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MULTI-TIMESCALE MULTISTABILITY

A Bergsonian Extension of Postphenomenology through Cyborg-Technology Relations

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Abstract

Postphenomenology has established that technologies are multistable—open to different meanings and uses—yet the temporal structure of multistability remains under-theorized: time figures as a single, homogeneous line along which stabilities succeed one another. This paper proposes multi-timescale multistability (MTS multistability), a Bergsonian extension that reconceives multistability as a generative process unfolding across multiple temporal scales at once. Drawing on Hirai's multi-timescale interpretation of Bergsonian duration and the societal landscape—the slowly changing configuration of norms, values, and socio-technical practices—the framework analyzes how stabilities shift within hours of situated practice, how landscapes formed over decades condition them, and how these scales interact. One consequence is methodological: empirical and transcendental orientations appear not as opposed positions but as attention to different timescales of the same process. The framework is developed through practices intersecting art, disability, and technology in Japan—AI audio workshops where everyday sounds become musical material, and dance performances by a collective including a performer living with ALS—read against the thirty-year transformation wrought by the Able Art Movement. The analysis shows how human-technology boundaries—central to cyborg-technology relations—stabilize and destabilize across situations and timescales, conditioned by, and potentially transforming, the societal landscape.

1 INTRODUCTION

1.1 A CATHETER ON STAGE: DISABILITY, ART, AND THE QUESTION OF TIMESCALES

In a small space in Japan, before some twenty invited audience members, Hideo Arai—a physical performer living with amyotrophic lateral sclerosis (ALS)—and two fellow performers hold medical catheters in their mouths and blow air into liquid, producing bubbling sounds reminiscent of frogs. For Arai, the catheter is part of the ensemble of technologies with which he lives every day. The audience includes medical professionals, researchers, and performers. In their reflections afterward, one phrase recurs: what they witnessed was "something not yet named"—neither simply care nor simply expression, but something in between.

This moment is brief—a few minutes within a performance lasting a little over an hour. Yet it sits at the crossing of two very different timescales. On one side lies the long history through which tools like this catheter came to mean what they mean: through institutional differentiation and professional specialization unfolding over decades and longer, "medical devices" and "instruments of artistic expression" have come to belong to separate worlds, each with its own professions, institutions, and expectations. That a catheter is for suctioning phlegm—and not for making music—is not a natural fact but the sediment of this history. On the other side lies the far faster timescale at which such meanings can shift. Within the course of a single performance, a catheter becomes an instrument, and the perceptions of those present changes: a boundary that seemed fixed is, for a moment, crossed.

These two timescales do not merely coexist; they condition each other. The deviation on stage is legible as a deviation only against the slowly formed order from which it departs: without the long history that made catheters "medical," there would be nothing remarkable about making one sing. Conversely—and this is the question that animates this paper—can such fleeting deviations, if shared, repeated, and taken up by others, come to reshape the slower order itself? Japan's Able Art Movement suggests they can: over roughly thirty years, artistic expression by people with disabilities moved from the margins of welfare institutions to a recognized cultural practice, altering what society takes for granted. How, then, should we conceptualize technological meanings that stabilize and destabilize at different temporal scales—and whose changes at one scale interact with changes at another?

To answer this question, this paper develops what I call multi-timescale (MTS) multistability, a Bergsonian extension of the postphenomenological concept of multistability. Postphenomenology has shown that technologies are "multistable": the same artifact can take on different meanings and uses in different contexts. Time has always been implicit in this idea, and some scholars have traced how stabilities change over history or differ across generations (discussed in Section 2). What has been missing is an account of multistability as spanning multiple temporal scales at once—the minutes and hours of situated practice and the decades over which societies settle what technologies are for—together with the interactions between these scales. Drawing on a recent multi-timescale interpretation of Bergson's philosophy of time, I reconceive multistability not as a static plurality of uses but as a generative temporal process unfolding across interacting timescales.

The framework is developed through practices at the intersection of art, disability, and technology in Japan—AI audio workshops in which the sounds of everyday life, from running water to moving wheelchairs, become musical material, and the dance performances of the collective that includes Arai—read against the thirty-year transformation wrought by the Able Art Movement. These practices speak directly to the theme of this topical collection, cyborg-technology relations: for people whose daily existence is constitutively entangled with technologies, the boundary between human and technology is not fixed but configured and

reconfigured across situations and timescales (Shew & Earle, 2024). They also allow a broader methodological claim. Postphenomenology has excelled at micro-level analyses of situated human-technology relations; the framework proposed here extends its reach to the macro level of long-term societal transformation—without abandoning the empirical ground on which the tradition stands. Before developing the framework, I first situate it in the debate from which it emerges.

1.2 BACKGROUND: THE EMPIRICAL TURN, POSTPHENOMENOLOGY, AND THE QUESTION OF TIME

Contemporary philosophy of technology navigates a fundamental tension between transcendental and empirical orientations (Bosschaert & Blok, 2023; Mykhailov & Liberati, 2023; Ritter, 2024; Van Den Eede, 2022). This distinction, articulated as "Technology with a capital 'T'" versus "technologies with a small 't'" (Lemmens, 2022; Mykhailov & Liberati, 2023; Van Den Eede, 2022), reflects deeper methodological questions about how we should study technological phenomena. Proponents of the former approach advocate for transcendental perspectives that examine the conditions and structures of technological existence (Coeckelbergh, 2022; Lemmens, 2022; Mykhailov & Liberati, 2023; Ritter, 2024; Smith, 2015). Proponents of the latter, responding to what they saw as abstract theorizing that obscures how humans actually interact with specific technologies, advocate for empirical approaches (Aagaard, 2018; Di Lodovico, 2023; Rosenberger, 2020; Rosenberger & Verbeek, 2015). This shift toward the empirical, often dated to the 1990s and later termed the "empirical turn" (Achterhuis, 2001), gave rise to postphenomenology as a dominant paradigm.

Yet postphenomenology has itself faced criticism. Critics argue that it discounts "technology überhaupt" (Lemmens et al., 2017 quoted in Van Den Eede, 2022; Lemmens, 2022; Ritter, 2024) and that philosophy of technology has become "too narrowly focused on 'empirical' issues of fact, and not focused enough on 'transcendental' issues concerning conditions for these facts" (Coeckelbergh, 2022; Mykhailov & Liberati, 2023; Smith, 2015). This stands in contrast to approaches like Stiegler's "organology of technics," which analyzes how technology shapes consciousness (Stiegler, 2017; Lemmens, 2022; Pavanini, 2022; Wellner, 2022). In response, several scholars have sought to bridge these orientations (Bosschaert & Blok, 2023; Claassen, 2024; Coeckelbergh, 2022; Pavanini, 2022; Ritter, 2024; Van Den Eede, 2022). For example, Feenberg developed a "synthesis of theoretical and empirical approaches" (Bosschaert & Blok, 2023); Van Den Eede proposed bridging through object-oriented ontology (Van Den Eede, 2022); Coeckelbergh (2020) suggested expanding postphenomenology through concepts from the performing arts; and Claassen (2024) introduced a "social postphenomenology" that draws on Alfred Schutz to reconceptualize the basic relation as "We—Technology—World." These efforts share a recognition that current positions have become "too starkly delineated in order for the debate to reach any breakthrough" (Van Den Eede, 2022).

This paper does not aim to settle this debate; its point of departure lies elsewhere, in the question raised above of how technological meanings stabilize, destabilize, and interact across temporal scales. Yet addressing that question bears directly on the debate. Drawing on the concept of the societal landscape proposed by Hirai (2025)—the broader, slowly changing configuration of norms, values, institutions, and socio-technical practices—I develop MTS multistability: the idea that technological stabilities are generated and maintained across multiple temporal scales, conditioned by that landscape and, in some cases, contributing to its transformation. This reconceptualization connects empirical and transcendental perspectives by situating them at different scopes within the same landscape. What emerges is an empirical-transcendental theory of technics: less a further position within the debate than a demonstration that the two orientations attend to different timescales of one and the same process.

I follow Hui's distinction between technics and technology (Hui, 2016, p. 4): technics refers to the general category of making and practice across history, while technology refers to the specific modern technological regime that emerged in European modernity. In line with this distinction, I paraphrase "technologies with a small t" as concrete, local configurations of technics (such as particular devices, systems, or practices), and "Technology with a capital T" as the globalized modern technological regime that currently dominates the societal landscape by shaping its "valleys" of practices and institutions. This distinction will allow me to discuss local instantiations and societal-level conditioning within this societal landscape framework.

