Pubished in “The Future of Humanity: Revisioning the Human in the Posthuman Age”, Pavlina Radia, Sarah Fiona Winters, and Laurie Kruk (eds.), Rowman and Littlefield, 2019. Chapter 12, pp. 205-222

Actual Fantasy, Modulation Chains, and Swarms of Thought-Controlled Babel Drones: Art and Digital Ontology in the Posthuman Era

Adam Nash

RMIT University, Melbourne

What is the posthuman? A very human concept, it is both the contraction and expansion of anthropocentrism. How did this happen, and what is its relationship with the concept of the anthropocene? The key is the *digital*. If, as Rosi Braidotti has it, bodies are reduced to their informational substrate (2013, 12), then this move can be understood via a conception of the digital as *chains of modulation*. Drawing heavily on the work of Gilbert Simondon (2009, 7), this concept allows an ontogenetic understanding of digital processes. Consequently, seemingly disparate fields like *artificial intelligence* and *evolution*, or *robotics* and *live performance*, or *virtual reality* and *love*, can be resolved and modulated into a new individuating entity, without abandoning the ongoing individuation of each field. When this modulation process is not allowed to happen, individuals are artificially reified, and the only possible product is anxiety.

In this essay, I will draw on my practice as a digital virtual artist to explore the concept of the posthuman. From live performances in virtual space, through robots jamming with AI-driven virtual environments, to sentences that mindlessly re-enact the building of Babel over and over in response to the utterances of strangers in a multi-user game world, my artwork attempts to enact a speculative ontology of the digital. By using practice-based research to work with the theories of posthuman thinkers like Simondon (2005, 2009, 2012, 2017), Braidotti (2013), Donna Haraway (1991), Anna Munster (2006, 2013) and Bernard Stiegler (2013), I will show how all concepts of live performance, music, visuals, text, voice, dance and so on have merged into a post-convergent generic continuum. This can be used to facilitate a posthuman understanding of global digital networks in the anthropocene as a *metastable* environment in which individuating entities can participate in a *transindividual* rather than be subjectivised as digital slaves in a global anxiety factory.

The Posthuman

What is the posthuman? In one way of looking at it, it is simply the extreme realisation of Marshall McLuhan's (1964) simultaneously naive and prescient assertion of media as extensions of the human. Other ways of looking at the posthuman, like Jane Bennet's (2010) nuanced political economy of objects, situtate the human as generically equal in the network of the world, its history and its future. In a related, but perhaps inverted, and less consciously positive frame, the concept of the *anthropocene*, apparently in use by Soviet scientists since the 1960s, and popularised by atmospheric chemist Paul J. Crutzen (Steffen et al. 2007), puts the very geological history of the planet in the hands of the human, *anthropos* being old Greek for *human* and *kainos* for *recent*. In McLuhan's sense, this is the

human era because we have created tools that extend our being across the planet; in Bennet's, and in the somewhat related Object Oriented Ontologists', this is the *post* human era, because we have created things and networkks that transcend our being on the planet, and for Crutzen, it is quite literally *the human era*, because we have become the determining force of the planet.

Of course, all of these definitions rely on an assumption that the concept of *the human* is well defined and well understood. We humans consider it common sense: we are all humans, we are all of the same species, a species so well defined and easily recognisable that we can talk of human rights, rights that are ascribed, by humans, only to humans. And yet, human rights are often aspirational rather than realised. They revolve around freedom and safety, conditions that many humans are denied. Related are legal concepts of statehood, again a condition that many humans are denied. Still other conceptions of humans and our rights rely on legal concepts of agency and participation, again often denied to many of us. So perhaps a common sense definition appeals to the equally fraught and contested concept of *nature*, since there most definitely were humans before there were codified human rights. But common sense falters almost immediately in this appeal, since one of the great historical foundations of humanity is that we are an anomaly in nature, a species capable of *reason*, that great and brutish stick with which, along with our opposable thumbs, we humans are able to transcend nature, to bend it to our will, to subjectivise that to which all other species are subject. Certainly, human rights is a forthright expression of this super-natural attitude, since it is up to us to redress the crude lack in nature of such definitively human and superior concepts as *fairness* and *justice*. So while this triumph over nature allows us to define ourselves as human, and of course provides the basis on which is built the Enlightenment philosophy of the human subject that brings forth the very idea of human rights, it also prevents us from calling on nature to support our claims to species-hood. Like so many so called common sense ideas, it ends up that we know what the human is until we start to think about it.

Of course, the death of this particular human subject has been discussed in philosophical terms at least since Nietzsche in the West, and non-European-based philosophies have debated whether it ever attained a status substantial enough to require much effort to kill it anyway. It is perhaps more realistically a product of the relentless campaign of subjectivisation waged upon humans by global free-market ideology in the last 30 or so years. As Laurie Penny (2016) has written, "[t]here is no structural imbalance, according to this view - there is only individual maladaption, requiring an individual response," and "[w]e are supposed to believe that we can only work to improve our lives on that same individual level."

