Data aesthetics and the role of narration in generative artefacts

Luiz Gustavo Ferreira Zanotello

Luiz Gustavo Ferreira Zanotello is a Designer and Researcher. His research cover topics such as media art, transdisciplinary, speculative design, interaction design and digital contemporary languages.

ABSTRACT

Data-based generative artefacts are objects that, by the means of generative algorithms, have one or more formal aspects parameterized by data. Although defined by the methods from which data is translated into aesthetics, inside their black-boxes, these artefacts incorporate different actants in a network of different translations that altogether, constitute a narrative. Driven by concepts taken from the actor-network theory of Bruno Latour, as well as the object-oriented-ontology as proposed by Graham Harman, this essay explores the different narrative aspects inherent to generative artefacts, and further explores the role of these narrational aspects as evidences of an ontological speculation inherent to such objects.

KEYWORDS

parametrization, data, narration, generative, speculation.

1. INTRODUCTION

Widespread easily accessible technologies are currently able to extract scientific data from objects of both natural and artificial systems. Meanwhile, the growing intersection between the arts, the sciences, and technology, has been giving space to new forms of wonder, generative art being among them. Although the practice of generating artworks by the use of autonomous computer systems has already existed for more than fifty years[1], its artistic endeavor of parsing data to give shape to artworks has only for the past ten years acquired prominence in both media art and contemporary design worlds, thus urging attention to its methods and reasonings.

It is by the maneuver of parametrization, the process of assigning variable parameters that either influence or change the behavior and output of a system, those generative artefacts are able to incorporate data gathered by technological devices into their composition. The parameters within the algorithms of early generative art worked mainly under the generative principle of randomness, by containing variables that incorporated statistical schemes that influenced the output of the system. Today, the parametric algorithms often take the input of data from a third system that translates analog data into digital data. Where in the past, digitally produced randomness played the central role, today, the serendipity of the analog world have its input through data turned digital.

At times facing the danger of being a mere aestheticization, whereas too a "visualisation" of datasets in perceivable forms, artworks generated by algorithms with the input of data are usually conceived as a mere interplay between the object from which the data is gathered, the artist who developed the algorithm, and the generated artwork that took such data to build its form from. However, inside the black-box[2] of such artefacts, a myriad of other different actants come into play to compose the final artwork. There is the artist who chooses to associate the object of question with a specific form, there is the computer that processes the algorithm programmed by the artist, there is the technological device used to extract analog data from the object, there is the printing or viewing machine of the generated artwork, and there is the digital data itself. This collective formed by such different actors come into a narrational play, where the artwork may be less perceived by its generated form or even to the analog data it is based on, than it is to the story of associations it is constituted of. Could the narrative inscribed between these actants be the very central material of data-based generative artefacts?

1.1 A first example

In *Cosmos*, the artist duo *Semiconductor* created a wooden sculpture made from carbon dioxide measurements from the Forestry Commissions Alice Holt Forest in the United Kingdom, and placed the sculpture afterwards on the same forest from where the data was gathered from, as if returning the "data" to its original habitat. The official project's description from the artist's website goes as follows:

> Cosmos is a two metre spherical wooden sculpture that has been formed from scientific data made tangible. Interested in the divide between how science represents the physical world and how we experience it, Semiconductor have taken scientific data as being a representation of nature and are exploring how we can physically relate to it. Located in the Forestry Commissions Alice Holt Forest, U.K., the sculpture is made from one year's worth of measurements of the take up and loss of carbon dioxide from the forest trees, collected from the top of a 28m high flux

---

[1] The first generative art exhibition, "Generative Computergrafik", which featured artworks by Georg Nees, occurred in Germany in 1965.

[2] The term "inside the blackbox" aims to illustrate the opposite of the process of "blackboxing", as conceived by Bruno Latour (1999).

tower located nearby in Alice Holt Research Forest. To reveal the visual patterns and shapes inherent in the data, Semiconductor developed custom digital techniques to translate the data from strings of numbers into three-dimensional forms. The result is complex interference patterns produced by the waveforms and patterns in the data. Through this process of re-contextualising the data it has becomes abstract in form and meaning, taking on sculptural properties. These sculptural forms become unreadable within the context of science, yet become a physical form we can see, touch, experience and readable in a new way. Here, humanising the data offers a new perspective of the natural world it is documenting. The definition of cosmos is a complete, orderly, harmonious system and here refers to the sources of the combined data which work in harmony to make the forest what it is. (Semiconductor, 2012)