1.3 AIM AND SCOPE

This paper develops MTS multistability and applies it to cases involving art, disability, and technology in Japan: AI audio workshops where every day sounds become musical material, and dance performances by a collective including a performer living with ALS whose daily existence is constitutively entangled with medical technologies.

The latter case directly engages in the theme of this topical collection: cyborg-technology relations. For cyborgs, the boundary between human and technology is not fixed but dynamically configured across situations and timescales (Shew & Earle, 2024). MTS multistability offers a framework for analyzing how such boundaries stabilize and destabilize at micro-temporal levels while being conditioned by a macro-temporal societal landscape—and how micro-temporal practices might, under certain conditions, contribute to transforming the landscape.

The paper makes three contributions: it proposes MTS multistability as a Bergsonian extension of postphenomenology, outlines an empirical-transcendental methodology for studying technics, and provides an empirically grounded analysis of how AI, disability, care, and artistic expression are temporally interrelated.

1.4 STRUCTURE OF THE PAPER

The argument unfolds in five further sections. Section 2 revisits the postphenomenological concept of multistability and identifies the under-theorization of temporal structures and scale. Section 3 introduces Bergson's philosophy of time, Hirai's multi-timescale interpretation and the concept of the societal landscape, and illustrates the concept by applying it to a historical case, the Able Art Movement. Section 4 formulates MTS multistability and sketches an empirical-transcendental theory of technics. Section 5 presents two cases: AI audio workshops and dance performances by a collective including a performer with ALS, analyzing how stabilities shift across timescales and how micro-temporal experiments relate to macro-temporal landscape transformation. Section 6 concludes by summarizing the main contributions, noting limitations, and indicating directions for future research.

2 POSTPHENOMENOLOGY AND MULTISTABILITY

2.1 IHDE'S CONCEPT OF MULTISTABILITY AND EXPERIMENTAL PHENOMENOLOGY

Postphenomenology took shape in the 1990s in connection with what Achterhuis (2001) later called the "empirical turn" in the philosophy of technology. Within postphenomenology, Don Ihde's work is foundational. Ihde (2012) elaborates the notion of multistability to describe how perceptual objects and technical artifacts can exhibit multiple, context-dependent "stable" configurations, visually (e.g., ambiguous figures), as well as practically (e.g., tools used in different ways). Ihde develops this through what he calls "experimental phenomenology," a practice of probing how human-technology relations shift by varying technologies and contexts.

As the postphenomenological tradition developed, multistability became a central analytical tool. Rosenberger (2016) explicitly calls multistability a "central fixture" of postphenomenology, and Whyte (2015) describes it as a key concept for postphenomenological research. Early uses of the concept were often situated at the level of perceptual or imaginative variation, such as visual illusions or simple tools. Over time, however, multistability has increasingly been mobilized to address normative concerns and socio-political questions: how particular stabilities become dominant, whose interests they serve, and how mundane artifacts structure public spaces and social possibilities (Rosenberger, 2014).

Importantly, postphenomenology reinterprets the phenomenological practice of "variation." Whilst Husserlian eidetic variation aims at identifying invariant essences, postphenomenological variation is oriented toward revealing multiple stabilities and thereby avoiding essentialism. Rosenberger (2016) formulates this shift succinctly: where Husserl's variations seek essences, postphenomenology "discovers multistabilities" instead. In this way, multistability has come to mark both an ontological claim about technologies (they can be used and meant in multiple ways, but not arbitrarily) and a methodological stance (we investigate technologies by exploring these variations).

2.2 FROM PERCEPTUAL TO NORMATIVE MULTISTABILITY

Building on Ihde's original insights, several authors have extended the concept of multistability in different directions. Rosenberger (2014) uses multistability to analyze the "agency of mundane artifacts" such as anti-homeless benches, arguing that different stabilities correspond to distinct patterns of inclusion and exclusion in public space. Here, multistability is directly tied to political and ethical questions about whose bodies and behaviors are invited or repelled. More recently, Rosenberger (2020) has proposed "variational cross-examination" as an explicit methodology: a systematic comparison of a technology's various stabilities in order to understand how one stability comes to dominate and how this dominance can be critically assessed. Aagaard (2018) extends multistability into educational technology, showing how different stabilities unfold over time and sediment into habitual patterns. Following Whyte (2015), Pavel et al. (2020) introduce "pivot" (a shift from one stability to another) to describe how multistable technologies mediate learning processes.

De Boer (2023) offers a different kind of extension. Rather than primarily adding new empirical cases, he asks how multistability can be explained. Drawing on Gibsonian affordances and ecological niches, as well as Rietveld and Kiverstein's (2014) "landscape of affordances," de Boer argues that the multistability of a technology is grounded in structured environments and practices. Technologies can be used for multiple purposes (the "multi") but not for infinitely many (the "stability") because their affordances are shaped and constrained by forms of life, norms, and material arrangements. This work begins to link multistability to broader environmental and normative structures, but it still treats time mostly as an implicit background parameter rather than as a theoretical variable.

Taken together, these contributions have moved multistability from perceptual to practical and political concerns (Rosenberger, 2014, 2016, 2020; Whyte, 2015), from implicit methodological practice to explicit articulation (Rosenberger, 2020), and from local descriptions to partial explanatory models grounded in affordances and forms of life (Aagaard, 2018; de Boer, 2023; Pavel et al., 2020). They also already hint at temporal processes—trajectories of use, sedimentation of habits, shifts between stabilities—without fully theorizing the temporal structures involved.

Parallel to this conceptual development, some authors have sought to reconnect postphenomenology with more holistic or transcendental perspectives. Coeckelbergh (2022) proposes a quasi-transcendental register in postphenomenology; Ihde and Malafouris (2019)

revisit the figure of Bergsonian homo faber to situate empirical case studies within broader narratives of human-technology co-constitution. Pavanini (2022) connects multistability to Derrida's différance and Stiegler's general organology, reframing multistability in terms of quasi-transcendental structures of technicity, pharmakon, and organological layering. Romele (2021) proposes to move beyond the empirical turn by combining postphenomenology with Bourdieu's sociology, introducing the notion of technological capital to capture how socially sedimented dispositions shape human-technology relations. Notably, he identifies attention to the social and cultural conditions of possibility in which mediations are embedded as already present in Ihde's Technology and the Lifeworld (1990) and still practiced by a minority of postphenomenologists, Hasse among them—suggesting that what is now called the transcendental question was latent within postphenomenology from the outset.

These approaches show that the earlier opposition between "empirical studies of technologies with a small t" and "transcendental or essentialist accounts of Technology with a capital T" is already being bridged from within the field. However, even in these attempts at transcendental revision, the temporal dimension, especially the relation between different timescales of technological change, remains relatively underdeveloped conceptually.

2.3 LIMITS OF EXISTING ACCOUNTS: TEMPORAL STRUCTURES AND SCALE

So far, time is omnipresent, but the concept of time itself has remained unexamined in postphenomenological work on multistability. Ihde's historical examples presuppose long-term historical change (Ihde, 2012); Aagaard's (2018) classroom study traces shifts from minutes to semesters; de Boer's (2023) affordance landscapes presuppose the historical formation and stabilization of forms of life. Yet, in all these cases, time tends to be operationalized as a linear and homogeneous parameter: a sequence along which events and changes are ordered. The focus is on what changes and how it changes, but not explicitly on what kind of time is at stake, or on how different temporal scales interact.

Just to reiterate, temporal change itself has not gone unnoticed. Wellner (2015) reconstructs the history of the cellphone as a sequence of "historical variations," explicitly treating the stabilities of a multistable technology as changing from one generation of the device to the next; Hasse (2008, 2014) shows how scientists of different generations perceive the same experimental images differently, linking what counts as a stable perception to processes of cultural learning over time. Postphenomenology also has long-standing connections to STS perspectives—actor-network theory and the social construction of technology (SCOT)—which examine how the interpretive flexibility of an artifact reaches "closure" and stabilizes within society over time (Pinch & Bijker, 1984; Rosenberger & Verbeek, 2015). What these accounts share, however, is a picture of change along a single timeline: variations succeed one another, and flexibility closes into stability, within one temporal order. What remains untheorized is the simultaneous coexistence of qualitatively different timescales—the hours of a workshop, the decades of institutional change—and, above all, the interaction between them. It is this multi-scale structure, rather than temporal change as such, that the present paper thematizes.

