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## STS confronts the Vocaloid

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# **STS Confronts the Vocaloid: Assemblage Thinking with Hatsune**

## **Miku**

Nick Prior

In recent years, a number of interlocking theoretical tendencies in science and technology studies (STS) have mustered around the idea that societies and cultures are part of a complex web of enrollments, networks, and human-nonhuman conjunctions enacted across a fluid domain of materialities (Bell 2006). Drawn to nontotalizing ways of thinking, these tendencies embrace opportunities to reveal the heterogeneous, contingent, and emergent nature of sociotechnical relations and the interwoven meshworks of technologies and bodies. While cyborg theory and posthumanist positions have exploded the idea that humans, in all their pure agency, act alone (Haraway 1991; Hayles 1999), both Deleuzian philosophy and actor-network theory have been concerned to state the generative nature of flat ontologies that look for connections between plural objects considered on an equal ontological footing (Law 2002; Latour 2005; DeLanda 2016).

While not exclusively fused to these tendencies, or to STS as a whole, the idea of the assemblage resonates strongly with aspects of this cluster and opens up apertures on the intricate ways that objects, including musical objects, fold with, relay, and mediate each other. For its proponents, assemblage thinking goes beyond discrete ideas of scale or humancentric ideas of action and coaxes us towards how things emerge and are sustained in acts of becoming. As an ontological unit, it provides an inherently dynamic, but nonessentializing, view of the world: an alternative to traditional concepts like community, event, and even society. As a theoretical resource, it is a powerful way to describe the dynamic perplexities of the contemporary social world: a world that in all its accelerating fluidity, with its fuzzy boundaries and organic-inorganic hybrids, seems increasingly hard to pin down (Virilio 1997).

Drawing on research undertaken in Japan and the United Kingdom, this chapter asks to what extent STS, when armed with the assemblage concept, can enrich our understanding of

contemporary music.<sup>1</sup> The specific object under scrutiny is a singer whose songs and voice are composed by her fans and who functions as an effervescent conduit for media production, but who refers to no flesh-and-blood actor. The entity is Hatsune Miku, a character who represents a version of Crypton Future Media's Vocaloid range of software, a virtual environment in which music producers generate vocal phrases and compositions. Dubbed the ultimate "fake celebrity" by some and nothing less than the "savior of the music industry" by others, Miku is now something of a global superstar who tours and performs across the world as a computer-generated avatar (Zoladz 2014). Possessing elements of participatory openness and inheriting long-standing histories of vocal manipulation, the advent of Miku suggests that we are in interesting times as far as oppositions central to the historical formation of music are concerned: live/recorded, authentic/fake, real/unreal, absence/presence, as well as what constitutes a musical instrument. Add to this the fact that Miku is coded and that her songs are written largely by amateurs, and the sheer complexity of Miku as an entangled event requires advanced-level conceptualization.

After introducing some background to the Miku case, this chapter will explore some of the fundamental principles of assemblage thinking and reveal why she is, in many respects, the archetypal assembled object. What keeps Miku alive, it will be argued—what nurtures and sustains her—is a constant process of love, labor, and attachment across countless circuits. She is both the gathering point for heterogeneous sociotechnical practices and the outcome of those practices. The chapter finishes by posing two methodological questions: what kinds of demands do assembled objects place on scholars with STS-related projects, and how might we configure our methods to meet those demands? This is where the development of a "live methods" approach to research (Back and Puwar 2012) is well positioned to generate new and experimental ways to capture the "liveliness of the present."

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<sup>1</sup> The research was undertaken from 2016 to 2018 and comprised a mix of interviews with staff at Crypton Future Media, participant observation at four Miku concerts, attendance at expos, promotional events, live screenings, and informal conversations with Miku fans and Vocaloid users. The research was made possible by a grant from the Strategic Research Support Fund from the School of Social and Political Science at the University of Edinburgh, UK.

