

Spatiotemporal Networks in Ryoji Ikeda's Electronic Music: Loop, variation and re-contextualisation of sound

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Ryoji Ikeda's sonic composition has often been considered to prioritise a physical, immersive experience of space over temporal musical progression. This article challenges this commonly held view, arguing that the static nature of his work should be understood in terms of complex interactions between space and time rather than in dualistic terms. By analysing a large-scale sonic transformation within his 2005 album *Dataplex*, the article uncovers complex rhizomatic networks of materials that expand across multiple tracks. The links between the album tracks leads to an unconventional quality of musical time that contains a high degree of stasis yet nevertheless presents a non-linear progression, which is created through repetition (loops), variation and re-contextualisation of sounds. The analysis suggests that experiencing the ordered series of tracks in the album means accumulating information and exploring memory within a non-interchangeable process of sonic flow and metamorphosis. Despite the fragmentary nature of these internal continuities, the resulting rhizomatic networks provide a means to understand and even to listen structurally to Ikeda's sonic composition.

1. INTRODUCTION

Ryoji Ikeda is a leading figure in the field of computer-based electronic music and audiovisual art. Born in Gifu, Japan in 1966 and currently based in Paris, Ikeda has continually expanded the scope of his work by exploring crossover genres and artistic media, including gallery installations, computer music live performances, audio album recordings and, more recently, acoustic instrumental composition. His artistic output is often based on mathematical concepts that involve large amounts of computer data, such as DNA sequencing, analysis of molecular structures or open data from institutions such as CERN and NASA. Digitally manipulating and encoding data sources, Ikeda converts them to signals that are then used as structural elements in his sonic and visual composition. These features provide the basis for his interdisciplinary art projects in which a constant stream of sound and visual elements are often presented in perfect synchronisation. An abundance of data signals becomes an abundance of perceptive information, providing us in

turn with immersive, multisensory experiences. While a sense of immersion can be said to be most powerful when sound and visual together provide integrated sensory stimuli, similarly immersive experiences can also be found in his purely sonic compositions, namely, electronic musical pieces.

Ikeda's music is informed by various genres and styles, including minimalism, ambient, techno, dance music and DJ music. It can also be mentioned in the context of noise music, given that harsh, glitchy electronic noises form a crucial part of his sound pallet (e.g., Hegarty 2007). No matter how noisy the materials, however, Ikeda's composition is characterised by structural rigidity and simplicity throughout. A constant stream of repetitive beats, looped rhythmic patterns and indefinitely prolonged sounds are combined to form a motionless texture. In it rhythms no longer serve as a structural force of momentum but as repeating components of static sonic surfaces. As is often discussed, Ikeda's sonic work challenges a traditional concept of music – rigorous organisation of time – emphasising instead the role of spatial (textural) design in a composition. It exemplifies, as Collis (2017) indicates, a form of music that concerns a physical, immersive experience of space rather than structures and movements in time.

This does not mean, of course, that there is no temporal activity in Ikeda's music. It presents a kind of temporality not generally found in traditional music, namely, a state of time that is larger in scale and non-linear in structure. Analysing individual tracks of one of his albums does not suffice, however, when attempting to uncover this – one instead needs to focus on a large-scale sonic transformation and networks within the album as a whole. Only by shifting our attention from the local to the global can it be shown that the timeline of Ikeda's music is built upon rhizomatic networks¹ of materials in which temporality deserves as much attention as spatiality. This article

¹I use the word 'rhizomatic' in reference to the well-known concept of 'rhizome' by Deleuze and Guattari (1987), defined as decentred, proliferating, non-linear networks of relations without a sense of order, unity or hierarchy.

aims to provide a more nuanced view than existing studies of Ikeda's sonic art by arguing that the static nature of his work should be understood in terms of complex interactions between spatiality and temporality rather than in dualistic terms in which one aspect, spatiality, is simply favoured over the other.

The discussion begins with a summary of space/time dualism in contemporary music and sound art practice. This section addresses how the radical expansion of sound and musical syntax led to an increased focus on the spatial axis in music. The historical-aesthetical overview is then followed by a specific examination of Ikeda's work. Focusing on one of his art projects, *Datamatics*, I will first address the process by which Ikeda draws extra-musical inspiration (encoding of data) for his audiovisual composition. The sense of immersion created by its use of multimedia equipment will then be shown to be of similar importance in a purely sonic version of *Datamatics* made by the composer. The view that Ikeda prioritises spatiality in his work will then be challenged by a more nuanced analysis of his 2005 album *Dataplex*. Uncovering rhizomatic networks of material between multiple tracks, I acknowledge the importance of a non-linear progression created through sonic repetition, variation and re-contextualisation over time. This alternative view on Ikeda's spatiotemporal composition finally leads us to a broader discussion of musical structure and listening.