This under-theorization has two consequences. First, empirical analyses of local technological practices (e.g., creative appropriations by people with disabilities) and macro-level reflections on "Technology" (e.g., discussions of Gestell) often remain methodologically and conceptually separated. They may be related narratively—"local practices aggregate into broader transformations"—but the structure of that relation, in temporal terms, is rarely theorized. Second, multistability risks being confined to short-term, situational shifts, while longer-term processes through which certain stabilities become dominant at the societal level remain described in different vocabularies, not systematically connected to the multistability framework.

In short, the temporal aspect of multistability is already present in the empirical materials; however, the temporal concepts remain underdeveloped; predominantly linear, single-scale, and descriptive rather than analytical. As Coeckelbergh (2022) himself admits, even recent attempts at transcendental holistic revisions have largely left the temporal dimension unaddressed. This points to the need for a framework that can integrate situational pivots with the long-term sedimentation of societal landscape.

3 BERGSONIAN TIME AND SOCIETAL LANDSCAPE

3.1 BERGSON'S CONCEPT OF DURATION AND HIRAI'S MULTI-TIMESCALE INTERPRETATION

To bridge the empirical and transcendental positions, I wish to focus on Bergson. Bergson is widely regarded as an influential precursor of the French theory of technics and has been frequently referenced by philosophers associated with transcendental approaches, such as Stiegler and Hui (Stiegler, 1994/1998; Hui, 2016, 2021, 2024a, 2024b); as well as by figures associated with more empirical approaches, such as Ihde (Ihde & Malafouris, 2019); and by philosophers who seek to bridge these positions, such as Pavanini (2022), who reframes multistability through the lens of Stiegler's general organology, and Coeckelbergh (2023). The key concept of Bergson's philosophy of time is durée (duration), which refers to a qualitative lived time, preceding quantitative measurement. Moments are not temporally separated but interpenetrate with each other, constituting durée as heterogeneous time.

Building on this foundation, Hirai (2022) proposes a "multi-timescale" interpretation of Bergson, first formulated in Japanese and subsequently elaborated on in English (Hirai, 2023a; Hirai & Kobayashi, 2025; Taniguchi et al., 2025). Its point of departure is that durée is not a single, universal flow. As Bergson's notion of the multiplicity of durations suggests, every process has its own intrinsic timescale. Bergson's renowned example is sugar dissolving in water: if I want a glass of sugar water, I must wait until the sugar dissolves, and this duration "cannot be extended or shortened at will" (Bergson, 1907, p. 10, as translated in Taniguchi et al., 2025). The same holds for lived experience. Human consciousness operates within a "window of the present" spanning a few seconds: changes that are too fast (the vibrations of light) or too slow (the growth of a plant) escape direct experience (Hirai, 2022, 2023b; Taniguchi et al., 2025). What we live through as the simple quality "red," for instance, is the contraction of hundreds of trillions of vibrations per second into this far coarser window (Bergson, 1896, Chapter 4). Quality—and, more broadly, consciousness—thus arises not at any single scale but from the gaps and interactions between scales; the particular "slowness" of consciousness relative to microscopic phenomena is not a limitation but an enabling condition (Taniguchi et al., 2025).

For the present argument, one further distinction in this interpretation is crucial. Taniguchi et al. (2025) distinguish multiple axes of timescales that should not be conflated: one axis concerns the layered temporal structure within an individual organism, from material processes through sensation and the window of the present to memory; another concerns the timescales over which "landscapes" of adaptive action are formed through canalization—over evolutionary time, over an individual's learning, and, in humans, over the cultural formation of norms, institutions, and language. It is this second axis that the present paper pursues. This interpretation thus yields precisely the conceptual resource whose absence Section 2.3 diagnosed: a picture of time not as a linear, homogeneous parameter but as a stratified system of coexisting, interacting timescales, in which the landscapes conditioning action are themselves formed and transformed at characteristic timescales.

3.2 SOCIETAL LANDSCAPE: NORMS, INERTIA, AND TRANSFORMATION

Building on this multi-timescale interpretation, Hirai (2025, 2026a, 2026b) introduces the notion of a societal landscape. The societal landscape refers to the dynamic structure of a society's norms, values, and collective behaviors as shaped over long periods through canalization. Hirai derives this concept by reconstructing Bergson's theories: the structure of societal transformation in The Two Sources of Morality and Religion; the theory of perception as action possibilities in Matter and Memory; and the canalization theory of evolution in Creative Evolution. The reconstruction incorporates insights from contemporary sciences such as dynamical systems theory. The concept offers a perspective that views individual experience and collective society not as separate entities but as interconnected through interactions across hierarchical levels (Taniguchi et al., 2025).

The societal landscape is constructed as a network of constraints formed by the collective interference of diverse individual landscapes, and can be pictured as a landscape with “valleys” (or “attractors” in dynamical systems theory terminology): relatively stable configurations in which it is energetically easiest for people to act. As these valleys have been carved out by the accumulation of long-standing customs and institutions, acting along them is the most natural and least resistant option for individuals. Societies exhibit strong inertia because this stability is maintained by the mutual interference of forces, where contradictory elements are neutralized and remain virtually persistent in the collective consciousness, leading to a robust but “banal” collective configuration, one in which individual traits are not erased but merely obscured within the collective configuration. Consequently, even heroic acts or political revolutions tend to be neutralized by the pull of existing valleys, and thus, the societal landscape rarely transforms overnight. Instead, change typically unfolds as follows: First, “innovators” articulate new visions. Subsequently, resonance occurs through de-neutralization: the innovator's message reactivates latent experiences submerged within followers' deeper selves, bringing them to the forefront. The emergence of early adopters, as well as imitators who emulate the innovator’s gravitational effect, amplifies this momentum, and this resonance gradually propagates through the societal landscape, diminishing the stability of the old equilibrium. When it radically transforms the shape of the attractor basin until a threshold is crossed, it finally leads to an unstoppable, sudden shift.

The concept of societal landscape resonates with Rietveld and Kiverstein’s (2014) “landscape of affordances” and with de Boer’s (2023) attempt to explain multistability in terms of affordance structures and forms of life. These concepts share a common structure: a landscape that simultaneously enables and constrains actions. The landscape of affordances describes how bodily skills and material environments together structure a field of possible actions; de Boer, as discussed in Section 2, extends this idea by grounding multistability in structured environments and forms of life. However, these accounts tend to treat the landscape as a snapshot at a given moment, without theorizing how it transforms over time. Hirai's societal landscape can be read as a temporal extension: a long-term, slowly changing topography of norms and values that not only embeds affordance landscapes and multistable technologies but also provides a framework for understanding their transformation.

By employing a multi-timescale model, we can thus conceptually bridge the gap between local practices and societal transformation. Time is treated as stratified and interactive: there are different levels and rhythms of change, and their interactions produce characteristic patterns of stability and transformation. This provides a conceptual resource for thinking about the temporal aspect of multistability not merely as “change along a single timeline” but as the outcome of interactions between multiple temporal scales.

In the next subsection, I illustrate the societal landscape concept by applying it to a historical case, the Able Art Movement.

3.3 HISTORICAL EVIDENCE FOR LANDSCAPE TRANSFORMATION: THE ABLE ART MOVEMENT (JAPAN, 1990S-PRESENT)

In 1973, Yasuo Harima initiated a movement to establish a community-based house of independence, where students from special needs schools could live with purpose after graduation. With the support of many supporters, the welfare facility “Tanpopo-No-Ye” was established in 1980 in Nara Prefecture, Japan. Throughout the 1980s, the facility developed programs that incorporated cultural and artistic activities into daily care for people with physical and intellectual disabilities. In 1995, Harima proposed the “Able Art Movement,” a civic art movement that sought to view the energetic and expressive activities of people with disabilities as a new form of art that restores humanity and explores various possibilities therein.

3.3.1 The Societal Landscape Before Transformation

In Japan during the 1990s, disability was primarily framed through medical and welfare models. People with disabilities were primarily positioned as recipients of care and support, and expressive activities in welfare facilities were generally positioned as means of therapy or as recreational, not evaluated as creative work.