Braidotti (2013) points out that part of the invitation, or challenge, of the posthuman era is to reconsider the status and condition of the human. For Braidotti, this requires dispensing with dichotomous binaries, especially the one that opposes culture and nature, or what she calls the "constructed and the given," (2) instead perceiving a continuum based on the autopoietic force of living matter. This is clearly a progressive and promising approach, but it is not without a couple of problems that are well countenanced from a Simondonian perspective, of which more detail a little later.

The problem with the continuum approach is twofold. First, a 'continuum' still implies a duality that the continuum runs between: *from* nature *to* culture. Perhaps I am doing unjust violence by reducing this monistic philosophy to a continuum between two poles that ultimately reinforces a dualism that it was expressly intended to avoid, but this continuum-based view is very concerned with salvaging the human subject within the posthuman, albeit by gaining a new understanding of that subject. This seems to lead to a subjectivised individuality that, by establishing a boundary of itself, even a porous boundary, guarantees a dualism. The very concept of *autopoeisis* produces such a dyad. As Eve Kosofsky Sedgwick (2003) says, "it's far easier to deprecate the confounding, tendentious effects of binary modes of thinking ... than it is to articulate or model other structures of thought. Even to invoke nondualism, as plenty of Buddhist sutras point out, is to tumble right into a dualistic trap." (2)

Secondly, in dealing with the concept of the continuum, while aspiring to a smooth or undifferentiated genericism, one has to be very careful to prevent the quality of linear movement, inherent in a continuum between poles, from sacrificing the quality of reticulation. Should this sacrifice not be assiduously avoided, things and concepts are then only ever *carried forward*. In other words, it is not necessarily that reticulation is not possible in an ostensible continuum, rather that a tendency towards considering history as an arrow can prevail.

Nonetheless, it *is* very clear that the posthuman problematises the difference between the human and its other. Julian Savulescu and Ingmar Persson (2016, np), of the Oxford Uehiro Centre for Practical Ethics, give the example of the human-pig chimera. In their words,

> scientists take a skin cell from a human and from this make stem cells capable of producing any cell or tissue in the body, known as 'induced pluripotent stem cells'. They then inject these into a pig embryo to make a human-pig chimera. In order to create the desired organ, they use gene editing, or CRISPR, to knock out the embryo's pig's genes that produce, for example, the pancreas. The human stem cells for the pancreas then make an almost entirely human pancreas in the resulting human-pig chimera, with just the blood vessels remaining porcine. Using this controversial technology, a human skin cell, pre-treated and injected into a genetically edited pig embryo, could grow a new liver, heart, pancreas or lung as required.

It's important to note that this process has never actually been done, and it is not known whether it will actually work, but scientists are working on it. The question, for these ethicists, is whether the human-pig chimera should have human rights or not. Of course, if it does, then it would not be possible to take out its organs to put into 'real', non-chimeric, humans. On the other hand, if the human-pig chimera is not ascribed human rights, then it's pretty much impossible to claim a continuum, since there is a clear demarcation between human and other. Indeed, looked at this way, the very concept of human rights betrays a non-continuous taxonomy of life.

This is a difficult problem for ethics, and one that is of course repeated for the humanities: must it become the posthumanities, regarding the endeavours of all life as within its purview, or does the humanities simply go away in the posthuman era?

A problem that is somewhat less terrifying, or at least less meaty and easier to understand because it relies on the kind of digital operations we are used to in our contemporary daily lives, but is certainly no less consequential, can be found in the example of the swarm of thought-controlled drones built by Panagiotis Artemiadis and team at Arizona State University's *Human-Oriented Robotics and Control Lab* earlier this year (Dormehl 2016). Self-consciously using sci-fi-tinged military terms like "human commander" (I would have gone with "The Thinker"), Artemiadis describes a process whereby a human's specifically rehearsed thought patterns are recorded and then used to mold variables for drone control software. The thinker can then control the flight and navigation of what Artemiadis calls "swarms of" (Dormehl 2016, np), but in the video is actually three, drones. This is a classic modulation and display process, of which more later, and is comparatively simple to do. Originally used in research into controlling prosthetic limbs,. The problem displays itself via the scientist's vocabulary choice, highlighted earlier, which betrays an alarmingly lax philosophical attitude to the problem of the nature/culture divide. To wit, Artemiadis sets up the explanation of the work by saying, "[t]he brain is wired to control artifacts that resemble human limbs." (Dormehl 2016, np) There is much that is contestable in this phrase, but let's concentrate on the choice of the word "wired." This is one we are all used to hearing in relation to definitions of the human. "Our brains are hardwired for this and that" is a common phrase in documentaries and science for the layperson publications, despite there being very little evidence to support such claims. Two sentences later Artemiadis (Dormehl 2016, np) says "the brain can adapt to output control actions for a swarm of ... robots." Now, adapting to something is the qualitative opposite of being wired to do something. Being wired to do something implies that nature has done it to us, whereas adaptation implies we are doing it to nature. This would be a crucial problem for the posthumanities to consider: the symbiotic relationship between language and technodeterminism, where existing vocabulary is repurposed on the run, or neologisms and linguistic chimeras are hastily constructed in response to some new technology. Certainly there is currently a crushing conformity emerging from Silicon Valley, linguistically and otherwise, a kind of fascism of the unreflexively "cool", that needs to be rigorously examined and challenged.