Cosmos questions neither scientific data nor the phenomenon it represents. Instead, the sculpture embraces scientific data as a representation of nature, and explores the aesthetic possibilities that the scientific representation of natural phenomena carries: how to turn strings of numbers taken from technological devices away from the context of scientific discourse, towards a humanized, graspable, sculptural one? *Cosmos* refers to scientific data and the aesthetic possibilities inscribed in such data, however, the sculpture does not turn scientific data into scientific knowledge nor a scientific understanding of the phenomenon it represents. It takes scientific data as a raw material for artistic maneuver, that through a parametric algorithm is turned into a sculpture. As the raw material, detached from the scientific knowledge it originally was part of, the data plays only an aesthetic role in the sculpture, vaguely related to variances of the phenomenon itself.

However, the sculpture does not incorporate only data: it incorporates a narration, a story of "make-believe". The narrational aspect of such artefact stands only loosely by the microform that its generative algorithm translates from. Rather, it stands for the sole point, as a black sphere made out of 1-year data of carbon dioxide, sitting in the same forest it was taken from. It stands by its supporting video that narrates the story of such data, and all its translating maneuvers and actants that are part of it. It stands by the translation of the "carbon dioxide" phenomenon to analog scientific data gathered from the 28m high flux tower located nearby the forest, the translation of the analog data to digital data by a technological device, the digital algorithm that translates the data to a three-dimensional form, the translation of a digital file to a tangible object, and at last, the translation of the object into a work of art.

Data, in *Cosmos*, is a staged element within a plot of translation. *Cosmos* brings to the senses less the visualization of each data point, but more the very fact that this data existed - or may have existed. The knowledge that *Cosmos* produces does not carry a deeper understanding of the phenomenon it represents. However it may create the idea of a third, a new object, a sculpture born less from scientific data and the natural phenomenon, and more from its speculative story: the story of the carbon dioxide's scientific data that formed a black sphere inside the forest, making the forest closer to what it is.

As Bruno Latour writes about one of the meanings of technical mediation: "techniques modify the matter of our expression, not only its form" (Latour, 1999, p.185). How does the technical translation of objects modify the matter of the generated artwork? Would this distance between the natural phenomenon and the sculpture's design, one with an indivisible narration of consecutive translating actants, be an evidence of the speculative nature of such artefact? Is the gathering of data from carbon dioxide already a form of speculation performed by the antenna?
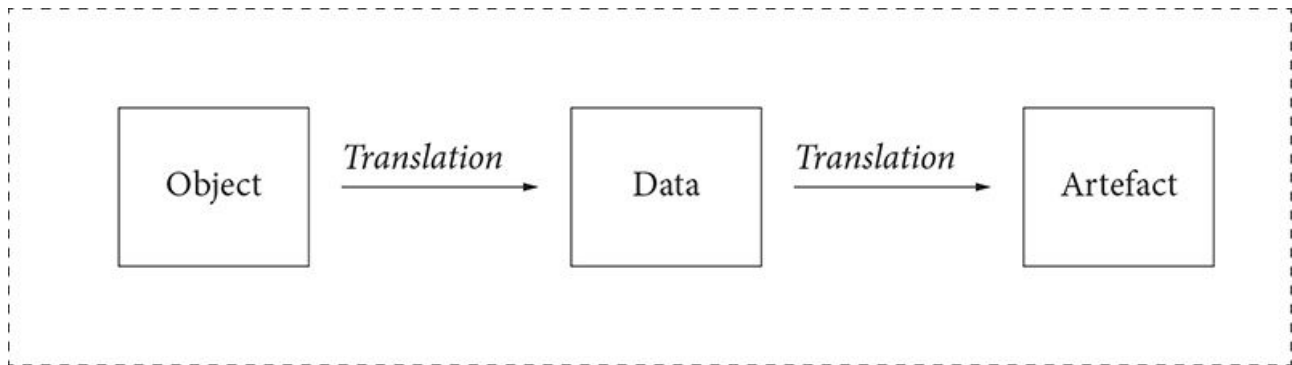
2. UNBOXING GENERATIVE ARTIFACTS