There was a distinct segregation by canalized valleys in the societal landscape. “Disability” belonged to the domain of medicine and welfare, while “art” belonged to the domain of culture and the arts; the two domains were separated both institutionally and conceptually. For a person with a disability to be recognized as an “artist”—as someone whose work merits exhibition, sale, and critical attention—was exceptional and nearly inconceivable. Deeply moved by the works created by people with disabilities, Harima referred to individuals with disabilities who create art as “artists of the soul,” also embedding a critique of the contemporary art scene. This was a significant deviation from the societal landscape in Japan at the time, where “disability art” was perceived to be of lower value compared to fine arts.

3.3.2 Articulation

Harima's proposal of the Able Art Movement constituted an act of articulation, the first step in transformation, whereby innovators articulate new visions. Harima did not simply advocate for more art activities in welfare settings but proposed a reframing: that artistic expression can become a foundation for people with disabilities to connect with the world, that such expression has intrinsic value beyond therapeutic effects, and that people with disabilities can and should be recognized as artists. This articulation gave communicable form to what had been scattered practices and possibilities. The Able Art Movement provided a name, a concept, and a vision that could propagate.

3.3.3 Resonance, Propagation, and Transformation

Harima's articulation resonated deeply. Early adopters, including operators and staff of other welfare facilities, art directors interested in collaboration, and curators who had been drawn to what had been called “Outsider Art” or “Art Brut,” resonated with this proposal. From the early stages of the activities, corporations such as Toyota Motor Corporation participated, and activities including exhibitions, symposia, and publications were actively developed. From the 2000s, imitators emerged from among those who learned about the movement through exhibitions, symposiums, and publications, and it propagated one after another throughout Japan. Similar programs began at other facilities, led by people as enthusiastic and charismatic as Harima. Exhibitions were organized, networks were formed, and publications appeared one after another.

Thirty years after Harima's articulation, the transformation of the societal landscape in Japan is evident. Funding programs specifically supporting artistic activities by people with disabilities have been established by the government. Museums and galleries have begun exhibiting works by artists with disabilities not as curiosities but as legitimate contributions to contemporary art.

Professional roles have emerged, including art coordinators at welfare facilities, curators specializing in this area, and researchers studying the intersection of disability and creativity. Training programs and publications have codified and transmitted new understandings. What was once a radical reframing gradually became an established option—a new valley in the societal landscape.

3.3.4 The Current Landscape

Today, roughly thirty years after Harima's initial articulation, the societal landscape in Japan has undergone observable transformation—at least in the welfare and art sectors. The proposition that people with disabilities can become artists, and that welfare facilities can become sites of artistic production, is no longer radical. It is widely accepted, institutionally supported, and materially resourced. This does not mean the transformation is complete or uncontested; older framings (disability as deficit; art activity as therapy) persist, and multiple valleys coexist. Nevertheless, the case can be read as illustrating a macro-temporal pattern of landscape change—articulation, resonance among early adopters, propagation through imitators, and the gradual stabilization of a new valley—thereby lending plausibility to the societal landscape framework. In the next sections, I will use this framework to reconceptualize multistability as *multi-timescale multistability* (MTS multistability) and to analyze how empirical interventions in concrete technics relate to long-term transformations in the societal landscape of technics.

4 MTS MULTISTABILITY

4.1 MTS MULTISTABILITY: COEXISTENCE, LOCAL AND SOCIETAL DYNAMICS

By engaging the key concept of multistability in postphenomenology with an expanded Bergsonian philosophy of time, we can reconceptualize this concept. Multistability does not merely refer to the coexistence of multiple stabilities. It is a temporal process wherein one stability emerges, interacts with other stabilities, and transforms. MTS multistability is the view that human-technology relations stabilize through processes of interaction that unfold across multiple temporal scales, from momentary attunements to transformations of the long-term societal landscape. It analyzes both (i) the coexistence and switching of stabilities in local practice and (ii) the conditions under which such local perturbations propagate, canalize, and reshape the societal landscape.

The concept of societal landscape explains why different stabilities coexist rather than merely succeeding one another independently. The stability that was previously dominant for a technology becomes a canalized valley within the societal landscape, influencing its current use and the imagination of its future. What Rosenberger (2020) identifies as a dominant stability can thus be redescribed in temporal terms: dominance is the depth of a canalized valley, formed and maintained over macro-temporal scales—and the question raised by variational cross-examination, of how one stability comes to dominate, receives here a multi-timescale answer. When people begin to find different meanings in a technology (e.g., freely interpreting a tool designed for one purpose and discovering alternative meanings), the transformation of the societal landscape initially remains confined to a local scope. Consequently, the new stability coexists with the stability that is already canalized and widely spread.

Due to the transformation unfolding differently depending on the scale of the community involved, I introduce an axis with local and societal as its poles to describe the scope of resonance within the societal landscape. I call site-specific, locally coherent manifestations of the societal landscape "local instantiations." Here, local refers to small communities (e.g., early participants in a social movement, performers and audience gathered for a performance), whereas societal refers to society-wide patterns of norms and institutions. Transformation

within a local instantiation can sometimes occur in a matter of hours—for instance, participants' values may transform through discussion in a symposium or through the experience of a performance. In contrast, transformation at the level of the societal landscape typically unfolds over decades through articulation by innovators, resonance through the de-neutralization of early adopters, and the emergence of imitators. From a broader perspective, a transformation within a local instantiation can itself be understood as a micro-temporal perturbation that may or may not propagate to the societal level.

4.2 BRIDGING EMPIRICAL AND TRANSCENDENTAL ORIENTATIONS

By introducing the concept of the societal landscape, we can bridge the transcendental and empirical positions. The transcendental position, which sees "Technology with a capital T," is typically framed as a macro-level discussion from a "high-altitude" (Lemmens, 2022) or "bird's eye" (Van Den Eede, 2022) perspective. This "Olympian perspective" (Rietveld & Kiverstein, 2014) surveys the societal landscape "from the outside" (Rosenberger, 2014), focusing on structural regularities and conditions of possibility rather than the lived experience within specific technological practices. In contrast, the empirical position, understood as "technologies with a small t" (Lemmens, 2022), is typically framed as a micro-level discussion "from within" (Rosenberger & Verbeek, 2015), focusing on individual, concrete local instantiations in a "first-person perspective" (Rosenberger & Verbeek, 2015; Ritter, 2024). Since both are discussions about the societal landscape, there is no need to view them as a dichotomous opposition.

Efforts at specific, concrete sites tend to lean empirical, yet they can simultaneously possess transcendental reach. For example, in discussions about the nature of technologies surrounding cyborgs, such as those involving people with disabilities, it is entirely possible to engage with specific, concrete cases, analyzing and describing them meticulously and deeply (empirical), while simultaneously aiming to collectively transform people's values and customs over the long term (transcendental). Of course, a transformation of the societal landscape takes time. However, the first step lies in articulation by innovators and how this connects with early adopters who resonate with it, triggering de-neutralization. Engaging in articulation at each here-and-now site is entirely consistent with aiming to carve new valleys and canalize into a societal landscape that tends to position such articulation as deviant or marginal.

The foregoing discussion suggests that what is needed is not a choice between empirical and transcendental orientations, but a framework that integrates both.

4.3 AN EMPIRICAL-TRANSCENDENTAL THEORY OF TECHNICS

This framework motivates an empirical-transcendental theory of technics. This term requires unpacking.

Traditional philosophy of technology adopted a transcendental stance. Heidegger, for example, is often read as contrasting ancient Greek technē with modern technology, arguing that the essence of modern technology—Technology—lies in Enframing (Gestell) (Hui, 2016). Postphenomenologists have criticized such accounts as essentialist and too abstract, divorced from our lifeworld (Rosenberger & Verbeek, 2015).

MTS multistability suggests a different transcendental register—temporal rather than essentialist. The "conditions of possibility" for particular stabilities are not static essences but historically formed valleys that are transformable through sustained intervention. To pose transcendental questions is to ask about the macro-temporal societal landscape, the sedimented valleys, and the mechanisms of canalization and enabling that condition how multistability is generated and changes.

This yields an empirical-transcendental approach with two moments. The empirical moment analyzes specific technologies as mediations: how particular people engage with particular technologies, how stabilities shift, how new configurations are attempted. The transcendental moment asks about conditions: what the societal landscape makes possible, how they have been formed, how they might be transformed. The hyphen between empirical and transcendental signifies that these two are not opposed on the same scale but are positioned at different scopes, local instantiations and the societal landscape, enabling productive movement between micro-temporal observation and macro-temporal questioning.