## **Dramatis personae: The Miku story**

Wataru Sasaki is a voice snatcher: his main job is to scour the internet for arresting voices. When he finds a voice that interests him, he will often invite the owner of that voice into the recording studio for a few days to record tiny fragments of that person's singing and speaking voice. He will then spend another few days chopping it up and deconstructing it in software, after which he'll gather all the vocal materials together as a database so that the company he works for, Crypton Future Media, will be able to generate a virtual singer in the form of a Vocaloid: a vocal synthesis instrument. In an interview with Sasaki, he tells me that he regularly scours the last forty years of vocal materials in this way and has a good sense of how voices in Japan have changed in that time.

Saki Fujita is a *seiyū*: a Japanese voice actress. In Japan it's possible to build a successful career in the entertainment business based solely on the quality of your voice, and talented voice actors and actresses are in demand in the film and anime industries, in particular. One of the more curious sights in a Japanese stationery store, for a Western visitor at least, will be several rows of consumer magazines dedicated solely to voice actors and actresses. In Saki Fujita's case, it's her voice that forms the database to Crypton's most well-known product, the Hatsune Miku Vocaloid. It's her voice that is recorded, sold, and "sunk" into the Vocaloid environment to become an algorithmically manipulated stage for further vocal manipulations by professional composers and amateur musicians.

CosMo is one such amateur musician, though he self-defines more as a visual artist. He uses the Vocaloid software to write songs *as* Hatsune Miku. This is because Crypton Future Media presides over a facilitating legal framework to allow anybody to publish under her name. In the case of CosMo, one of his most popular songs (with tens of millions of hits on video sharing sites, and regularly performed "live" at Miku concerts) is called "Hatsune Miku no Shoushitsu" (The disappearance of Hatsune Miku). The song is a piece of glitchy electronica that runs at 240 beats per minute, the synthetic voice delivering high-octane and increasingly desperate exclamations that reflect on the precariousness of Miku's own digitality. Part digital simulation, part creative

collaborator, Miku sings that she might at any moment end up in the desktop's trash bin and be forgotten forever. In an interview, CosMo admits that what attracted him to the Vocaloid software in the first place was that it allowed him to circumvent traditional structures in the music industry: it was the perfect environment for introverted producers like himself, he says (Bokaro Seikatsu Purojekuto 2013). There are currently over five hundred thousand Miku songs written by amateurs like CosMo in almost every conceivable music genre: from death metal and J-pop to opera and techno.

Miku was devised in 2007 as a marketing image for Crypton Future Media, a small music software company based in Sapporo on the northern Japanese island of Hokkaido. She was the package character illustration for the second version of Crypton's flagship music-making software, Vocaloid, a joint collaboration with the Japanese electronics company, Yamaha. Designed with long cyan pigtails and rendered in typically *kawaii* (or cute) Japanese style, Hatsune Miku was given no biographical characteristics but was described as a 16-year-old schoolgirl, height 158 cm, weight 42 kg. Her costume intentionally echoes the colorings of the iconic Yamaha DX7 synthesizer, while the overall look aligns with the aesthetic tropes of the hyperfeminine anime characters promoted in the global branding of "cool Japan." In total, there are six characters in the Vocaloid range, each representing different vocal types, though Hatsune Miku is by far the most popular.

The Vocaloid environment itself resembles other music-making software insofar as it represents musical data on a timeline, the data subject to multiple forms of manipulation courtesy of the editing tools. However, unlike most VSTs (virtual studio technologies) of the early to mid-2000s, what was being composed was a "voice"—more specifically, a high-pitched, youthful, singing voice associated with the Miku character. Aiming the product initially at professional music producers, Crypton's intention was to add in a virtual singer to the existing suite of strings, drums, guitars, synths, and so on that could be generated digitally, or "in the box," without the need for expensive or cumbersome originals. Technically, the software is comprised of three blocks—a

score editor, a synthesis engine, and a singer library—and it is that third one that contains the deconstructed fragments of Saki Fujita’s voice. Her diphones, sustained vowels, and triphones comprise the software database decomposed and recomposed as vocal phrases the character of which—vibrato, pitch, crescendo—can be modified in the graphic user interface.