Blackboxing, as Latour conceives, is "the way scientific and technical work is made invisible by its own success" (Latour, 1999, p.304). He continues and states that "when a machine runs efficiently, when a matter of fact is settled, one need focus only on its inputs and outputs and not on its internal complexity" (Latour, 1999, p.304). In an analog linear manner, the following graph points out the three blackboxes that constitute the systems of generative artefacts:

**Figure 1.** First level of unboxing of a generative artefact.

Beyond pointing out the three main blackboxes, this first comprehension layer already points to the two key translations that occur during the process of creation of the Artefact. A chosen Object (light, traffic, temperature) has a certain aspect of it translated into a dataset of discrete numbers. Either at the same time or at a further moment, the dataset is translated into a new medium (a sculpture, a sound, a video), an Artefact. This graph exposes the linear narration of these artefacts, a tale of its technical development which also serves as a general description of the artwork itself. In order to understand the translating actants inside the blackbox of these artefacts and their interplay with the narrative aspects of the artwork, more black-boxes must be opened in a more complex chain of translations.

2.1 The artefact's network
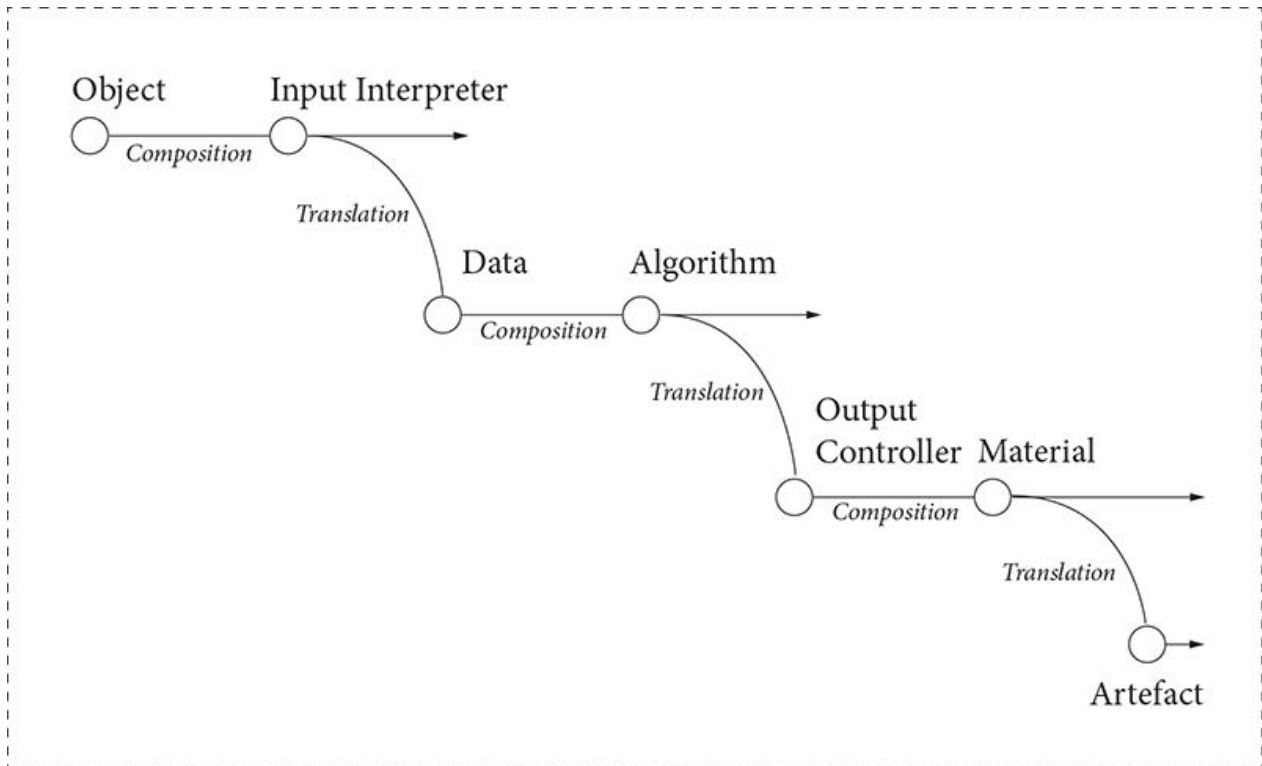
Figure 2. The generative artefact's chain of translations.