2. TEMPORALITY VERSUS SPATIALITY

Since the beginning of the twentieth century, music has evolved through the exploration and adoption of new methodologies and technologies. Post-tonal compositional techniques led to new possibilities for pitch organisation and an increased interest in subtle qualities of sound (i.e., timbre). Electronic technologies, at the same time, provided composers with new tools for establishing their own sonic palettes by capturing, preserving and manipulating sounds or by synthesising and mixing sound materials. These developments, in turn, led to a new musical aesthetic in which sound is no longer a mere 'result' of composition but a subject of composition (Solomos 2020: 2). Creating, designing and fixing sounds thus became as important as structuring sounds, as is especially the case in the practice of electronic music, the field in which the traditional focus of composition *with sounds* was replaced by the composition *of sound* (Risset 1992: 591).

By refocusing on sound and exploring new technologies, composers and musicians transcended the established boundary of music, posing in turn challenges to the audience's flexibility and capability in listening. Outside a system based around pitch hierarchies, one may have difficulty in making sense of

interactions between sounds. How can we recognise and categorise unconventional sounds as musical materials and subsequently understand their structural relationships? These questions had to be addressed when examining musical repertoires based on an extended sound palette.

Establishing a new sound hierarchy was an especially pressing issue in the research and analysis of electronic music. It is precisely in this context that the father of *musique concrète*, Pierre Schaeffer, emphasised the necessity of a sound typology in his theory of *objets sonores* (Schaeffer 1966). In it the author encourages us to discount the source of a sound (i.e., what the sound is made by) and, instead, carefully to observe and describe the physical qualities of the sound itself (i.e., how the sound is heard), by focusing, for instance, on the degree of pitchedness, energy distribution (duration) or graininess. An extensive sound typology for acousmatic music can help us develop our listening capability in order to distinguish subtle differences in quality between sounds that may otherwise be heard to be similar or to be incomprehensible. This process of recognition subsequently allows us to investigate the structural relationships between sounds, no matter how noisy or unfamiliar they may be. It can thus be shown that any sound can serve as a structural constituent of music as long as it is organised in a temporal framework of a piece. This means that novelty in sound does not change the traditional ontology of music: that a musical work should embrace an autonomous structural momentum and distinct sonic sculpture in time.

The idea that music exists as a temporal object can, however, be challenged by the intense physical experience of sound. Over the course of the twentieth century, the idea became gradually accepted that sound can simply exist for its own sake without playing a definite role in structure, namely, without conveying a strong sense of movement and progression in time. In this aesthetic, traditional elements of music for creating a sense of momentum – melody, rhythm and harmony as discernible structures – are considered to be of lesser importance. As observed in Giacinto Scelsi's *Quattro Pezzi su una nota sola* (1959), a piece can entirely consist of an indefinitely prolonged single pitch with variation in texture and timbre, creating in turn a sense of stasis, ambiguity and stillness in time. A similar effect can also be created through perpetual repetition of the same sonic elements, as often articulated in minimal music. In both cases the identity of music as a temporal object is thrown into question while the spatial experience of sound itself is emphasised. Such a state of sonic existence is most effectively achieved when materials of a piece are electronically processed – sounds that are indefinitely prolonged or perpetually repeated

(looped) are most easily produced through the use of electronic apparatus even though it is still possible to create analogous examples by means of a massed sonic construction in acoustic instrumental music. The focus on spatiality is, however, most prominent in sound art, the field in which sound is treated primarily as a spatial object to be exhibited in a museum gallery or an open-air space.²

When sonic spatiality is prioritised over temporal progression, traditional formalistic analysis used for uncovering the abstract structure of music is not an effective way to investigate a piece. Instead, what López (2004) describes as 'profound listening' or Oliveros (2005) as 'deep listening', namely, the intense focus on the environmental sound matter and space–time continuum, can be said to be of more use for the appreciation of the acoustic reality. Music always must exist in time, however. No matter how intensified the spatial aspect of a work, time necessarily remains essential for its sonic space to be experienced and examined, as when observing the spatial contents of a soundscape that is full of acoustic information. As Smalley (2007: 37) puts it, '[a] listener needs time to progress from an initial listening encounter with the soundscape to a state of engaging actively and fully in scanning and exploring the spectromorphological and spatial properties on offer. I cannot listen to everything simultaneously and need to devote attention to each of the zones in turn, accumulating a global view, which emerges over time.' What Smalley is discussing here is analogous to Voegelin's debate on sound art, where she argues that one can only build the sonic space in one's listening through a durational experience, therefore time and space are mutually related and bound in one concept, namely, 'timespace' (Voegelin 2010: ch. 4).