Silicon Valley is of course the *de facto* home of the digital, and the digital is the key to all of the concepts underlying the posthuman, the medium and enabler of all these posthuman endeavours, regardless of their place on the continuum. The digital has so completely and so quickly infiltrated every layer and aspect of the contemporary condition to become so foundational that it is often forgotten as a subject of study. And yet, any attempt to understand contemporary moves is really impossible without a rigorous understanding of the digital. In the rush to keep up with the latest cool thing, social media, robotics, Pokemon Go, or the return of VR, there is a tendency for critical theory to devolve into a reactionary, superficially phenomenological descriptivism that misses the forest of the digital for the trees of individual trends or devices. The digital is the generic foundation enabling all of this, and yet it is not well understood. It is important not to mistake the naming of a thing

for the understanding of a thing. It is not that the posthuman era, for example, is a result of the digital, it is that the posthuman era *is* the digital era. Therefore an ontology of the digital is required and one of the primary tasks of the posthumanities should be to ontologise the digital. Towards that end, I would like to briefly lay out such an ontology, before discussing some examples of my own artwork that enact various aspects of this ontology.

Digital Ontology

Ontology has traditionally been unable to think being and media together, based as it is on the Aristotlean dichotomy of form and matter. German media scholar Friedrich Kittler (2009) points out that even Heidegger's (1996) update of Aristotle to address this problem was resistant to the relationship between ontology, technical media, and mathematics. Yet, digital media seems to merge form and matter through the use of mathematical logic, somehow dissolving a binary using binary.

At the same time, contemporary media studies either ignore ontology in favour of phenomenology, or undermine attempts at ontology by privileging historicisim or non-anthropocentrism (Clemens andNash, 2015).

In the philosophy of Gilbert Simondon (2009), the old dichotomy of form and matter is replaced with an operational theory of ontogenesis which he calls "transduction" (11). Rather than ontology, there is ontogenesis, a process of individuation that, without relying on vitalism at all, dispenses with the auto/allo poeisis binary. The profoundly non-anthropocentric nature of Simondon's thought can be seen in his insistence that the 'organic' and the 'inorganic' are but modes of being, orders of gradation within a continuum. Echoed in contemporary times by the thought of Jane Bennett (2010), this non-anthropocentrism can equally attend to human concerns as it can to chemistry, climate, and technology, since they are all related in an emergent continuum.

Rather than individuals, for Simondon (2009) there are only individuations in process. These individuating processes operate within and through what he calls, borrowing from chemistry, a "metastable" environment (6), a milieu which the individuating process both emerges from and carries within itself. The idea of 'the individual' is replaced in this ontogenetic system of thought by a multiplicity of individuations, a continual process of reciprocal relations (Combes 2013). The structure and operations of digital data and networks is a working display of this ontogenetic model that we are able, to a certain extent, to manipulate at will. Digital data can only be said to exist as a series of modulatory operations that bear no indexical relation to any putative source (Nash 2012; Kittler 1999). The only way that digital data can appear in the world is through an individuating process of modulation into a display state of some sensible mode (visual, audible, olfactory etc). This process requires a set of protocols encoded throughout all elements participating in the process (hardware, software, electricity, networks, and people, for example), facilitating constant reciprocal processes of differentiation. Digital data in its undifferentiated state, i.e., when it is not participating in a modulatory individuating process, when it is indistinguishable (contra Object Oriented Ontology) from any other digital data, might be seen as a parallel of Simondon's pre-individual metastable environment. While protocols ensure predictable modulation, they can only work precisely

because the data carry within themselves this digital pre-individual. Only thus can they modulate (i.e., individuate) into sensible digital entities. Therefore, the digital is a stark illustration of Simondon's thought that no individual can really be said to exist except in the most contingent and processual way.

We can see how Simondon's ontogenetic system describes and uncovers digital networks and other large networks of operations like human society and climate, but how could it be applied to individual human subjects, since Simondon is apparently disavowing their existence? Simondon's system of thought is extremely nuanced and complex, but we do not do it too much violence if we consider human individual subjects as participants in a reciprocal process of becoming in relation to an 'outside' that is not surrounding an already given subject, rather an environment that participates constantly in the subject's constitution in an ongoing cycle of reciprocal, mutual affectivity. With this we see the world not as a collection of predetermined individuals with a clearly demarcated inside and outside, rather it is affectivity that describes and becomes the relations of an 'individual' to itself and to the world. This affective relation is interior and exterior to the individual at the same time, so that we are never separate from the world.

So, for Simondon (2009, 5), a subject is more than simply an individual, and indeed is defined by an incompatibility with itself. This tension between a subject and itself has to be resolved through a giving over to transindividual being. In the contemporary world of Western liberal values that privilege individuality and competition, most of us human subjects do the opposite: we turn inwards, trying to find a system of discrete interior relations in order to reinforce a static individual identity that is separate from our environment. For Simondon, this is an impossible attempt, since the subject will always be affected by the preindividual milieu in which it participates. By turning inward in an attempt to close off from its milieu which is already within the subject anyway, the subject feels invaded by the preindividual's capacity to exceed the individual, and it is this sense of invasion that Simondon classifies as anxiety. I have written elsewhere (Nash 2016) how this anxiety is precisely the commodity of digital social networks like Facebook, Instagram and so on, a commodified anxiety that is endlessly produced and consumed by individuals, the constitution of whom, as anxious individuals, is constantly reinforced in a perverse global distortion of the concept of the transindividual.

