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# The Anthropocene Shifts in Visual Arts: A Case against Anthropocentrism

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“To strive against odds on behalf of all of life would be humanity at its most noble.”  
(Edward O. Wilson, 2016, *Half Earth: Our Planet's Fight for Life*)

## Abstract

Although this paper focuses largely on the Anthropocene, it is not about the local or global dangers of climate changes and escalation of pollution. It is about the diverse responses of selected artists and humanists to the problems created by the anthropocentrically structured powers geared for exploitation of biological environments and material ecologies. These artistic reactions cannot be simplified to a single thread of environmental storytelling: they are seen and interpreted as personal and moral responses to the perceptions about the old culture-nature dichotomy as well as to commodification and depletion of the biosphere. This article looks at individual reactions of artists who respond to the exploitable character of the global-wide management of environmental and technological resources; the responses to a paradigm often referred to as the “Anthropocene” or “Sixth Extinction”. The Anthropocene and cognitive sciences have been considered game changers by numerous thinkers as they can affect perceptions about anthropocentrism.

**Keywords:** Anthropocene; anthropocentrism; visual arts; dark ecology; cognitive sciences; Sixth Extinction



## Introduction

The particular context in which the Anthropocene is currently pursued in the West is described at the opening of this paper. There follows a brief contextualisation of the Anthropocene as a possible paradigm shifter in terms of unmasking anthropocentrism as the main culprit and enabler of the hierarchical construction of power. This is done through analysing the current scientific understanding of interconnectedness of all life and thus debunking the traditional classification of life in terms of ranking or hierarchies. Anthropocentrism is also a main tool for construction of colonialism, capitalism and carbon politics and in need of an exposé. The artists who participate in this task are discussed in the main body of this paper. Therefore, the focus is on artists who have been illuminating the connectivity of life and matter, and use scientific findings to amplify the scope and impact of their art. Questions that are considered in relation to artistic productions are for example: What does it mean to be a human and what is the position of the non-human in the Anthropocene? Conclusions are drawn about values of awareness of the Anthropocene and the art strategies for bringing attention to and enlarging this cognisance.

## Our Current Context: The Anthropocene

In terms of deep history we are currently in the Holocene period, a geological epoch within the Cenozoic Era.<sup>1</sup> Elizabeth Kolbert (2014), the popular science writer, explains that in geological time, epochs are quite short, spanning some tens of millions of years, whereas eras last hundreds of millions of years. We may have the feeling that as a species and thanks to our scientific and technologic development, we can make a significant difference—perhaps reduce poverty worldwide, make business sustainable and even achieve some Millennium Goals,<sup>2</sup> but we might also as a species, meet the same outcome as *Anomolacaris*, the Giant Shrimp which became extinct 530 million years BP, leaving no phylum behind (Leakey and Lewin 1996). The reason for suggesting the possibility of extinction of our species is that the planet is in the midst of the Sixth Extinction (Kolbert 2014). This extinction of species is generally considered<sup>3</sup> to have started about 12 700 years ago and has also been called the “Anthropocene” extinction.<sup>4</sup>

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1 See for example Leakey and Lewin, 1996; Walker, Johnsen, Rasmussen, Popp, Steffensen, Gibbard, Hoek, Lowe, Andrews, Björk, Cwynar, Hughen, Kershaw, Kromer, Litt, Lowe, Nakagawa, Newnham, and Schwander, 2009.

2 UNDP [O]. 2011. Millennium Development Goals. Available at: <http://www.undp.org/mdg/basics>

3 Crutzen 2002; Crutzen, Lax and Reinhard 2013; Doughty, Wolf and Field 2010; Grayson and Meltzer 2012; Waters, Zalasiewicz, Summerhayes, Barnosky, Poirier, Gałuszka, Cearreta, Edgeworth and Ellis 2016.

4 The period beginning after the last glacial was 11 700 years before 2000 AD, or 13 700 years BP and is considered to be the most recent post glaciation period of the Quaternary glaciation (from about 110 000 to 12 000 years ago) (Ehlers and Gibbard 2004). The end of the “Ice Age” has not come yet.

It refers to the way *Homo sapiens* has had an impact on the environment which, while being beneficial to many species, has been disastrous for others.

Although Eugene Stoermer (1934–2012) had coined the word “Anthropocene” in the 1980s (to refer both to the impact of humans and evidence of that impact on the environment), it was the chemist Paul Crutzen who had popularised this alternative term for the geological period known as the Holocene. When Crutzen (Crutzen and Birks 1982) revealed the “hole in the ozone layer”, and other measurable and visible traces of man’s activities were being reported—among them the acidification of the oceans, massive destruction to habitats, erosion, sedimentation, extinction of biodiversity and most prominently urbanisation with its destructive impacts—it seemed time to name what was happening. Some scientists<sup>5</sup> are questioning whether the name “Anthropocene” can be officially pronounced as an epoch when geological time periods have always been indicated by changes in the record of fossils (Wright 2014). Irrespective of the name of the extinction, the fact of it can be discerned in the spate of scientific and humanistic articles and books. Perhaps one of the most recent, poignantly titled *The Annihilation of Nature; Human Extinction of Birds and Mammals* by Gerardo Ceballos and Anne and Paul Ehrlich (2015), lists frighteningly the mammals and birds driven to recent extinction by mankind. Other scholars are more inclined to see the Anthropocene as a longer time span for humans to annihilate nature: “... we humans truly fanned the flames of the Sixth Extinction whose fuse we lit some 60,000 years ago when we first made it out of Africa to colonise the world” (Anderson 2016). Whatever timescale we adopt, it is valuable for scientists, natural philosophers and humanistic commentators including artists to reflect, in the second decade of the twenty first century, on the graphic evidence of the impact humans have had on the human-nature relationship, obsessed as they are with the solipsistic question of what consciousness is in humans<sup>6</sup> and their self-appointed centrality on the planet. The discussion of man-nature has taken innumerable forms in different historic and prehistoric periods.

## The Anthropocene Shifts and Cliffs

This article aims to present various views on the Anthropocene to elucidate on the discussion of selected artworks and at the same time pay tribute to the voices against the mainstream management of resources and the frameworks supporting this management. “The issues of climatic change are too complex to be reduced to a single narrative” (Scranton 2015, 21). The views on the Anthropocene are presented here to assess the

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Paul Crutzen is one of the 1995 Nobel Prize winners for his work on the effects of ozone-depleting compounds.

5 For example, scientists like Zalasiewicz, the current director of the *Anthropocene Working Group of the International Commission on Stratigraphy* and his group.

6 Only lately has consciousness been extended as a possibility to other creatures. See, for example, Frans de Waal’s *Are we Smart enough to Know how Smart Animals are?* (2016) and *The Bonobo and the Atheist: In Search of Humanism among the Primates* (2015).

individual takes on the status quo of human-nature relationship; they are drawn through the prisms of anthropocentrism and contrasted with the current scientific observations about interconnectedness of ecology and mutual interdependence of biosphere.

