

The Crackle of Contemporaneity

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There comes a time to move beyond asking the broad question “What is contemporaneity?” to consider more acute ways in which this question can be traced and signalled. We consider the notion of *signal* to be particularly appropriate in the consideration of contemporaneity, since signals are a constitutive element of contemporary infrastructures and our experience of time even if they are relatively undetectable. They operate underneath human perceptual thresholds as carriers, controllers, and codes, while also surfacing into perceptual and semiotic registers, as signs across various media—textual, visual, and, of course, sonic—all the while accessible as traces. Perhaps in this way it is possible to experience contemporaneity at a range of different scales—from the microtemporal to the planetary—to register both our closeness and distance from it (Agamben 2009), and to exemplify how times come together disjunctively in the present.

Moreover, although contemporaneity has been widely theorised around visual culture and post-conceptual art, the role of sound within this discourse is almost entirely missing.¹ This is strange not only because, as Jacques Attali (1985) argued, changes in sound and music often pre-empt changes within visual, and indeed, political culture, but because sound and music are inherently temporal in character: made up of acoustic vibrations (and often electronic signals) that unfold dynamically, constructing and constituting important aspects of presence, while reflecting temporality in their material character. As such, sound perhaps offers a unique opportunity to understand the topologies and currents of contemporaneity. But attention to these material characteristics significantly alters Attali’s idea of sound as an indicator of change, since for him it indicated change at a semiotic level that required a hermeneutic approach in its analysis. We argue that signals not only *represent* but *enact* control structures and temporal complexity, prompting a more materialist or archaeological analysis in order to be able to hear some of the nuances of temporal complexity.

Put simply, this chapter explores the idea of listening to contemporaneity, through an engagement with signals that operate both above and below the threshold of human perception. In particular, we explore *Detektors* (2010–12),

¹ One notable exception to this is Peter Osborne’s discussion of new music in *The Postconceptual Condition: Critical Essays* (2018). This is also the hypothesis for Ryan Nolan’s PhD research, “What Does ‘Contemporary Music’ Mean Now?” (University of Plymouth), which we take as a point of departure for this essay.

an artistic research project by Martin Howse and Shintaro Miyazaki, in which workshop participants used bespoke circuits to demodulate and listen to the crackle of signal traffic within the electromagnetic spectrum. What is exposed is the materiality of signal traffic as well as the technical apparatus through which it is made perceivable. Our proposition is that this spectral realm of signals allows us to understand contemporaneity as a temporal complexity that operates between surface and depth, and through this we can begin to hear that “time is out of joint” (*Hamlet* 1.5, Shakespeare [1623] 2005, 691). Aside from Hamlet’s response to the world, we make explicit reference here to Mark Fisher’s essay “The Metaphysics of Crackle” (2013) to point to some of the material conditions for this temporal complexity, not least in registering the crackle of technology through which this particular experience of time is made possible at all: and through which we might experience the crackle of contemporaneity.

LISTENING TO CRACKLE

The chapter foregrounds the embedded research methods of *Detektors* to engage with the “techno-temporal” infrastructures and topologies of the contemporary infosphere. The project is understood as one contribution to, and indicative of, a wider set of critical and aesthetic practices that interrogate the underlying material and processual structures of contemporaneity. Engaging with *Detektors* allows us to try to draw together materialist analyses of sound with the discourse of contemporaneity. Additionally we discuss archaeological methods and then the concept of hauntology, along with Fisher, as a way to witness the forensic materiality (or what we here call crackle²) of the signals themselves.³ Fisher discussed the crackle of vinyl records, explored as a reminder (or remainder) of the presence of the recording and production apparatus. He argued against the symptomatic privileging of live performance and its claim for authenticity over recorded and sampled forms (such as in the case of dub or hip hop)—which fail to account for textuality, mediation, or sound production and in doing so, miss what might be described as a *metaphysics of absence*. Similar to Fisher’s exploration of *recorded* media and their associated artefacts, *Detektors* explores the forensic materiality of *live* electromagnetic emissions. In this case, the metaphysics of absence comes in the otherwise imperceptible materiality of such technological signals.

2 We refer to this as *crackle*, following Fisher’s use of the term, but this is not the most prominent feature of these signals: they also squeal, chirp, fizz, and pulse.

3 “Forensic materiality” is a phrase taken from Matthew Kirschenbaum’s *Mechanisms: New Media and the Forensic Imagination* (2007), in which he draws a distinction between “forensic materiality” and “formal materiality.” Forensic materiality is based on what he calls “the principle of individualization” in which no two things can be said to be exactly alike and is thus the foundation of discriminatory investigation of traces, remains, debris, and any and all other material evidence in forensics (Kirschenbaum 2007, 10).

