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Chryptochrome: how can the materiality of mobile LiDAR technology be used as a metaphor for eco-conscious storytelling

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Abstract

In recent years, LiDAR has become a foundational tool in virtual production (VP), extended reality, and real-time environment pipelines, enabling rapid translation between physical spaces and computational worlds (Jones et al., 2022; Graham and Cook, 2023). This practice-as-research project investigates how mobile LiDAR scanning can also operate as a creative and conceptual tool in on-location ecological filmmaking. Produced in 2024 using a smartphone LiDAR sensor and generative sound tools, the short film *Chryptochrome* explores how computational sensing technologies reconfigure relationships between human authorship, machinic perception, and vegetal presence. Rather than treating LiDAR as an instrument for spatial accuracy or digital replication, the project foregrounds its material qualities, such as pulsed light, trace-based reconstruction, and algorithmic uncertainty, as aesthetic resources. Situated within mobile filmmaking, eco-media theory, and debates around human-machine interaction in art, the film positions LiDAR as a speculative interface through which physical environments are translated into ephemeral virtual forms.

Keywords: mobile filmmaking, lidar, ecocritical, experimental film

Link to work: https://youtu.be/e0rO3VePtNk

Research Statement

This research statement accompanies my short film produced in 2024 using a mobile phone's LiDAR scanner and a theremin application. The work emerges from the sub-discipline of mobile filmmaking within practice-as-research, and contributes to ongoing questions regarding how

cellphone tools can reframe ecological relationships within fillmmaking. The central research question guiding the project was:

How can the materiality of mobile LiDAR technology be used as a metaphor for eco-conscious storytelling, particularly in visualizing plant communication?

While the piece references scientific ideas about plant perception such as cryptochrome responses to blue light (Chamovitz, 2012; Mancuso and Viola, 2015), it should not be understood as a biological documentary, nor as an instructional scientific narrative. Rather, the work uses LiDAR as a narrative and material device through which to explore the imagined perceptual worlds of plants. In doing so, it repositions the mobile device as a kind of hybrid participant in ecological sensing, and repositions the author within a triadic relation between human intention, machinic computation, and vegetal presence.

Contextual Review

My project sits within an established body of mobile filmmaking practice (Schleser, 2021) that engages with social, material, and ecological contexts. Max Schleser's contribution to mobile media scholarship has been foundational in articulating how mobile devices afford new modes of social and environmental engagement, often emphasising the tactility, portability, and everydayness of handheld cameras. Schleser's framing of the smartphone as an ethnographic and social documentary tool provides an important contextual anchor for this project, as my own practice adopts the mobile device not simply as a camera but as a perceptual apparatus embedded in lived experience — in my case, within a daily walking practice.

The work also corresponds with recent scholarship on vertical framing (Ross, 2022), an increasingly prevalent orientation in mobile cinematography. Miriam Ross has written about the aesthetics and cultural implications of the vertical frame within screen cultures, drawing attention to how verticality alters both spectatorship and the perceived relationship between humans and environments. My film engages directly with verticality, not as a concession to social media formats but as a deliberate ecological gesture. Trees search for light vertically, and the vertical frame allows the viewer to follow that movement from earth to canopy. At the same time, the vertical strip format resonates with the history of celluloid as a plant-derived medium, evoking the material origins of film as a substrate. In this sense, the vertical frame acts as a remediation of film history within a contemporary computational medium, linking arboreal movement to cinematic form.

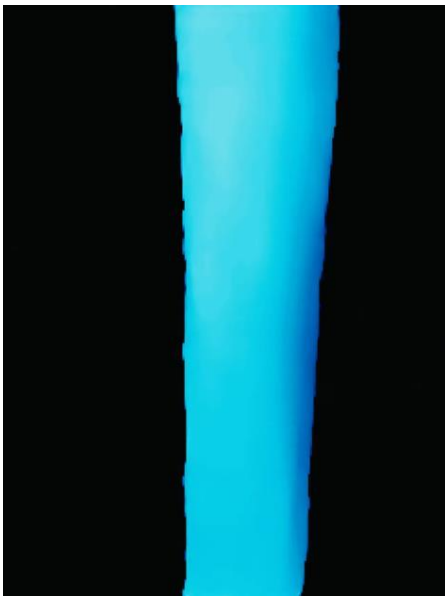

Figure 2: vertical framing and tree trunk

Beyond the cinematic context, the film engages with philosophical accounts of technology and mediation. The work of Friedrich Kittler (Kittler, 1999) is relevant here, particularly his assertion that media technologies determine our situation by shaping the very conditions through which we perceive and record the world.