Recently the Anthropocene became a hot topic approached from a variety of angles, most of which expose the alarming state of ecology and environment as a direct or subsidiary result of human short-sighted management of Earth's resources. The Anthropocene debates are mainly focused on human relationships with nature, on exploitative economics, on technology and the future of humans. The Anthropocene "is a concept that also marks the various violations of environmental and human life in corporate practices and technological culture that are ensuring that there won't be much of humans in the future scene of life," writes Jussi Parikka in *The Anthrobscene*, where the title is an allusive pun on the obscenity of the human exploitation of nature (2014, 1). Yuval Harari, on the other hand, darkly suggests in *Homo Deus* (2016) that the future of humans in terms of biology might be near its end and that the next epoch belongs to algorithmic corporation, a fusion of technology and nature. This prognosis might be why the enthusiasts of "dataism"<sup>7</sup> are not overly concerned with dystopian views of the future of environmental ecology as, according to them, we humans will become exponentially augmented<sup>8</sup> with technology and therefore less dependent on the biological trivia like the oxygen supply, the processes of photosynthesis or access to clean water. Such augmentations, however, might be the survival solution reserved only for the privileged few. On the other hand, "the best of all possible news is that, should 'we survive the Anthropocene, it will not be as 'humans'," writes Benjamin Bratton (2013). Speculations about the survival "in a world unrecognisably different from the one we have known for the last 200,000 years" (Scranton 2015, 18) and the disheartening possibilities of erasing ecology (Wolfe 2003) cannot be ignored.

While the debates about the Anthropocene in the span of the last decade range from the grave lamentations on the state of our planet to the optimistic offerings<sup>9</sup> of possible solutions to "fix" the ecological "problems" created by humans, it might be useful for all debates to keep in mind that about 3 500 million years ago there was no oxygen in the Earth's atmosphere. That the present atmosphere is rich in oxygen is the result of millions of years of photosynthetic processes initiated by the first unicellular organisms, which unflinchingly kept releasing oxygen into the Earth's gases as a by-product of transforming carbon dioxide and sunlight into energy (Lane 2003). Calling to imagination this extreme time span emphasises the uttermost temporality of *Homo sapiens* on our planet, and also stresses that it took the Earth about four billion years

7 Harari says that the new emerging religion "venerates neither gods nor man—it worships data" (2016, 366).

8 See for example, Ray Kurzweil's *The Singularity is Near* or Robin Hanson's *The Age of Em*.

9 Some examples reflecting such futuristic optimism are King's *Augmented: Life in the Smart Lane* (2016), Scoble and Israel's *The Fourth Transformation* (2017), Colville's *The Great Acceleration: How the World is Getting Faster and Faster* (2016) or Kelly's *The Inevitable* (2016).



**Figure 1:** “It is 2017, I should be advocating for honey bees by now, not fighting for basic human rights.” Source: afropunk.com Too real! #SaveTheBees <http://www.afropunk.com/photo/too-real> March 27

**Figure 2:** Choosing life. Photograph by Carrie Antlfinger. Source: [http://www.truthdig.com/report/item/choosing\\_life\\_20150419/](http://www.truthdig.com/report/item/choosing_life_20150419/)

to achieve favourable conditions for humans—the era of the Holocene, with habitable equilibrium of resources and hospitable climate.

That this equilibrium has been severely upset through human governance of the Earth’s resources is not new knowledge: first theories about greenhouse effect and its relation to the burning of coal (fossil fuels) were drawn<sup>10</sup> in 1896 by Svante Arrhenius, a Swedish scientist, who spotted a close relation between carbon dioxide levels and rising of atmospheric temperature. The progressive acceleration of gas emission is reported by numerous environmental studies.<sup>11</sup>

In humanities, some brutal but vital questions are being asked in the face of the Anthropocene: “How will thinking about Kant or Fanon help us trap carbon dioxide? Can arguments between object-oriented ontology and historical materialism protect honeybees from colony collapse disorder? Are ancient Greek philosophers, medieval poets, and contemporary metaphysicians going to save Bangladesh from being inducted by the Indian Ocean?” (Scranton 2015, 19). In view that human affairs are still not being

10 Svante Arrhenius. “On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground.” *The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science*, Fifth series 41: 251 (April 1896), pp. 237–276. Source: [http://www.rsc.org/images/Arrhenius1896\\_tcm18-173546.pdf](http://www.rsc.org/images/Arrhenius1896_tcm18-173546.pdf)

11 See Steffen, Will, Wendy Broadgate, Lisa Deutsch, Owen Gaffney and Cornelia Ludwig. 2015. “The Trajectory of the Anthropocene: The Great Acceleration.” *The Anthropocene Review* 2 (1): 81–98. Also see Steffen, Will, Jaques Grinevald, Paul Crutzen and John McNeill. 2011. “The Anthropocene: Conceptual and Historical Perspectives.” *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 369 (1938): 842–867.

even remotely attended to and that inequality continues its reign (Figure 1), shouldn't ecology and the Anthropocene take a back seat and exercise patience? "Animals are simply the latest candidates in the endless procession of victims—women, minorities, the poor—clamouring for rights and justice, or just a modicum of decent treatment. If animals want rights ... then they will have to take a number. The queue of prior claimants is long," says WJT Mitchel in foreword to *Animal Rites* (Wolfe 2003, loc 26). The anthropocentric perspective is built upon scaffolding of victims (Figure 2). The fact that humans assigned different value to different lives has to do with how power is distributed in the world order; the Anthropocene debates draw attention to this inequality which permeates all spheres of constructing and sustaining the existing status quo. Harari (2016, 100) asks "is human life more precious than porcine life simply because the human collective is more powerful than the pig collective? The United States is far mightier than Afghanistan; does it imply that American lives have a greater intrinsic value than Afghanistan lives?" Hierarchising life places us in the catch 22 situation: it will again be the poorest who will suffer the most under the Anthropocene depletion of basic resources.<sup>12</sup>

Finally, the frightening claim comes from Timothy Morton (2010, loc 59), saying that "[o]ne of the things that modern society has damaged, along with ecosystems and species and the global climate, is thinking." It targets the economic management of natural resources, the hierarchical classification of life and environments, including political distribution of power and inequality. Treacherous thinking that humans are in control of their own as well as the planet's fate is the leading idea that underpins Morton's *Dark Ecology* (2016). It exposes our "spellbound state" of not becoming aware that humanity is "itself nature", of not "halting the mastery over nature through which nature continues its mastery" (Adorno 1983, 61). Such a "spellbound state" could be created and sustained through fostering rifts between different ways of knowing the world.

## Raising Borders between Human and Non-Human Life

Consciousness as a metacognitive phenomenon is a very modern philosophical question. It is phrased succinctly now as something which can be discussed (Churchland 2007). This has not always been the case. Without the technology to see inside the brain without destroying the matter, the supposed seat of consciousness had to be guessed at. What consciousness was to our most distant ancestors has to be inferred from modern day hunter-gatherers' ideas about the spirit or the soul. The consciousness of things, seen dramatically to leave creatures at death, was described rather vaguely as "soul" or "spirit" for millennia (Wright 2009). Paleolithic artists 40 000 to 30 000 years ago

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12 The latest, for example, landslide in Sri Lanka caused by the rubbish dump on 15 April 2017, also repeatedly happened in 2014 and 2016. The poor households were the victims. South African examples are countless.

painted the walls of caves in Europe and there is an argument that this activity was associated with what we term religion (Lewis-Williams 2002, 2004a). The shamanistic activities of hunter-gatherer predecessors are deeply intertwined with the idea that man is part of nature, neither set above it or in control. A telling explanation of a spirituality of such a kind is described amongst the remainder of the San people in Southern Africa (Lewis-Williams 2004b). Other scholars even consider the development of religion and spirituality to date much further back than 40 000 years ago (Rossano 2009).