Not long after the release of the third character version—and facilitated both by the *dōjin* system of self-publishing in Japan and a kinetic digital ecology of fandoms, forums, and sharing—Miku became the gathering point for a massive outpouring of amateur production. From fan art to manga, dance routines to memes, over a million derivative or secondary works had been produced and over one hundred thousand songs written, primarily, by amateur musicians like CosMo. Crypton does not control the rights to Miku’s image: instead, the company is covered by a share-alike license. This means that as long as producers do not use a derivative work for advertisements or publicity, they are free to make works unencumbered by legal restrictions. It is in this sense that anybody can *be* Hatsune Miku. Hence, if one searches for Hatsune Miku songs on platforms like Spotify or video sharing sites like YouTube, the songs that are returned are almost always written by amateurs under the name “Hatsune Miku,” often appended with their amateur name, such as “cosMo@Bousou-P.”

It is a select few of these songs that are chosen by Crypton for the “live” treatment. Since her first concert appearance in 2009, Miku has gone on to perform throughout the world as a digital projection (not technically a hologram, incidentally, but an image projected onto a series of curved 2D screens), synced to a backing track, and often accompanied by a live pop-rock band. She appeared on the David Letterman Show in 2014 as such and supported Lady Gaga on her spring tour in the same year. But her performances are not just restricted to the domain of popular music: in recent years Miku has sung with classical symphony orchestras, performed in operas, danced with “real” ballet dancers, and acted in kabuki performances. Her first foray into Europe was in 2018, when she played to sellout crowds in Paris, Cologne, and London, giving fans in those cities

and countries the opportunity not just to see Miku “live,” but to meet other fans and partake of what is an increasingly expansive world of Miku merchandise.

At this point, the normal sociological procedure might be to ask a series of somewhat conventional questions. How is Miku commodified and globalized? Is this a truly democratic model of cultural production? To what extent are Miku audiences and Vocaloid audiences socially stratified, and exploited as content producers in the age of platform capitalism? Is she real or simulated?

These aren’t necessarily invalid questions, but their answers tend to generate partial slices and somewhat limited insights into what is an entangled constellation of forces and materials. It’s for this reason that it’s more meaningful, interesting, and appropriate to ask how Miku is assembled, or ongoingly constituted, by the practices of a panoply of actors (human and nonhuman) deploying different kinds of efforts across multiple scales. This is to see Miku as a work of attachment and to restore the prosaic, but nonetheless crucial, means by which she is made over in everyday sociotechnical and affective practices.

### **Assemblage thinking**

Like other relatively recent and fashionable concepts, such as “affordance” and “mediation,” the concept of assemblage is part of a theoretical apparatus devised by scholars across the humanities and social sciences to make conceptual gains in ontological matters: namely, to describe the dynamism and intensity of sociomaterial relations while giving due credence to the complexities of scale, materiality, and agency. The concept is wielded from a position of hope to give procedural access and descriptive life to sociomaterial imbroglios, understood to be comprised of multiple connective capacities. It is, therefore, designed as a resource with which to meet the heterogeneous nature of entities on their own terms, diverging from standard sociological explanations of hegemonic forces and structures of power while preserving some recognition for the structural and

patterned so central to the whole enterprise of modernist social science as a whole (Marcus and Saka 2006; Venn 2006).

Translated (somewhat obliquely) from Deleuze and Guattari's use of the French word *agencement*, assemblage is an open concept that only really comes alive in its connections with other concepts in the Deleuzian toolkit, and often at suggestive, if not ambiguous, levels (Phillips 2006). It can, therefore, be frustratingly opaque and difficult to get a fix on. In *A Thousand Plateaus*, Deleuze and Guattari characterize assemblages as "tetravalent" (Deleuze and Guattari 1987: 556), having a fused intensity that contains both content and expression. But the term also appears liberally in the book to refer to everything from animal becomings, Kafka's works, and "bodies without organs" to linguistic variation, the operations of machines, and the assemblage that is *A Thousand Plateaus* itself. Here, Deleuze and Guattari are keen to relay the entanglement of entities, leaning on the metaphor of the constellation to capture how things in all their "thinghood" (450) are not fixed, but contain intensities operating at different speeds, constantly in variation and subject to transformations. It is a "veritable invention" (448), though what precisely is being invented is often a little unclear.