One of the instruments that helps facilitate this is the conflation of the concepts of *data* and *information*. Simondon (2009, 6) considers perception to be always a resolution of conflict. This is because perception individuates, and individuation is always the resolution of two disparate fields. Perception resolves the conflict into something new, as it retains the traces of the pre-individuated fields within itself. Rather than thinking in hylomorphic terms of ‘individuals’ and ‘reality,’ Simondon acknowledges only individuation within a metastable environment. This is a useful way of thinking about digital data networks, because it takes the concept of information seriously, i.e., as “two different orders that are in a state of disparation" (Simondon 2009, 9). Information is not thereby conflated — as it is in our contemporary digital era — with the concept of data, but as the orienting partner of perception. This enables us to reconsider networks as always in the process of formation, insofar as they are constantly orienting or in-form-ing perception.

Recently, the phenomenon known as *Big Data* has cast the global network of digital data in the role of the information that today must not only orient, but dominate and direct the perception of humans in society. Many adherents of Big Data as an ideological practice, such as Christian Rudder who started dating site OK Cupid (Rudder 2014) and Eric Schmidt who used to run Google (Schmidt and Cohen 2013), even cleave to an extreme version of this. As a result, Big Data is seen as providing the only true picture of everything, especially we humans in society. 'Big' in this sense is neither pejorative regarding size as a function of ethical practice (as in 'Big Pharma'), nor paranoid of a vicariously exerted political program (as in 'Big Brother'), but rather crowds out all other methods and epistemologies by the ordering of a collection so vast that it simply must constitute the best possible picture of reality. 'Knowledge' becomes a mere derivative of data. Moreover, the results generated by unprecedentedly massive data sets, and the technical operations that produce them, can and must be applied without hesitation to all aspects of human (and non-human) existence as a matter of urgency. Whether we are dealing with possible terrorist threats, epidemiological risk, or literary history, Big Data provides all the answers. The Austrian-English philosopher Ludwig Wittgenstein (2002) once remarked that "the limits of my language mean the limits of my world" (68). Our new proselytizers for Big Data maintain that those limits are established quantitatively.

They are not entirely wrong to do so. As Justin Clemens and I have argued (Clemens and Nash 2015), one of the crucial consequences of digitization is that "numbers are themselves essentially ideological in a digital framework […] What is peculiar about this ideology is that it is also essentially true: numbers (in the form of statistics, the modelling of rates of change on a mass scale, the correlation of data from an enormous range of different sources, etc.) are the only way to ensure a minimally rational comparability and consistency of data sets." (19) Yet such an ideology ignores the individuating and processual nature of all interactions, where any subject is actually an ensemble or assemblage that contains within itself the pre-individual, a remnant of the metastable environment from which its individuation emerged. This remnant forms, within the subject, the ground for new individuations to occur in any interaction with its environment, including with other subjects, which also carry such enduring pre-individual remnants within them. This phenomenon of the remnant is what Simondon (1993) calls the "transindividual" (307). According to Simondon, the psycho-social is the transindividual (2003, 8).

A global digital network of data, in which everyone can participate, creating ever more data in which to participate, may seem the perfect milieu in which subjects may en masse resolve what Simondon saw as the problem of subjectivity, i.e., that the subject is incompatible with itself. According to Simondon, anxiety is produced when the individual cannot resolve, within itself, the disparity between its subjectively constituted individuality and its pre-individual part. Therefore, the only answer is for the individual to participate in the transindividual, and what better stage on which to enact the transindividual than the global data network? And yet, it is the individual that is the subject of Big Data or, more precisely, the collection of individuals who are defined as such, as they are captured, within Big Data. In other words, to ensure the existential guarantee of Big Data, that money can be made from it, the data must be data about individuals. Therefore, the architecture of the

engines of Big Data — social networks and personalised digital services — must facilitate and exacerbate only what Simondon called "interindividual relations" (Combes 2013, 37). Such interactions do not "penetrate the individuals" and are incapable of resolving the problem of "incorporated immanence," (Scott 2014, 138) and therefore can only create anxiety. Because Simondon saw every interaction as an amplifying relation, we are compelled to see the global data network as an anxiety amplifier on a planetary scale.