Whenever the idea of soul or spirit did arise is not easily discoverable, but once organised religion became a feature of the Anthropocene, the narratives about the soul—the divine spark—spread and became dominant. In Asia Minor and Mesopotamia (modern Iraq) and Egypt for an exceedingly long period during the eight to the sixth centuries AD, the earliest scientists were also philosophers or “wise men” struggling to describe principles in the flux of the phenomenological world and encouraging ethical behaviour for the sake of the soul/spirit (Lazaridis 2007). It was believed that without a moral compass the social order would descend into chaos (Wright 2009). That art could have ethical considerations gave rise to classical Greek forms and abstractions which are expressed in Plato’s idiosyncratic notion of a supra realm of perfect ideas in the fifth century BC. Meanwhile in Asia Minor the idea of God and the soul was undergoing an evolution, from a mighty warrior inherited from Sumeria to a more amenable and tolerant being (Wright 2009). Then, after the second or third century AD and the spread of Christianity, the idea of the soul developed from being something only humans had, to a spoil over which battles could be waged. Thus the soul’s primary work was not to be fretting over the phenomenological world and its science, but to focus only on its divine connection. Science had limited popularity during the so-called Dark Ages up until the early twelfth century in Europe. Thereafter, the Arab recovery and the development and distribution of ancient Greek knowledge, gradually fed an extraordinary renaissance of scientific enquiry in the twelfth century in France. The advancements of scientific discoveries and certainties are well documented from that time on into the eighteenth century Enlightenment, leading to the extraordinary florescence of science, mathematics, physics and medicine in the early twentieth century.<sup>13</sup>

The divine human spark that supposedly puts humans apart from all the other non-humans has not been discovered. And so far “there is zero scientific evidence that in contrast to pigs, *Sapiens* have souls” (Harari 2016, 118). There is enough evidence though, showing that other animals have capacity for tool use, communication skills and even rudimentary use of ToM (Theory of Mind).<sup>14</sup> According to Michael Tomasello (2014) the quality that sets humans apart from other animals is flexibility of social cooperation and collaboration. While humans like to stick to their belief systems, they

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13 For example see Thomas Kuhn, 1996. *The Structure of Scientific Revolutions*. 3rd edition. Kindle.

14 The ability to read minds is thought to have stemmed out of the protective behaviour of caring for offspring.



are also able to modify their behaviour when required (Mercier and Sperber 2017; Sloman and Fernbach 2017).

## Arts against Anthropocentrism

Artistic engagement with scientific research often results in heightened awareness of the often disregarded environment. Environmental destruction witnessed in the twenty first century is the long-term result of the theoretical delegation of matter/body to the nether regions of the human psyche and human concerns. However, there is an apocalyptic urgency being felt at this time in the Anthropocene. Kolbert's *The Sixth Extinction* (2014), Naomi Klein's *This Changes Everything* (2004) and Claire Colebrook's *In Praise of the Flat Earth* and *Framing the End of the Species* all announce the Anthropocene as the game changer in shifting the perceptions about culture-nature nexus. One also would expect to see this urgency articulated by artists. "Human, matter and environment" says Stacy Alaimo "can by no means be considered as separate" (2010, loc 129). Science and technology make it possible to detect "elusive patterns in the cosmic world, or [to descend] to atomic dimensions at the bottom of matter" (Stafford 2007, 1) and unveil what is inadmissible to the naked human eye.

Many advances in evolutionary biology have assisted in making the concept of a mind-body unity important in science and, subsequently, in the humanities. Such new understandings have gradually filtered into cultural criticism<sup>15</sup> and enabled those engaged in critiques of literature, the fine arts and the disciplines of other humanities, to view theoretical and philosophical responses to culture through a new lens, that of biology. The frontiers of consciousness, the borders between life and non-life, are central in the current scientific debates<sup>16</sup> and have spread to humanities.<sup>17</sup>

Examples of contemporary artists, philosophers and art theorists who work with this new understanding are innumerable. Understandably, I mention only a few which are particularly relevant for the Anthropocene and the South African context.

Some artists take the opportunity to probe and explore the invisible aspects of materiality by working directly with scientists. One such example is the South African artist, Jenna Burchell, who together with a group of geophysicists, a sound engineer and a programmer, constructed a series of rock sculptures (*Songsmith: Cradle of Humankind*, 2016) (Figure 3) which produce sounds translated from electromagnetic vibrations recorded from the original places the rocks rested. The work speaks not only about the physicality of the world, its hidden time/matter/energy dimensions, but also renders the landscape as something rather different to its traditional perceptions as an access to

15 See for example Barkow, Cosmides and Tooby 1995; Carroll 1995; Pinker 2007; Storey 1996.

16 For more debates in quantum physics and biology see Randall L, *Dark Matter and the Dinosaurs* (2016) and Lane N, *The Vital Question* (2016).

17 For example, Purcell's *Mind, Matter and the Universe*, Adams and Gruen's *Ecofeminism: Feminist Intersections with other Animals and the Earth*, Herbrechter's *Posthumanism* and Oppermann and Iovino's *Material ecocriticism*.



**Figure 3:** Jenna Burchell, *Songsmith: Cradle of Humankind* (2016). Fragments. Source: <http://artlovenature.co.za/songsmith-cradle-of-humankind-jenna-burchell/>

resources. By literarily giving the rocks songs to sing, the artist alerts the viewers to the physical sound, a voice, of land and thus disrupts the hierarchical perception of living and (so-called) non-living systems.<sup>18</sup>

The current scientific views on body/mind unity also reverberate with recent understanding of the unity of humans, with their biological, de-anthropocentricised environments, that comes from a variety of different fields like molecular biology, cognitive psychology or primatology. Astonishingly, “Franz Kafka’s *Metamorphosis*, published in 1915, was an odd opening salvo for a less anthropocentric century” reports Frans de Waal (2016, loc 145) and further explains that by “having selected a repulsive creature for metaphorical effect, the author forced us from the very first page to imagine what it is like to be a bug. At around the same time, Jakob von Uexküll (2010), a German biologist, drew attention to the animal point of view, calling it its *Umwelt*.” It is only recently that the scientific world views started to consider a more inclusive approach to “other” creatures (Bassler 2008; De Waal 2015, 2016; Lane 2016).

Artists like Joe Davis unfold the *Umwelt* of, for example, protozoa and pay tribute to “lower” life forms (*Listening to Protozoa*, 2000 or *RuBisCo Stars*, 2009). In *RuBisCo Stars*, by sending chemical formulae of chloroplast enzymes<sup>19</sup> essential for photosynthesis as radio signals into the cosmos to be the ambassadors of life on our planet, Davis attests to the Anthropocene, to the non-human part of ecology. Morton in *The Ecological Thought*, asks “what would an ecological society look like? What would an ecological mind think? What kind of art would an ecologically minded person enjoy?” (2010, loc 26). Shifting away from the anthropocentric paradigm and locating the meaning in the ecology seems to be one of the possible responses by Davis.

18 See Oparin-Haldane’s theory about the origin of life arising from organic matter when exposed to suitable conditions over a period of time.

