specific act where content is tied to a tree, inviting weather, animals, or growth to interact and co-author it over time. This practice stems from arts-based eco-pedagogy, such as projects engaging partici-

pants with trees through mapping and attachment rituals to build environmental connections. Use twine, yarn, or vines for tying; recycled cloth or paper for messages; natural inks. Select a tree (e.g., on campus). In a group or solo session, tie the messages to branches gently. Include a written invocation, like acknowledging the tree's 'refusal' or rhythms, inspired by experiential learning with trees. Photograph or video the tying process. Revisit periodically to note changes (e.g., fading from rain or bird interactions), reflecting on how the tree 'responds.' Evaluate via a ritual description, photos, and a meta-reflection on shifts in perspective. This builds on paradigm shifts in art and environment studies for holistic learning.

Closing: Share-out in a circle. Each participant names a future pedagogical or publishing action they will try, highlighting how Days 1–3's progression—from tree attunement to fungal composting to syllabus ritual—creates a unified, compostable narrative.

Day 3 takeaway: Rewriting curricula through multispecies thinking transforms education into a compostable, co-authored process, weaving the elements of prior days into enduring, relational change.

N.B.: This speculative workshop offers a material translation of arbo-real aesthetics and multispecies pedagogy, grounding the arguments of this paper in compostable practices for an alternative classroom setting. It invites educators to treat publishing not as a product but as a process, in which trees, fungi, and decay act as co-authors, collaborators, and teachers.