The novelty of this theory lies in treating transcendental conditions not as fixed essences but as a societal landscape capable of long-term transformation, and in analytically capturing its interaction with emergent stabilities in a local instantiation. This also marks the difference from Romele's (2021) Bourdieusian proposal: where technological capital and habitus name the socially sedimented conditioning of human-technology relations, the societal landscape plays an analogous role here—but its formation, maintenance, and transformation are explicitly theorized as processes unfolding and interacting across multiple timescales.

4.4 METHODOLOGICAL NOTE

A robust evaluation of MTS multistability would require longitudinal research spanning decades, which lies beyond the scope of this paper.

The analysis serves a different function: exploratory case studies that test the framework's applicability and generate hypotheses. The two cases were selected from the project introduced in Section 5 for two reasons. First, they instantiate contrasting modes of multistability: Case 1 concerns a technology intentionally brought into the disability context from outside (an AI audio plugin), while Case 2 concerns technologies already constitutive of a participant's daily existence (medical devices). Second, they operate at micro-temporal scales that complement the macro-temporal evidence of Section 3.3, allowing the framework's claims about different timescales—and their interaction—to be examined from both ends. Together, these materials function as prototypes rather than tests.

Methodologically, the analysis can be understood as a temporal extension of postphenomenological variational analysis (Rosenberger, 2020): where variational cross-examination compares a technology's stabilities across contexts and uses, and the present analysis additionally compares them across timescales. The empirical materials consist of project documentation, video recordings of the workshops and performances, participants' statements during the collective reflection sessions that concluded each workshop, documented post-performance reflections by audience members, and records of post-screening talks. The analysis proceeded in three steps: identifying the initial stability of each technology as configured by its designers and institutional context; tracing shifts in stability through documented episodes and participants' own formulations; and distinguishing, in the terms of Section 4.1, between directly observed articulations and indications of nascent resonance or canalization, which remain hypothetical.

The author has been involved as the general supervisor of the project that includes the two cases. This position afforded sustained access to the practices analyzed, but it also creates a risk of overinterpreting signs of transformation. To mitigate this, the analysis relies not solely on the author's own interpretations but on documented participant reflections, and it notes instances where expected transformations did not occur or remained ambiguous.

5 MTS MULTISTABILITY IN PROJECTS WITH PEOPLE WITH DISABILITIES

This section applies the framework of MTS multistability to a series of interconnected cases involving art, disability, and technology in Japan. These cases are drawn from a broader context that itself exemplifies multi-timescale dynamics.

In 2004, Tanpopo-No-Ye opened “Art Center HANA” (hereafter referred to as HANA) as part of its facilities, a community-based hub for exchange where people with disabilities engage in diverse cultural and artistic activities, including painting, poetry, theater, dance, and music. The activities of artists with disabilities at HANA and similar facilities continue to face ongoing challenges—for example, changes in physical and mental condition due to illness, accidents, aging, or progression of disability. Continuing expressive activities as conditions change requires exploring various tools and techniques, and finding new ways to create. Indeed, Atsuko Takeda, an artist who has been active at HANA since its earliest days, had been finding it increasingly difficult to continue her expressive activities due to the progression of her disability with age.

In August 2020, Tanpopo-No-Ye launched a project to explore how emerging technologies such as generative AI might sustain and extend the expressive activities of artists with disabilities. After a preparatory period, this initiative was selected for the Agency for Cultural Affairs’ “Project for Promoting Cultural and Artistic Activities by Persons with Disabilities,” and has been operating as the “Art for Well-being” project since April 2022. This project is a collective exploration of new horizons in expression, care, and technology, comprising various sub-projects deployed across Japan. Each sub-project begins with micro-temporal experiments that transform the local instantiations of the societal landscape while aiming for resonance with broader communities through events, exhibitions, and publications. Each sub-project involves a person called a *technician*. Here, *technician* refers to a practitioner of technē, an attempt to reclaim the term to denote individuals who possess the knowledge and craft of poiesis, rather than artists or engineers, who have been divided into modernity. The following analysis examines two cases that together exemplify different aspects of MTS multistability.

5.1 CASE 1: SHIFTING STABILITIES OF AN AI AUDIO PLUGIN

This case examines a series of workshops titled "Re-tuning the Lifeworld: Discovering music in everyday sounds through timbre transfer AI," which explored AI as a mediator for creating new encounters with sound, neither assisting people with disabilities nor replacing human creative activities, and reports on micro-temporal multistability.

5.1.1 Neutone and the workshop design

Neutone Morpho (Neutone Inc., 2024) is a plugin for music production software developed by Neutone Inc., led by artist/researcher Nao Tokui. (Hereafter, the plugin is referred to as Neutone.) Based on algorithms developed independently, it can perform real-time timbre transfer (e.g., transforming voice into the sound of a violin ensemble). Not only are dozens of pre-trained models available, but users can also extend their own models using the provided training service.

Neutone was originally designed as a studio tool for music producers, but these workshops brought this technology into contact with participants outside the initially intended user community. This intentional appropriation created conditions under which new meanings could emerge through creative engagement. While Suno and Udio are well-known generative AI services for music, these generate finished songs all at once according to prompts. Completely different from these, the choice to focus on AI that generates timbre as raw material for compositions was motivated by a hypothesis: that working with sonic materials would be closer

to the experience of repeatedly layering strokes with pencils or brushes, rather than asking a machine to complete a painting all at once.

In the first phase, two workshops were held. The first workshop was held on August 26, 2023, for 3.5 hours, with 15 participants divided into 4 groups: 5 members with disabilities from HANA, 8 staff members from Tanpopo-No-Ye (hereafter referred to as staff), and 2 guests. The second workshop was held on January 13, 2024, for 4 hours, with 18 participants divided into 4 groups: 9 general participants, 4 from "Otoasobi-no-Kai" (an artist group comprising people with intellectual disabilities), and 5 staff members and others. Each group was organized to include at least one person capable of basic operations with music production software. Both workshops followed the same sequence: (1) "Ear Cleaning"—a listening exercise devised by composer Raymond Murray Schafer, in which participants listen attentively to surrounding sounds for a set period, note the closest and farthest sounds heard, and share what they heard. (2) A short lecture expanding the concept of music using examples such as ambient music. (3) Introduction of the goal of creating "sound-music"—something between lifeworld sounds and conventional music. (4) Overview of Neutone. (5) Listening to the real-time transformation of a microphone input through Neutone. (6) Recording sound materials in the field. (7) Creating sound-music using music production software and Neutone. (8) Group presentations and collective reflection. For the first phase, Tokui served as the *technician*, responsible for designing and facilitating the workshops.

5.1.2 Micro-temporal observations: shifting stabilities

At the beginning of the workshops, participants tended to understand the meaning of Neutone as a sophisticated sound-effect processor, as initially configured by its developers. This initial stability positioned Neutone as a tool, something used instrumentally to transform input into novel output.

Through the workshop process, this stability began to shift. When participants began transforming various sounds collected through field recording with various Neutone models, something unexpected happened. Rather than simply transforming familiar sounds into novel ones, the process revealed previously unnoticed aspects of participants' everyday sonic environments. Participants discovered rhythmic patterns in breathing and keyboard typing sounds, found musical possibilities in noise that had been dismissed as merely “noisy” or “irritating,” and developed sensitivity towards sonic textures they had never previously attended to.

In the first workshop held at HANA, participants recorded sounds both inside and outside the facility: the sound of outdoor air conditioning equipment, sounds produced when wheelchairs move, the voice of a member (HANA calls facility users who have disabilities “members”) who loves chatting, the sound of water from a faucet hitting a bowl, cooking sounds, and so on. In the second workshop held at a music university, participants recorded sounds such as the engine noise of low-flying aircraft, the sound of hitting trash cans, the sound of closing door locks, rain sounds, footsteps. These lifeworld sounds, many of which are typically classified as “noise” or simply pass by unnoticed, became materials for musical exploration when transformed through Neutone. At this stage, Neutone's stability had become that of a mediator directing intentionality toward the trivial sounds of the lifeworld.

