

# Voicing the Nonhuman: Exploring the Affectual Relationship of Sonification

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## ABSTRACT

*Sonification can translate ecological and social changes into audible formats, granting the listener an ability to understand their ecological environment in ways that may have been previously unable; however, this process relies on data extraction and translation through a humanistic lens. I question, in what ways does sonification become a ‘voice’ through its communicative signaling of ecological beings? How do listeners respond and interact with sonification affectively? This exploratory paper considers three case studies – NASA’s Perseus Black Hole, PlantWave, and Sonic Kayaks.*

## 1. INTRODUCTION

Mid-February 2022 I received my copy of PlantWave – a pocket-sized, mobile, sonification tool that translates plant data into music. Attaching the sensors to my favourite Maranta Leuconera plant, I was immediately greeted with an upbeat major melody, a tune I had assumed to be indicative of a healthy plant. Following a few hours of sonified listening, I noticed the tune began to change, slowing in pace and shifting lower in pitch. Within minutes of this sonic transition, my mother called from the other room: *What’s wrong with your plant?*

Developed as a subtype of auditory displays, sonification works to translate relationships within data into sonic compositions [1]. As a result, sonification has been widely utilized as a scientific tool to better understand ecological, environmental, or socially imperceptible changes; however, an analysis can also be given to its possibilities in humanities and ecological listening practice, exploring the process of translation that moves data from the code, into communicative sounding, towards an affective whole-body listening experience.

Critical interventions into sonification have more recently analyzed this relationship of listening to data as being a network of material bodily practices [2], requiring multi-sensory understanding. To extend this work, I suggest analyzing this process as a form of ‘voice’ production might illuminate affectual experiences that are ascribed in the data mapping, but also emerge through listening process and discussion. At the same time, it is worth considering the colonial logics of agency and human forms of mastery that emerge through translation. Exploring three sonification case studies – NASA’s Perseus Black Hole, PlantWave, and Sonic Kayaks – this paper works to ad-

dress the affectual responses that surface for listeners and consider the parameters of voice ascribed through this process, further questioning how these logics impact one’s understanding of their relationship to the ecological environment through auditory means.

## 2. DEFINING VOICE & AFFECT

To define ‘voice’ in this paper is to situate its use in relation to multiple definitions. To consider a few: physiologically, voice has been often linked to the human body as the process of creating an audible signal through numerous resonant chambers [3], however recent scholarship suggests a biological approach is often rooted in ableist perspectives that suggest “voices are supposed to work, [while assigning] a universalist conception of the body” [4, p. 46]; culturally, the term has been used to describe forms of inequality that emerge from the silencing of specific groups or their presence outside of colonial norms of organization [5]; philosophically, voice has been studied as an object of discipline addressed through linguistics, ethics, politics, and traced further through the dimensions of phenomenology [6]; technologically, voices have been explored as crafted artificially in humanized, often feminized, voice assistants.

Collaboratively, I am interested in broadening this definitional underpinning by considering the conceptualization of voice beyond the human. Dylan Robinson defines this reality as an “intersubjective experience between human and nonhuman actors in music performance by considering object agency in non-representational and new materialist theory alongside Indigenous knowledge regarding nonhuman relations” [5, p. 79]. One way this is explored is in the context of space:

“To acknowledge spatial subjectivity means addressing the ways by which space exerts agency, affect, and character beyond the realm of striking aesthetic impact. In certain cases, it may mean experiencing it as a partner, interlocutor, or kin....it means rising to the occasion of full participation within interactions between other subjectivities including musical and human actors (listeners/performers)” [5, p. 97]

Using this framework to define voice, the process of translating ecological beings through data into music becomes a material extension of a communicative signal: the ‘body’ is measured, marked, and minimized through data points, while the ‘voice’ becomes a sonic translation.

Measuring these various definitions and approaches, I contend with ‘voice’ between these contexts by balancing the cultural implications, recognizing the colonial subjectivities of data, and calling into consideration the concepts of spatial intersubjectivity to understand the shifting roles of listener and subject. In essence, this approach to exploring voice aims to situate the experience of listening to sonification within an ecology: “To wrest listening away from its standard conception as a largely human and animal centered activity allows us to understand listening as an ecology in which we are not only listening but listened to” [5, p. 98]

Perhaps most importantly shared across disciplines, voice denotes a relational understanding of the self, community, environment, or technology, by amplifying *affect*. Voice is an amplifier of affect by shaping and producing emotive responses for both speaker and listener; “The voice, in its expression of affective and ethico-political forces, creates worlds” [7, p. 337]. Through a recognition of timbre, tone, duration, and pitch, the listener is encouraged to move beyond how something is made to speak, beyond the aesthetic, to an embodiment of meaning.

While technologically designed ‘voicing’ may emerge through sonification, their digitized (often musical) cues prescribe an affectual whole body listening experience, opening new forms of sensory engagement and altering how a listener responds to their ecological worlds.

### 3. SONIFICATION CASE STUDIES

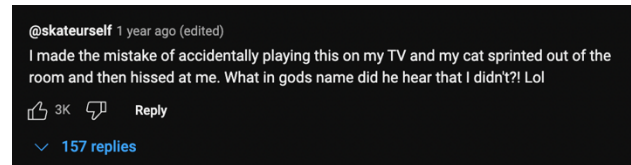
Utilizing three case studies – the Perseus Black Hole, PlantWave, and Sonic Kayaks – I consider various examples of ‘voicing’ sonification, paying special attention to the affectual responses from listening practice.