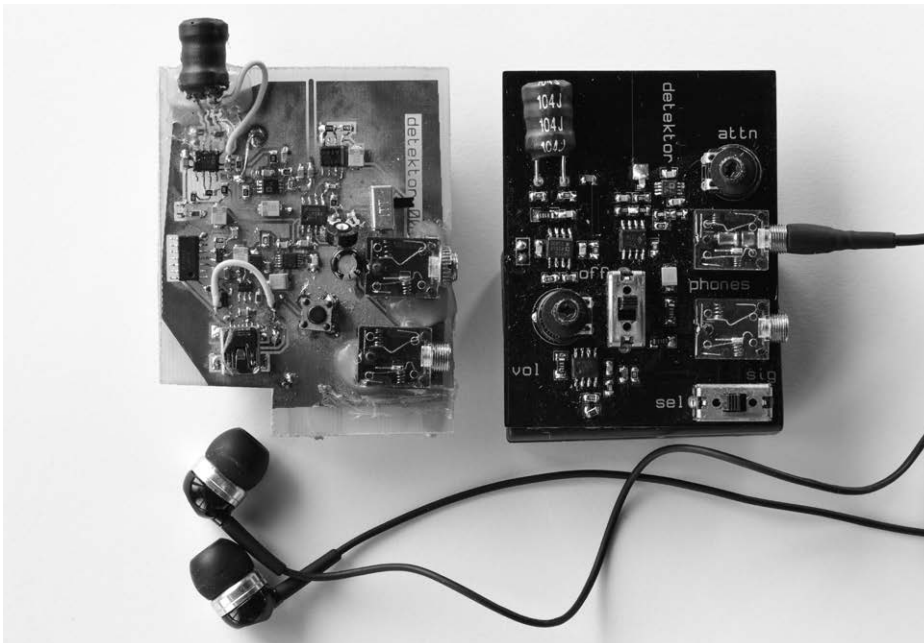


Figure 5.1.

All electronic technologies—from the transmissions of Wi-Fi and GSM telecommunications, to lighting, automatic teller machines (ATM), and security cameras—produce such emissions. Telecommunications even harness them: signals are mixed (modulated) with a carrier signal before they are transmitted, in order to make them suitable for transmission. Modulation allows transmissions to occupy particular areas of the electromagnetic frequency spectrum that are usable, and, by using carrier signals of different frequencies, it allows multiple channels of signal traffic to sit, side by side, within the frequency spectrum. *Detektors* centred on the use of circuits (see figure 5.1), designed by Howse and Miyazaki to demodulate electromagnetic signals between 100 megahertz and 3 gigahertz, and sonify these into an audible range of 20–20,000 hertz.⁴ Using these devices, the project sought to develop a cartography of electromagnetic emissions: “conceived as a website (now offline) with a cartography of user-generated geolocational sound recordings, logs and walks, which reveal [the] hidden electromagnetic geographies, spaces and topologies of our urban areas; and a database and catalog of sonic studies of electromagnetic emissions produced by our everyday electronic devices” (Miyazaki 2018).

⁴ Television and radio occupy the megahertz region. Wi-Fi refers to the 2.4 gigahertz (ultra high frequency) and 5.8 gigahertz (super high frequency) region of the electromagnetic spectrum.

In addition to its aesthetic and metaphysical aspects, *Detektors* also operates as a (geo)political project. Howse and Miyazaki's efforts to create a cartography of user-generated sound recordings, sonically mapping the geolocational "ghostly double" of towns and cities (Howse, 2018), had the potential to reveal differences in the materiality of electromagnetic activity on a planetary scale. Such a cartography would no doubt begin to reveal aspects of what the Marxist geographer David Harvey has called spaces of "uneven geographical development" (2006). In the case of *Detektors*, what would be revealed sonically is the uneven development of networked infrastructures that were partially visualised in 2012 by Carna, a botnet that collected and mapped the location of every IPv4 address on the internet network.⁵ This mapping is directly related to the subjective experience of the historical present, which in Peter Osborne's terms is a geopolitical fiction. In *Anywhere or Not at All*, Osborne (2013, 25) argues that the contemporary cannot be perceived as a whole and differs to a remarkable degree depending on one's global location. Global network maps provided by internet service providers illustrate one way in which otherwise disjunctive localities are becoming interconnected in time, but they also evidence huge inequality in terms of the material reality of digital infrastructure.

In addition to geopolitics, we might read *Detektors* in line with an aesthetic tradition of sonifying the hidden electromagnetic realm: *Drive-in Music* (1967) by Max Neuhaus, Joyce Hinterding's *Aeriology* (1995), Alan Lamb's *Primal Image* (1995), and Christina Kubisch's *Electrical Walks* (2004–present), among others, or various "signal-sniffing" compositions such as Nicolas Collins's *El Loop* (2002), David First's *Tell Tale 2.1* (2004), and Andy Keep's *My Laptop Colony* (2009). In these projects, the drones, squeaks, and crackles of electromagnetic phenomena emerge from a variety of different contexts, from the cosmic microwave background and other sources of background radiation (such as rocks, soil, and plants), to signals produced by electronic devices. In most projects though, the sounds are a kind of waste (although less so with Neuhaus): the inadvertent by-product or excess of other processes, whether natural or technological. While *Detektors* shares some of the aesthetic characteristics of these works, and some of the motivations to sonify electromagnetic signals, Howse and Miyazaki shift their focus away from the electromagnetic character of the natural world, or by-products of technology, to the sonification of digital traffic that courses through contemporary informational infrastructures. Detecting and demodulating signals into a frequency range and acoustic form audible to humans highlights a tension at the heart of their project. As in the work of Kubisch, human participants walking and listening become an affective means to understand the hidden realm of microwave activity.

5 Similar to the intentions of Howse and Miyazaki, the creator(s) of the Carna botnet used the Nmap Scripting Engine (NSE) to gather geolocational information on all IP addresses that responded to an ICMP message (Carna botnet 2018).