The above diagram (Fig. 2.2) depicts the key chain of translations necessary for the generative artefact to be materialised. As Latour conceives, translation means "displacement, drift, invention, mediation, the creation of a link that did not exist before and that to some degree modifies the original two" (Latour, 1999, p.179). This unboxing breaks down the previously analysed relation between the Object, the Data, and the Artefact, in a technical mediation between even more actants which mainly perform a successive translation from the initial Object to the Artefact in the end. The key point of this chain is, however, the translational processes that are happening in-between. Would the material properties of such artefact be less informed by its Data than it is by the sensor (Input Interpreter) that retrieved it?

The diagram demystifies the potential fiction that generative artworks are solely informed by a certain object's data and algorithm. Even more, each and every actant depicted above can also be unboxed to reveal a whole other chain of translational actants, of which are no less constituent of the final Artefact, although they exercise a smaller influence in its form. It is clear, that the matter that informs the artefact is the very technical mediation between all the actants of the above chain.

In this intricate chain of events, one substantial change to the actants would influence the whole chain in diverse ways, even their goals. The Object's goal is not the same when associated to the Interpreter. As Latour (1999) conceives, each association between two or more actants in a translational movement is always symmetrical: the Object, the Input Interpreter, the Data, the Algorithm, the Output Controller, and the Artefact are all symmetrically co-modified throughout the process. What could their new goals be? A moment of speculation is thus unfolded, one that is accessible through the narrative aspects of the Artefact.

2.2 Narrative as actant

> Each artifact has its script, its potential to take hold of passerby and force them to play roles in its story (Latour, 1999, p.177)

The Narration is the process of narrating a story. The narrative is the object of the act of narration. As human memory is invariably historical, narratives are tropes of communication, objects that serve as a means of socialization. Once again as Latour states, "science and technology are what socialise nonhumans to bear upon human relations" (Latour, 1999, p.194). It is the narrative aspects of the Artefact, an object constituent of scientific and technical actants, the door to humans from the nonhumans entangled in its chain. The Artefact, with its narrational aspects, is the common result of a series of transformations, but one that exposes its very constituent actants to human socialisation. The narrational aspects are the ones who are the "ghost" throughout the process of the Artefact's development, and they are also the "shell" that keeps all its preceding actants openly accessible to humans. But would these very aspects inscribed in the Artefact, not be a new actant in the preceding chain?
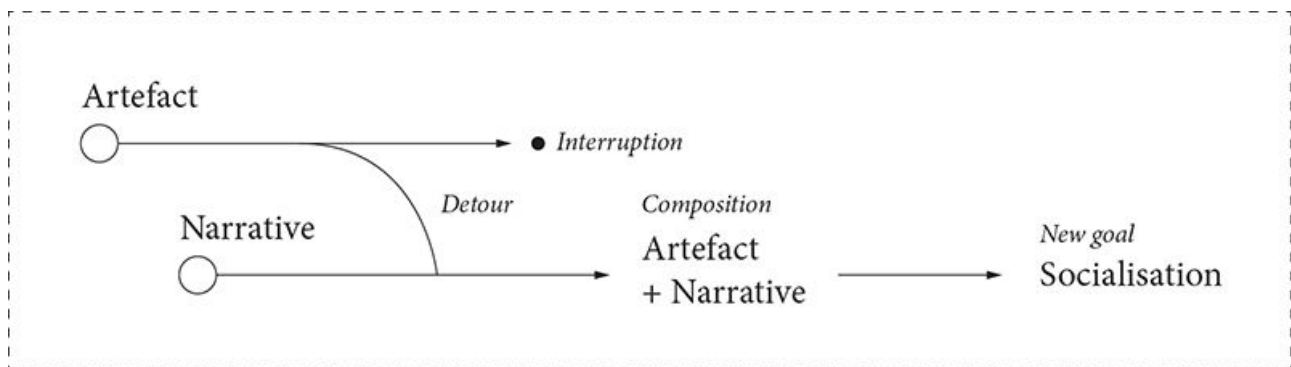
Figure 3. Composition of the socialization of generative artefacts.

The properties of the Artefact, its material qualities, its form, its color, its texture, its smell, its movement, its spatial configuration, by themselves, do not suffice to open the blackbox and expose its preceding network to humans: the properties can only allude to a narration, a narration of its own assembly. Thus the Narrative, whether communicated through words or through allusions in the Artefact, is the key element that makes the socialisation of its preceding actants possible. It is the Narrative that tells the story of the technological manoeuvres necessary for the development of the Artefact, a narrative that tells the procedures of delegation leading to its own constitution. It is the Narrative that tells that this particular curve of the Artefact is associated with the tidal wave movements of a tsunami in the Pacific, or that the sea has in its mess the Artefact as a means to socialise with humans. It is the Narrative the actant that makes it possible for a generative artwork to be not a mere aestheticization of data, nor a random arrangement of input and output objects processed by invisible algorithms[3].