Time serves as a medium for experiencing a sonic space rather than a platform to be neatly filled and structurally organised. This understanding of time is especially relevant to the obfuscated temporality in sound art. In this category of art practice, as Cox (2018: 34) argues, sound is not considered to be a definite object in an abstract form but rather a physical condition that transforms in a constant flux of 'events and becomings'. The temporal framework of a work is an incidental result of this ambiguous flux and therefore not an aspect to be examined in musical analytical terms. What are deemed to be of more interest in this discipline are the concepts behind the composition and their philosophical, cultural, historical and political

meanings and contexts (e.g., Kim-Cohn 2009; LaBelle 2015; Grant, Matthias and Prior 2021).

Ikeda's work is often discussed in the context of sound art mainly because of its conceptual nature and close association with visual art. While this interdisciplinary approach is evidently important to understand the broad picture of his work, I argue that it also leaves sufficient room for a musical analytical investigation. The intricate spatiotemporal relationships in Ikeda's sonic work exemplifies a new perspective of musical time, the importance of which has nevertheless been overlooked as a result of the emphasis on sonic spatiality. It is a quality of time that contains a high degree of stasis yet also presents a non-linear progression based on sonic repetition and variation. The degree to which this temporality can be observed depends on the format of the work. My primary focus here is his purely sonic composition presented in the form of audio albums, the idea of which nevertheless originates, in most cases, from his audiovisual pieces. The section that follows will therefore discuss the relationship between his audiovisual work and his sonic composition.

3. IKEDA'S AUDIOVISUAL COMPOSITION AND SONIC COMPOSITION

Multisensory stimuli in Ikeda's audiovisual compositions are generally created through the use of flashlights, large-scale visual images and a stream of sounds including harsh, loud noises. The scale, size and volume of their perceptive information often transcend the limit of human cognition, overwhelming our sensory system. In his gallery installations and audiovisual concerts, the visitors/audiences are immersed in a plethora of spatiotemporal events and motions. The excess of information has been described as a 'density of nothing' (Lee 2018: 11) in which neither semantic nor syntactic meaning can be found. Despite this absence, however, the final composition nevertheless provides a physical, immersive experience that is unique to its space and time.

The excess of information in Ikeda's audiovisual work is not a consequence of a random accumulation of events. Using extraneous data sets as a primary source of composition, Ikeda meticulously designs and arranges his sonic and visual materials. In the *Datamatics* series (2006–), for example, he explores 'the potential to perceive the invisible mult substance of data that permeates our world', such as DNA sequences, Morse code, dimensional mapping of the universe or molecular structures. By digitally processing these data sets and converting them to sequences of sonic and visual events, Ikeda outlined the basic principle of this project on the occasion of the 2006 *Datamatics* concert premiered in Japan (Ikeda

²This is emphasised in Alan Licht's two basic definitions of sound art: 1) 'an installed sound environment that is defined by the physical and/or acoustic space it occupies rather than time and can be exhibited as a visual artwork would be'; and 2) 'a visual artwork that also has a sound-producing function, such as sound sculpture' (Licht 2019: 6).

2022). In it the encoded data sets are first rendered into quickly moving visual patterns, which consist of lines, dots, geometric shapes or letters in black and white with some colour accents. Sonic rendering also takes place using minimal materials, that is, a small number of fixed frequencies, which are combined with complex rhythmic patterns. In the next stage of rendering the graphics, 2D sequences of patterns undergo 3D rotation and 4D mathematical processing, a process by which the movement of 2D or 3D objects are given a higher degree of geometric complexity. These graphic transformations are paired with a meticulous layering of various sound components to create an expansive sense of acoustic space. These processes of data rendering outlined here were further developed for other *Datamatics* pieces, including later versions of audiovisual concerts, a series of installations, multichannel concerts, publications and CD releases. By deconstructing the visual, sound and source codes and creating new orders, Ikeda achieves multiple abstractions of his original source (ibid.).

Ikeda's work has the strongest impact on our sensory systems when sound and visual elements are combined to provide a powerfully immersive experience. Despite his frequent use of visual elements, however, Ikeda remains primarily a sound artist, choosing also to create purely sonic compositions. Since the 1990s he has actively released recordings of his electronic and acoustic musical compositions as part of a large-scale art project, an independent solo album or as a compilation album for archival purposes, examples of which include *+/-* (1996), *0°C* (1998), *Matrix* (2000), *op.* (2002), *Test Pattern* (2008), *Supercodex* (2013), *The Solar System* (2015), *Code Name A to Z* (2017) *Music for Percussion* (2018) and *EP* (2021). His audio pieces are not a compromised version of his artistic imagination but a self-sufficient artform that provides an equally intense, immersive experience. The following discussion will focus on this purely sonic aspect of his composition with specific reference to the 2005 album *Dataplex* (CD derived from the *Datamatics* series). As will be explained in further detail, the tracks that constitute his albums exist in rhizomatic networks of sonic materials, creating in turn a coherent auditory universe.