The methodological approach of *Detektors* is also broadly in line with “media archaeology” as a way of practising media criticism from a *nonhuman* perspective—“epistemological reverse engineering” as Wolfgang Ernst (2011, 239) puts it—revealing how media (and not just humans) become active archaeologists of knowledge (Miyazaki 2013b, 514). Ernst’s example of this is Fourier analysis, in which the technical device demonstrates its analytical precision over the human sensory apparatus in its analysis of complex soundwaves. As such, “Only by the application of such medial-technological tools can we explain the microtemporal level of such events,” as Ernst puts it (2011, 245). Unlike in sonic *arts* approaches, in which such signals become expressive or somewhat compositional, Howse and Miyazaki instead investigate the sonic *aesthetics* (whether directly perceivable or not) of contemporary urban infrastructures, using the capture and documentation of signals as an archaeological research method to “make audible the hidden infoscapes of *our time*” (Miyazaki 2018, our emphasis).

Central to this approach is the idea of listening as an embodied research tool, and sound as a form of knowledge that is particularly appropriate to understanding the intangibility and temporality of network infrastructures. As Jonathan Sterne and others make clear, forms of auditory knowledge have a long history, from “mediate auscultation” (Sterne 2003, 99–136)—that is, the practice of listening to the body (in particular by use of a stethoscope to diagnose illness) and deep listening of sonar operators—to car repair (the purr, wheeze, or rattle of specific engine parts are often the quickest way to diagnose an issue). Unlike the “cool gaze” of visual research or the incorporeal quality of argumentation, such approaches foreground embodiment (beyond visibility), pattern recognition, and other affective encounters.

In sonifying electromagnetic signals, and placing emphasis on humans listening to and negotiating signaleptic spaces, *Detektors* challenges the implied objectivity of media archaeology and additionally foregrounds aesthetic practice and subjective experience. But then again—and setting aside Ernst’s potential over-emphasis of signals over semantics—perhaps all archaeology does just this whether overtly or not, as it oscillates between the presence and absence of humans in order to assemble previously hidden phenomena to grant access to the present. Suffice to say that it is through the bringing together of a materialist, archaeological approach and the discourse on contemporaneity (Ebeling 2017)⁶ that human and machine witnesses—or “detectors”—begin to uncover some of the conditions of contemporaneity that otherwise remain inaccessible (see figure 5.2.).

6 This “archaeology of contemporaneity” is explored in depth by Ebeling (2017).



Figure 5.2.

Detektors makes a good analytical object in this way because we want to highlight the importance of signals and microtemporality, and their deep involvement in wider planetary-scale assemblages on the one hand—what Benjamin Bratton refers to as “the stack”⁷—and more localised affective experience on the other, embodied in the user of the technical device not least. We argue that this layering of scales and interconnection of technological and social entities can be seen as a key feature of the contemporary—evoking Boris Groys’s “Comrades of Time” (2009), in which he explains how we collaborate with time and demonstrate solidarity with it. Once entangled in planetary-scale technical infrastructures, time can be seen to be nonlinear and multidimensional, layered and relational, thus bringing together not only people from past and future times into the present but also technology that contributes to our collective experience of it. To emphasise this point, Groys invokes Jacques Derrida, who, in his critique of what he calls the “metaphysics of presence,” has demonstrated “that the present is originally corrupted by past and future, that there is always absence at the heart of presence” (Groys 2009, 1).

7 We take this term from Benjamin Bratton (2016). “The Stack” is a layered technical mega-structure that operates on a planetary scale, comprising “Earth, Cloud, City, Address, Interface, User.”

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The importance of an archaeological approach in tracing and signalling contemporaneity, alongside the affective and embodied subjectivity of aesthetic encounters involved in *Detektors*, helps offset the reductive pragmatism of the data produced through such means. To stress the point once more, we therefore argue that Howse and Miyazaki's project—and the exigencies of understanding contemporaneity from a material and techno-temporal point of view—are as much about the human experience of signal-traffic, as they are about microtemporality and archaeological data-mining.

This is very different to other approaches to understanding contemporaneity rooted in a humanist tradition such as, to name one key example, Peter Osborne's conception of the contemporary as the defining historical temporality of the present, which is firmly situated in the times of human lives, demonstrated by his assertion that there exists no *socially shared subject position* from which the totality of the present can be perceived (Osborne 2013, 23). Our intention is to nuance these ideas with the profusion of machinic and techno-temporalities in the constitution of contemporaneity, while, at the same time, maintaining the importance and sensibility of the social realm. As such, *Detektors* allows us to narrow our analysis to signals, and allows us to trace fragments of the contemporary through the spectral materiality of electromagnetism and the transmission of coded messages to human sensory perception through the affective act of listening to demodulated signals. Here we are highlighting the interconnections of objective and subjective registers of the contemporary (Cox and Lund 2016), as both a mode of being in time, a particular relationship to the historical present, and as a sort of shared historical periodisation, as in "our" contemporaneity. Moreover if we can speak of "our" contemporaneity in a collective sense, it is because ours is markedly different than other "present times" throughout history—owing largely to not only the proliferation of digital network ecologies and planetary computation, but also the emergent politics that arise when these networks interface with human worlds and nonhuman ecologies.