Indeed, in the absence of clear guidance on its usage, it has been left to other scholars to put shape on the concept, including those in the fields of philosophy and STS. Based on a sympathetic rearticulation and sustained treatment of Deleuze and Guattari's concept, DeLanda argues for a "materialist social ontology" (2016: 3) that maintains the assemblage as a possibility space that describes both the act of fitting together discrete components and the resulting object itself. Just as for DeLanda the assemblage is composed of heterogeneous elements, "different in spatio-temporal scale but not in ontological status" (2002: 47), so it becomes an alternative way of thinking about phenomena as wide-ranging as the evolution of language and human history to those proposed by conventional classical social science. This is because, for DeLanda, an assemblage is defined by the properties that emerge from ongoing interaction between the component parts, as well as the expressive functions played by these components during interaction. Hence, in the case of early



models of military organization, the warrior-horse-bow ensemble contains heterogeneous elements that cut across multiple dimensions—biological, technological and biographical—out of which emerges a powerful assemblage of collective capacities that transform the nature of warfare and the development of nomadic armies.

One can begin to see why this way of thinking has become attractive to STS scholars, particularly those interested in getting at the big questions of what technological artifacts *are*, their material “thingness,” and their active role in holding together sociomaterial relations. While the concept is not quite a mainstay in the STS conceptual formulary, it is becoming an increasingly attractive way of dealing with knotty conceptual problems and cracking open difficult empirical cases.

For Latour, for instance, the shift from the study of society to the study of associations (Latour 1986) is one that gives ontological credence to the constitutive role of practices in helping to stabilize social relations, as well as the heterogeneous forces that blend together the human and nonhuman worlds. Here, one of the operational logics of actor-network theory is to proceed on the basis that nothing, “not even the human is for itself or by itself, but always by other things and for other things” (Latour 2002: 256). Hence, in Law’s ANT-influenced study of Portuguese and Spanish maritime technologies, the vessels are themselves actor-networks built of heterogeneous entities (guns, ropes, crew, wood, sleeping quarters) and possessing certain capacities (mobility, navigability, storage, martial power, and so on). They comprise multiply connecting lines stabilized into “arrays or networks of relations” (Law 2002: 91) that, when linked with other arrays, such as navigational apparatuses, undergird possibilities for colonialist expansion and European domination. In Mol’s examination of the disease atherosclerosis (2002), on the other hand, the author shows how the disease exists in myriad registers and in various objects—the body, the diagnostic tool, the database, the physician, the patient—that are intertwined and held in tension. Hence, the importance for Mol of “foregrounding practicalities, materialities, *events*” (12–13) through which the disease is enacted.

As for music, compared to more traditional concepts wielded by sociologists, anthropologists, and critical musicologists, such as discourse and ideology, the assemblage concept is not well used. That's not to say it is completely absent, however, and a smattering of music scholars have begun to apply assemblage thinking in striking ways to empirical objects, events, and practices. In his study of the experimental music scene in Santiago, for instance, Tironi (2010) cleaves to a nonbounded ontology to show how the scene is not a spatial cluster, but a "gelleable mobile" that emerges through heterogeneous and nonlinear practices and materials. Here the practice-based unit most relevant to everyday musicking in Santiago is the "project"—a gathering of horizontal linkages of micromedia, labels, collaborations, support services, and instruments. It's certainly not the case in Tironi's view that the scene fails to cohere, perpetually undermined by states of liquidity and dissolution. Rather, leaning on Mol's work (2002), Tironi shows how decentered spatial networks gather around the temporary and "amoeba-like" capacities of the project, which is increasingly shaped by the expansive, porous, and catalyzing connectivities of the internet, computer-based recording, and digital instruments. Hence, just as the scene is dispersed through Santiago, so it takes on the spatial and material qualities of a constantly mutating actor-network.