Art in the posthuman era

How and what can art do in the digital? To rephrase, what is art in the posthuman era? Digital environments are post-convergent, that is, in McLuhan's (2001) sense (10), containing all prior media as content (Nash 2012). A post-convergent medium is the dynamic whole that is created by the convergence of all prior media, plus the excess that is both created by, and is required to create, such convergence. I have written elsewhere (Nash 2017) about how contemporary art is now both subject to, and yet strangely ignorant of, the historical genericising move that the digital has brought on. Such post-convergent moves can perhaps be identified throughout the history of media, but the digital is distinguished by converging all previously differentiable media into an undifferentiable continuum, that of digital data (Kittler 1999, 2). Consequently, for media to be differentiated in the digital era, digital data must be modulated into some kind of sensible display state via protocols that virtually reassemble the required medium, be it a visible, audible or some other kind of sensible medium. This is why there is no meaningful distinction between artforms in the digital - sound, music, visuals, motion, words- every previously discrete form is converged into an undifferentiated generic form. The digitisation process contributes its own operations to this process, creating an excess that cannot be rationalised exclusively in terms of a meta-media, because the concept of a meta-media is itself one of the media that is, or can be, explicitly virtualised as content within itself, just as the process confers a retroactive virtuality on all prior media being digitised as virtual content, creating both the prior media and the excess of their own virtuality. But, is it even possible to talk of art in a posthuman context? Isn't art purely a human construct? How can it possibly survive a migration to a posthuman state?

It is simple to *recreate* artforms in the digital, and this happens all the time. Music now is always digital, for example. But for music to exist as music, as understood in the pre-digital era as a discrete form, in the digital era requires eliding the fact that the distribution medium of the music is identical to the production medium. This is easily done, and is the method of the vast majority of artworks in the digital era, i.e., a virtual reconstruction of a pre-digital form. This is unlikely to contribute to any new understanding of either the artform itself, or the practitioner or perceiver of the work, or the society in which it exists. For a digital art to contribute original thought, it must not be a virtual reassembly; it must somehow work with the intrinsic qualities of the digital. It must somehow be posthuman.

For Simondon (year), *aesthetic thought* is more fundamental (or primal) than scientific or ethical thought because it occurs before the division of the religious and technical phases of human culture into practical and theoretical modes. As Simondon (2017) outlines:

> This is precisely the goal to be attained: the mission of reflexive thought is to lift upright and perfect the successive waves of genesis through which the primitive unity of man's [sic] relation with the world splits in two and comes to sustatin both science and ethics through technics and religion, between which aesthetic thought develops. (175)

This can, and should, be applied to aesthetics, to art, and to practice. It is modulation that allows aesthetics to theorise the relationship between thought and the sensible. It allows enacting the reality that art, or practice, is not a kind of language, or a discursive ordering of sense. Modulation also highlights the dangerous reductiveness of the idea of the tool, as in the colloquial "photoshop is just a tool", or Heidegger's tool-being. It also avoids recourse to dialectics, with its negative power, and instead affirms difference.

We have seen that individuation occurs through disparation in a milieu that does not pre-exist the individual, but, on the contrary, is constituted by a transduction, or modulation. In other words, modulation is the process of individuation and its milieu in relation, in communication, in emergent resolution. This is a *metastable* relation between two orders of different realities that enter into resonance. Artists are very aware of this process, even if they have not articulated it to themselves as such. This process is a mode of individuation that is precisely not confused with that of a thing or a subject. This is important for art because the subject/object dichotomy is basically incapable of thinking art without casting it into some kind of dialectic that prevents it from existing as an individuating process in communication with its milieu. In other words, it is incapable of explaining how Beethoven's music still exists without getting caught up in all sorts of unproductive discourse around the subject.

This fundamental deficiency especially reveals itself in the arena of networked interactions, as in digital social networks or multi-user games or even telephone conversations. The solution to avoiding this centuries old trap is to think only in terms of agency. Guided by Simondon's (year) concepts of modulation, this can extend to all art, to all practice. Further, the concept of *agency* is then recognised as that of *affect*. Where there is affect, there is individuation. These moves allow a non-anthropocentrism to be thought by people, and for art and its works to have their own individuation, in communication with their milieu which includes but is not limited to people, including the artist, without forming an indissoluble identity. We might say 'what you do is not you', even if we encourage people by saying 'you are what you do'. It is the disparate, i.e., difference itself which causes sensibility and thought to emerge as a resolution of disparate fields.

This is how we can account for the affect and effect of art, the material effect and the affective power upon the recipient, the interactor, the listener, the player, as well as the artist. Unlike hermeneutics, which attaches the work to the subject, and unlike structuralist or sociological interpretations, which locates the affectivity of objective structures in the work, the process of modulation retains the heterogeneity of disparate forces, and synthesises from them a new force. It eliminates the need for struggles about figurative resemblance or structural identity and leaves only modulation of disparity that constitutes the work, its public, the artist and the artist's milieu. The apparently disparate fields - at least they have been treated as such by aesthetics since Kant - of art and technics are

resolved in this way as well, so that it is not possible to speak of the conceptual aspect of the work as separate from the technical aspect of the work, whether in the technical manipulation of matter or the technical manipuation of form distinctions that previously prevented aesthetics from falling into a dualistic trap, which then required it to be 'saved' by dialectics by 'overcoming' the trap through brute negative force rather than procedural resolution.

Simon Mills (2016, 174) reminds us that crucial in this attempt is an understanding of media as environmental, rather than simply a transmission method, and this applies to the concept of the tool discussed earlier just as much as it does to paint, words, video, multi user virtual environments, and music. We as artists are a part of this environment.Just as much as it is a part of us, it is our milieu, and it is not only cultural, it is also natural, technological, psychological and social. It is a vast complex of transductive operations occurring on all sorts of reticulated stages and phases.