19 Full name: Protein Ribulose - 1,5-bisphosphate Carboxylase Oxygenase. The Foundation of all life on Earth.

*While Darwin sleeps* (Figure 4) is an animation that not only educates about ecological processes and evolution, but also alludes to the impossibility of total classification of life. Edward O. Wilson (2016) points out the urgent need for realisation that it is the interdependence of species on each other that is the very glue that upholds life, and the project of categorising and building hierarchies between life forms is an outdated paradigm. Eduardo Kac also critiqued this compulsion to dominate the world through categorisation in his installation *Genesis* (1999).

Another reaction to Morton's question is by Colleen Flanigan, whose living sea sculptures help regenerate the damaged coral systems. Those with the greatest power protect those without—which is part of the answer for the ecological mind. Flanigan, together with Wolf Hilbertz, the developer of a mineral accretion for growing coral reefs using metal and electricity known as “Biorock”, had to date installed over 400 such coral growing sculptures (Figure 5). These sculptures are mainly located in the National Marine Park of Cancūn, Mexico. A multitude of artists, environmentalists and scientists are working in collaborative projects “rescuing” a wide variety of bugs, bacteria, microbes, plant life and non-human creatures from human inattention, for example, in *The Multispecies Salon* (Kirksey 2014). However, the rescuing and saving biosphere is ultimately the matter of shifting the human anthropocentric perspective from “*what* (nature) depends on *whom*” (humans) to “*who* depends on *what*.”



**Figure 4:** Paul Bush, *While Darwin Sleeps* (2004). Stills from animation, 5 mins. Source: <http://www.paulbushfilms.com/films/whiledarwinsleeps.htm> Video available at <https://www.youtube.com/watch?v=7wAOcSbcUHK>



**Figure 5:** Colleen Flanigan, *Living Sea Sculpture: Contemporary Art as Coral Refuge*, Cancún, Mexico (2011). Source: <http://colleenflanigan.com/lss1.html>

## Arts and the Anthropocene

Art addressing the Anthropocene faces many challenges, which range from critics' accusations of preaching at the audience to fostering hopes (false or not) that environmental activism will save the planet. Both these approaches stem out of the perception that the ruined environment is something to be "rescued", "saved" or "rebooted". Kayla Anderson puts it frankly that "the planet does not need us to save it, we need us to save us from ourselves" (2015, 340).

Exhibitions which target the Anthropocene such as *Yes Naturally: How Art Saves the World*<sup>20</sup> or *Today We Reboot the Planet*<sup>21</sup> might to a degree be summed up, according to Anderson, as being "perhaps too 'strongly affirmative, extraverted, and masculine'" and similar in tone to the "environmental rhetoric Morton critiques his notion of *dark ecology*" (Anderson 2015, 340). She admits that it is not so much art itself presented at these exhibitions, but their framing as "solutions to environmental problems can be found if we are prepared to change our habits: through recycling and new kinds of cooperation we can save the planet" (2015, 339). *The Great Acceleration: Art in the Anthropocene*<sup>22</sup> exhibition curated by Nicolas Bourriaud, however, steps away from these typical instances of cheerleading for and problem fixing of the Earth's environment. It rather offers a melancholy experience on human entrapment within the societal machinery of perpetual production; it is not only ecology that is threatened, says this poignant reflection about our human crisis. By placing seemingly dissimilar artworks such as Po-Chih Huang's *Production Line*<sup>23</sup> (2014) and Henrik Olesen's *A.T* (2012) on the viewers' path, a picture of the Anthropocene emerges as a set/system of capitalist ideas about

20 The Hague, 2013 curated by Stichting Niet Normaal and Ine Gevers.

21 Serpentine Gallery, 2013. Adrián Villar Rojas exhibition.

22 9th Taipei Biennial, Taipei, 2015.

23 Full title is *Production Line: Made in China and Made in Taiwan*.

freedom, identity, progress and success. The problem is that these ideas might just be anthropocentric illusions used to separate humans from ecology ... however, what is encouraging, is that arts are in position to contribute towards restoring critical thinking by asking troublesome, disruptive questions and making intellectual provocations which, according to Scranton in *Learning to die in the Anthropocene* (2015), can tip the scales for human survival.

*My Mushroom Burial Suit* (Figure 6) is such a much needed provocation. It is the title of 2011 TED talk by Jae Rhim Lee in which she proposes an uncomfortable and unorthodox idea for the future disposal of the deceased in especially designed clothes made out of flesh-eating fungus. Her environment-friendly design is scientifically researched to ensure that the lifelong accumulation of toxins in human bodies will be remediated after death by certain fungi's capacity to detox and facilitate decomposition. Projects of this kind are imbued with the sense of fear, but are aligned with the idea of dark ecology where the human discomfort becomes insignificant and indeed necessary. Anderson (2015, 346) says that current discourses about the Anthropocene are "plagued by narratives that are heroic, solutionist and masculinist" and that "critical, conceptual and speculative" artworks are of particular value for "critical and non-instrumental thinking" as they provide us with "platforms for envisioning radical futures."

A vision of what might be ahead, a conceptual speculation is presented by the South African artist Frikkie Eksteen in the installation *Hanging Garden* (Figure 7). Mushrooms, like in the work by Jae Rhim Lee, take precedence over the human-centeredness. In *Hyperobjects*, Morton (2013, loc 178) says "we are no longer able to think history as exclusively human, for the very reason that we are in the Anthropocene" and this is strongly imagined by Eksteen. The installation features a display of framed drawings and paintings invaded by fungi cultures, which are progressively deleting the legibility of the "artworks". The exhaustion of humanism collides with the threat of possible extinction of human life on the planet ... but life will remain in other forms. Unlike Lee's individual human body disposal artwork, this is the possible future of human species looking back at its collective demise. "A free man thinks of death least of all things, and his wisdom is a meditation of life, not death" and the ecological death is furthest from the mind at present. The subject of death was well exhausted since



**Figure 6:** Jae Rhim Lee, *Infinity Burial Project* (2011). Source: <http://awesomewithoutborders.org/grant/525/> Her TED talk is available at [https://www.ted.com/talks/jae\\_rhim\\_lee](https://www.ted.com/talks/jae_rhim_lee)



**Figure 7:** Frikkie Eksteen, *Hanging Garden* (2004). Oyster mushrooms cultivated on charcoal drawings and oil paintings, picture frames, glass, fixed display—room dimensions: 637.5 x 510 x 269 cm. Source: [frikkieeksteen.blogspot.co.za2010/06/hanging-garden-2004.html/](http://frikkieeksteen.blogspot.co.za2010/06/hanging-garden-2004.html/)

modernism and postmodernism—death of God, of author, of place—and is seen as a desire to transcend human material conditions (Morton 2016, loc 207).

## Discussion

This discussion is towards building a case against anthropocentrism and interweaves insights from current scientific knowledge with the responses of artists recognising the Anthropocene.

The critics of neoliberalism, for example Chris Hedges or Noam Chomsky, point to complex and intertwined relationships between economy, politics, media and social values. Quantum technology is on its way to displace binary computing; the traditional view on duality of gender gives way to more fluid conceptions of humans and their sexuality. It is the problematic binary/dual/dichotomy paradigms that are at the core of the divide between humans and their environments, between the humanities and sciences, between disciplines in general. While humanism's supposed primary function was to create an ethical and philosophical sphere for understanding human agency and its values, it de facto also functioned as classification (ranking) system for creating the

ever-increasing gulf between the centrality of the human and satellite-like inconsequence of the non-human. Michel Foucault, Giorgio Agamben, Jacques Derrida and, to some degree Hannah Arendt, remind us of this problem.