Perhaps the most sophisticated, ambitious, and programmatic treatment of the assemblage in a music context derives from the work of Born, and in particular her essay "Music and the Materialization of Identities" (Born 2011). For Born, that music is multiply mediated necessitates new approaches that recognize that it is more than a force that shapes or mediates subjectivities and tastes. Instead, music is best grasped across four planes of social mediation: from the often intimate and everyday socialities of practice, rehearsal, and experience, including those activated by myriad communities, to the social and institutional conditions characteristic of patronage systems, cultural economies, and markets. None of these planes are reducible to each other for Born, and here she takes seriously the need to hold in balance the autonomy of heterogeneous elements while showing how they mutually interact across time and space. It is in their constellatory assemblage, as arrays—

that is, in their “mutual modulation” (Born 2011: 379)—that they mediate or participate in the entangled nature of social formations. This multiplanar approach to music allows Born to extend beyond microsociologies of the intimate mediations between music and identity, useful as they are, in order to fully explore a “co-constitutive theory of social mediation” (Born 2011: 382), where music generates affective aggregations and identities at the same time as it feeds into and off social transformations.

## **The disassembling of Hatsune Miku**

Having taken a detour through some theoretical lineages and thoughts on the term, let me now return to Miku. To what extent and how is Miku assembled, and where does this take us, empirically, analytically and, indeed, methodologically? There are two strands that I want to briefly isolate here, though it’s important to stress that qua strands, they are profoundly intertwined: firstly, the Vocaloid as a para-instrument; and, secondly, the efflorescent practices of Miku as a folded community.

### *The Vocaloid as para-instrument*

Firstly, if Théberge is right and instruments can be thought of as assemblages, then we need to treat them “not as singular objects, but as components within a network of other instruments, technical devices, social settings and educational, institutional and discursive contexts” (2017: 65–66). In the case of software like Vocaloid, it would be wrong to assume that the instrument has no materiality, though it clearly exists in a different form of materiality than, say, a violin or synthesizer. This is despite the fact that it simulates, via the graphic user interface, the physical properties of a hardware studio, with a keyboard, transport buttons, a mixer, and so on. Instead, the software is a constantly evolving set of capacities, worked up in digital spaces, subject to version updates, beta testing, and so on. The head of the Vocaloid division tells me that five people are constantly working on the software engine, which is developed in-house, and refining the code is often a matter of trial and

error. Crypton also tests early versions of new Vocaloids by getting music producers to make new songs, changing the values and parameters on inspection of the results.

Following Fuller, it's clear that software operates at many scales; it is "distributed as an embedded part of sociotechnical infrastructures ... integrated into patterns of work and communication" (2008: 4). But it is also reminiscent of Tironi's project, inasmuch as it functions as the gathering point of a set of technical, corporeal, and decentered practices that attempt to stabilize it. As a unit for action, it is constantly being rewritten, assembled, and compiled, though versions of it still end up packaged and sold as objects associated with particular Vocaloid characters.

Software's affordances also lend Vocaloid a certain quicksilver mobility and malleability. It can (technically) be infinitely copied, rewritten, hacked, deleted, and so on, while it only comes alive when it is activated within other assemblages, such as computer hardware. It is portable, transferable, and relatively durable, though that does not mean it is indestructible. Indeed, like physical instruments, Vocaloid software can not only progressively decay—suffering from "bitrot," where new versions supersede older versions, making older versions inoperable on some hardware—but can malfunction or crash (Mackenzie 2006). Somewhat unsurprisingly, there's a plethora of websites dedicated to Vocaloid glitches that inform users of the many quirks and workarounds that can be found in the software. As for the user-software interface, we can say that Vocaloid is both enrolled in and predicated on a series of bodily conventions—scrolling, cutting and pasting, inputting data, and so on—that are common to VSTs in general but that also overlap with broader body-data configurations and applications such as word processing. Bodily traces are, furthermore, evident in the residual presence of Saki Fujita's voice in the Miku Vocaloid as it is recomposed and enacted through amateur practices. The situated bodily practices of amateur users themselves—as they acquire, learn, and put the software to use—adds in a further layer.