The digital era is the era of media as environment. The digital is the exemplar par excellence of the Simondonian modulation process. We all of us as artists interact with the digital constantly, crucially and completely, regardless of whether, like myself, we explicitly do this or, like others, consider it but part of the work. The same modulation process, the same allagmatic epistemology of Simondon, is at play whether programming a virtual environment or trying to understand the affective power of music.

There is a fairly strong connection here betweeen Simondon and Spinoza - obviously there are some significant differences as well, but both outline a kind of monism and both are very much concerned with affect. The famous postulate 1 of Spinoza's (1994) Third Part of the Ethics: Of the Origin and Nature of the Affects reads, "The human body can be affected in many ways in which its power of acting is increased or diminished, and also in others which render its power of acting neither greater nor less" (70). Simondon assumes that this extends to all things, *all* things physical, vital, conceptual, extant or not. There is no reason to think that Spinoza himself doesn't in fact also do this, but in Simondon it is very explicit. For Spinoza, there is the power of thinking and the power of acting, but they are not two different things, rather degrees of the same thing. So too with Simondon we can see the individuation of becoming and the individuation of thought required to think the individuation of becoming. This is really the crux of the application of Simondonian thought to art: in order to think individuating becoming, thought itself needs to modulate. As Simondon says: "Beings can be known by knowledge of the subject but the individuation of beings can be seized only by individuation of the knowledge of the subject" (2013, 36).

As I have hopefully made clear, the distinction between data and display, via modulation, is constitutive of the digital. Therefore, my works try to explicitly modulate data into display. The digital also potentially allows equal participation in a work, since the distinction between creator and player is also an explicit act of modulation. As an artist first and foremost, I am compelled to conclude by briefly enunciating the ways in which some of my works enact the thoughts contained in this essay.

Artworks as/and Digital Ontology

In this section, I briefly describe some works I have made and/or collaborated on. Each of them enacts, or attempts to enact, some of the aspects of digital ontology that I have discussed in this essay, by trying to affectively engage with the principles of modulation, or transduction, of digital data.

Neuron Conductor (2017 –2019) is a hybrid biological/machine generative artwork. It is a collaboration between myself, artist John McCormick and neuro-euro-engineer Asim Bhatti. It uses an artificial neural network to interact with a biological neural network in order to learn new creative musical procedures. A biological neural network, consisting of real mosquito neurons, is cultured on a multi-electrode array, where signature neural spiking patterns are produced from the introduction of various viruses. These patterns are filtered through the artificial neural network to create the movement of the robot, which in turn generates the music in real time. Viruses such as dengue and zika become the source material for the striking compositions conducted by the biological machine. This bio-robot is a study of a system that incorporates biological, digital and hardware components into itself for its own purpose of creation, and is a good example of modulations of data from and between disparate registers: electrical signals from neurons, hardware robot joint movements, digital virtual environments, musical scales and realtime visual images.

Child in the Wild (2016 – 2018) is an interactive installation that enables human participants and a child-sized humanoid robot to co-create an immersive audiovisual artwork through the use of the robot's artificial neural networks that do object and image recognition. It is a collaboration between myself and artist John McCormick.

Visitors show the robot pictures and objects, which the robot 'recognises' using artificially intelligent image recognition routines. The robot uses text-to-speech to speak out loud what it 'thinks' the image or object is. It then searches on the internet for images and information related to the recognised image or object. As well as speaking out loud the information found in the search results, it also causes the returned image results to be displayed via projector. These displayed images are then 'decomposed' and animated according to pixel values. These pixel values are simultaneously used to generate a musical score in real time. All of these things happen more or less simultaneously, creating an immersive environment of generative sound, colour, speech, images and animation, all 'conducted' by a child-sized humanoid robot sitting in a pram.

This work is an assemblage of hardware robot, peoples' phones, AI image and object recognition, web search results, projected animations and music, all engaging in an ongoing transductive network of individuating relationships in realtime.

Out of Space (2015 – 2016) is a playable abstract audiovisual virtual environment, using a custom hardware system developed by Stefan Greuter and Adam Nash before such a system became commerically available. This custom system was a low cost experimental platform that enables participants to experience full-body interaction with virtual reality scenes. The platform combines a commodity Head Mounted Display (Oculus Rift), with a depth based camera (Kinect) capturing movement of body and limbs within the physical