SIGNAL HAUNTOLOGY

A spectre is haunting the spectrum: the spectre of contemporaneity.⁸ Parody aside, the spectral quality arises because signals occupy parts of the electromagnetic spectrum outside human perception, and because they are temporal—capable of decay, and surges, spikes, and troughs. Signals express a material-temporal ambiguity for humans as they are imperceptible to our sensory apparatus but ever present. These comments derive from what Derrida has called *hauntology*, a term from *Specters of Marx* (1994), further developed in the context of sound by Fisher (2012, 2013, 2014) and Simon Reynolds (2010), among others. Indicated not least by his essay title "The Metaphysics of Crackle," Fisher is referring not only to Derrida's concept of hauntology but

8 Making reference, like Derrida mentioned below, to the infamous opening lines of *The Communist Manifesto*, "A spectre is haunting Europe. . . ." (Marx and Engels [1888] 1985, 78).

also to his *metaphysics of presence* to examine the tension between the “authentic” live voice and its recording (Fisher 2013, 44). By drawing a neat parallel to voice and writing in Derrida, it can be seen that when it comes to music, there has been a symptomatic privileging of live performance over recorded forms as if they were somehow less authentic or significant. Presence is revealed to be an illusion maybe, but our interest is less metaphysical and more rooted in the lack of recognition of the material pre-conditions of the sounds.

Indeed hauntology is a concept that has repeatedly emphasised that presence can only ever be perceived in fragmentary form. *Fragmentary* is here understood in two ways: both as incomplete or partial, and as broken or out of joint. Addressing these different understandings of fragmentation in order, first, the sounds and signals encountered in *Detektors*—or indeed, in any strategy for engaging with contemporaneity—will always be incomplete, pointing to the wider conditions of its production, without ever fully capturing it. As such, *Detektors* is perhaps less an attempt at the exhaustive and empirical logging of data, than an example of praxis geared to the adjustment of one’s *habitus*—Pierre Bourdieu’s notion of the ways in which one understands the world and reacts to it (1990, 52)—through affectively confronting a spectral world of electromagnetic emissions. The second understanding of fragmentation found in contemporaneity, and expressed hauntologically, refers to the notion that the complexity and multiplicity of the present must necessarily be experienced as loss, or absence. It remains broken because it is bewildering and excluding, in the sense that so much of contemporary experience is not for us—as individuals, groups, societies, even as humans so it would appear. Mediation plays a part here too, since, “the broken-time proper to hauntology” (Fisher 2013, 47) diverts the presence of a present moment via a re-presentation or re-enactment of that which is absent, a return of the past (or commingling of different locations, different presents) and subsequent lost futures. This re-mediation is important because “when the present has given up on the future, we must listen for the relics of the future in the unactivated potential of the past” (ibid., 53). Here, not least, the spectre of historical (or dialectical) materialism can be detected.⁹

Written soon after the dissolution of the communist bloc in 1989, Derrida’s *Specters of Marx* developed a set of ideas around spirit or spectre, and the hauntological, in order to counter claims of the “end of history” (Fukuyama 1992), and to consider the continued legacy of Marxism: reawakening the so-called “spirit of Marx” (Derrida 1994, 2). Indeed, Derrida used the uncanniness and untimeliness of the spectre to articulate this critique—ghosts, after all, don’t belong to a particular time or place; they are present but not quite—since it allowed him to critique homogeneous and teleological conceptions of time that underpin the end of history and the perceived impasse of Marxism set against a triumphant capitalism, as if there was no alternative future imaginable. His thinking on temporality has since been revisited for its ability to shed

9 Such as in the media archaeology of Walter Benjamin, as in “On the Concept of History” (2003), in which the past enters into a constellation with the present, interrupting the mechanical temporal process of historicism.

light on heterogeneous understandings of time; it is interesting too since the rhetorical trope of the spectre introduces a subjective and speculative register, yet one offset by the dislocated, asynchronous, and often intangible presences of informational capitalism and the gross inequalities that it perpetuates.¹⁰ In Marx's alleged favourite Shakespeare play, *Timon of Athens*, the question arises, "How goes the world?—It wears, sir, as it grows" (as quoted in Derrida 1994, 77). Derrida takes this as the nature of growth in the context of global expansion, and we might add how time expands in the present and in turn "is out of joint," under capitalist conditions (ibid.). For, "As that which is and is not, the specter represents temporalities that cannot be grasped adequately in terms of present time" (Postone 1998, 371). The logic of past times haunts the present and renders it spectral and uncertain.¹¹

It should be stressed at this point that although we discuss hauntology in relation to sound, our use of the term is not specifically intended to invoke what has become known as the musical genre of sonic hauntology (Born, Fisher, Reynolds et al.¹²), and which was characterised by nostalgia, appropriating and mixing past cultural artefacts—such as sampling vinyl recordings—as an exercise in "transtemporal invention" (Born 2015, 379). Reynolds (2012, 328) describes the sensibility of sonic hauntological practices clearly when he writes that they "captur[e] the sense of a collective unconscious, the ghosts of our life coming back to haunt us." Fisher's use of the term applies to recorded music and how what is past appears in the present like a spectre of the material mode of production, for instance; it also applies to unacknowledged past influences (such as the way in which white culture is unable to escape the influence of black music¹³). In the spirit of Afrofuturism, he explains: "It is, in other words, a *technologised* time, in which past and future are subject to ceaseless de- and re-composition" (Fisher 2013, 47). Thus temporal complexity and its inherent disjunctions can be clearly heard in the ways that sounds are recomposed in the present through sampling or decolonisation (Mbembe 2001), and the like. Everything appears to be here and now,¹⁴ or as part of a cyberpunk imaginary. We can also detect this disjunctive tendency in Howse's other projects, which operate in the tradition of what he calls "psychogeophysics," observing other realities such as the earth's physical properties and its interaction with local