Debunking of the hierarchy in humanistic systems comes in waves from both science and philosophy. In philosophy Martin Heidegger expressed doubts about the continuous activity of framing and reframing of humans as demarcated entities and their referential “outside”. Through the concept of *homo sacer*, Agamben (2003) points to the possibility of an unfixated and unpinned/transgressional status of *homo sapiens* individuals within sociopolitical domains. The trajectory of unveiling problems of anthropocentrism is well and systematically traced by Cary Wolfe in *Before the Law: Humans and other Animals in Biopolitical Frame* (2012). In sciences, the de-anthropocentric path famously starts with Charles Darwin’s *Origin of the Species*, and proceeds to Lynn Margulis’s view on cooperative aspect of cellular evolution,<sup>24</sup> Francis Crick’s phylogenetic revolution about the ancestry of genes,<sup>25</sup> and culminates with Frans de Waal’s insights about the evolution of emotions from the field of primate studies.<sup>26</sup> The ideas about the decentralisation of the human position converge from both fields. The philosophical “intuitive” and the scientific “evidential” are perhaps best merged in the frameworks proposed by Bruno Latour (2004) and Murray Gell-Mann (1995).

In *The Tell-Tale Brain*, Vilayanur Ramachandran (2011) demonstrates from the biological, cognitive and neuroscientific angles that humans are special but ... not as special as most of the traditional humanistic approaches would lead us believe. Humans share not only the DNA specifics but similar neural processes are shared among the broader spectrum of primates and other mammals. The efforts to revisit the relationship between humans and animals are not a novelty; Derrida, in the posthumously published *The Animal that therefore I am* (2008), sought a fresh way of thinking about animals and humans, about human “animality” and the increasingly shrinking space animals occupy in the planet’s biosphere. Although Derrida to some extent adopts a biological lens in “looking” at animals, his concerns are more focused on shifting the ontological perspective for the “viewers”. Still, according to Louise Westling (2013, 199), he “clearly opens the way for a necessary turn to the steadily proliferating scientific information about actual animals.” The ability of animals to reason, to deduct, to observe and draw conclusions and even to have a sense of justice, self-awareness, and the spirit of generosity and empathy has been well researched and reported by scientists like Jane Goodall, Dian Fossey, E.O. Wilson (2005) or De Waal. De Waal (2016) notices that the behaviouristic and anthropocentric way humans thought about animals is related to the narratives woven by science itself, which have been modelled on Aristotle’s (384–322

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24 Sagan, L. 1967. “On the Origin of Mitosing Cells.” *Journal of Theoretical Biology*, no. 14, 225-74.

25 Lane, N. 2016. *The Vital Question: Why is Life the Way it is?* Profile Books: London.

26 De Waal F. 2010. *The Age of Empathy: Nature’s Lessons for Kinder Society*. Also see Keyesers C. 2011. *The Empathic Brain* and Damasio A. 2010. *Self comes to Mind*.

BC) *Scala Naturae*; and also to the way animals have been tested for their cognitive abilities.

While many prominent scholars<sup>27</sup> focus on the use of scientific understandings from biology, particularly in relation to narratives, cognition and emotion, others see the cognitive turn and the Anthropocene as an opportunity to revise the human-centred paradigm. Alan Richardson (2010, 141), for example, observes that the “cognitive turn in humanities” enables the posing of new questions and the reopening of old ones. These questions pertain to the embodiment of cognition,<sup>28</sup> the materiality and malleability of the brain, cognition and metacognition. The cognitive sciences show that in terms of operational processes there is not much difference between human and non-human brains; such knowledge can be used to interrogate borders between human and non-human. For example, the issue of self-awareness in animals is well discussed by De Waal in *Are we Smart Enough to Know how Smart Animals are?* (2016). Cognitive turn offers a closer look at the essence of biology and its role in cognition.

In humanities, Mark Turner (2002, 9) sees the “cognitive turn” as an “aspect of a more general cognitive turn taking place in the contemporary study of human beings” and stresses that this “turn”, while continuing to draw its central questions and methodologies from the “humanities as old as classical rhetoric”, aims at “combining old and new, the humanities and the sciences, poetics and cognitive neurobiology.” Its purpose, Turner (2002, 14) claims, is “not to create an academic hybrid but instead to invent a practical, sustainable, intelligible, intellectually coherent paradigm for answering basic and recurring questions about the cognitive instruments of art, language, and literature.” Turner (2002, 9) insists that the implication of the “cognitive turn” is that “we cannot simply go back to literary texts without assimilating what science has discovered about human nature, minds, and behavior over the last half-century, and considering what these discoveries can offer for a first truly comprehensive literary theory” and further that in the midst of the Sixth Extinction it is very urgent.

What is valuable in cognitive sciences is that they include studies of other species and work across anthropocentric boundaries. Looking at culture from such a broad perspective enables fresh insights (Cochran and Harpending 2009). The ability of humans for high end cooperation has been marked as an exceptional cognitive adaptation that lies behind the success of *Homo sapiens* as dominant species (Tomasello 2014). However, cooperation toward a common goal occurs on all levels of biological life and in all spheres of culture. Bonnie Bassler (2008), for instance, who specialises in studying chemical communication and cooperation between bacteria, believes that the primordial cooperation observed in bioluminescent bacteria set the scene for the emergence of cells and cell specialisation leading to complex organisms. Her findings seem to support Margulis’s theory about the behaviour of early cells (Lane 2016). Bassler also argues that human democratic concepts of legislature and quorum are the

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27 See Hogan (2004); Oatley (2011); Kövecses (2005); Hobbs (1990); Boyd (2009).

28 See Lakoff and Johnson (1999).



analogous mechanisms employed by bacteria for decision making that propagate their collective survival.

The transmission of cognition<sup>29</sup> is thought to be one of the causes and one of the outcomes of sociality in the sense of cooperation to solve problems, joint intention, joint social action, social institutions, evolution of cooperative social activities and group responsibility (Tuomela 2007). In humans, even if such behaviours are technologically assisted and therefore enhanced, they remain of the same type. Nevertheless, we share many basic behaviour traits with other mammals (Figure 8). The Capuchin monkeys use nut-crushing rocks as tools and the skills of choosing the best rock for the job are passed on to their peers and across generations; Orca families teach their young hunting behaviour specific to their matrilineal groups—such transfer of skills observable only in certain orca families is not passed on genetically.<sup>30</sup> Culture is conceptualised (Hill 2007) as having three components—socially learned information, morality, and social rituals. Although the first component is reported about some primates, the other two components, morality of the social group and communication as rituals, are not easily proved to exist in non-human species. As Kim Hill (2007, 353) says: “It is unclear (and doubtful) whether any nonhuman species exhibit the second and third components of culture. Until this is established, I believe that it is inappropriate to talk about animal culture.” However, the topic of animal culture is hotly debated and there is a lot of supportive evidence that learning and knowledge in animals can be spread through sociality. This is especially in cases of studies conducted in the natural environments of animals, not in laboratory conditions. A certain consensus among scientists supports a definition of culture as not an end product but rather as a process which involves social transmittance of innovative behaviours. There is increasing reported evidence that justice and ethical behaviour have their roots in non-human mammals (De Waal 2010, 2015).