and virtual space. The work itself, the virtual reality scene that the player enters via the head mounted display and interacts with by moving their body in physical space, is an abstract audiovisual construction based on a minimal algorithm that governs size, shape, colour, and position of the geometry and tone, pitch, timbre, and rhythm of the sounds that are generated in response to the player moving through the geometry. If the role of art is to question everything, then when artworks are composed of digital data, art must question digital data. Data is not information.Information is not knowledge. Knowledge is not wisdom. Data is not necessarily digital, but this work is digital. It creates digital data that is, in some ways, aware of itself as data. Is this unique to digital art? Perhaps. In the pre-digital, is oil paint, in some ways, aware of its own status as part of an artwork? Perhaps not, but certainly it uses chemical affordances to behave as paint in a painting. Not only does this work create and use data, it is, in fact, constituted by, and as, digital data. Everything about digital data is hard to define once you start to question it, and this work is no exception. Using data, this work creates itself as data in *realtime*, displaying itself as an immersive audiovisual environment. Perhaps "datascape" is the best word for it. Then, it takes data as input. This time, it is tracking data from a person walking around in the gallery space and digitises it. It sorts, filters, and labels this data and then incorporates it into its own, very limited knowledge system. From that point on, the relationship that this data shares with its source, i.e., a person walking around, is purely arbitrary and requires constant reinforcement to ensure the relationship is ostensibly maintained. The work uses the affordance of the data source (i.e., the walking person) being physically present to maintain the visual illusion that the walking around is the same thing as the data captured by the walking around. But it is not the same thing, and the art, such as it is, is in riding a balance between legible relationships and the void opened up when this process is recognised.

Reproduction (2010 – 2012) is an ongoing collaboration between myself and John McCormick. The work involves experimentation in audiovisual, performative, evolving, virtual entities spawning and reproducing in virtual environments, capable of intercommunication with the material world via various systems of motion and data capture. Loosely based on principles of artificial evolution, the parameters that we as the artists initially selected are, rather than the standard artificial evolution parameters like strength and fitness, all audiovisual performative parameters like red, green, blue, opacity, rhythm, timbre, tempo, tone (pitch) and so on. The entities 'evolve', 'reproduce', 'live' and 'die' over thousands of generations according to a constantly emergent evolution of these crude parameters that is informed, but not determined, by both their interaction with humans in the material world and with their interactions with each other. In other words, the original parameter set becomes, after the first generation, virtualised content for the next emergent generation. All the while, the entities are organising (or perhaps socialising) and improvising movements and 'songs' amongst themselves, whilst observing and improvising with any human visitors to their 'space'. The space in this case means both their digital virtual environment (accessible by humans via an online multi-user environment) as well as the physical space of wherever the work happens to be being exhibited. In the latter case, motion and data capture are used by the entities to perceive humans, while a modulated audiovisual display allows humans to perceive the entities. Our desire, as artists, is to engage - using sound, music, movement and dance - in what we

might call a "genuine" improvisation with these digital entities, by which we mean the human and digital performers share equal responsibility and value in the emergence of the improvised performance, dynamically building a shared performative vocabulary by learning from each other's nuances, gestures and performative suggestions.

Autoscopia (2009 – 2016) iss a virtual artwork by Justin Clemens, Christopher Dodds, and Adam Nash, commissioned by the National Portrait Gallery of Australia. Autoscopia allows users to enter names to create virtual portraits based on internet searches. These searches manifest as web portraits dynamically generated by search results, and audiovisual animated sculptures dynamically generated in the multi-user virtual environment called *Second Life*. The *Second Life* component closed at the end of 2010, but the web portraits continue to grow, all the while tweeting their existence, recursively feeding themselves back into the results of future searches. Autoscopia's *Second Life* portraits are built using data from internet-based vanity searches conducted within the *Second Life* installation. Each name creates a unique outcome composed of 27 'limbs'. Each limb is fed data from websites such as Google, Facebook, Twitter (and other more invasive, though publicly available, sources), with colours, geometry and audio, affected by variations in search volume. Data is then re-published via discrete web pages automatically composed through text and images collected during the search. The identity created will thereafter be reincorporated into future search results. Each portrait also 'tweets' its existence on Twitter, with both the web pages and tweets looping back into future portraits, creating a kind of time-based network meta-animation.

Babelswarm (2007) was a collaboration between myself, Christopher Dodds and Justin Clemens. It was the result of the inaugural Australia Council Multi-User Virtual Environment Artist-in-Residence program in 2007. It was staged physically in the Lismore Regional Gallery, NSW, Australia, and in the realtime 3D multi-user virtual environment *Second Life*. Activated by the voices of visitors in the real world gallery and chat messaging from virtual visitors in *Second Life*, a swarm of letter cubes- programmed to seek out their original word position- slowly builds a morphing, virtual Tower of Babel. This tower is constructed from the utterances of visitors to it, constantly reconfiguring itself according to the "artificial stupidity" of the individual letter forms. As Justin Clemens (2007) wrote in his introduction to the work:

> What sorts of conceptual figures are available to think such a thing? The very old: the Tower of Babel from the Book of Genesis, which melds the frightening possibilities of technology, language, and power in a single startling image. And the very new: swarm intelligence as an ideal that expresses how innumerable different individuals can nonetheless come to produce radical innovations in excess of the powers of any one of them -and in the midst of apparent disorder. Babelswarm is a project that draws on the most traditional elements of religion, art, and literature, as it engages with the challenges of a scientific and technological age. (Clemens, Dodds, and Nash 2007, np)

All of these works attempt in some way to explore the invitation that is opened to art by the concept of the posthuman, which I have identified here as analogous to the digital, when understood as a modulating, transductive process of reciprocal relations within and between ongoing individuating processes and their milieu. This is the practice of an ontogenetic understanding of digital processes, where disparate fields can be resolved and modulated into a new individuating entity, without abandoning the ongoing individuation of each field. When this modulation process is allowed to happen, we abandon the artificial reification of the individual, which is the hallmark of global capitalism and its automated production of anxiety. We are well advised by Rosi Braidotti to resist these forces that would – indeed do – use the advent of the posthuman as an opportunity to negatively erase, rather than connect across, difference in the exploitative pursuit of resources and growth. Perhaps only art is capable of individuating, from the generic leveling that the digital inaugurates, new concepts of affective relations that operate beyond the human.