The smartphone's LiDAR system performs a calculative sensing operation that is fundamentally non-human: pulsing light, measuring returns, and reconstructing spatial geometry through algorithmic processes. As Lev Manovich argues, (in a transmutation of Walter's notions of mechanical reproduction of art, 2008) computational media do not simply record the world but actively translate it into data structures that can be analysed, visualised, and recomposed according to the logics of software (Manovich, 2020). The human author is therefore displaced or re-situated within a computational perceptual system, no longer operating as the sole origin of representation but as one agent within a software-driven chain of transformation. In the context of my project, authorship is distributed across machinic processes (LiDAR scanning and algorithmic reconstruction), vegetal responses (movement, surface, light absorption), and human decisions (framing, editing, sonic selection), producing a hybrid mode of perception in which computation mediates the encounter between human and nonhuman worlds.

Jacques Derrida's notion of the trace (Derrida, 1976) provides another productive conceptual frame. Derrida identifies the trace as a mark of absence and presence — something that gestures to what is no longer there while shaping what is currently perceived. LiDAR, as a sensing apparatus, is a technology of traces. It emits light invisible to human perception and reconstructs scenes through the differential return of photons. What the viewer sees on screen is not the plant itself,

but a trace-based rendering produced by light bouncing off vegetal surfaces. In this sense, the film does not show plants directly; it shows their traces as computed surfaces. This spectral aesthetic aligns with my intention to avoid didactic eco-messaging in favour of a more subtle ecological attunement.

Figure 3: plants 'see' human buildings

The project also relates to strands of eco-documentary and environmental media theory concerned with nonhuman agency and vegetal life. As Michael Marder argues, plants possess modes of sensitivity and responsiveness that are fundamentally different from animal perception, operating through distributed, non-centralised forms of sensing rather than cognition as traditionally understood (Marder, 2013). While *Chryptochrome* does not claim scientific accuracy, it engages metaphorically with research suggesting that plants respond to environmental stimuli chemically, electrically, and photoreceptively. The notion that plants perceive and respond to blue light through cryptochrome receptors functions within the film as a narrative provocation rather than an empirical claim — not something to be demonstrated, but something to be encountered through form. In this sense, the film's ecological contribution lies not in explanation but in attunement, inviting viewers to consider vegetal perceptual worlds through a computational aesthetic that resonates with what Marder describes as a non-anthropocentric "plant-thinking," grounded in exposure, responsiveness, and relation rather than representation.

Figure 4: lidar senses tree canopy

Methodology and Approach

The methodological approach for this project is aligned with practice-as-research frameworks (Nelson, 2013), particularly Robin Nelson's articulation of practice as a mode of inquiry that embraces experimentation, tacit knowledge, and play. Nelson emphasises that practice-based research is not merely the illustration of prior theory, but a process through which theory may emerge from making. This was true of my own project. The film was developed through iterative fieldwork during daily walks in a wooded environment near my home. The routine of walking shaped the research as a lived, haptic practice, embedding the work within everyday rhythms rather than staged production environments.

Methodologically, I adopted what might be described as a rhizomatic approach (Deleuze and Guattari, 1987), in which filming did not proceed according to a predefined storyboard but through branching encounters with plants, light, and surfaces. I pointed the phone's LiDAR sensor at trees, ferns, and undergrowth, collecting spatial data as patterns and returns rather than as optical images. This offered a form of machine happenstance, in which the device's algorithmic interpretation of space introduced events beyond my control. My deliberate framing choices (for instance, tracking the trunk of a tree upward) coexisted with computational glitches, moments of occlusion, and unexpected visual artefacts. The process thus blended intentionality with emergence.