10 The notion of *spectre* might also be argued to counter platitudes of impersonal capital, and of disinterested neo-conservative power. "Moreover, the current world situation is characterised by an enormous inequality of techno-scientific, military, and economic development, with the result that 'never have violence, inequality, exclusion, famine, and . . . economic oppression affected as many human beings' (85). This situation undermines any teleological understanding of history (53–54, 63–64, 78)" (Postone 1998, 373, citing Derrida 1994).

11 And being; as Hamlet famously describes: "to be or not to be," but nothing is less certain" (Derrida 1994, 10).

12 We also refer here to artists such as Burial, The Caretaker, and Belbury Poly, and the record label Ghost Box. These examples each foreground the sounds of surface crackle, some emphasising retro-aesthetics of a lost future.

13 To Fisher, black experience has always been out of joint with any universal notion of the contemporary and in this respect, and as an aside, he points to Afrofuturism, as a way to understand this condition of the contemporary and its disjunctions.

14 As well as "anywhere, or not all" (Osborne 2013). Decolonialised time is clearly an important intervention here, such as in the work of Achille Mbembe (2001).

signal ecologies¹⁵—engaged as much with pataphysics as metaphysics (see, for example, Howse’s essay “The Aether and Its Double” [2008], which combines models of theoretical physics with the literary writings of Lewis Carroll).

Despite allusions to science fiction, *Detektors* was not a decolonial or compositional project, and has little to do with aesthetic and semiotic motifs of this or that musical genre, or arguably their stated concerns. Yet, there are clear connections to the project under discussion: music of sonic hauntology, and the writings that discuss it, emphasise a sense of fragmentation, the “technical uncanny” and atemporality—the experience of time out of joint. Nevertheless it should be emphasised here that Fisher’s writing on the subject goes much further than a straightforward analysis of sonic hauntology as a musical genre, and already encapsulates such temporal complexity. To Fisher, sonic hauntology “blurs contemporaneity’ with elements from the past” (2013, 46).

The concept of the spectre suggests a virtual, insubstantial state of being, a simulacrum, a ghostly presence that signifies absence. As we have already stated, Derrida utilises this “non-identical, non-presentist temporality of spectrality” (Postone 1998, 371) to markedly extend his critique of “presence” as the most authentic state of being, which was important to the broader project of deconstruction and was framed most famously by the opposition between the embodied voice and textual writing (see Derrida 1997). The implications of Derrida’s critique of the metaphysics of presence necessarily problematises the concept of linear history—and deeper structures of historical time—by foregrounding the heterogeneity of time’s multiplicity inherent in the temporal logic of “haunting”: “Haunting is historical, to be sure, but it is not *dated*, it is never docilely given a date in the chain of presents, day after day, according to the instituted order of a calendar” (Derrida 1994, 3).

Fisher takes this haunting as symptomatic of what he referred to as a paradoxical shift in historical temporality, which occurred with the passing of modernity to the pastiche time of postmodernity (and we might add the contemporary as a further periodisation if we accept this logic). The paradox that Fisher is pointing to is that artworks created by those working under the rubric of sonic hauntology were not only haunted by ghostly relics of the past, but were also mourning the loss of once conceivable futures that will no longer be realised. The distinction here is important, Fisher (2012, 16) notes, explaining that the hauntological emphasis on lost futures isn’t so much about the future as historical actuality as it is the loss of a social imaginary capable of conceiving an alternative future to contemporary capitalism.

Referring to Fredric Jameson’s discussion of Lawrence Kasdan’s 1981 film *Body Heat*, Fisher (2013, 45–46) highlights a key difference between the artworks to which he simply refers as “*postmodernism*” and the work produced by hauntological artists. In his analysis, Jameson (1991, 20) explains how Kasdan actively sought to engage the viewer in a “nostalgia’ mode of reception,” enacting a number of directorial and cinematographic decisions which ultimately “dis-

15 See Howse’s website <http://www.1010.co.uk/org/>. For more on psychogeophysics, see <http://www.psychogeophysics.org/wiki/doku.php>.

tance the officially contemporary image from us in time.”¹⁶ To Fisher (2013, 46), this describes the distancing of the contemporary image as an act of “*gloss[ing] over* the temporal disjunctures,” while pointing out the material difference of the “hauntological artists [who] foreground them.” The disjunctive aspect is crucially important as it highlights a key similarity between the internal structural logic of hauntology and the concept of the contemporary, in both its art-critical and philosophical-historical sense. That is, albeit differently, both hauntology and the contemporary register the existence, or “coming together” to use Osborne’s phrase (2013, 17), of multiple temporalities and different types of time in the historical present.