Currently, the cognitive sciences provide two main insights pertinent to anthropocentrism. Firstly, that humans share many cognitive traits with other mammals, especially primates, and secondly that humans are not as reason oriented as has been previously assumed. In *The Enigma of Reason* (2017) Hugo Mercier and Dan Sperber demonstrate that reason developed in humans not so much for abstract, logical problem solving but for resolving problems emerging from living in collaborative groups. The “intellectual” point of view, according to them, is not as shrewd as a social “interactionist” perspective. This was a useful survival strategy in the early groups of hunter-gatherers where social cohesion was achieved through holding common convictions, beliefs and opinions. Bias is an adaptive behaviour, say Steve Sloman and Philip Fernbach (2017), and the “interactionist” inclination in human reasoning is still very strong. In *Denying to the Grave* Sara Gorman and Jack Gorman cite research which suggests that “people experience a dopamine rush when they process information that supports their

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29 Teaching, learning and passing on of knowledge across generations and peers.

30 See, for example, <http://www.smithsonianmag.com/science-nature/understanding-orca-culture-12494696/>



**Figure 8:** Capuchin monkeys display the selective use of stones to open nuts.

beliefs”.<sup>31</sup> This implies that humans are not only bound to their biology but are attached to the belief system of their groupings.

Lawrence Kraus sees anthropocentrism as a sign of dwelling in a comfort zone; an attachment to beliefs rather than to evidence. “Everything about our evolutionary history has primed our minds to be comfortable with concepts that helped us survive, such as the natural teleological tendency children have to assume objects exist to serve a goal, and the broader tendency to anthropomorphise, to assign agency to lifeless objects, because clearly it is better to mistake an inert object for a threat than a threat for an object” says Kraus (2017, loc 88). He also points out that scientific methods promote non-intuitive ideas about the world and draw us out of the “myopic comfort zone”. That is why artworks by Eksteen and Lee are so successful in addressing the Anthropocene and anthropocentrism.

According to Lisa Zunshine (2010, loc 435) “the contemporary sciences of the mind destabilise the old division between ‘nature’ and ‘nurture’” and result in a diversity of approaches within the “cognitive revolution”, or “cognitive turn”. Francisco Varela (in Varela, Thompson and Rosh 1992) explains that one of the reasons for diversity of those approaches has been brought about by the specific research and funding allocation policies in the United States. His explanation stresses that the access to resources, one of the biological underpinnings of cultural evolution, weights the direction in which culture evolves.

31 See Elisabeth Kolbert's "Why facts don't change our minds?" *New Yorker*, February 27, 2017.

The direction that culture takes us could be the call for a more integrated view of ecology (Morton 2016). Samantha Frost (2016, loc 199) says “a number of scholars have suggested that it is precisely because we have lived and labored under the fantasy of the human that we have wrought such terrible crises on the world”. Rosi Braidotti (2013, 1) announces that “the concept of the human has exploded” and any attempts to re-evaluate it must draw on turning to ecology. This urgency is felt by many scholars: Ron Nixon (2011), Jane Bennett (2010), Latour (2004) are just few examples. Artists too, make their contribution and express what Percy Shelley (2000, 530) said about developments in science: “[W]e want the creative faculty to imagine that which we know; we want the generous impulse to act that which we imagine.”

Artists use the cognitive instruments of art, language and literature to make serious insights about the biological groundings of culture; Davis, Flanigan and Burchell critically address the implications of the materiality and aliveness of ecology, while Eksteen, Lee, Kac and Bush interrogate the anthropocentric paradigm. Artists have always been using technologies for art-making but something different emerges when artists work with science to address ethical grounds: culture can be re-evaluated in relation to biological issues. “In light of these exciting developments” says Barbara Stafford (2007, 1) about cognitive science, and other sciences, “those of us in the humanities and social sciences are being given wonderful new intellectual tools to reimagine everything from autopoiesis to mental imagery”. Alaimo in *Bodily Natures* (2010, loc 112) writes that “concern and wonder converge when the context for ethics becomes not merely social but material—the emergent, ultimately unmappable landscapes of interacting biological, climatic, economic, and political forces.” The recovery of the status of the material, both human and non-human, the biology, the organic and non-organic are called for by numerous researchers, even if coming at a price of the sometimes necessarily “bricolage” state. Matter, for Karen Barad (2007, 151), is “not little bits of nature, or a blank state, surface, or site passively awaiting signification, nor is it an uncontested ground for scientific, feminist, or Marxist theories. Nor is it a fixed support, location, referent, or source of sustainability for discourse.” This offers an immense opportunity to rethink what humanity is or could be when the surrounding world is not seen just as a context to our meaning making. The artworks described depend on science to expose the ecological heritage humans share with nature. They provoke interrogations of the anthropocentric views by drawing attention to the non-human.

## Conclusion

It is inconceivably difficult to think of aeons of time when day to day our present lives have to be micromanaged by the minute. The Earth’s approximate age of 4.54 billion years against our individual lifespan of four score years and five or so, seems pitiable. The fact that, century by century, the technologies of humans have built on each other to give a continuity and comprehensiveness to life, has made mortals feel immortal.

What is more difficult to see are the patterns that underlie what technology seemingly allows humans to have mastery of—the complex diversity of life. However, since the 1920s, it has gradually become possible through science and technology to be aware of these patterns. Nevertheless, the idea that humans are somehow the pinnacle of life is no longer feasible or realistic. In the early twenty first century humans are still attached to the attitude that they can use the planet's life as a resource without paying any price. The famous Gro Brundtland (1987) statement about sustainable development is defined as the “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” and is typical of the human-centred understanding of what the place of *Homo sapiens* is in the scheme of things. If there is a lack of understanding of how all systems on the planet interact and everything is seen only piecemeal, it is inevitable that the incalculably complex systems operating over trillions of years in nature remain hidden.

Cross-disciplinary debates which de-emphasise the centrality of humans as users entitled to the resources of nature are urgently needed in the sciences and the humanities. Then there will be a chance of a future for the planet and a chance for change. Actions such as that of the young Boyan Slat, in devising a boom to clean the oceans of the plastic we have deposited in them to such devastating effect, create a hope that inventiveness, ethical use of technology and the desire to survive well is a concern of younger generations. However, as Morton has observed, it is the recovery or rediscovery of critical thinking that matters the most in facing the Anthropocene.

Art, by calling for modification of human behaviour—such as turning to recycling, lowering of gas emissions and fixing pollution—has an important role in spreading awareness about the Anthropocene. However, the value of art is in broadening perspectives on how we see ourselves as humans as part and parcel of ecology and in accentuating shifts in contemporary thinking about what is to be human and not only human. There is a place for art which exposes that the lack of awareness of our biological and ecological heritage is a very limited and short-sighted paradigm at the end of the second decade of twenty first century. Finally, it is not enough for art to call for stopping pollution; and it might also be not enough for art to offer “perspectives on how the world is and how it could be in light of the Anthropocene” (Anderson 2015, 338). It might be necessary to revisit the past and see the anthropocentric project in opposition to our being liberated.

Questions like “in the face of exploitation, brutality, and impoverishment, shouldn't art address human suffering and struggle” (Davis and Turpin 2015, 3) rather than concern itself with ecology? have been asked because the deep divides between people, nature and ecology were promoted throughout history by the anthropocentric paradigm. Nature has existed before humans and we need to recognise that, as long we are biocultural beings and not robots, our survival depends on nature, not vice versa. There is a scope for exploration how human inequality intersects with the abuse of ecology and how artists address it as an ethical problem.