#### 3.1 Cries of a black hole

NASA published the sound of a black hole at the center of the Perseus galaxy cluster on May 4, 2022. Extracting the pressure waves recorded from this phenomenon, “the signals were resynthesized into the range of human hearing, scaling them upward by 57 and 58 octaves above their true pitch” [8]. The final product was published across various social sites as a 35 second audio clip.

As this media environment remains out of reach and mostly unexplored, sonification offers a terrestrially bound “specific set of ideas that make images understandable to us based on a mutually agreed upon relationship to the material world” [9, p. 650]. Globally shared online, many responses were emotive. Northeastern physics professor, Jonathan Blazek, shares that the perception of this sonification project and black holes in general, is that “they’re these giant unfeeling places where mass can never escape, and there’s something deeply horrifying about that in a philosophical sense...the sound matches that” [10]. Across other social channels and comments, responses echo this sentiment noting that it can be likened

to the score of horror films, that it embodies a terrestrial mystery, and evokes existential dread.



**Figure 1.** Screenshot of a comment on Nasa’s YouTube video (<https://www.youtube.com/shorts/ioR5np1fmEc>). Screenshot was captured by the author Sept. 20, 2022.

This sounding might evoke feelings of distress and unease as we grapple with the relational understanding of such nonvisual cues with a mass known for destruction. Importantly, this affectual experience emerging through sonification of space media “reorients our view—epistemologically, culturally, and politically—and necessitates a need for ‘off-Earth’ perspectives” [9, p. 657]. The voice of Perseus’ Black Hole re-positions the listener to a celestial being, listening for understanding among the spectral moans.

#### 3.2 PlantWave

PlantWave, in its recent design, is a portable mobile sonification device developed by two musicians, Joe Patitucci and Alex Tyson [11]. Patitucci and Tyson are the founders of the zero-waste record label Data Garden, which had a mission to help people connect to nature through electronic music. Wanting to prioritize a generative relationship with plants and bio art, the progression to integrate data sonification into their label was a natural shift. Through this process, they “connected nature directly to the instruments with technology” [11], describing this process as allowing plants to become their own musical producer. They suggest that this tool reacts, shifts, and responds to a variety of “changes in light, time of day, oxygen levels, and even in response to movements in the room” [12].

This relational understanding, albeit through humanist forms of listening practices, might be best addressed in the context of Robinson’s notion of spatial intersubjectivity: “to wrest listening away from its standard conception as a largely human- and animal centered activity allows us to understand listening as an ecology in which we are not only listening but listened to” [5, p. 98]. Through this form of sonified vocal production, human listeners are encouraged to perceive the plants as not only singing through data, but also reacting and responding to other beings in their environment, their surrounding ecosystem, and temporal relations; further, adjusting and re-framing the role of ‘listener’.

Inspired by the experiences that emerge when an individual listens to a plant music, Patitucci and Tyson have been highly attuned to the affectual relationship that begin sounding between the human listener and plants; “By creating technology that helps to re-awaken our intu-

itive connection to the natural world, maybe we are helping humans to cultivate sensitivities important for humans to live beyond our little valley of the sun” [11].

### 3.3 Sonic Kayaks

Sonic Kayaks engages paddlers to map and collect data related to water temperature, turbidity, underwater sound, and air particulate pollution. Sonified in real time, this project allows the paddler to listen to the data they are collecting while engaging in forms of data tracking and translation as a form of scientific citizen engagement. This process integrates the listener directly into the development of sonic translation of water and air through changes in speed and destination, among other spatial and temporal factors. The lake, and its many facets, perform as a collective symphony.

Here, the affectual relationship is amplified by placing the process of data collection and sonification into the boat itself: “Users might hear sounds from the Sonic Kayak indicating a temperature gradient and choose to paddle around an area to gather more detailed information in that particular location, or hear underwater noise and decide to stop paddling and take a longer sample in a particular place.” [13, p. 14]. Considering their intended listeners, the Sonic Kayak designers note that they “see particular opportunities for communities to use the system to highlight poor practice and lobby for environmental protection [13, p. 14]. However, this tool has also been used as an accessible navigation tool for the visually impaired by translating GPS signals. One user shares that the presence of such audible cues has granted a new form of independence on the water, allowing them to paddle without guidance or supervision [14].

## 4. SONIFYING THE FUTURE

Collectively, these case studies point to the ecological, social, and affectual changes that emerge through the translation of data into communicative sonic relationships. As beings largely influenced by these forms of affectual experiences and voice as a signal, the process of developing a sonified voice for the nonhuman opens new forms of knowing, extending the listening practice through full body experience and curating affective experiences by inviting the listener into sonic frameworks of sensory practice; however, sonification also masks ecological agency through its prescribed affectual mapping techniques (an area requiring future research). Importantly, this preliminary consideration of the affectual responses of sonification through the lens of voice, shares possibilities for full body listening and multi-sensory engagement in the field of acoustic ecology; exploring sonification as voice through its affectual qualities, its translation of data, and the humanization of ecological beings, I suggest that the listener is re-situated, moving between listening positionalities, while the sounding object is performed through carefully curated translation.

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