Sound was developed through a complementary method involving a theremin application. As I walked, I pointed the phone at plants and allowed the app to generate tones responsive to

accelerometer data and light inputs. Plants became instruments or co-composers, insofar as their surfaces and positions influenced the sonic data generated. I later edited these raw recordings, shaping them into a cohesive soundscape while preserving their contingent origins. The resulting audio underscores the vegetal–computational–human assemblage at the heart of the project.

Vertical framing formed another methodological component. Throughout filming, I composed shots vertically, sometimes tilting upward to follow the growth direction of trees, and sometimes reframing horizontal movements into vertical strips during editing. This decision served two functions. First, it reinforced the ecological metaphor of plants reaching for light. Second, it produced a remediation of strip-based film, subtly referencing the material history of cinema as a medium originally supported by celluloid — a material once derived from plant cellulose. This rematerialisation of film history within a LiDAR environment contributed to the broader thematic interplay between nature and computation.

Evidence of Significance

The significance of the work can be understood along four axes: ecological, media-theoretical, methodological, and documentary-practical.

Ecologically, the film offers an alternative mode of eco-conscious storytelling. Rather than narrating environmental issues or presenting plants as objects of scientific scrutiny, the work constructs an experiential ecology in which the viewer encounters plants through computational traces. This approach aligns with tendencies in contemporary eco-media theory that emphasise relationality and attentiveness rather than didactic messaging. By foregrounding computational mediation (Manovich, 2020; Menkman, 2011; Crawford, 2021), the film suggests that ecological experience in the Anthropocene is often technologically mediated, and that such mediation can itself be made perceptible.

Media-theoretically, the film contributes to discussions around the sensory capacities of computational devices. By using LiDAR instead of the optical camera, the work highlights the existence of parallel perceptual registers in consumer technologies. This connects to Kittler's assertion that media operate beyond human sensory limitations, and to Benjamin's interest in how technologies reshape authorship. Derrida's trace concept is made literal in the LiDAR workflow: the device does not capture light as images but reconstructs light as absence–presence differentials, making it a technology of traces in both the philosophical and aesthetic senses.

Methodologically, the project demonstrates an approach to practice-as-research grounded in daily life, embodied routine, and improvisational play. The combination of rhizomatic filming, theremin-based sonic co-composition, and vertical remediation exemplifies how practice can generate theory, not merely apply it. The role of happenstance and machine co-agency foregrounds

emergent processes that are valuable within creative research contexts, and connects to broader debates on posthuman authorship.

Documentary-practically, the work expands mobile documentary by repositioning the smartphone not merely as a camera but as a sensor and ecological participant. Schleser's work has shown how mobile filmmaking can democratise documentary practice; my project extends this by exploring how mobile devices can also redistribute authorship. The film therefore offers a modest contribution to mobile media scholarship by demonstrating how smartphones might be used not only to record social reality but to speculate on nonhuman perceptual worlds.

Finally, the film's vertical orientation contributes to evolving screen cultures in which portrait-format cinema is no longer peripheral. Ross's work contextualises verticality within a larger discourse of screen ecologies; my project extends this conversation by linking vertical framing (Ross, 2022) to vegetal orientation, thereby providing a new rationale for its use within documentary practice.

In 2024 the film was shown at three international film festivals: MINA (Melbourne, Australia), Vertical Vision International Film Festival (Pittsburgh, USA) and Tijuana Vertical Film Festival (Tijuana, Mexico).

Conclusion

This project reflects an attempt to create a poetic, computational, and ecological encounter using everyday technology. By positioning the smartphone's LiDAR system as a participant in ecological sensing, the work offers an alternative mode of eco-conscious documentary that avoids overt scientific claims while fostering perceptual curiosity. Grounded in practice-as-research methodologies and informed by media theory, film studies, and eco-thinking, the film demonstrates how creative practice can generate new perspectives on human–machine–nature relations. Its significance lies not in explaining plant communication scientifically, but in attuning viewers to the possibility that plants see, signal, and sense in ways that exceed human perception, and that our technologies may — if only metaphorically — help us meet them partway.

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