In one of his earlier blogs on the concept, Fisher (2006) introduces the phrase “technological uncanny” to encompass a number of tenets of sonic hauntology. Most prominently, and as we have discussed throughout this chapter at length, it foregrounds the “noise” produced by the technological apparatus itself—what Fisher refers to as crackle: the effect of which unsettles the distinction between surface and depth, and through which we begin to hear that time is out of joint. Thus the illusion of presence is unsettled in two ways, according to Fisher: temporally, as we realise we are listening to a “phonographic revenant”; and ontologically, by “introducing the technical frame, the material pre-condition of the recording, on the level of the content” (Fisher 2013, 48–49). This is part of his response to the problem of postmodernism’s terminal temporality (its endgame). Here again he is drawing upon Jameson’s nostalgia mode, which isn’t necessarily a state of wistful affection for the past or of a specific historical moment, but what Jameson (1991, xvii) describes as “a depersonalised visual [and we would add, sonic] curiosity and a ‘return of the repressed’” separate from particularly personal or affective qualities. The difference with *contemporary* art is that it is no longer necessarily concerned with reclaiming lost histories or unimaginable futures, as much as deeply examining the temporal complexity that follows from bringing together different times in the same historical present. It follows that *Detektors* can be said to be contemporary—even an example of contemporary art although perhaps not intended to be—in this sense as it permits an examination of the multiplicity of different times, human and nonhuman, coming together in the same present.

TEMPORALITIES OF CRACKLE

“The crackle . . . reminds us of the technological means by which this capturing of time was made possible” (Fisher 2013, 49) and seems to offer a critique of an inert presentism. Just as the surface crackle and acoustic depth of recorded media indicate a temporal palimpsest—problematizing totalising understandings of time—the spectral quality of live electromagnetic emissions similarly

16 The historical present has been colonised by “pastness” displacing “real” history in Jameson’s critique of postmodernism, and thereby displacing politics (1991, 20). This is why Jameson prefers the phrase “late-capitalism” to “postmodernism” in order to reject the view that new social formations no longer obey the laws of industrial production, and thereby to stress relations of production and the continued importance of class struggle.

challenge such notions. Materially present and perceptually absent, they orchestrate the command and control of network processes that go relatively unnoticed day-to-day, but play a determining factor in all manner of contemporary experience. The technical detail here is important and helps us substantiate what might otherwise seem to be rather speculative claims.

While digital computation operates at a symbolic level of code, and beneath this as binary information, it is articulated by time-based electronic signals and physical hardware states. Electronic signals are fundamentally temporal in their character: impulses, fluctuations, and waves that propagate through a medium (like a wire, or a circuit). The orchestration of such signals—their ordering such that messages and state-changes happen in correct sequences—is therefore “time-critical” (to use Wolfgang Ernst’s term). Across digital networks and even within individual digital devices, small timing errors can have dramatic effects. Two key drivers of the field of information theory—in which the concepts and techniques of digital technologies were first developed—concerned finding ways to encode, optimise, and decode signals for transmission, either through networks or within a device (in time and through space); and, in relation to this, overcoming the inherent technical challenges of electromagnetic noise during transmission. Such research was developed at sites like Bell Laboratories to meet the challenges of reliable transmission of information across telecommunications networks. In this context, noise in transcontinental networks was considered a big problem—rather than a creative opportunity as with our examples from sonic arts—as this text from Bell Canada Archives explains:

There was sputtering and bubbling, jerking and rasping, whistling and screaming. There was the rustling of leaves, the croaking of frogs, the hissing of steam, the flapping of bird’s wings. There were clicks from telegraph wires, scraps of talk from other telephones, curious little squeals that were unlike any known sound. . . . The night was noisier than the day, and at the ghostly hour of midnight, for what strange reasons no one knows, the babel was at its height. (Quoted in Gleick 2012, 197)

At a material level, digital information is the time-based modulation of electromagnetic signal into mathematically calculated patterns, sufficiently repetitive to overcome the noise-floor of given hardware, yet with sufficient difference and articulation to communicate messages with minimum time and energy.¹⁷ Through such encoding, and optimisation against noise, messages become unintelligible to humans: even if they were within a perceptible frequency range, they are no longer an analogue of an acoustic waveform. Nevertheless, such emissions do display pattern and rhythm, texture, pitch, and dynamics, that when demodulated to an appropriate frequency range, and transduced from signal into sound, are formally legible, though not humanly decipherable. As Miyazaki asserts (2012), the temporal quality of such signals lends them to listening—itself a mode in which rhythms and textures are easily apparent. Listening to such signals has the potential to reveal patterns and features that

¹⁷ While the efficiency of such hardware has increased wildly (and therefore the issues of atmospheric noise decreased), the vast increase in communications continues to drive attempts to optimise communication signals (to fit more information through), even while bandwidth is increased.

other modes of investigation do not. Not least, one reason for media theories to shift focus from visual studies to “acoustic space” (to use McLuhan’s term) is that the human ear is especially sensitive to microtemporal changes of pattern and rhythm (Ernst 2016).