4. RHIZOMATIC NETWORKS IN IKEDA'S MUSIC: AN ANALYSIS OF *DATAPLEX*

Ikeda's sonic composition is generally simple in structure. Its formal outline can be illustrated by analysing the distribution of materials on the spatial and temporal axes. Despite this, however, it has frequently been argued that Ikeda's work is ambiguous in terms of its interpretation. Weil (2012: 123) states, for instance,

'[t]he interpretation of Ikeda's work can be considered totally open' even though 'it formally attains a state of extreme precision that implies the opposite'. Responding to Weil's statement, Collis (2017: 381) further provides a more concrete example of this paradox. Analysing 'dataflex', a track extracted from *Dataplex*, he argues that the piece's conformity with the stereotypes of dance music (e.g., clear patterns of layer construction and temporal design) is merely superficial in that 'the conventional pitch-based procedures of dance music – chord progressions, verse-chorus forms, modulations to different tonal centres – are missing'. He therefore concludes that, due to the absence of pitch movement, a sense of musical momentum is significantly reduced and replaced by a sense of stasis and, as a consequence, the overall formal design of a piece is not considered to be of significance. In addition to this syntactic ambiguity, Collis also indicates ambiguity in terms of semantic content. Encoded data sets as structural elements of Ikeda's composition (e.g., Morse code messages) do not convey semantic/symbolic meaning but only serve as a 'paratextual' inspiration for organising sounds. In both syntactic and semantic terms, the primacy of structure is hence cast in doubt. What is instead at stake in Ikeda's work, according to Collis, is the spatial experience defined by the (postmodern) notion of the sublime.³ The sheer amount of sonic information overwhelms our senses, leaving us with a feeling of awe. The bodily sensation created by this process is of an ephemeral kind and can only be captured at the moment of its very experience, which is 'a moment that cannot be reconstructed by memory' (ibid.: 383).

Even if structural impetus in a traditional sense – movements towards a climax and eventually closure – is replaced by sonic stasis, there is, however, always movement and change in Ikeda's composition. In his work, minimalistic repetition (loops) of the main sonic components necessarily combines with variations in frequency (pitch), rhythmic patterning, the combination of layers, dynamic balance and overall density. That Ikeda's sound provides a spatial experience is therefore only metaphorical in reality – by overemphasising spatiality and momentary experience, we may miss what is subtly yet unmistakably happening in Ikeda's audio pieces, namely, transformation through repetition and variation. In contrast with traditional concepts of

³Collis's argument is analogous to that of Abe (2012), who initially indicated the association between Ikeda's installations and the postmodern notion of the sublime, one that Lyotard originally observed in avant-garde art that is abstract in nature. The postmodern notion of the sublime in music can be understood as a sheer concentration on *now* and the very presence of sound qua sound, as paraphrased by Wurth (2009: 128): '[T]he sense of the [postmodern] sublime is a hint of something not yet formed that can only occur as such, as un-form, before the mind has been able to organize any directed response. Indeed, in the very failure of the mind to regulate the "data" of experience the sublime announces itself.'

musical momentum, however, this transformation does not have a specific goal but occurs as a process of becoming in and of itself without resolving, achieving or arriving.

Non-goal-orientated music is not a new concept. Since the twentieth century it has been viewed as a temporal feature distinct from traditional Western musical teleology, especially as Cox indicates, in the context of post-war American experimental music.

The ideal, autonomous musical work of European modernity attempts to master time's elusive flow by making it a mastered, closed, integral totality – an entity or time-object. ... Against this conception, Cage and the postminimalists affirmed a notion of time as duration – an infinite, open process in which presence and completeness are forever deferred, a boundless flow that engulfs the auditor or spectator in a field that cannot be totalized. (Cox 2018: 152–3)

Radical examples of non-teleological music as a representation of unstructured temporal flow – what Kramer (1981) originally described as 'vertical time' – have been observed in some genres of experimental electronic music, such as drone music, techno dub or noise music, where a high degree of stasis is created through the slow process of sonoristic change over a long stretch of time. In these types of music 'materials are not fertile seeds poised to grow but rather inert objects' (Demers 2010: 102), a sense of growth or development hence replaced by 'the ultimate still life displaying a motionless progress' or 'moving immobility' (Hainge 2004). While Ikeda's music can be said to exhibit a similarly boundless flow of sound, however, its process is not as open as the Cagian notion of time, nor is its duration as static and arbitrary as can be found in drone music and techno dub. Rigidly controlled, Ikeda's work provides listeners with a direction for exploring the sonic flow. In the context of Ikeda's music, this flow does not merely refer to what is happening in an individual track but to larger-scale networks between tracks within an album. It is questionable whether a single track can adequately be called 'a piece', given that many of his tracks are short in duration (most typically from one to three minutes) and do not contain dramatic changes within them. Track contents within an album as a whole are instead associated by rhizomatic relationships, together forming a loose concept of album unity, which itself could be considered to be a 'piece'. In order to show an example of these relationships, the following paragraphs will focus on discernibly related materials across the entire album *Dataplex*. This contrasts with Collis's approach, in which he analysed a single extract to support his discussion on spatiality. This selection will clarify how sonic spatiality at a local level can be integrated into larger-scale temporality.