References

Bennett, Jane. 2010. *Vibrant Matter*. Durham: Duke University Press.

Braidotti, Rosi. 2013. *The Posthuman*. Cambridge: Polity Press.

Clemens, Justin and Adam Nash. 2015. "Being and Media: digital ontology after the event of the end of media." In *The Fibreculture Journal*, No. 24.

Combes, Muriel. 2013. *Gilbert Simondon and the Philosophy of the Transindividual*. Cambridge: MIT Press.

Dormehl, Luke. 2016. *This Scientist Can Control a Swarm of Drones with his Thoughts*. Posted on 15th July 2016. https://www.digitaltrends.com/cool-tech/drone-swarm/

Haraway, Donna. 1991. *Simians, Cyborgs and Women : The Reinvention of Nature*. New York: Routledge.

Heidegger, Martin. 1996. *Being and Time*. Translated by J. Stambaugh. Albany: SUNY.

Kittler, Friedrich. 2009. "Towards an Ontology of Media." in *Theory Culture Society*, vol 26 nos 2-3, pp23-31.

Krtolica, Igor. 2012. "The Question of Anxiety in Gilbert Simondon". In A. de Boever, A. Murray, J. Roffe & A. Woodward (Eds.), *Gilbert Simondon: Technology and Being* (pp. 73-91). Edinburgh: Edinburgh University Press.

Lacan, Jacques. 2014. *Anxiety: The Seminar of Jacques Lacan, Book 10.* Translated by A.R. Price. Cambridge: Polity Press.

McLuhan, Marhsall. 1964. *Understanding Media*. London: Routledge.

Mills, Simon. 2016. *GIlbert Simondon: Information, Technology and Media*. London: Rowman & Littlefield International.

Munster, Anna. 2006. *Materialising New Media: Embodiment in Information Aesthetics*. Hanover: Dartmouth College Press.

Munster, Anna. 2013. *An Asthenia of Networks: Conjunctive Experience in Art and Technology.* Cambridge: MIT Press.

Nash, Adam. 2012. "Affect and the Medium of Digital Data." In *Fibreculture Journal,* 21.

Nash, Adam. 2016. "Affect, People and Digital Social Networks." In *Emotions, Technology, and Social Media*, edited by Sharon Y. Tettegah. London: Academic Press, pp. 3-24.

Nash, Adam. "Art Imitates The Digital." in *Lumina*, vol. 11 no. 2, pp. 110-125. 2017.

Penny, Laurie. 2016. "Life-Hacks of the Poor and Aimless." *The Baffler*. Online: http://thebaffler.com/blog/laurie-penny-self-care, posted 8th July 2016.

Sauvagnargues, Anne. 2016. *Artmachines*. Edinburgh: Edinburgh University Press.

Savulescu, Julian and Ingmar Perrson. "Should a human-pig chimera be treated as a person?" *Aeon*. https://aeon.co/ideas/should-a-human-pig-chimera-be-treated-as-a-person posted14 July 2016.

Scott, David. 2014. *Gilbert Simondon's Psychic and Collective Individuation: A Critical Introduction and Guide*. Edinburgh: Edinburgh University Press.

Sedgwick, Eve Kofosky. 2003. *Touching Feeling: Affect, Pedagogy, Performativity*. Durham: Duke University Press.

Simondon, Gilbert. 1993. "The Genesis of the Individual." in *Incorporations*. New York: Zone Books.

Simondon, Gilbert. 2005. *L'individuation à la lumière des notions de forme et d'information*. Grenoble: Éditions Jérôme Millon.

Simondon, Gilbert. 2009. "The Position of the Problem of Ontogenesis." in *Parrhesia*, 7 (2009a): 4-16,

Simondon, Gilbert. 2012. "Technical Mentality." in *Gilbert Simondon: Technology and Being*. Edinburgh: Edinburgh University Press.

Simondon, Gilbert. 2017. *On the Mode of Existence of Technical Objects*. Translated by Malaspina, C. and John Rogove. Minneapolis: Univocal Publishing.

Spinoza, Benedict de. 1994. *Ethics.* Translated and edited by Edwin Curley. London: Penguin Books.

Steffen, Will, Paul J. Crutzen and John R. McNeill. 2007. "The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature?" In *Ambio* 36, no. 8 (December 2007): 614-621.

Stiegler, Bernard. 2013. *What Makes Life Worth Living: On Pharmacology*. Cambridge: Polity Press.

Wittgenstein, Ludwig. 2014. *Tractatus Logico-Philosophicus*. Translated by D. F. Pears and B. F. McGuinness. London: Routledge.

Wolfe, Cary. 2010. *What Is Posthumanism?*. Minneapolis: University of Minnesota Press.