The Narrative is thus the one actant that modifies all the preceding actants to work, coherently, towards a new goal. As already described earlier in the analysis of the sculpture *Cosmos*, the generated artefact is less about its constituent actants, as it is about the Narration that wraps them into a single, coherent, third object. It is this object that is open to the interpretation of the viewer, the one that is open to speculative wondering.

3. THE SPECULATIVE MOMENT

---

[3]See Jim Campbell's Formula for Computer Art (Campbell, 2000). Campbell constitutes a critic towards computer art, exposing the risk of it becoming a formulaic aestheticization of data. The formula does not account, however, the narrational aspects of generated computer artworks, aspects that if well crafted (as described above), are able to unbox and take off from invisibility the processes from which such works were developed.

The artist, in hers/his attempt to grasp and visualize an object's reality, wonder about its form by the means of the evidence she/he can find. An external interpreter, a technical device of sensing, grasps details and quantities of the object, closer to it, and invisible by other means to the artist. The collective formed by the artist in addition to hers/his technical delegates, wonder about the form from the retrieved quantities: a possible form of a third object, one that is more than the data, and more than the qualities perceived. Shaviro, when writing about Graham Harman's idea of the ontology of objects, says:

> "(…) precisely because we cannot know things in themselves, the only thing that is left to us is to speculate. We cannot grasp objects cognitively; but we can allude to objects through metaphor and other aesthetic practices." (Shaviro, 2014, p.48)

The speculation in data-based generative artefacts occurs in the attempt of grasping an object's inner reality by means of an association between aesthetic and scientific wondering. This speculation is also extended to the technical delegates that gather and process the data taken from the object. The already explained chain of translations inherent to the artefact's development is a further evidence of the speculative nature it consists of. An endeavour carried by the degree of uncertainty and distance to the object upon each translation manoeuvre, especially the one performed by the algorithm: the actant that turns the graspable quantities from an object into a form. The emerged form is not a form that "is": it is a form that "could be".

3.1 Data as evidence

> "Our third table emerges as something distinct from its own components and also withdraws behind all its external effects. Our table is an intermediate being found neither in subatomic physics nor in human psychology, but in a permanent autonomous zone where objects are simply themselves." (Harman, 2012, p.10)

In a plot where the object always withdraws behind its external effects, the role that data plays need to be further discussed. At times described as scientific, data gathered through technical devices perform scientific procedures of measuring as an attempt to grasp an object. Escaping from being a 1:1 representation of an object, data is itself the result of a translation of mediums, one that is performed upon a particular technically perceivable aspect of an object. Its potential lies in the tracing in time of measurable quantities, a dataset plotted with a plot: the narration of an exterior effect from an object in time.

As quantified external traces of an object, data thus assumes a role of evidence in the narrative inscribed in the artefact. When even the object's external effects are unreachable to humans, Data is the key evidence of the object's existence, an evidence that is narrated by its influence in the artefact's form. The input interpreter assumes in this plot the role of a "probe" (Bogost, 2012), the explorer of an "alien reality" plotting graspable effects it encounters into numbers. The interpreter determines key aesthetic qualities of the data which are not directly linked to the object's effect (resolution, noise, scale). In that sense, the evidence that data represents is never unmediated and is always subject to a form of translation. Thus data is evidence not only to the object's existence in time, but of the always oblique and partial grasping of an object: an evidence of the speculation that the artist and the algorithm perform together to generate the artefact.

3.2 Aesthetic manoeuvre

The work of the artist Nathalie Miebach explores the role of visual aesthetics in the translation of scientific data. She questions the traditional data visualisation performed by science, by assuming data as raw material for aesthetic reasoning. By gathering data from the environment by means of simple home-made devices, Miebach translates the numbers into

meticulously woven structures without computers, however yet in an algorithmic manner. In "Arctic Sun - Solar Exploration Device for the Arctic" (Miebach, 2006), the artist recorded with technical devices the gravitational influence of both Sun and Moon on the Arctic for two days, and also the tidal changes, moon phases, and solar path during the period. Each type of element in the sculpture is informed by one of the data layers, which together composes a whole narrative about two days inside the Arctic's environment.