All of this is to see the Vocaloid not as a tool that exists in the realms of realized instrumentality: it is not an instrument in the organological sense, for instance; nor is it exhausted by the otherwise ontologically accurate term *posthuman instrument* (Bell 2016). Rather, it is an abstracted human-

technical hybrid that favors the kinds of ontological positions mentioned above, a conception of the world as open, malleable, and contingent, and one where code and algorithms are increasingly “lively” in shaping the nature of social transactions, perceptions, and behaviors (Beer 2016). It is in this sense that taking software seriously means nothing less than revisiting concepts like *social*, *technological*, and *cultural*, not least because software is so convoluted, so dispersed and unbounded in its architecture “that it defeats comparison with any other technical object” (Mackenzie 2006: 17).

### *Miku as a folded community*

Secondly, to return to Born’s second plane of social mediation (2011), music can usefully be approached as an animating force for social collectivities to imagine themselves as such, a place for the mustering of diverse publics and communities of interest. It can help forge social identities through processes of attachment, distinction, and affiliation while giving shape to ways of listening, hearing, and being. Here, the work of sociologists of music like DeNora, Hennion, and Hesmondhalgh have been instructive in showing exactly how shared experiences, attachments, and moods can be made musically. In its properties and activations, music can enhance fellow feeling and shared experiences, though it can also make and reinforce social divisions (Hesmondhalgh 2013: 87).

There are many ways of being a Miku fan. For instance, there is a proliferation of Miku-based user communities, with an expansive online and offline presence: from cosplay to pornography, karaoke nights to workshops. Most cities, universities, and colleges in Japan hold Vocaloid meetups, and many major cities outside Japan do as well. Miku also invites her fair share of what are popularly seen as “extreme” forms of fandom: in 2008, in a well-publicized case, a Japanese man “married” a Miku hologram generated by a desktop application, the coverage (particularly in the West) fueling discourses of techno-orientalism. And yet, global fandoms have ramified Miku’s presence beyond localized instantiations and consumer practices traditionally

associated with Japanese *otaku* (the devoted male fans of popular culture), enrolling her into plural identity positions. There is a sizable LBGT+ following, for instance, and gender bending or “shipping” Miku with other Vocaloid characters is not an uncommon practice. One young female fan from Wales tells me that while she was growing up her Miku fandom was considered effeminate and puerile by her peers, though many of those peers now express their love of Miku. Another writes an online minicomic, “Hetero-normativity, Hatsune Miku, and Me,” which explores her coming to terms with her sexuality through one of Miku’s songs.

What kind of love is this? Following Hennion (2007), it is best seen as an intense engagement born of a serious investment of time and effort, based on a honing of skills and preparedness to open oneself to the particularities of the object. In other words, it is a self-reflexive form of noticing that permits an active seduction, one in which the object of adoration neither dupes nor merely bestows capital, but can seize and surprise and, in doing so, help craft self-identity.

But, there’s an important distinction to be made here between Miku fans and those of, say, Gorillaz, another “virtual” musical entity, or a more conventional singer like Lady Gaga. Miku fans are not fans of a separable entity encapsulated in the persona of the performer, celebrity, or star (even if the performer is, as with Gorillaz’s Damon Albarn and Jamie Hewlett, using the virtual skin as a proxy). Remember, Miku has no biography or personality. It’s more the case that Miku *is* the community and doesn’t exist apart from it. She is brought into being by millions of networked interactions between fans, artists, and designers in a community of shared interests and activity. In other words, the community is a fold inasmuch as its inside and outside constitute each other. Its means and ends are inseparable; it is the effect of the Miku community on the community and the multiple results of that effect.