Ikeda's music consists primarily of repetitive rhythmic patterns rather than pitch movement. In this context, intricate repetitive rhythms do not function in a conventional manner, that is, so as to lend an impetus to musical motion. A sequence of durations, instead, serves as a basic unit for indefinite looping, which then becomes a textural motif within the continuous sonority. Here durational hierarchy is of lesser significance than the nature of the acoustic surface such as its regularity, graininess or density. In Ikeda's work, looped rhythmic patterns are therefore treated analogously to prolonged or iterated sounds in structural terms – all of them can be indefinitely stretched in time and combined to create a sense of stasis.

Many looped/prolonged sounds in *Dataplex* are deployed in multiple tracks, providing discernible links and a sense of order between them. While some tracks exist independently (see those marked with an asterisk in Table 1), the majority of them are related to those next to them, suggesting, in turn, formal divisions within the album. At the beginning, for example, the material that features in track 1, high-pitched regular beeps, is also used in tracks 2 and 3. The largest group with discernible links, tracks 2 to 8, overlaps this first group. The repeating material that integrates them – with the exception of track 6 – is an irregular rhythmic pattern that sounds like a fast Morse code message, fixed approximately on pitch A (an octave higher in tracks 5 and 8). In each track this Morse rhythm coincides with other looped sonorities so as to form a distinct texture. Most of these superimposed materials are similarly high-pitched/non-pitched, dry, fricative or iterative and used several times as repeating layers for static textures in a series of tracks. Track 6 is integrated in a different fashion. Although the Morse rhythm is absent, a new noisy rhythmic pattern appears, which is shared with track 7 that nevertheless also contains the Morse rhythm. Overall a sense of separation between tracks 1–8 is, as a consequence, diminished. Instead there is a subtle sense of homogeneity, with overlapping links: track 1 to 3 (beeps); 2 to 8 without 6 (Morse) and 6 and 7 (noisy pattern). As suggested by the titles (e.g., *data.simplex*, *data.duplex*, *data.triplex*), the overall texture gradually increases, as the tracks proceed, in density (number of strata) and complexity until it reaches saturation point at the end of track 7, leading to the fragmentary structure that features in track 8.

Within this large-scale transformation, individual tracks are simple in structure. What we experience in a large proportion of Ikeda's music is, as has been discussed, statically prolonged time sculpted by constant repetition of the same/similar materials with occasional changes in textural content. In this sense, as Fink said about pulse-pattern minimalism,

Table 1. Track contents of *Dataplex* with the indication of formal divisions

Track no.	Track title	Track no.	Track title
1	data.index	11*	data.minimax
2	data.simplex	12*	data.syntax
3	data.duplex	13*	data.telex
4	data.triplex	14	data.flex
5	data.multiplex	15	data.reflex
6	data.complex	16	data.convex
7	data.hypercomplex	17	data.vertlex
8	data.googolplex	18	data.vortex
9	data.microhellix	19	data.matrix
10	data.superhellix	20*	data.adaplex

Ikeda's composition can be considered a 'low-involvement' style of music (Fink 2005: 157); it requires little involvement in listening since it lacks constant movement, transformation and structural momentum, as observed in conventional forms of music. By focusing on the process of sonic becoming and its implication for wider progression, however, an alternative view is also possible. In Ikeda's composition, changes occur on a different time scale from what we would normally experience in a musical piece, namely, more slowly and beyond the boundary of individual tracks. Even where only repetition seems to be occurring, however, this content, served over a period of time, nevertheless is a necessary precondition for what follows. This suspended time does not 'resolve', for example, as an extended dominant does so in tonal music, but simply leads to the new environment emerging from it. Listening to this process of becoming requires close attention to what is happening in the moment and to how it transforms over time. Given that Ikeda's music contains a certain sense of direction, his 'low-involvement' style can, in fact, be said to be highly demanding in terms of listening.

After the first set of track connections (1 to 8), eight of those that follow exist as pairs: 9/10, 14/15, 16/17 and 18/19. For instance, the connection between tracks 9 and 10 is built upon the similarity in the main looping material, which is an abruptly panned rhythmic pattern fixed on a single pitch. In contrast with tracks 1 to 8, these looped materials are not strictly identical but merely alike. Despite the differences in precise rhythm, central pitch (respectively G \flat and D \flat) and tempo, however, the homogeneity of their general features – for example, their clarity in pitchedness, soft, muffled timbre and panning – suffices to provide a sense of continuity between the tracks. An analogous example is also found in tracks 14 and 15, where an identical set of chords in middle and low registers are used as anchor materials even though they feature distinct rhythmic patterns in each. In both of these pairs the physical appearance of the material

transforms over time. This contrasts with tracks 1 to 8, where identical materials repeat while appearing in different textural contexts. These two forms of sonic repetition and variation combine to form more complex threads of material in the later part of the album, the most remarkable example of which is observed in the connection between tracks 18 and 19.