In collaborative work, Neutone's stability shifted further. Participants began referring to the AI not as a tool they use, but as a creative partner. In the reflection, one participant from the second workshop reported: “It became a ‘session’ where people who actively participate according to their interests would take turns for each task, and the AI felt like one of those participants.” This formulation is significant. It positions AI not as a tool subordinate to human intention but as a participant in a collaborative process, suggesting a shift in stability from tool to mediator of intentionality to session partner.

Thus, Neutone mediated not only the transformation of sounds but also transformations in perception and relation. The workshop cultivated what might be called “intentionality toward various sounds embedded in the lifeworld”—an intentionality that treats everyday acoustic phenomena as potential musical materials rather than as background to be ignored or noise to be eliminated. This intentionality, arising through the mediation of ear cleaning and Neutone as a technology, persisted even after the mediators disappeared, as participants themselves were transformed through the workshop experience.



Figure 1. Field recording around the HANA facility during the first workshop of the series "Re-tuning the Lifeworld: Discovering Music in Everyday Sounds through Timbre Transfer AI." Participants—including a member with disabilities—and staff collect everyday sounds around the building, such as the sounds of a moving wheelchair and of outdoor air-conditioning equipment, which later become materials for musical exploration (see Section 5.1.2). Photo: courtesy of Tanpopo-No-Ye Foundation.



Figure 2. Constructing "sound-music" from the collected materials. A member and staff gather around a single computer, transforming field-recorded sounds with Neutone Morpho's timbre-transfer models and assembling them into a collaborative composition (see Section 5.1.2). Photo: Natsumi Kinugasa.

5.1.3 Analysis: Conditions for destabilization and articulation

The shifting stabilities can be analyzed in terms of the framework developed in Section 4. The workshop design intentionally created conditions for destabilization: by bringing Neutone into contact with non-expert users, by framing the goal as “sound-music” rather than conventional music production, and by beginning with the “ear cleaning” exercise that prepares participants to direct intentionality toward trivial lifeworld sounds that normally do not come to consciousness. These workshop design choices loosened the constraints of the initial stability and opened space for alternative stabilities to emerge. The collaborative structure of the workshop facilitated intersubjective negotiation of meaning. Through sharing recordings, engaging in dialogues about their experiences, and co-creating works, participants collectively developed new ways of understanding what Neutone is and its purpose. The emergence of shared vocabulary “sound-music,” and “session partner”represents nascent articulation: the crystallization of new understanding into a communicable form.

5.1.4 From Articulation to Nascent Resonance

In this workshop, an alternative stability of AI was articulated. In the current societal landscape, a dominant stability of AI lies in its use as a tool for prediction, efficiency, optimization, and cost-effective content creation. This stability limits the design and deployment of AI to specific applications such as recommendation systems, diagnostic tools, and content generation services, marginalizing others. In contrast, an alternative stability was presented in these workshops: AI as a medium for perceptual exploration, relational engagement, and creative partnership. This stability does not position AI as a replacement for human capabilities or as a tool for achieving predetermined goals more efficiently. It positions AI as a participant in open-ended processes of discovery and expression.

Whether these micro-temporal experiments will contribute to macro-temporal transformation cannot be determined within the temporal scope of this paper; however, nascent indications can be observed. For example, two staff members from a facility for people with severe motor and intellectual disabilities who participated in the second workshop felt that there was great potential in this workshop and developed an adapted version for their own facility the following year. At the same time, Neutone Inc. became aware of such users and, with external funding, is developing a prototype of dedicated hardware that is easy to use in the field. This is a definite indication that resonance with the initial workshops is beginning to propagate. At the time of writing, trials are underway at that facility as part of music classes, with efforts toward “performing” and playing together by transforming sounds generated by subtle movements and breathing of children with severe disabilities into instrumental sounds. If this is realized, not only will further stability emerge, but it could also expand the concept of playing an instrument. However, at the time of writing, broader resonance is at best nascent. Therefore, it is reasonable to position this workshop as a prototype to demonstrate possibilities rather than an established practice.

5.2 CASE 2: BLURRING THE BOUNDARIES BETWEEN CARE AND EXPRESSION

This case examines the creative practice of a collective called "The Vanishing Mediator: Where technologies dissolve and bonds form," which includes a physical performer living with ALS, and reports on micro-temporal multistability at the intersection of expression, care, and technology.

5.2.1 Background: Hideo Arai and the Formation of the Collective

Hideo Arai is a physical performer and dance artist who learned Noguchi Taiso—a body method that “releases muscle tension and draws out supple power by entrusting the body to gravity and movement”—directly from its founder, Michizō Noguchi. Alongside stage activities in Japan and abroad, Arai has conducted workshops on physical expression and nonverbal communication

for a diverse range of participants, including those with and without disabilities, at various social welfare settings.

In the summer of 2022, Arai was diagnosed with ALS. Since then, in addition to his previous position as a "supporter" of people with disabilities, he has continued to develop new forms of activity and expression from his position as a "person living with ALS." This shift in positionality is significant. Arai's engagement with disability is no longer external but lived, and his relationship with technology is no longer optional but a daily constituent of his existence.

Shin Sakuma, a Javanese dancer who knew Arai but had never performed directly with him before, proposed creating a performance together. This led to the formation of a collective comprising Arai, Sakuma, and Kiyoko Itasaka (a practitioner of physical expression and visual artist who is also Arai's partner) as physical performers, and Yasuaki Kakehi (an interactive media researcher and artist) as the technician. This collective operates under the name "The Vanishing Mediator: Where technologies dissolve and bonds form" (Tokete-iku tekunorojī no en-musubi)[1], explicitly situating its practice at the intersection of expression, care, and technology.

The collective has been active over two seasons: from October 2023 to February 2024, and from July 2024 to January 2025. In each season, they conducted two private trial-and-error sessions, followed by a performance as "a public experimental workshop" positioned as spaces for reconsidering expression and care, with approximately 20 invited audience members. Note that the term "experiment" here refers not to hypothesis testing in engineering or natural sciences, but to a collaborative attempt at something whose outcome is not known in advance.

5.2.2 Cyborg-Technology Relations and the Question of Boundaries

As Shew and Earle (2024) discuss in framing this topical collection, for "cyborgs,"—people who live with technologies such as wheelchairs, prosthetics, pacemakers, hearing aids, cochlear implants, and medications—the boundary between human and technology is not clear. To be a cyborg, as they suggest, is "to be forced to recognize the radical interdependence of your life, to take care as a matter of survival."

Verbeek (2011) extended the schema of human-technology-world relations in postphenomenology proposed by Ihde, adding cyborg relations and representing them with the schema (human/technology) → world. This schema suggests that a human and technology form a unit, and the person's intentionality is directed toward the world. However, the slash still suggests a boundary; a division between human and technology, even if they function together.

As Shew and Earle criticize, this schema does not match the lived reality of actual cyborgs. Not only in the case of technologies that are implanted in the body and cannot be removed, such as pacemakers and cochlear implants, but also in the case of removable technologies like wheelchairs and prosthetics, the relationship with technology is often experienced and thematized, even when physically separated from it. Technology is not simply a tool used only when needed; it is woven into one's sense of self, capabilities, and daily rhythms.

For Arai, living with ALS means living with an ensemble of various medical technologies, including a suction device for removing phlegm, a pulse oximeter for monitoring oxygen saturation, a LIC (Lung Insufflation Capacity) trainer for respiratory rehabilitation, and a high-performance powered wheelchair (M3 Corpus) made by Permobil with electric positioning functions to prevent pressure sores, among others. These are not technologies he has chosen

[1] The Japanese *tokete-iku*, written in hiragana, superimposes two senses of *tokeru*—"to dissolve" and "to come untied"—senses that the English *dissolve* (from Latin *dis-solvere*, to loosen apart) happens to unite: the name announces at once a technology receding into the background and a loosening of the meanings a technology has been assigned, out of which new bonds (*en-musubi*, the tying of relational ties) form.

for expression, but technologies necessary for living his daily life. In the societal landscape, these technologies are firmly situated within the domain of “care and medical practice,” a domain understood as categorically quite different from “artistic expression.”

Through long-term institutional differentiation, professional specialization, and conceptual habit, “medical devices” and “tools for art” have been canalized into separate valleys. This separation shapes the possibilities of our thinking. It makes it natural to assume, for example, that a catheter is for suctioning phlegm and that entirely different tools are needed for artistic expression.