Taking data as evidence, the artist is confronted with the task of crafting a process that translates the data into forms able to tell a story of the object's existence. It is a speculative endeavour, insofar it is an attempt to establish an artefact that "alludes to an object that cannot quite be made present" (Harman, 2012, p.14). It is also an aesthetic endeavour to form stories out of data, as well as to translate the emergent narratives into meaningful forms. The generative artefact, in itself, wraps all its generative actants into a symphony of metaphors: metaphors of an object's existence in time, one that cannot be fully grasped by other means. The artefact in this sense is a narrative prototype of data.

As Shaviro states: "reality is far weirder than we are able to imagine" (Shaviro, 2014, p.44). The generative artefact attempts, with its association to technical mediums, to open the doors to the weirdness of the reality of objects. By being transparent to the data it informs and to the object from which the data was gathered from, the artefact is capable of narrating the existence of the object it alludes to. However always as a third, an object different than the one humanly grasped, or scientifically evidenced. Thus, the generative artefact proposes an ontological reasoning on what the translated object could be, by turning perceivable humanly imperceivable effects of it, and by also escaping the direct translation of its physical existence. It provides meaningful narratives of an imperceivable object, communicated by the story of its own development, and the generative aesthetics of its form.

4. CONCLUSION

> "Speculative Realism insists upon the independence of the world, and of things in the world, from our own conceptualisations of them." (Shaviro, 2014, p.44)

Data-based generative art, although not traditionally linked to the contemporary philosophical turn of Speculative Realism, can be a practice directly linked to its reasonings. The delegation to nonhuman actants, the translation of an object's effect to scientific data and posteriorly to a perceivable form, and lastly, the narration of the performed steps of translation, are the main evidences of the speculative act inherent to this type of artistic practice. Artefacts generated algorithmically by the input of scientific data are independent of our own conceptualisations of them, as well as from the physicality of the object from which they have taken data from. Artists and technical devices speculate together towards the formation of a third object, born from technical-scientific procedures and an object's external effects.

It is only through narration that these types of artefacts fulfil the task of ontological reasoning. The narrative aspects of such artefacts are the key factors that wrap the artefact both in its intrinsic and extrinsic compositions. It is first, a narration of its own constitution, a technical story of the series of translations and actants that led to the emergence of the artefact. It is this narrative the one that inscribes the artefact in a socialisation process to both humans and nonhumans, as it is evidence of the artefact's association to the objects that it prescribe. And it is in second, a narrative of data. It is this second narrative that serves as evidence of an

object's existence, thus fostering the speculative manoeuvre of ontologically defining what the object could be, by translating its data into a form.

Such combined narration may be inscribed in the artefact's form, or attached to it by other means. Both form, however, a necessary material for the ontological speculation that data-based generative artefacts are capable of. The craft of such speculation needs to be precise in its translating manoeuvres, for the artefacts bare the risk of formulaic aestheticization and vagueness of meaning. The task of the artist is thus crafting the coherent translational algorithms, and choosing the precise translating actants that can, in the end, play their roles on the speculative plot, an artefact that is able to suspend the disbelief of a third object that cannot quite be made present.

REFERENCES

Bogost, I., 2012. *Alien Phenomenology, Or, What It's Like to be a Thing*. Minneapolis: University of Minnesota Press.

Campbell, J., 2000. Delusions of Dialogue: Control and Choice in Interactive Art. *Leonardo*, 33(2), pp.133-136.

Harman, G., 2012. *The third table.* Documenta (13): 100 Notes - 100 Thoughts / 100 Notizen - 100 Gedanken, Volume 85. Ostfildern: Hatje Cantz Verlag.

Latour, B., 1999. *Pandora's Hope*. Cambridge: Harvard University Press.

Miebach, N., 2006. *Arctic Sun: Solar Exploration Device for the Arctic* [Online] Available at: <http://nathaliemiebach.com/tide03.html> [Accessed 20 March 2015].

Semiconductor, 2012. *Cosmos.* [Online] Available at: <http://semiconductorfilms.com/art/cosmos/> [Accessed 5 March 2015].

Shaviro, S., 2014. Speculative Realism: A Primer. *Spekulation, Text zur Kunst,* 93, pp.40-52.