Two types of sonic materials are used as anchor materials between the two tracks. One is an ambiguously pitched, prolonged reverberant sound (described in the following text as material A), and the other is a harsh, bright static noise that coincides with two looping layers based on pitched structures, that is, a descending figure shown in Figure 1a and a looped rhythmic pattern shown in Figure 1b (together described as material B). In track 18 these materials are laid out to form a simple structure that begins with a seamless prolongation of material A, subsequently joined by divided layers of material B that slowly fade in and increase in loudness (Figure 2). Except for the occasional addition of other incidental materials, this track is simply a slow process of transformation in which these two main elements are gradually combined to form a texture with increasing degrees of overall density, harshness and loudness. The way in which these materials are deployed in track 19 is, however, more indirect and complex. This, the longest track in the album, is, as shown in Table 2, symmetrical in form; it starts with a texture based on material A, followed by a long middle section in which material B appears, before closing with a return to material A. In the opening section, material A emphasises a lower-frequency band than it did in track 18. This change allows new rhythmic layers (Table 2) to be discerned in the resulting texture, despite its complexity. In the closing section, on the other hand, material A appears in its original form, providing a light floating sonic effect within a simpler and quieter texture. While making a clear reference to the previous track, the repeating material is carefully adjusted for new textural contexts.

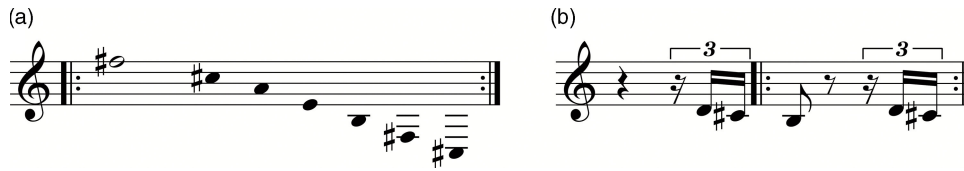


Figure 1. Transcription of pitched elements within material B.

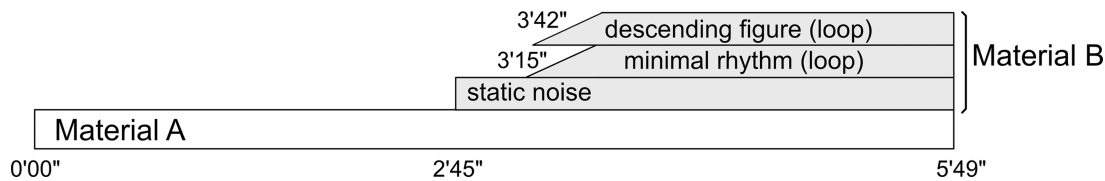


Figure 2. Formal outline in track 18 of *Dataplex*.

A similar adjustment is also made when Ikeda uses material B in the middle section, which consists of a newly introduced rhythmic pattern followed by its seven variations (see Table 2). Four of the components of the initial rhythmic pattern – beeps, reverberating pitches, a sustained bass and bursts of an extremely high-frequency sound – are used as repeating entities that consistently appear throughout the preceding variations. In each of the variations, click sounds with a distinct rhythmic pattern are superimposed on these fixed looped entities, combining also with additional layers and occasional sonic modulations. Throughout the seven variations degrees of density, rhythmic intricacy and textural complexity gradually increase. Within the context of this large-scale transformation material B is used in variations 4 and 7. In variation 4 material B is almost the same as in its original form (track 18) and its slow fade-in and subsequent increase in loudness and density also remind us of track 18 (see Figure 3). Variation 7 features a further increase in textural density and complexity (Figure 4). In it material B is varied, distorted and saturated by means of various sound modulation techniques. For example, the descending figure that forms part of material B (shown in Figure 1a) is now laced with permutations and inversions, further filling an already condensed sonic space.