Apart from obvious benefits of science and humanistic endeavours making a real rapprochement, there is little place for artists to ignore current trends. The benefits include enrichment of knowledge, keeping knowledge contemporary, opportunity to be an artist who has access to knowledge beyond art debates, and moving out of the old specialist style of thinking about art and artists. Body and mind need to be reunited and humans reconnected with their biological legacy and their environments; fields of knowledge are opening to convergence beneath the avalanche which only humans can stem, the Sixth Extinction.

## References

- Adorno, Theodor. "Progress." *The Philosophical Forum* 15.1–2 (Fall–Winter 1983–1984), 55–70 (61–63; 62).
- Agamben, Giorgio. 2003. *The Open: Man and Animal*, translated by Kevin Attell. Stanford: Stanford University Press.
- Alaimo, Stacy. 2010. *Bodily Natures: Science, Environment, and the Material Self*. Kindle edition.
- Anderson, J. 2016. Book Review. *G. Ceballos, A. Ehrlich and P. Erlich. 2015. The annihilation of Nature*. Baltimore: John Hopkins University Press. *Transactions of the Royal Society of South Africa* (in Press).
- Anderson, Kayla. 2015. "Ethics, Ecology, and the Future: Art and Design Face the Anthropocene." *Leonardo* 48 (4): 338–347.
- Barad, Karen. 2007. *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*. London: Duke University Press.
- Barkow, Jerome, Leda Cosmides and John Tooby (eds). 1992. *The Adapted Mind: Evolutionary Psychology and the Generation of Culture*. New York: Oxford University Press.
- Bassler, Bonnie. 2008. *Chemical Communication among Bacteria*. Virginia: American Society for Microbiology.
- Bennet, Jane. 2010. *Vibrant Matter: A Political Ecology of Things*. Durham: Duke University Press.
- Boyd, Brian. 2009. *On the Origin of Stories. Evolution, Cognition and Fiction*. Cambridge: The Belknap Press of Harvard University Press.
- Braidotti, Rosi. 2013. *The Posthuman*. Malden, MA: Polity Press.
- Bratton, Benjamin. 2013. "Some Race Effects on the Post-Anthropocene: On Accelerationist Geopolitical Aesthetics." *E-Flux Journal*, no. 46, June 2013.
- Brundtland, Gro H. (ed.). [O]. 1987. *Our Common Future*. Report of the World Commission on Environment and Development of 20 March 1987. Available at: <http://www.un-documents.net/wced-ocf.htm> (accessed 18 June 2016).

- Carroll, Joseph. 1995. *Evolution and Literary Theory*. Columbia: University of Missouri Press.
- Ceballos, Gerardo, Anne Ehrlich and Paul Ehrlich. 2015. *The Annihilation of Nature; Human Extinction of Birds and Mammals*. Baltimore: John Hopkins University Press.
- Churchland, Paul. 2007. *Neurophilosophy at Work*. Cambridge: Cambridge University Press.
- Cochran, Gregory and Henry Harpending. 2009. *10,000 year Explosion: How Civilisation Accelerated Human Evolution*. New York: Basic Books.
- Crutzen, Paul J. 2002. "Geology of mankind." *Nature*, no. 415, 23.
- Crutzen, Paul J., and John W. Birks. 1982. "The Atmosphere after a Nuclear War: Twilight at Noon." *Ambio*. 11 (2/3): 114–125.
- Crutzen, Paul J., Lax, G., and Reinhart, C. 2013. "Paul Crutzen on the Ozone Hole, Nitrogen Oxides, and the Nobel Prize." An interview. *Angewandte Chemie International Edition* 52 (1): 48–50.
- Damasio, Antonio. 2010. *Self comes to Mind. Constructing the Conscious Brain*. New York: Pantheon.
- Davis, Heather and Etienne Turpin. (eds). 2015. *Art in the Anthropocene*. London: Open Humanities Press
- De Waal, Frans. 2010. *The Age of Empathy. Nature's Lessons for a Kinder Society*. London: Souvenir Press.
- De Waal, Frans. 2015. *The Bonobo and the Atheist: In Search of Humanism among the Primates*. Kindle edition.
- De Waal, Frans. 2016. *Are we Smart enough to Know how Smart Animals are?* Kindle edition.
- Derrida, Jacques. 2008. *The Animal that therefore I am*, translated by David Wills. New York: Fordham University Press.
- Doughty, Christopher, Adam Wolf and Christopher Field. 2010. "Biophysical Feedbacks between the Pleistocene Megafauna Extinction and Climate: The first Human-induced Global Warming?" *Geophysics Research Letter* 37: L15703.
- Ehlers, J., and Gibbard, P. L. (eds). 2004. Quaternary Glaciations: Extent and Chronology 3: Part III: South America, Asia, Africa, Australia, Antarctica. Amsterdam: Elsevier.
- Frost, Samantha. 2016. *Biocultural Creatures: Towards a New Theory of the Human*. Durham: Duke University Press Books. Kindle edition.
- Gell-Mann, Murray. 1995. *The Quark and the Jaguar: Adventures in the Simple and the Complex*. St. Martin's Griffin.
- Grayson, D., and Meltzer, D. 2012. "Clovis Hunting and Large Mammal Extinction: A Critical Review of the Evidence." *Journal of World Prehistory* 16 (4): 313–359.
- Gorman, Sara and Jack Gorman. 2016. *Denying to the Grave: Why We Ignore the Facts that Will Save Us*. Oxford: Oxford University Press.

- Hanson, Robin. 2016. *The Age of Em*. Oxford: Oxford University Press.
- Harari, Yuval N. 2016. *Homo Deus: A Brief history of Tomorrow*. London: Harvill Secker.
- Hill, Kim. 2007. "Evolutionary Biology, Cognitive Adaptations, and Human Culture." In *The Evolution of Mind. Fundamental Questions and Conversations*, edited by Gangestad, Steven W., and Jeffrey A. Simpson. London: Guilford, 348–356.
- Hobbs, Jerry. 1990. *Literature and Cognition*. Centre for studying language and information. USA: The MIT Press.
- Hogan, Patrick C. 2004. *Cognitive Science, Literature and the Arts: A Guide for Humanists*. New York: Routledge.
- Kafka, Franz. 2009. *Metamorphosis*, translated by David Wyllie. Classix Press.
- Keyesers, Christopher. 2011. *The Empathic Brain*. Kindle edition.
- Kuhn, Thomas. 1996. *The Structure of Scientific Revolutions*, 3rd edition. Kindle.
- Kraus, Lawrence M. 2017. *The Greatest Story Ever Told... So Far*. Kindle edition.
- Kirksey, Eben (ed.). 2014. *The Multispecies Salon*. London: Duke University Press.
- Klein, Naomi. 2004. *This Changes Everything: Capitalism vs. the Climate*. USA: Simon & Shuster.
- Kolbert, Elizabeth. 2014. *The Sixth Extinction*. New York: Henry Holt.
- Kolbert, Elizabeth. 2017. "Why facts don't change our minds." *New Yorker*, Feb 27.
- Kövecses Zoltán. 2005. *Metaphor in Culture: Universality and Variation*. Cambridge: Cambridge University Press.
- Kurzweil, Ray. 2006. *The Singularity is Near. When Humans Transcend Biology*. Penguin Books.
- Lakoff, George and Mark Johnson. 1999. *Philosophy in the Flesh: The Embodied Mind and its Challenge to Western Thought*. New York: Basic Books.
- Lane, Nick. 2003. *Oxygen: The Molecule that Made the World*. Oxford: Oxford University Press.
- Lane, Nick. 2016. *The vital Question: Why is Life the Way it is?* London: Profile Books.
- Latour, Bruno. 2004. *Politics of Nature: How to Bring the Sciences into Democracy*. Cambridge: Harvard University Press.
- Lazaridis, Nikolaos. 2007. *Wisdom in Loose Form. The Language of Egyptian and Greek Proverbs in Collections of the Hellenistic and Roman Periods*. Leiden: Brill.
- Leakey, Richard and Roger Lewin. 1996. *The Sixth Extinction. Patterns of Life and the Future of Mankind*. New York: Anchor.