This approach is made apparent in Miyazaki’s concept of algorithmic analysis as a means to examine these signals, as material instantiations of symbolic step-wise instructions. He explains that algorithms “occur when real matter is controlled by symbolic and logic structures like instructions written as code. ‘Algorithms’ let us hear that our digital culture is not immaterial, but lively, rhythmical, performative, tactile and physical, and, most importantly, that ‘algorithms’ are not just normal rhythms” (Miyazaki 2013a, 135). Such rhythms remind us that machines run sequences and processes that are carefully orchestrated. Machines can thus be seen to manipulate time in particular ways, rendering the algorithmic “an epistemic model of a machine that makes time itself logically controllable and, while operating, produces measurable time effects and rhythms” (Miyazaki 2012). “Understanding computation means doing epistemic reverse-engineering of their inbound and outbound processes, signals and rhythms,” Miyazaki explains while paying attention to “its audible, tactile, vibrational, more dynamic and ephemeral aspects” (ibid.).

This technique of deep listening¹⁸ to analyse computer operations has a longer history that intersects with information theory and the identification of noise as an inherent quality of communication. This further resonates with Howse’s other experiments with noise, such as *Demons in the Aether* (2008), which also involved workshop participants sonifying the surrounding electromagnetic activity and was instructive to the development of the hardware used in *Detektors*. In playing various streams of data, the “noise probe” could indicate a fault from its change of tone by tuning into the rhythm of the machine or by the identification of a particular pattern. The temporal dimension of this emphasises that signals are not stable and always changing. They are subject to very particular kinds of temporality, the temporality of material infrastructures and of the data itself as well as the changing algorithm.

Yet signals also occupy space.¹⁹ In video documentation of *Detektors*, we see a point-of-view camera perspective of the researcher—moving around half-

18 *Deep listening* is a term associated with Pauline Oliveros to describe an aesthetics of listening that responds to environmental conditions on the basis of principles of improvisation, ritual, teaching, and meditation.

19 The measurement of wavelength specifically refers to the signal’s occupation of space. Higher frequencies (i.e., shorter wavelengths) take up less space while low frequencies propagate over longer distances. In the same way as the visible section of the electromagnetic spectrum (light) occupies and transforms a space, so do Wi-Fi, Bluetooth, and GSM signals. The *Wifi Camera* project (2010) by Adam Somlai-Fischer, Usman Haque, and Bengt Sjöln (http://wificamera.propositions.org.uk/) makes a good example of this, through which physical objects are “illuminated” by Wi-Fi energy (even though humans eyes can’t see this), and similarly such objects cause “shadows” in Wi-Fi beams. For a moment, it seems it’s the spatiality, rather than temporality, of these signals that becomes important. They remain physical instantiations of symbolic patterns, but their materiality is affected by space and surface. Temporality returns however in two clear ways: first, spatial features diffract, resonate, reflect, absorb, and otherwise modulate these signals, dynamically changing them, as they travel, in time. Second, the incredibly high speed of signal transmission and its ability to cover long distances mean that signal transmission has the effect of folding space, and cutting time.

empty university buildings and empty labs, travelling bus routes, and finding areas of electromagnetic intensity in what often feel like visually and spatially insignificant locations. These clips emphasise that the signals detected by the equipment—the protocols and transmissions—are part of huge invisible infrastructures, spread out in topologies distinct from the physical structures. The “landmarks” of the infosphere, the points of intensity and interchange, are only sometimes coincident with visual, urban topologies. Human presence does haunt these spaces, but at one remove, in the structural forms of the network, in protological decisions, and of course as communications; furthermore, at a material level of sound and signal, they remain encrypted and impenetrable. Also key, is the sense that the command and control of the stack, which such signals flow from and through, happens elsewhere. These signals knit together, but also divide out, time and space according to informational logics unbounded by human notions of scale and orientation.

Communications networks stretch across and around the whole planet, but more fundamentally than this, the planet’s atmosphere constitutes the medium electromagnetic transmissions occupy as energy. Transmissions have to contend with the properties and noise-floor of this planetary medium. The optimisation techniques of information theory were designed precisely to overcome the challenges of such conditions, and the tendency—summed up in the second law of thermodynamics—for patterns and structures to err towards entropy and disorganisation over time. Listening to noise within the electromagnetic spectrum, at particular times of day, and in particular places, emphasises this point: “Lightning produces a wide range of radio waves. Some of the VLF waves are bent by the atmosphere and follow the earth’s magnetic fields. The ionosphere acts as a prism, in that the higher frequency radio waves travel faster through the ionosphere than do the lower frequency ones. That seems to explain why one hears the whistler’s high-frequency tones first” (Fox 1990, 107–8).²⁰ The rounding and filtering of such emissions through space, and in time, emphasises the material character—alien though it is to us—of radio energy. While such atmospheric effects are less of an issue above the VLF range, they are indicative of the material forces at issue. As such, wireless digital transmissions also have to contend with such challenges—much of their characteristic patterns when sonified are a product of optimisation of the signal to maximise power and ward against errors.