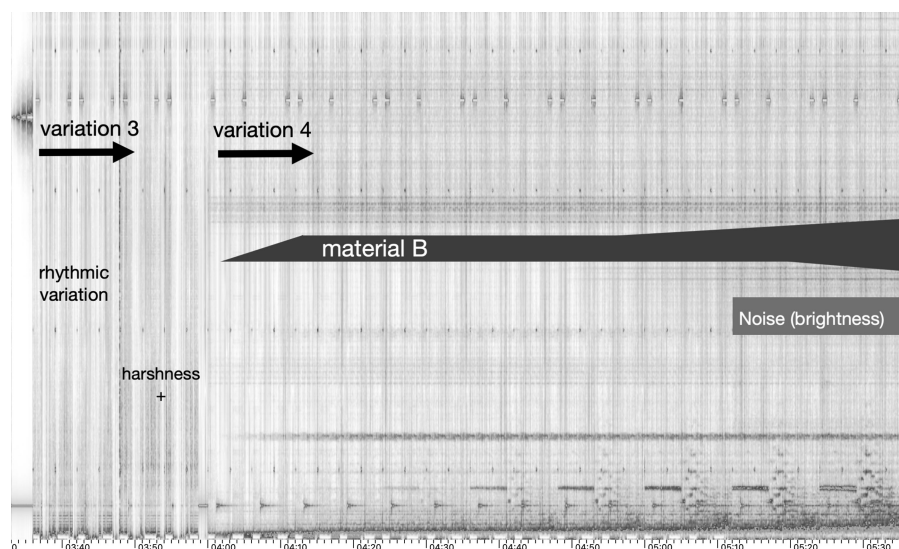
While local networks of materials are most relevant to our experience of the album, links are not limited to local relationships but also expand among tracks placed at a distance. For instance, regular beeps used in tracks 1 to 3 later reappear in track 11, fixed on the same pitch. Moreover, rhythmic patterns that are discernible during the second half of track 13 and in the final section of track 19 show great similarity to the looped Morse rhythm, the element that is most

frequently used during tracks 2 to 8. These examples confirm the rhizomatic nature of the track connections within *Dataplex* as a whole.

That these relationships are a feature of Ikeda's style and not limited to this one piece is confirmed by examining other of his albums. For instance, one of his earliest albums +/- (1996) shows a similar approach to the grouping of tracks. The album consists of 10 tracks, which form three sets of three, namely, 'Headphonics' (tracks 1–3), '+' (4–6) and '-' (7–9), followed by the coda '+/-' (10). In each of these groups the same looped materials are used, though sometimes with changes of frequency and/or timbre, that is, swiftly repeating sine wave beeps ('Headphonics'), iterative beats with different frequencies and timbres ('+') and an ambiguously pitched prolonged sound with different frequencies ('-'). This example contrasts with the more complex and aperiodic networks of material in his most recent album *Ultratronics* (2022). Three elements are of particular importance for the rhizomatic relationships between its 17 tracks (ultratronics 00 to 16). The first is a modulated (or possibly synthesised) voice that is utilised in tracks 1 to 8 and track 13. Despite differences in the degree of distortion, semantic content and overall textural context, the distinct character of this repeating voice provides a sense of continuity in the first half of the album. This is reinforced by an internal connection between tracks 2, 4 and 7, all of which deploy an identical, heavily distorted vocal noise loop. The second is the ambiguously pitched, prolonged, reverberant and muffled sonorities that constitute tracks 11 to 16, which contrast with the preceding tracks, which are largely based on pulsing looped rhythmic patterns. A sense of homogeneity, which is nevertheless inexplicit and loose, is consolidated by three sublinks between individual tracks: 1)

Table 2. Formal outline in track 19 of *Dataplex*

Opening	0'00"–0'47"	Material A (variation) + beeps, regular ticks, click rhythm, extremely high frequency
Exposition of the looped rhythmic pattern	0'48"–1'12"	Contrasting sonorities (ticks, click rhythm, <u>beeps, reverberant pitch, sustained bass, extremely high frequency</u>)
Variation 1	1'13"–2'22"	Rhythmic variation of clicks
Variation 2	2'23"–3'34"	Addition of a new rhythmic pattern based on distorted noise
Variation 3	3'35"–3'59"	Rhythmic variation of the existing layers, increase in harshness
Variation 4	4'00"–5'34"	Fade-in of material B and addition of bright noise
Variation 5	5'35"–6'47"	Rhythmic variation and the addition of noise with stereo motion
Variation 6	6'48"–7'15"	Rhythmic variation
Variation 7	7'16"–8'27"	The return of material B (variation) with increasing volume and saturation
Ending	8'28"–10'00"	Material A (original)+ high-pitched irregular rhythm

**Figure 3.** Sonogram with annotation in variations 3–4 in track 19.

tracks 12 and 13 exist as a pair, deploying the same set of looping layers; 2) the looped material that appears at the end of track 14 is developed in track 15, providing a clear sense of continuity; and 3) the same clattering sound is used in tracks 12 and 14 (and also, more distantly, in track 3). Lastly, in order to suggest large-scale symmetry, Ikeda uses the same high-frequency sine wave in the first and last tracks of the album.

Experiencing the ordered series of tracks in Ikeda's albums means accumulating information and exploring memory within a non-interchangeable process of sonic flow and metamorphosis. These internal continuities are, however, fragmentary and therefore

cannot be understood as a logical, linear formal progression. The rhizomatic relations that are discreetly established through the configuration and re-contextualisation of repeating materials nevertheless provide a means to understand and even to listen structurally to the spatiotemporal complexity.