- Lewis-William, James D. 2002. *The Mind in the Cave: Consciousness and the Origins of Art*. London: Thames & Hudson.
- Lewis-Williams, James D. 2004a. "Consciousness, Intelligence and Art: A View of the West European Upper Palaeolithic Transition." In *New Perspectives on Prehistoric Art: a View of the West European Middle to Upper Palaeolithic Transition*, edited by G. Berghaus. Westport: Praeger.
- Lewis-Williams, James D. 2004b. *San Spirituality: Roots, Expression and Social Consequences*. London: David G. Pearce.
- Mercier, Hugo and Dan Sperber. 2017. *The Reason Enigma*. Harvard: Harvard University Press. Kindle edition.
- Morton, Timothy. 2010. *The Ecological Thought*. Cambridge: Harvard University Press.
- Morton, Timothy. 2013. *Hyperobjects*. Minneapolis: University of Minnesota Press.
- Morton, Timothy. 2016. *Dark Ecology*. New York: Columbia University Press.
- Nixon, Ron. 2011. *Slow Violence and the Environmentalism of the Poor*. Cambridge: Harvard University Press.
- Oatley, Keith. 2011. *Such Stuff as Dreams. The Psychology of Fiction*. Chichester: Wiley-Blackwell.
- Parikka, Jussi. 2014. *The Anthroscene*. Minneapolis: University of Minnesota Press.
- Pinker, Steven. 2007. *The Stuff of Thought. Language as a Window into Human Nature*. USA: Viking.
- Ramachandran, Vilayanur. 2011. *The Tell-Tale Brain: Unlocking the Mystery of Human Nature*. London: William Heinemann.
- Randall, Lisa. 2016. *Dark Matter and the Dinosaurs*. Kindle edition.
- Richardson, Alan. 2010. *The Neural Sublime*. Baltimore: The John Hopkins University Press.
- Rossano, Matt. 2009. "Ritual Behavior and the Origins of Modern Cognition." *Cambridge Archeological Journal*, 19 (2): 243–256.
- Sagan, Lynn. 1967. On the Origin of Mitosing Cells. *Journal of Theoretical Biology*, no. 14, 225–74.
- Scranton, Roy. 2015. *Learning to Die in the Anthropocene*. San Francisco: City Light Books.
- Shelley, Percy. 2000. *A Defence of Poetry, in Shelley's Poetry and Prose*, edited by Donald Reiman and Neil Fraistat, New York: Norton.
- Slooman, Steve and Philip Fernbach. 2017. *The Knowledge Illusion: Why We Never Think Alone*. New York: Riverhead Books.
- Sperber, Dan. 1996. *Explaining Culture: A Naturalistic Approach*. Oxford: Blackwell Publishers.
- Spinoza, Baruch. 1665. *Ethics*, IV. 67. <http://www.earlymoderntexts.com/assets/pdfs/spinoza1665.pdf>



- Stafford, Barbara. 2007. *Echo Objects: The Cognitive Work of Images*. Chicago: University of Chicago Press.
- Steffen, Will, Jaques Grinevald, Paul Crutzen and John McNeill. 2011. "The Anthropocene: Conceptual and Historical Perspectives." *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 369 (1938): 842–867.
- Steffen, Will, Wendy Broadgate, Lisa Deutsch, Owen Gaffney and Cornelia Ludwig. 2015. "The Trajectory of the Anthropocene: The great Acceleration." *The Anthropocene Review* 2 (1): 81–98.
- Storey, John. 1996. *Cultural Studies and the Study of Popular Cultures: Theories and Methods*. USA: University of Georgia Press.
- Tomasello, Michael. 2014. *A Natural History of Human Thinking*. Cambridge: Harvard University Press. Kindle edition.
- Tuomela, Raimo. 2007. *The Philosophy of Sociality: The Shared Point of View*. Oxford: Oxford University Press.
- Turner, Mark. 2002. The Cognitive Study of Art, Language and Literature. *Poetics Today* 23 9 (1): 9–20.
- UNDP [O]. 2011. Millennium Development Goals. Available at: <http://www.undp.org/mdg/basics>.
- Varela, Francisco, Eleanor Thompson and Evan Rosh. eds. 1992. *The Embodied Mind*. Cambridge: MIT Press.
- Von Uexküll, Jakob. 2010. *A Foray into the Worlds of Animals and Humans: With a Theory of Meaning*, translated by Joseph D O'Neil. Minneapolis: University of Minnesota Press.
- Walker, Mike, Sigfus Johnsen, Sune Olander Rasmussen, Trevor Popp, Jörgen-Peder Steffensen, Phil Gibbard, Wim Hoek, John Lowe, John Andrews, Svante Björck, Les C. Cwynar, Konrad Hughen, Peter Kershaw, Bernd Kromer, Thomas Litt, David Lowe, Takeshi Nakagawa, Rewi Newnham and Jakob Schwander. 2009. "Formal definition and dating of the GSSP (Global Stratotype Section and Point) for the Base of the Holocene using the Greenland NGRIP Ice Core, and Selected Auxiliary Records." *Journal of Quaternary Science* 24: 3–17.
- Waters, C., Zalasiewicz, J., Summerhayes, C., Barnosky, A., Poirier, C., Gahuszka, A., Cearreta, A., Edgeworth, M., and Erle, C. 2016. "The Anthropocene is functionally and stratigraphically distinct from the Holocene". *Science* 351 (6269): 262.
- Westling, Louise. 2013. "Still Anthropocentric." *New Formations: A Journal of Culture/Theory/Politics* 78: 198–201 (Review).
- Wilson, Edward O. 2005. "Foreword from the Scientific Side." In *The Literary Animal: Evolution and the Nature of Narrative*, edited by Jonathan Gottschall and David Sloan Wilson. Illinois: North Western University Press, vi–xii.
- Wilson, Edward O. 2016. *Half Earth: Our Planet's Fight for Life*. New York: Liveright Publishing.
- Wolfe, Cary. 2003. *Animal Rites*. Chicago: University of Chicago Press.

Wolfe, Cary. 2012. *Before the Law: Humans and other Animals in Biopolitical Frame*. Chicago: University of Chicago Press.

Wright, Robert. 2009. *The Evolution of God*. New York: Little, Brown & Co.

Wright, John. 2014. *The Naming of the Shrew: A Curious History of Latin Names*. London: Bloomsbury.

Zalasiewicz, Jan, Mark Williams, Will Steffen and Paul Crutzen. 2010. "The Anthropocene, following the lost world of the Holocene, holds challenges for both science and society." *Environment, Science and Technology* 44 (7): 2228–2231.

Zunshine, Lisa. 2010. *Introduction to Cognitive Cultural Studies*. Kindle edition.