Howse and Miyazaki’s project extends the phenomenological experience of physical urban space to the unseen energies of the techno-temporal. They offset imperceptible infrastructures of electromagnetic networks against the relatively fixed infrastructures and architecture of services, buildings, and roadways (Miyazaki 2013, 520): presenting a displacement of the visual to the aural. Of course, as Shannon Mattern argues in *Code and Clay, Data and Dirt* (2017, xxvi), the infrastructural systems of both media communications and architecture are not mutually exclusive, but are rather “mutually constructed.” By con-

²⁰ Whistlers are descending tones heard within the very low frequency (VLF) electromagnetic range of 3–30kHz (just below the broadcast radio range), caused by lightning at a “geomagnetic conjugate point” (that is, a point on the same geographic longitude, but the opposite hemisphere) (Fox 1990, 107).

sidering the “city-as-media-infrastructure,” she demonstrates the myriad ways in which the materiality of the built city, and other urban centres, reinforce and support the hidden or imperceptible infrastructures of signal communication (ibid.). The signals and digital infrastructures made known by *Detektors* are only perceptible to the human sensory apparatus through processes of demodulation and transduction. Prior to this technological process electromagnetic signals can be understood in terms of their implicit *sonicity*, which Ernst (2016, 23) describes as the epistemological “message” of sound signals that addresses humans on the temporal level (for the sense of hearing permits the clearest resolution of microtemporal processes²¹). This is the “essential temporal nature” of sound separate from its affective qualities (ibid.) and thus, for Ernst, provides its analytical precision. To breach the surface and enter into the realm of signification requires “a temporalizing medium like the record player to make it *explicit* through time-sequential unfolding” (ibid., 22). This is a techno-temporal process where *effects* of microtemporal operations in digital media surface to become an *affective* experience—either through visually perceiving changing data as a continuous stream on a computer screen or audibly, as is the case with *Detektors*, by transposing hidden data into the audible frequency range of the human sensory apparatus.

How we register the disjunctive temporalities of contemporaneity when mediation has become immediation—when material processes are, on the surface, immaterial—becomes centrally important. *Detektors* makes knowable what appear to be relatively instantaneous technological processes (sending and receiving an email; the constant refreshing of pixels perceived as a continuous picture; facetime calls) and foregrounds the production, or productive forces (signal traffic) of these processes. It (re)introduces what Fisher called the “grainy materiality” (2013, 44) of digital communications through demodulating messages carrying signals (the medium), rendering the medium itself audible and sensible. And this is an important point, which further echoes Marshall McLuhan: *Detektors* deals with the medium of communication through signals, not the message itself.²² (In any case, humans could not perceive the message being carried by the signal, which is intended for Wi-Fi routers, mobile phones, and other modem/networked devices.)

In the same way that proponents of sonic hauntology reclaimed the uncanny effects of technologised time by situating the crackle and hiss of technical production at the centre of their compositions, with *Detektors*, Howse and Miyazaki restore a sense of the uncanny by uncovering the textural reality of immaterial communication synonymous with contemporaneity. Further to this, as we have attempted to demonstrate throughout this chapter, the onto-epistemological message (see Prior 2015) of the *Detektors* project is twofold: first, through the

21 According to the experiments of Ruth Litovsky and H. Steven Colburn, whose research is an extension of Helmut Haas’s work on the precedence effect, humans can aurally detect an echo threshold down to approximately four or five milliseconds. That is not to say, however, that two sound sources are heard as clearly divisible auditory events; however, they are nonetheless perceivable as what could be called a microtemporal process (see Litovsky et al. 1999).

22 Marshall McLuhan famously indicates how the form of a medium embeds itself in any message it transmits.

demodulation of ghostly electromagnetic signals, it provides insight into what is in the world, by sonifying that which is otherwise imperceptible to humans; second, and most pertinent to the experience of historical contemporaneity, the project actively foregrounds notions of spatio-temporal disjunction and interconnection. We maintain that to deeply examine the conditions of the historical present, emphasis must be placed on what we have called the techno-temporalities of contemporaneity. Like Miyazaki's concept of the algorithym, which invokes rhythmical qualities of both analogue and digital processes, our emphasis on techno-temporalities is intended to synthesise the discursive and non-discursive realms of the contemporary. In this we are echoing Mattern's contention that material and media archaeological analyses often diminish the function of people, cities, and buildings—the analogue network within which these technological media exist and operate (Mattern 2017, 24). *Detektors* encapsulates this sensibility to the fullest extent, as it operates as both the techno-archaeologist *and* the time-sequential device through which affective experience for the human is generated.

Contemporaneity is increasingly defined by complex relationships and registers of time: from the microprocesses of delay lines to spatio-temporal evolutions in planetary history. Under the conditions of contemporary capitalism, coupled with the ubiquity and immediacy of digital communication methods, it could be argued that temporal disjunction has never been more detectable. Algorithms both pre-empt risk in global financial markets²³ and prioritise yesterday's posts on our social platforms,²⁴ just as network technologies granularise communications, simultaneously fragmenting existing relations and creating new ones. A material remainder can be found in the signal: and it becomes possible to hear the crackle of contemporaneity. The crackle signals the disjunctive aspects of presence, while ontologically reflecting temporal complexity in its material character in the present.

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23 The notion of pre-emption is central to the concept of what has come to be called the post-contemporary, an alternative historico-temporal argument that best describes the historical present largely explicated by theorists Armen Avanessian and Suhail Malik. The basic premise here is that the experience of the historical present is pre-produced, through pre-emptive acts: "the future happens before the present, time arrives from the future" (Avanessian and Malik 2016).

24 In a recent paper on algorithmic music, Geoff Cox and Morten Riis (2018) have discussed the ways in which algorithms operate across multiple temporalities at both micro and macro scales.

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