5.2.3 Performance: Crossing Categorical Boundaries

In the public experimental workshops, there were moments when the boundary between “tools for care” and “tools for expression” was crossed. For example, Arai and the other performers used a medical catheter as a tool for expression in the performance, producing a bubbling sound reminiscent of a frog. From the perspective of the catheter's designers and the medical system that provides it, this is clearly an off-label use. But that purpose is merely what the designers intended. It is possible to interpret it freely and appropriate it as one's own. The multistability of the catheter was actualized through Arai and colleagues' creative appropriation.

In another scene, the performers incorporated respiratory rehabilitation training into the performance, using devices such as a pulse oximeter—a clip-shaped device attached to the finger to measure heart rate and blood oxygen saturation (SpO_2), and a LIC trainer, a respiratory rehabilitation device equipped with an Ambu bag and a flow meter that is squeezed by hand to ventilate the lungs. This training, typically situated in the domain of medical care, became movements with both therapeutic and expressive significance when incorporated into the performance.

Furthermore, throughout the entire piece, Arai skillfully operated a high-performance powered wheelchair equipped with electric positioning functions designed to prevent pressure sores, developing a dance that made extensive use of very slow circular and vertical movements. In the medical context, the wheelchair is a technology for postural change and mobility support; in the context of artistic expression, it became an extension of Arai's body.

In these moments, the stability of technologies shifted. The catheter was no longer only a medical device but also a sound-producing instrument. The Ambu bag was no longer just a respiratory assistance device, but also a prop in a performance. The wheelchair was no longer only a mobility device with pressure sore prevention functions but also an extension of a dancing body. These shifts do not negate the stabilities of these technologies in care; Arai still needs them for survival, but they have opened up new stabilities that resist the deep valleys carved into the societal landscape.

Furthermore, it is also suggestive that Kakehi introduced a technological device as a mediator into this performance, one that was expected to be gradually dismantled and fade into the background. These devices were composed of flexible foam tubes available at home improvement stores and small motors, and continued to rotate slowly. Without any sensor-based control, a moderate gap was provided between the pipe and the motor shaft, allowing it to spin freely when the pipe struck an object. This device was part of a relationship of mutual interaction, influencing the movements of the performers as they were part of the environment, while also being freely modified by the performers. Even when the device that had mediated the performers' subtle movements was dismantled, and the mediator's presence disappeared, the intentionality toward those movements remained as an experience through the transformation of the individual landscapes of the performers and audience members. Unlike embodiment relations in postphenomenology, this is human intentionality cultivated by technology, as in Case 1.



Figure 3. Performers of the collective The Vanishing Mediator interacting with slowly rotating objects composed of flexible foam tubes and small motors, during a public experimental workshop in the collective's second season (2024–2025). Hideo Arai dances with his powered wheelchair, while Shin Sakuma and Kiyoko Itasaka respond to the objects with their bodies. With no sensor-based control, a tube spins freely when it strikes something, so that the objects both influence and are influenced by the performers' movements (see Section 5.2.3). Photo: Ryuichi Maruo.



Figure 4. Medical catheters becoming instruments. In the collective's second-season public experimental workshop, three performers, each holding a catheter in their mouth, blow air into liquid, producing bubbling sounds reminiscent of frogs; Shin Sakuma strikes a frog-like pose. The scene enacts the crossing of the boundary between "tools for care" and "tools for expression" analyzed in Section 5.2.3. Photo: Ryuichi Maruo.

5.2.4 Micro-temporal Observations: “Something Not Yet Named”

Those who witnessed the performance included individuals with high levels of expertise and extensive experience in their respective fields, including medical professionals such as a doctor and an occupational therapist, researchers in disability studies, performers and developers. In post-performance reflections, a striking phrase appeared repeatedly: “something not yet named.” This formulation is significant. It indicates an experience that cannot be easily captured

by the labels attached to existing categories of expression and care. The performance was neither mere expression nor mere care. It was between these categories, straddling across ridges from valley to valley, deeply carved in the societal landscape.

From the perspective of MTS multistability, this namelessness is a marker of a new stability. A new configuration came to vision; a way of connecting expression, care, and technology that existing categorical structures do not accommodate. This configuration has not yet been articulated in a way that would enable propagation through language. However, since it has been articulated as a physical expression and recorded on video by professionals, propagation through recorded video is possible. Whether a stable name or concept will emerge, and whether imitators will appear, remains to be seen.

5.2.5 Care, Expression, and Temporality

This performance highlights the temporal dimension of care in a manner that resonates with Puig de la Bellacasa's (2017) ethics of care. As Puig de la Bellacasa argues, care involves practices of maintenance, attention, and responsibility that unfold in time and create relations of interdependence. It is not a one-time intervention but an ongoing commitment. It operates not in the time of efficiency and optimization but in the time of patience, repetition, and attentiveness to the rhythms of vulnerable bodies.

In this performance, care practices such as respiratory rehabilitation training, monitoring, and positioning were not hidden backstage or separated from the expressive content, but were instead incorporated into the performance itself. The rhythms of care became part of the rhythms of expression. The attentive attitude required for care—"looking carefully, listening carefully"—became part of the attention that constituted the audience's aesthetic experience.

This incorporation suggests a possibility that is obscured by the dominant societal landscape; that care and expression need not be separate domains but can interpenetrate. The separation of care into the "medical" domain and expression into the "art" domain is a valley carved collectively by the majority, not a natural necessity. By crossing this boundary in practice, the performance made visible the possibility of reintegration.

From a multi-timescale perspective, this reintegration is still operating at the micro-temporal level of the performance itself. Whether it can contribute to macro-temporal transformation—i.e., the transformation of the societal landscape that separates care and expression—depends on whether the experience resonates with a broader range of people and whether imitators emerge.

5.2.6 Potential Resonance

Like Case 1, this case is also a prototype, but there are signs of potential resonance. To date, three screening events have been held, featuring screenings of the recorded performance video followed by post-screening talks by the performers. A total of over 100 participants attended, and enthusiastic dialogue was observed after each event. This suggests that this articulation may resonate with multiple communities in the near future. Whether this initial interest will develop into broader resonance remains to be seen.

5.3 CROSS-CASE ANALYSIS: TEMPORAL DYNAMICS OF THE LANDSCAPE

So far, we have examined two local instantiations through the lens of MTS multistability. We now integrate the findings from Cases 1 and 2, while using the Able Art Movement (Section 3.3) as a macro-temporal reference point for thinking about societal landscape transformation.

5.3.1 The Nested Structure of the Cases

The analysis forms a nested temporal structure that exemplifies multi-timescale dynamics. Section 3.3 provides historical evidence of macro-temporal transformation in Japan's societal landscape. Within the societal landscape shaped in part by such transformations, Cases 1 and 2 unfold as micro-temporal experiments in local instantiations. These experiments are enabled by conditions that are themselves products of longer-term landscape change such as institutional support, funding schemes, conceptual repertoires, and participant communities, while also probing new possibilities that may or may not propagate beyond the local scope.

This nested structure illustrates the relationship between local instantiations and the societal landscape, as discussed in Section 4. Past societal-landscape transformations (such as the Able Art Movement) provide enabling conditions for micro-temporal practices in local contexts. When such practices resonate and propagate through articulation, de-neutralization of early adopters, and the emergence of imitators, they can contribute to a macro-temporal transformation of the societal landscape. This analysis captures a single point in this ongoing dynamic. We can observe the results of past macro-temporal transformations (Section 3.3), examine current micro-temporal experiments (Cases 1 and 2), and identify potential future transformations to which these experiments might contribute, but cannot yet directly observe them.

5.3.2 Common Patterns Across the Two Local Instantiations

Several patterns emerge across the two local instantiations. First, Cases 1 and 2 involve categorical boundary crossing. In Case 1, the boundary between "everyday sounds" and "musical materials" was crossed. The AI tool transitioned from an "effect processor" to a "session partner." In Case 2, the boundary between "care tools" and "expression tools" was crossed. Medical devices became materials for performance. This pattern resonates with the macro-temporal boundary crossing discussed in Section 3.3, where the boundary between "disability/welfare" and "art/culture" was gradually reconfigured. People with disabilities engaged in expressive activities were repositioned as artists. These boundary crossings are manifestations of multistability. The same entity (sound, tool, person) can be stabilized in different categorical positions, and practices can shift between these stabilities.