This can be seen most strikingly in a typical Miku “live” performance. In this context, the crowd can be said to imagine itself in acts of collective self-recognition generated by its attachments to Miku. Here, the fundamental thing being celebrated is Miku as a projection of the crowd’s own efforts not least because the songs that she sings are the fans’ own songs. This collective celebration

takes two forms in the concerts that I've observed. Firstly, the waving of glow sticks in almost perfect synchronization with others, in a kind of self-organized choreography where almost all of the audience members synchronize their movements in tandem with each other to form a single gestural effort. Secondly, the chanting, which is very deliberate, well-ordered, and powerful. Interestingly, audiences do not sing along with Miku's songs themselves: there is no lyrical enunciation or doubling. Instead, audiences have developed call-and-response strategies at particular parts of the songs that have built up into conventions over time, possibly as a result of watching other audiences online.

And there's a further intensifying twist to all this: what gives this affection additional value and urgency is the sense that what is being adored has no conventional substance or center. The tragedy of Miku is that she is an empty idol that is kept alive by the constant labor of love of her heterogeneous parts. It is precisely the lack of a logocentric core that is entirely productive in the affect it produces in fans and audiences who attempt to fill the perceived void with their participatory acts. So, when some fans weep at her concerts, it has partly to do with the affect generated for and by an object that cannot speak for itself and can, moreover, only be sustained by these very collective acts of love and attachment. In such affective encounters can be found the ontological constitution of Miku as a becoming: one whose agency is distributed via the materiality of the mutually constitutive channels of communication. As with assemblages in general, fans are "trying to stabilize an object or subject state that is inherently elusive" (Marcus and Saka 2006: 106). Hence, the head of live programming at Crypton tells me that, on one occasion in Tokyo, Miku "broke down" halfway through a live set. She (or rather the software) froze and the banks of backup computers also failed. But the audience members' response was entirely in keeping with their self-constitution as a community: they cheered and willed Miku to recover (shouting "*ganbatte*" or "do your best"). They thereby became the repairers of their own public sociality.

## **How to study a singer who doesn't exist**

The heading is a misnomer, of course. Miku exists: she is just as real as grain markets and protons and, arguably (in all her multiply mediated materiality), singers like Billie Eilish and Justin Bieber. Whilst Western media often portray Miku as the quintessential fake celebrity or as a hologrammatic trick, in Japan—partly because one of the fundamental precepts of Shintoism is that nonhuman objects have animating spirits—her reality is rarely questioned. The aim of this chapter has not been to question it either. Neither has it been to offer a finished statement or bounded theoretical program. Rather, the question posed relates to how we best relay something of the ontological complexity of the object under scrutiny that was previously out of reach because the tools at our disposal may not have been advanced or extensive enough. It is for this reason that Miku is not presented as an ideological formation or effect of power. Instead, she is described as an enrollment of things: extensible, incomplete, and commodious—in short, an assemblage. It's a concept that, in its openness towards processes of emergence, in its recognition of the heterogeneity of things, and in its desire to trace connections, is set fare to be a fruitful companion to scholars in STS. If their fields of inquiry involve hypercomplex objects or processes—the sociotechnical workings of globalization, financial markets, nation-states, smart cities, and software, for instance—we can say with some confidence that assemblage thinking is particularly well suited.

But are all things assemblages? If not, why not? And what kinds of research methodologies are most appropriate and consistent with this approach? Cautionary notes are certainly worth heeding. There is a real danger that the concept-as-metaphor runs out of steam if it's deployed too rigidly or in a way that makes it impossible to say anything more than “everything is an assemblage”. If the world is made of assemblages of different scales and sizes, and all are emergent but not reducible to their parts, there's the potential risk of emptying out the concept. Equally, if flat ontologies are comprehensive in what they make available, the temptation may be to describe, rather indiscriminately, a bland mush of “stuff” in a conventional research format based on modern methods of social research (like surveys, interviews, and observation). Both of these responses may end up flattening or deanimating this very stuff. If STS scholars are serious about putting the



assemblage concept to work, their methodologies have to be fit for that purpose. But how, in an ANT sense, does one “follow the actors” (Latour 2005) when those actors are massively distributed, elusive and motile, extending in all directions at once? How does one follow code, for instance, or an algorithm, or a becoming?