5. CONCLUSION

In music and sound art practices since the mid-twentieth century – especially in the arena of experimental, electronic and minimalistic music – sound does not always act as a structural force of linear progression. It can also be present in a state of flux, slowly and

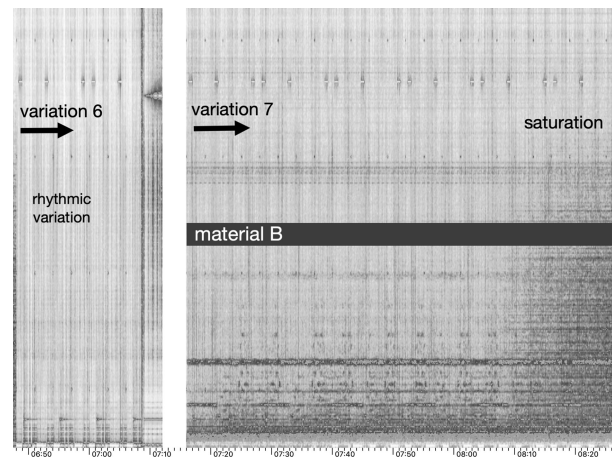


Figure 4. Sonogram with annotation in variations 6–7 in track 19.

ambiguously moving and transforming yet without a definite goal or conclusion. In this state of flux, however, even when sonic spatiality is strongly emphasised, its static quality necessarily takes part in the process of becoming. To become something it must also first be something – this is precisely the reason why Ikeda's static textures, consisting of loops, are a precondition for the process of sonic becoming, variation and re-contextualisation. In his albums, this process of becoming is not presented as an incidental and arbitrary transformation of sound but rather as an ongoing renewal of materials with a certain sense of rigidity and direction. Spatial and temporal axes are therefore equally important when investigating and experiencing Ikeda's work.

Two ways of approaching music flow from this spatial and temporal dualism: first, concentration on sonic physicality (simultaneity); and second, intellectual understanding of linearity, which respectively correspond to what Austrian composer Peter Ablinger implied in the words 'listening' and 'thinking'. While listening metaphorically means, according to Ablinger (2022: 253), 'being' or 'being here', thinking is 'being elsewhere'. Intellectual investigation of music is to think about music by remembering, categorising and associating events that are observed over a period of time. When processing sonic information in this way, we are not actually living in the acoustic reality of sound but rather outside of it. An analysis of musical structure, form and meaning can only be achieved via an indirect approach to sound, in other words, by 'being elsewhere'. Listening is, in contrast, a direct contact with sonic reality in the most concentrated form of the present and, in this respect, *presque rien*. A true sense of listening is, in Ablinger's definition, only possible by disregarding the wider context of music and merely

concentrating on the physical experience of sound itself. This contrast between listening and thinking, of course, only make sense in purely metaphorical terms. Musical listening is an artefact of complex internal interactions, including observing the spatial aspect of sound and exploring temporal networks between accumulated memories. While one may wish to focus particularly on either the spatial or temporal aspect in an analytical or aesthetical discussion, a profound investigation of music necessarily requires a constant going back and forth between the two.

Spatial and temporal axes are both important in Ikeda's sonic composition. Of course, the degree to which temporality matters varies in each work. Some of his albums hardly embrace temporal 'events' per se, showing instead a pervading sense of stasis, as exemplified by his 2021 album *Technocolours*. This highly conceptual, minimalistic album contains 10 two-minute tracks consisting of different colours of prolonged noise (e.g., orange noise, yellow noise, green noise), the final track consisting of a 'variation' in which these colours of noise combine to form a slowly transforming prolonged noise. In this extreme example, the content consists only of occasional changes of colour, therefore spatiality overwhelms temporality even though the changes of colour still provide a sense of transformation in time.

Even when transformation is discernible, temporality in Ikeda's composition clearly differs from conventional ideas of musical time. Minimalistic procedures in his music are often used in a way that leads to a high degree of uncertainty in terms of structure or form. Repeating loops and variation of sounds provide, however, threads of material between tracks, building in turn rhizomatic networks within an album. Spatiotemporal networks of material are, as has been discussed, of particular importance in Ikeda's album

production and less so in his audiovisual installations. These networks may arguably, however, be stretched beyond the temporality of individual albums. Many of his sound installations, audiovisual concerts and audio albums are conceived as part of an art project or a series of works, and in each of these Ikeda often reuses some sonic materials. This suggests that Ikeda's networks can even transcend the framework of an individual album, making not only conceptual but also subtle physical references to the broader context of his creative trajectory. Rhizomatic networks outside musical time can only be perceived, if ever possible, as a function of memory. By accumulating perceptive information, the experiential richness and complexity in Ikeda's work can be multiplied on a stretched timeline beyond that of an individual piece.

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