Second, boundary crossing was accompanied by the emergence of new articulations. Harima's articulation of the "Able Art Movement" (Section 3.3) provided a communicable name and vision that formed a new understanding. Participants in the Neutone workshops articulated "sound-music" as a new category. Spectators of the performance struggled; therefore, they tentatively named the experience "something not yet named." These articulations are not merely descriptive. They are performative acts that help constitute new stabilities by making them communicable and repeatable.

Third, the two local instantiations occurred within contexts that provided enabling conditions for experimentation; Section 3.3 indicates how such conditions can themselves be products of longer-term landscape change. The Able Art Movement emerged in a context where Outsider Art and Art Brut were gaining international attention, and where specific individuals were positioned to take up and propagate Harima's proposal. The first Neutone workshop was conducted at a community-based arts/welfare center with a long-standing practice that helped prepare it to support such experiments. The performance was enabled by the collective's explicit commitment to exploring the intersection of expression, care, and technology. Micro-temporal experiments do not occur in a vacuum. They require niches within the societal landscape where alternative stabilities can be attempted.

5.3.3 Differences Between the Two Local Instantiations

Macro-temporal transformation is addressed separately in Section 3.3; here I focus on how the two local instantiations differ in important ways that illuminate different aspects of MTS multistability.

First, Case 2 foregrounds the lived experience of cyborgs in a way that Case 1 does not. Arai's engagement with medical technologies is neither optional nor experimental. It is a constituent of his everyday existence as a person living with ALS. This foregrounding connects the analysis to the discourse on cyborg-technology relations (Shew & Earle, 2024) and raises questions about the temporality of human-technology boundaries, which are less salient in the other cases. For cyborgs, the "boundary" between human and technology is not simply present or absent. It is a dynamic configuration that stabilizes and destabilizes across different timescales and situations.

Second, Case 1 involves a technology (an AI audio plugin) brought into the disability context through intentional appropriation, while Case 2 involves technologies (medical devices) already intimately bound to participants' lives. This difference highlights two modes of multistability: the appropriation of technology "external" to the lifeworld into a new context, and the reinterpretation of technology already embodied and integral to existence.

This difference becomes temporally significant because Case 2's local instantiation is sustained by the rhythm of ongoing care, whereas Case 1's is organized as a bounded workshop whose afterlives depend on repetition, documentation, and adaptation.

6 CONCLUSION AND FUTURE PROSPECTS

This paper has extended the key postphenomenological concept of multistability through Bergson's philosophy of time and Hirai's multi-timescale interpretation, proposing a framework called multi-timescale multistability (MTS multistability). This framework reimagines multistability not as a static coexistence of multiple stabilities but as a generative temporal process spanning different timescales.

The contributions of this paper can be summarized in three points. First, this paper proposes MTS multistability as a Bergsonian extension of postphenomenology. By introducing Hirai's multi-timescale interpretation of duration and the concept of societal landscape, it becomes possible to analyze both shifts in stability within local contexts and long-term transformations of the societal landscape within the same framework. Second, it outlines an empirical-transcendental methodology for studying technics. The empirical moment and the transcendental moment are not opposed on the same scale but are positioned at different scopes; local instantiations and the societal landscape, enabling productive movement between them. Third, through two empirical cases involving art, care, and technology in Japan, read against the historical reference point of the Able Art Movement (Section 3.3), it provides an empirically grounded analysis of how AI, disability, care, and artistic expression are temporally interrelated.

An important finding that emerged from the case analysis concerns the diverse forms of articulation. Across the two contemporary cases and the historical reference point in Section 3.3, articulation was central to the transformation process: Harima's "Able Art Movement," the workshop participants' "sound-music," and the performance witnesses' struggle with "something not yet named." However, articulation need not be linguistic. As Case 2 demonstrates, experiences that deviate significantly from the current societal landscape are sometimes difficult to express in language, yet can be sufficiently articulated through physical expression and video documentation. When analyzing the multistability of technology, attention should be paid not only to linguistic conceptualization but also to processes of articulation

through diverse media that can travel across sites (e.g., video recordings, exhibition formats, and reusable workshop scripts), thereby increasing the chances of resonance and canalization.

This analysis has several limitations. First, Cases 1 and 2 are micro-temporal observations, and whether they will contribute to macro-temporal transformation remains hypothetical. Confirming whether initial resonance develops into sustained transformation would require longitudinal research spanning years or decades. Second, the author has been involved in the Art for Well-being project as the general supervisor, and despite efforts to mitigate it, potential bias exists in the analysis. Third, the empirical material discussed here is situated in Japan, and the extent to which the patterns and mechanisms identified in this analysis can be generalized to other contexts requires further comparative research.

This paper also contributes to the theme of this topical collection: cyborg-technology relations. As Case 2 foregrounded, the “boundary” between human and technology for cyborgs is not fixed but a dynamic configuration that stabilizes and destabilizes across different situations and scales. The MTS multistability framework offers a perspective on understanding the cyborg experience not as a static condition of human-technology fusion, but as a dynamic process in which stabilities are constituted and reconstituted.

Three directions can be considered for future research. The first is longitudinal: the nascent resonances documented here constitute concrete, followable trajectories. Whether the adapted workshop and the dedicated hardware described in Section 5.1.4 stabilize into sustained practices at the facility for children with severe disabilities, and whether the performances' "something not yet named" acquires a name and finds imitators, can be pursued over the coming years through indicators of the kind outlined in Section 3.3: the emergence of imitators, the stabilization of shared vocabulary, and institutional uptake in funding programs and professional roles. The second is comparative: the framework should be tested where the societal landscape is configured differently—disability-art movements outside Japan, or other domains in which deeply canalized boundaries are contested, such as educational technology or care robotics—to determine which of the proposed mechanisms travel across contexts and which are context-specific. The third is theoretical: the conditions that facilitate or inhibit the propagation of local deviations require more refined articulation, including the media of articulation (linguistic, bodily, videographic), the position of early adopters within the landscape, and the availability of institutional niches. Here, the formal models of collective symbol emergence developed alongside the multi-timescale interpretation (Taniguchi et al., 2025) may offer resources for modeling landscape transformation, opening a path between philosophical analysis and computational approaches. Such refinement would also carry practical implications for those who seek to transform the landscape.

This paper offers the MTS multistability framework as a prototype for connecting micro-temporal observations with macro-temporal questions and the movement between empirical analysis and inquiry into transcendental conditions. The question of how concrete practices at local sites can be connected to the transformation of the societal landscape will remain an important question not only for the philosophy of technology but also for practitioners oriented toward change.

Data Access Statement

No new data was generated specifically for this study. The analysis draws on documentation of the Art for Well-being project, including video recordings of the workshops and performances and reports on the workshops and events that include participants’ and audience members’ reflections. The reports and digest versions of the videos are publicly available in Japanese on the project website (https://art-well-being.site/); the full-length performance recordings are not publicly released and are shown only at ticketed screenings.

Contributor Statement

Shigeru Kobayashi: Conceptualization, Investigation, Writing – original draft (including translation), Writing – review & editing.

Hideo Arai, Shin Sakuma, Kiyoko Itasaka, and Yasuaki Kakehi: Writing – review & editing (as members of the collective “とけていくテクノロジーの縁結び,” comments on the Japanese manuscript and on the author’s proposed English rendering of the collective’s name, "The Vanishing Mediator: Where technologies dissolve and bonds form").

Nao Tokui (Neutone Inc. / Qosmo Inc.); Shizuka Morishita, Taro Okabe, Daisuke Kobayashi, Miki Goan, and Takuya Oi (Tanpopo-No-Ye Foundation, secretariat of the Art for Well-being project): Writing – review & editing (comments on the Japanese manuscript).

Tanpopo-No-Ye Foundation: Resources (provision of photographs used in Figures 1–4, with permission for publication).

Use of AI

During the preparation of this work, the author used Claude (Anthropic; Claude Opus 4.5 for the initial translation, and Claude Opus 4.8 and Claude Opus 5 during revision) in order to produce an initial English translation of the author’s Japanese draft and to proofread the author’s revised English text. After using this tool, the author reviewed, edited, made the content their own and validated the outcome as needed, and takes full responsibility for the content of the publication.

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Conflict of Interest Statement

The author served as general supervisor of the Art for Well-being project discussed in this article and received remuneration for this role. The author has no other conflicts of interest to declare.

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