One methodological solution is to undertake biographies of cultural objects, to “follow the objects” by tracing and tracking them as they circulate, land, and accrete meaning across the world (Lash and Lury 2007). But, at time of writing, a Google search for Hatsune Miku throws up 38 million hits, there are over five hundred thousand songs, and these figures are increasing exponentially as her presence extends across myriad regions, domains, and languages. There is no singular “Miku” outside of her making, as the chapter has hopefully made clear. As for ethnography, which is often considered one of the most reliable data collection techniques in STS (Silvast and Virtanen 2019), even the best kinds of multisited ethnographies can depict only a tiny fragment of assembled objects such as these, while ecological validity is constantly being checked by the object’s expansiveness in societies that are producing more information at greater speeds than ever before. Researchers cannot constitute themselves as boundless swarms, after all, which is precisely why some sociologists have termed the “coming crisis of empirical sociology” as one born of its lagging behind big data technical infrastructures that can (Savage and Burrows 2007).

The turn to “live methods” is one recent attempt to address some of these concerns head-on. According to Back and Puwar (2012), if sociology is to maintain its relevance in a networked and increasingly kinetic present, it must be craftier and more imaginative: making the most of the affordances of new digital research devices and multimedia, for instance, while formulating methods for “live” and “real-time” investigations. On the one hand, this is to combine the playfulness of aesthetics with the serious desire to “develop empirical devices and probes that produce affects and reactions that reinvent relations to the social and environmental” (Back and Puwar 2012: 9). On the other hand, it is to try and recover a mode of inquiry that is more faithful to the emergent, relational, and entangled nature of things.

Let me finish, then, with an example from one of my previous experiments with and on Miku. I do so in order to hint at how STS scholars might use technological affordances to create new tools for investigation. From 2017 to 2019, in an attempt to see where a shift from a sociology *of* music to a sociology *with* sound might take us, I undertook a series of sonic ethnographies of Tokyo, using walking as a supplementary ethnographic method to collect (using a digital audio recorder) audio snippets of various aspects of urban life. I recorded the sounds of vending machines and street festivals, merchandise sellers and koto players, video game arcades and pachinko parlors, domestic washing machines and plastic toys. After assembling and cataloguing these audio samples, I deployed them as compositional material for a series of electronic music scores that attempted to relay something of the multisensorial, human-nonhuman complexity of Tokyo (Plourde, 2014). I performed versions of these pieces to audiences in Japan, Norway, and the United Kingdom, using various devices, such as music-making software, MIDI controllers, and computer hardware.

In the case of the UK performance, one of the pieces, “Voices of Akihabara,” was a collaborative effort with my Japanese cocreator, Hitomi Kobayashi, who simultaneously walked the streets of the Akihabara area of Tokyo (known as the “spiritual home” of Miku) and live-streamed the audio content while, in “real time,” I folded the audio stream into my score, which included samples from the Miku Vocaloid. A whole array of entities and processes had to be mobilized for this performance to happen: from global digital infrastructures and code, to purposive walking and the enrolling of Miku’s hybrid voice. The becoming of the piece was its point, driven by the idea that Miku is ontologically open, in process, emergent. This openness is also a marker of the “liveliness” of the present and the appeal of Deleuzian thinking where the empirical is held, not in suspension away from the concept, but in interaction with it (Ruppert, Law, and Savage 2013: 38). In that sense, the aim of the piece was to afford a point of access to sociomaterial imbroglios and hopefully, along the way, make a modest contribution to the larger project of thinking with and on assemblages like Miku.

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